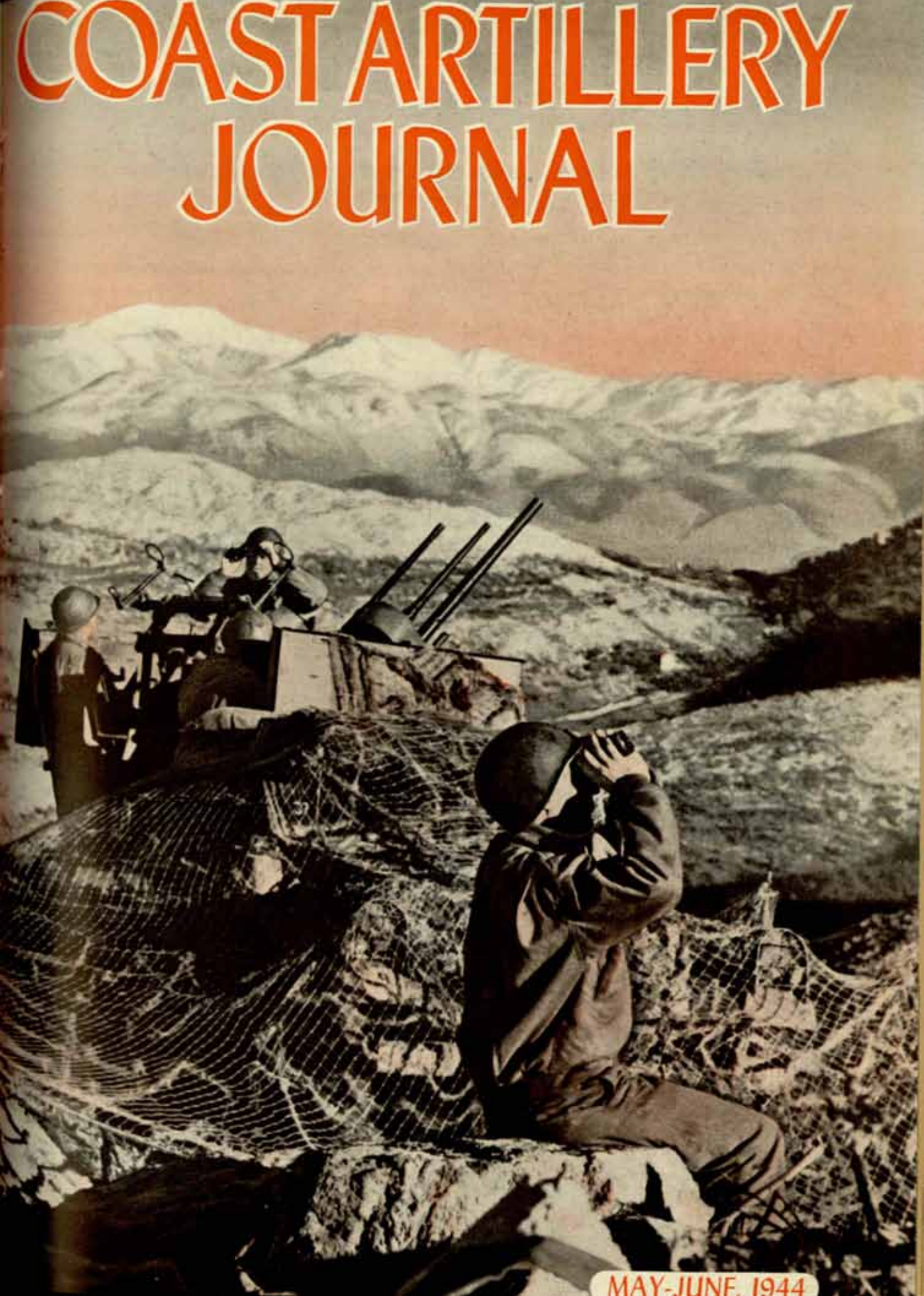
COAST ARTILLERY JOURNAL



MAY-JUNE, 1944

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The Versatile "90"

By Major James S. Metcalfe, Field Artillery

WITH THE FIFTH ARMY, ITALY—During questioning by a Fifth Army interrogator, a German prisoner, still dazed from the shock of battle, confessed his fear of American artillery.

About that same time, an American fighter-bomber pilot reported negligible flak over a front-line target which had been heavily protected by German antiaircraft fire the previous day. Both men were unwittingly paying tribute to the 90mm antiaircraft gun of the Coast Artillery which had suddenly been cast in a new rôle, that of field artillery.

The use of antiaircraft weapons as field artillery is not a new development. The British employed them in that manner at Tobruk and the Americans did likewise at Bataan. The Fifth Army in Italy, however, has pioneered a completely different approach to the utilization of AA gun batteries as a supporting weapon against terrestrial targets. The fire of these gun batteries has been integrated with the fire plan of field artillery battalions, both by survey and communications, so that the field artillery has been able to avail itself of a long-range, rapid firing, extremely accurate weapon.

In developing a standing operating procedure for the use of 90mm guns as field artillery, the Fifth Army Antiaircraft Section has not forgotten that the weapon's primary function is to afford protection from hostile air. Conditions in the Italian campaign, however, have permitted its dual-purpose employment without trespass upon its principal use.

Our field artillery is high on the list of the Luftwaffe's priority targets. It follows as a natural corollary that antiaircraft weapons will normally be adjacent to field artillery position areas. This has made it possible to tie in the 90mm batteries with neighboring howitzer or gun battalions. In this connection, the 90mm guns work through battery fire direction centers, a high volume of fire making a 90mm gun battery roughly equivalent to a field artillery battalion.

Survey is done by the corps artillery brigade and wire the usual means of communication. Observation may by grasshopper plane, terrestrial OP's and forward servers. Fire is conducted by conventional field artill means, but the fork and not the "C" is habitually us Firing tables for the 90 were received shortly after the lerno landing and have greatly facilitated the weapon's on ground targets. Although gunnery technique is genera that of field artillery, the M9 director is often used to vantage. Meteorological data is obtained both from the metro section and also from the corps metro units.

Field artillery officers have welcomed the 90mm gun "distinguished guest" among their own organic weapo Proclaiming it superior to the German vaunted 88, t have given it the soubriquet of "Baby Long Tom."

With 360-degree traverse, high velocity, long range, exceedingly rapid rate of fire, the 90 has already piled some enviable records. On one occasion, firing at a ra of 17,900 yards, it scored 13 hits and 18 near misses o bridge.

Recently, a 90mm gun battery was given the mission placing harassing fire on a bivouac area from 1200 ho to 1800 hours. During the execution of the mission, a hos aircraft approached the battery position. Reverting to antiaircraft rôle, the 90's switched to the air target, l resuming their harassing fire. The interruption placed battery behind schedule but its rapid rate of fire enab it to catch up with hardly any delay. An enthusiastic f artillery officer, expressing his approval at this incid which he had witnessed, remarked, "the ninety is a bea ful artillery piece."

Hostile air attacks have been relatively few on the F Army's main front since the Salerno landing. Antiairc batteries, frequently emplaced close to the forward li have often been subjected to German shell fire. Now

NG FRONTS

ey can successfully turn their own weapons upon the foe fire effective counterbattery missions, the morale of gun ews has gone up considerably.

Conversely, it has had a shattering morale effect upon e enemy. Prisoners, describing its explosive effect as *Lautsch-Boom,*" complain that there is no warning whistle, erely the blast of the projectile. A concentration of 90's n be delivered in volume without loss of surprise. Firing the Italian town of Atina, the 90mm gun battery had ty-eight rounds in the air before the first volley landed. Within one hundred seconds after "commence fire," all ty-eight rounds had hit the target.

The versatile 90 has already been used on harassing, interdiction, neutralization, destruction, and counterbattery missions with good effect. One of its most successful applications has been that of counter-antiaircraft battery. It has actually neutralized enemy antiaircraft batteries during attack missions in the front area by our planes; it has also forced such batteries to displace.

The Fifth Army Antiaircraft Section is stressing the employment of 90mm guns on field artillery missions. To this end, various techniques are being studied, and SOP's are being written on the basis of facts learned from experience. It is constantly stressed, however, that the weapon's primary employment must never be subordinated to any other use.

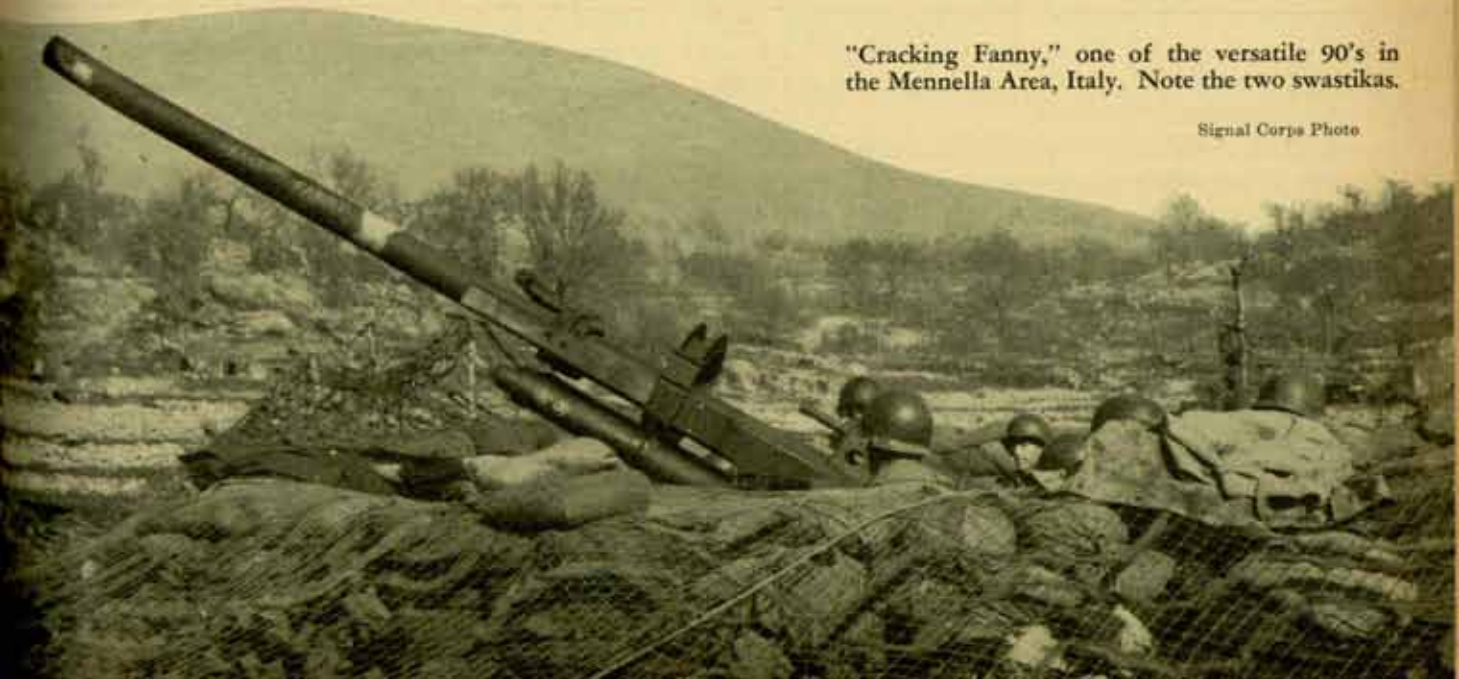
Ack-Ack at Anzio

By Lieutenant John L. Mullin, Coast Artillery Corps

ANZIO BEACHHEAD—Crammed with TNT, blood d fighting men and women this little Allied colony has come one of the hottest spots on earth.

It measures only some fourteen miles in length by about ven in depth but its ninety-odd square miles of flat and mile farmlands have taken some of this war's greatest conentrations of fire and assault. Every square inch of it is vulnerable to enemy fire. A ring of Kraut-held hills looks down on the fighting line and on the twin resort towns. German observers hidden on those heights place shells in the harbor, in the streets and can place one in the living room of any residence you name.

Here's the story of Ack-Ack at Anzio. It's a pretty stirring story, a story to fill the men of the AA with pride. It's a story of men . . . of men who stuck to their guns through terrible strain and fatigue, of men who stuck it out and



"Cracking Fanny," one of the versatile 90's in the Mennella Area, Italy. Note the two swastikas.

Signal Corps Photo

beat the Luftwaffe. It's a story of a weapon, a weapon originally designed for defense, that pitched in at the critical time with the Air Corps, Infantry and Field Artillery and in general won the complete respect of all services it protected here at Anzio. From D day (January 22) to April 2, AA fire has destroyed 157 planes and probably destroyed 100. Better than two planes destroyed daily.

There were anxious days here at Anzio. No one ever entertained any idea of being pushed into the sea, but there were days and nights when we thought that we were to be truly punished by a desperate Luftwaffe—battered, but still potent.

The Port of Anzio is small, concentrated, within easy reach of enemy fighter and bomber fields. The enemy on three sides, the sea on the other—that is the picture here at Anzio.

The real battle to reduce the beachhead began at 0630A 16 February. It was planned as a battle of annihilation—a determined and well-planned effort to destroy the British and American forces. Kesselring threw in elements of six divisions, including the crack 26th Panzer Division. It was to be a master political stroke. Wipe out the beachhead and Nazi prestige, withered and dying in the Balkans, would flower again. PW's said the Fuehrer had ordered it. It must have been. It must have been the paperhanger from Berchtesgaden who ran the show because the losses suffered by the enemy in the air alone were all out of proportion to the gains. Beginning 15 February shortly after midnight, mustering the strongest consistent attacking force yet seen in the Italian theater for seven consecutive days and nights, the Luftwaffe trying every known trick, and using everything from fighters to heavy bombers struck again and again at the Port of Anzio and generally plied its trade all over the beachhead.

All this was part of Germany's desperate effort to drive us into the sea. Propaganda leaflets showered the front, showed Father Neptune with pitchfork chuckling at the seabottom at Anzio saying, "Wow, what a haul!"

What a haul is right—what a haul for the AA! The enemy suffered heavily for his effort. In those seven days, he lost twenty-five planes which were seen to crash and burn and twenty-three more which are listed as probably destroyed—at the least, seriously damaged.

Let's look at the enemy's plan. It was simple—that is the strategy of the whole thing was simple. He figured if he could destroy our shipping, knock out the port installations, completely disrupt communications, that gradually we'd run out of food. That gradually the infantry and artillery wouldn't have anything left to shoot. Well, here is how he tried it. Then, we'll tell you how we did it!

Came the Luftwaffe

Just after "D" day the raids were typical, the tactics simple, the plan very old. Aircraft would strike out of the sun, preferably in the early morning or late afternoon, hoping to catch the AA defense asleep. The enemy would strike from a variety of angles and altitudes simultaneously. Principally, they were sneak raids—hit and run jobs where if you miss on the first try, you keep on going, come back another time, hoping that the AA will be caught napping. The gunners, experienced in Tunisia, Sicily, Salerno, waited. Planes came. Not so many left.

The enemy was getting nowhere rapidly. Seven days had gone by. The supplies poured into the Port. Then, on the night of 29 January, calling upon the Luftwaffe strength in southern France and northern Italy he sent 60 aircraft, Ju 88's—Do 217's, the largest concentration ever assembled in this theater, to smash the shipping at Anzio. Nine millimeter fire caught the formation far out at sea, forcing the aircraft to strike in single harassing attacks, and succeeded in destroying five.

That night when the score was taken the German Air Force had raided the beachhead fifty-three times in seven days! Our score for the seven days from 22 January to 29 January was thirty-eight planes destroyed, ten probably knocked down.

For the next two weeks up to 15 February, the enemy continued to hammer the port and beachhead. This was the same group who recklessly bombed and blasted the Allied defense of Crete into submission. The Herrenvolk were cautious. The hit-and-run race continued. In this period AA fire again destroyed thirty-nine enemy planes. Our total soared to sixty-eight planes destroyed—sixty-eight planes which were seen to crash. Our damage was slight in transport, material and personnel. The shipping still unloaded smoothly. The supplies poured into the port and over the beaches by the thousands of tons, greatly exceeding all prior estimation. We were winning.

Carroceto Offensive

Came the concerted drive south from Carroceto on the 16th. Everything the *Luftwaffe* could beg, borrow or steal came down to support the operation. PW's said it was not bad. Der Fuehrer said we would be gone in a couple of days, said we were already embarking in ships. Flights of thirty-five to forty fighter-bombers ranged over the area practically all night for several nights during the period. Again, every form of deception was practiced. Flares were dropped on AA positions. The fighter-bombers could look down and see the crews working furiously in the open pits. Timed with the air attack, long-range heavy-caliber projectiles, 170's, 210's, crashed into the port area, splattering the AA in the open pits with shrapnel. More flares and still more flares came down, turned the port area into day. Fighters, recklessly closing in for the kill, strafed, rained anti-personnel, high-explosive bombs all over the place. This was the test. The heat was on.

Morning—and they struck again. This time they were cautious, coming in swiftly to attack and then swiftly turning to run before our fighters spotted them. Bombed, shelled, strafed, the AA stood firm—stood firm through eighty-nine consecutive attacks! This brought the total number of raids to 178! In seven days we knocked down twenty-five more planes to bring the total number of aircraft shot down here since the landing to the grand total of 102!

The days rolled by. The tempo of enemy air activity fluctuated, then again began to follow definite pattern. Three days out of seven, between 0636A-0700A, the Luftwaffe struck in large force at the Port. Based on the aircraft which actually attacked, not counting those which

...med aloft as fighter cover, AA fire in the morning raids ...e destroyed approximately thirty per cent of the force! ...e attacks were not continued.

Here are some interesting figures on night raids.

On every occasion that the enemy has employed eight or ...e planes he has lost at least one plane destroyed and in ...e cases thirty to forty-five per cent losses in destroyed ...craft in a single raiding force.

Ack-Ack Plus Fighter Cover

So far this report has contained itself with AA alone. AA ...Anzio has no intention of grabbing full credit for the ...truction of German aircraft over the beachhead. The ...Corps has done more than its share. Best thing that ...can say is that without fighter cover we'd be swamped ...without the infantry we'd probably be swimming. But, ...thout adequate AA protection, the enemy could bomb al...st at will and reduce Anzio and Nettuno to rubble. The ...and Air Corps work as a team. By day, P-40's, Spitfires ...Mustangs roam overhead, herding the supply convoys ...port. By night the stealthy Beaufighters strike in the ...k against the German prey. Many a time during a night, ...th a score of 90mm guns on target waiting for the hapless ...der to come within range, suddenly deep underground ...radio will crackle in the Sector Operations Room, "Hold ...e will you chaps—hold fire, I'm on his tail and just about ...get him" and a Beaufighter pilot stalking his game is al...wed to finish his work.

There is no friction here, no conflict over claims for de...oyed planes. A Beaufighter over Rome the other night ...fired to base: "Ju 88 just blew up in my sights—did not ...a burst. Am certain Ack-Ack got plane over Anzio."

Yesterday a ME 109 crashed south of Cisterna—we ...didn't fire a round at it. Later a Spitfire pilot asked us if we ...uld confirm his victory. The Ack-Ack confirmed it.

Both services hold each other in high esteem.

Early Warning

An early warning system, vital to any AA defense, is per...ted to a fine degree at Anzio. Striking from every possible ...gle, from almost water-level to 15,000 feet, employing ...ery known type of attack from straight running torpedos ...glider bombs, the enemy has tried and failed to fathom ...e defense.

Barrage fire is used as a last resort, only if the raiders break through over the harbor. Heavy AA never fires barrage. Every time a 90mm gun opens fire, it is firing on a target.

This high degree of fire control here has helped to solve one of the serious problems of Army G-4 ammunition. Everything travels by boat, hence supplies are limited. Were the defense based on barrage alone, considering the number of raids, and the tactics used by the raiders, the ammunition expenditure would be tremendous.

AA as Field Artillery

During the enemy Carroceto offensive practically every gun on the beachhead pitched in to smash the attack with artillery fire. The 90mm gun proved to be particularly valuable with air burst against enemy infantry concentrations. Field Artillery staff officers greatly impressed with reports from their own OP's of the effectiveness of its fire termed it one of the best they had for the type of work. In one engagement 90mm guns fired 1442 rounds in thirty-five minutes and helped smother a strong enemy infantry formation.

The Proof

It is significant that as this is being written the German Air Force has the immediate strength to strike at the Port in strength. That he has not and has almost completely abandoned his large-scale night attacks is certainly one of the proofs of the pudding. However, perhaps the most significant feature is that in the past three weeks, of some 148 aircraft which have attempted to raid the harbor, only a handful have ever gotten close enough to drop their bombs on the shipping. In nearly all cases heavy flak has caught the raiders at extreme range and turned them back! This is one of the crowning achievements here. The majority of aircraft destroyed at night have been caught by heavy flak before they ever came close to the harbor.

Therefore from the results already gained by AA we can assume: that without near-perfect fire-control at night the Luftwaffe would have seriously punished Anzio Port; that AA fire as well as fighter cover has cut the German Air Force strength in this theater so much that the enemy has been forced to abandon both large-scale night and day raids and to resort to less costly almost futile harassing attacks by single raiders.

Both Ends of the Tracer Stream

By Lieutenant Colonel Charles S. Vance, Coast Artillery Corps

"Both ends of the tracer stream," is a phrase that takes ...new meaning now, after having had intimate associ...n with it from its beginning to its end. We speak of ...e "burst" very casually on the ground, but to the boys ...the air it has a more somber meaning.

Several years ago when talking to Air Corps officers about ...aircraft artillery they were asked what tactics they in...ded to use to counter AA fire. Most of them would ...gh and say, "Nothing, you can't hit anything." It is different now when the same question is asked. Since entering the North African Theater in November, 1942, I have found that the situation is reversed, with Air Corps officers asking "What tactics can I use to keep from being hit?"

Upon visiting the headquarters of a certain bombardment group which had been flying missions over Italy and Southern France where they found flak to be intense, I was asked by the commanding officer to give a lecture to

his officers on the tactics and capabilities of antiaircraft artillery. A lecture on American tactics and capabilities could have been easily prepared, but I was not sure about the German methods, and wanted more first hand information. I had utilized many previous opportunities to study German AA material that I found on Cap Bon (east of Tunis) immediately after the Axis surrender, and later in Sicily. When making reconnaissances for the AW Battalion which I command for positions in Tunisia and Sicily around airfields and bridges I had the opportunity to study the German tactics by locating former German gun positions. From Italian officers I have been able to secure additional information concerning German matériel and tactics.

To get the wanted and needed first-hand information to prepare the lecture, it would be necessary to accompany the bombardment group on a combat mission. I wanted my discussion to cover the capabilities of the famous 88's and their employment by the Germans.

One bright sunny morning when there was only about two-tenths cloud cover I went to the group headquarters and made arrangements to accompany them wherever they might go.

At the briefing of the pilots I learned that we were to go to southern France. The target was a certain viaduct carrying the main line railway to Italy. The viaduct was approximately 500 feet long and 350 feet high. If it could be destroyed the German supply line to the Fifth Army front would be cut for some time, as repairs could not easily be made. I also learned that a V flight would be the formation used with the leading flight at 12,000 feet altitude.

The group commander gave me a water-proof package containing chewing gum, malted milk tablets, a small compass, a rubber bag for drinking water, stimulating drugs, caramel and a book of matches. "These," he said "put in your pockets so you will have them with you if you have to bail out." Bail out! I had not thought about that before. War has strange effects on a man. Those that are in it do not think "they" will be hurt. Well, I had no intention of bailing out over Axis held territory—I intended to get back with information.

The group commander and I got into a command and reconnaissance car and were driven to the plane in which I was to ride. The plane was ready and waiting with motors idling. I climbed in and was given a parachute, "Mae West," and a box of K rations. The group commander had directed that an astrodome be installed in the plane for my use. The astrodome is made of flexiglass and when in place resembles a top gun turret. By having the use of the astrodome I would have a very good field of view.

Just as I began to adjust the parachute harness and put on the Mae West, the plane started taxiing toward the end of the runway. Other planes in the group ahead of us were already thundering down the runway. These are "hot" ships and require extra long runways, in order to attain the required speed to make them airborne.

We were at the end of the runway. The motors were gunned until I thought surely they would fly apart, but with the brakes set we did not move an inch; it was just the last minute precaution to be certain that the motors were working perfectly. Over the radio I heard the control tower give the order to take off. I was sitting in the navigator's chair, with an air speed indicator and altimeter directly before me. The plane was loaded with six 500 pound bombs and carried seven men. The motors were gunned again and we were off. The air speed indicator hand began to flicker as though it could not register speed fast enough—other planes along the side of the runway were just a blur—we were plunging down the runway at a speed of well over a hundred miles an hour—we were airborne.

The plane was tipping from side to side, struggling to right itself with its heavy load. We were flying evenly, gaining altitude and maneuvering to get into our position in the formation. We circled the field twice while all thirty-six planes were completing the formation at five thousand feet altitude. The group headed up the valley in which the airfield is located, carrying 320 tons of death in the bellies of those flying monsters.

The antiaircraft artillery positions located around our airfield could not be spotted from above two thousand feet, except for one gun which had a fresh coat of red lead.

Soon we were out over the Mediterranean, and changed to a course slightly west of north. We continued to gain altitude until the plane I was in was flying at 11,000 feet. The sea glistened like silver, with many dark spots caused by the thickening clouds beneath us. All indications pointed toward a complete overcast before we would reach the target. With a bright sun shining on the tops of the clouds they resembled mountains blanketed with snow. With the heavy billowing cloud bank below us, which at times completely obscured the view of the sea, and only the clear blue space above us, the formation looked like a flock of pigeons flying off to one of Buck Rogers' planets. We were in a compact formation as a protection against fighters—so compact it looked as if a man could jump from wing tip to wing tip of adjacent planes.

I was standing just behind the pilot, after riding nearly three hours, when he asked, "Colonel, do you see land?" I admitted that I did not. All I could see were clouds that looked like snow-blanketed mountains. In just a few minutes the clouds below and in front of us disappeared and at a position in the direction of two o'clock there appeared the Alps—real mountains and with a real blanket of snow. They had appeared to be a part of the cloud bank and I had been unable to distinguish between the resemblance and the real thing. The unfolding picture was most spectacular, like the water colors by great artists. The tall stately Alps covered with a sparkling and smooth snow blanket; the various hues of green vegetation below the snow line dotted with summer homes and farm houses; two cities nestling at the foot of the Alps, with their extravagant hotels that make the Riviera famous and their ports filled with fishing fleets now idle; connected by a curving picturesque highway hugging the mountains intimately as if afraid of slipping into the beautiful blue waters of the Mediterranean.

There were only a few minutes remaining to think of things foreign to war and to look at such seemingly beautiful scenes as those on display before it was time to start on the bomb run. I went back to the radio compartment and stood up with my head in the astrodome so I could get

ood view of the target and the things that were to happen here. I put on my steel helmet to give me some protection gainst flak, but it greatly decreased my field of view, so I dropped it down in the aisle. I had my camera ready to get ome pictures of flak, and fighters if they should appear. I was not disappointed, for soon after starting the bomb run black and ugly bursts of smoke appeared directly above the leading planes and about two hundred yards high. From nformation received before starting we knew we were running into one battery of two guns and one battery of four guns, both 88mm antiaircraft batteries. The German batteries must have opened fire at the extreme range for the altitude at which we were flying, because the first burst appeared early during the bomb run. Firing continued until we were well away from the target.

Twelve to fifteen bursts had appeared about 200 yards high before an altitude correction put in by Jerry took effect and the squadron just ahead of us appeared to be wrapped up in smoke. My mind was fully occupied in taking pictures of the flak bursts ahead when suddenly three large black bursts with red cores appeared between the plane I was in and the one on the port side. Since our formation was compact the burst could not have been more than fifty yards away. Had the bursts been farther away they would surely have severely damaged the plane on the port side, but it flew along as though nothing had happened. When the three bursts appeared I heard no sound, and would not have known they had occurred if they had not caught my eye. The air was a little rough and the plane was bouncing some, and due to those factors I do not know whether or not the shock of the burst was the cause of some of the bouncing. I estimate that during the time the 88's were firing there were 300 to 350 rounds fired with perfect altitude, except for the first twelve or fifteen.

Although there was a German fighter airfield within twenty minutes flying time of the target, we had no fighter escort. At the start of our bomb run we saw three German fighters about three thousand yards away and off to our right, but they made no effort to close. I saw them for only a few seconds as I was fully occupied in watching the target and trying to locate the German AA batteries. Since then I have often wondered if the fighter planes were sending altitude corrections to the AA batteries. I have talked to several pilots who claim they have seen the same thing happen often.

For a minute before the planes reached the bomb run they followed a weaving course, but followed a straight and constant altitude course for a few seconds on the bomb run until the bomb release line was reached. It was a pleasant sound to hear "Bombs Away" over the radio, and much satisfaction to look backward and down to see the bombs explode with billowing smoke and flying debris around a vital link in Hitler's line of communication. Immediately after releasing the bombs, all planes took evasive action.

Jerry's choice of gun sites from which to provide AA protection for the viaduct was severely limited due to the mountainous terrain. However, the four-gun 88mm battery was ideally located about 2500 yards away from the viaduct and on its extended center line, on the top of a small hill. I easily located this battery by its flash and smoke, but did not locate the two-gun battery. Jerry's tactics since the start of the Italian campaign is to defend heavily pin point targets. One feature that was noted during the time we were over the target would have been very interesting to antiaircraft men in this theater, and that was the very poor fire discipline on the part of the Germans manning automatic weapons. Regardless of range and altitude they threw up at us everything that would shoot. I noticed hundreds of bursts many yards below us. Range estimation is about the most difficult thing to teach our automatic weapons personnel, and proficiency requires continual supervised practice. From the show Jerry gave us, he is

Unloading at Anzio.

having the same difficulty. Because of the large number of sorties that the Allied Air Force is flying over Italy, France and Germany at present, Jerry is getting the amount of shooting that is the antiaircraftmen's dream, so he should not have itchy trigger fingers.

Luckily the plane I was in did not get hit by flak, but some of the others did. Some were lost and there were casualties in some of the planes that returned, Germany's ack-ack gunners were more accurate than they were even six months ago.

We left the target a complete wreck. It will require many months for the Germans to replace it. I know the country in that area well, having spent several week's leave there in 1919. Even though it gave me considerable satisfaction to see anything done to hinder the German plans, it did seem a shame to destroy beautiful places.

During the trip back, which was uneventful, my time was occupied for awhile by eating a dinner of "K" rations and listening to some very beautiful music over the radio, from a German station. Hitler might have said, "Such crust, bomb my structures and go away entertained by my music!"

Before reaching "home" my mind was also occupied with the information I had gained on this mission about the German antiaircraft tactics and weapon characteristics. As far as this particular target was concerned, the German tactical location of heavy AA batteries about a pin-point target was about the same as ours.

From subsequent missions by the same group over another pin-point target the above statement has more weight. Applying American AA tactics, I indicated on an aerial photograph of the area in the vicinity of the target the probable locations of two heavy AA batteries. The batteries were actually there when the group arrived over the target. Photographs were taken as the group went over the target and two batteries were shown within two hundred yards of the points I thought they would be and had indicated on the earlier photograph. I suspected Jerry would have two batteries there but he fooled me—he had four, one of which contained six 88's. One of the additional two was located where an American commander would have placed it but one was drawn in closer to the bridge than we would have located it even for protection against dive bombers.

From a characteristic view point I do not believe the danger area of the 88mm burst is as extensive as some of our manuals state. I was looking right down the muzzle of the 88's and their rate of fire seems to be slower than our 90mm rate.

The bomb run took us directly over the battery, and at maximum range of the guns where their angle of elevation was not excessive, the rate of fire did not seem to be over twelve rounds per minute.

We arrived "home" in the same length of time that it took to reach the target, circled the field twice, peeled off and started landing just a few yards apart at a speed that would cause a traffic cop to have a case of the jitters. We taxied to our place on the field and after I was on the ground and talking to the crew I learned that my first combat mission was also the first combat mission for the pilot of the plane.

Self-Propelled AAA in Amphibious Operations

By Major Francis J. Roddy, Coast Artillery Corps

At all times, and especially in time of war, there is much discussion among soldiers concerning the uses and merits of the different types of weapons. No group of officers is more concerned in these discussions than the officers of the Antiaircraft Artillery, which has undergone such rapid and radical change. A great deal can be learned from discussion and study, but certainty can be obtained only by experience. Changes in design and method of employment of antiaircraft Artillery have been so rapid that many officers are, through no fault of their own, in a position never contemplated for an officer. Instead of being perfectly familiar with all weapons of his arm, the officer of today too often knows well only the weapons with which his organization is equipped. In addition, as time and opportunity permit, he has partial knowledge of other equipment through reading, discussion, and hurried inspections. This partial knowledge of existing equipment limits the capacity of the officer to make intelligent decisions as to the best equipment for a particular operation.

Our battalion has taken part in amphibious operations with the 40mm Bofors and self-propelled and half-track mounts. We think, therefore, that we may be able to make a contribution to the general pool of information on at least this phase of a many-sided problem. What kind of light AA equipment should be used in amphibious operations? We answer emphatically, the self-propelled half track!

In the landing in Sicily the 40mm Bofors was used. The 40mm gun is an excellent gun, superior in many respects to the 37mm gun, but no gun, even the best, is worth having if gun, crew and ammunition cannot be at the proper place at the proper time. This was our experience in Italian operations.

Loading space on the ships is always limited, consequently the number of prime movers is limited and this,

…limits the load of ammunition and equipment. This …ation of space sets in force a string of events that can …d to chaos. Guns came ashore without crews and ammu…ion and no prime mover to haul them into position. …Ducks" and "Cats" are requisitioned but they are very …y performing their mission of making roads and unload…g supplies and there never are as many of them as you …nt or think you need.

Our battalion landed on the shores of Sicily as part of a …nforced Infantry Division. Two batteries landed north …f the town of Scoglitti and two landed southeast of the …wn. The .50 caliber machine guns landed in the third …ve and were manhandled through the surf and into po…tions. This equipment included the mount, M2; gun; …ater chest and hose; a five gallon water can; and the am…unition. The landing craft must be unloaded quickly so …ey can pull right out and clear the beach for other craft …ming in. To move all this heavy equipment according to …is plan, we found it necessary to assign six men to each …n. The four extra men in each crew were taken from …responding 40mm gun crews. After the machine guns …ere emplaced and the ammunition in position, they re…rned to the beach to wait for the 40mm guns to land.

These .50 caliber machine guns were emplaced in firing …sitions without too much difficulty, but they were not, in …l cases, the prearranged positions. In some cases the boats …d not land on the part of the beach where they were …heduled to land. Where this happened, the machine …n was emplaced temporarily in a good firing position …rby. However, this condition threw off the plan of de…se until later shifts and changes could be made. It is …most always the case that the plans for landing operations …nnot be carried out exactly as planned and all concerned …ould be prepared to meet unexpected and changed con…tions and to exploit unexpected opportunities or overcome …foreseen obstacles.

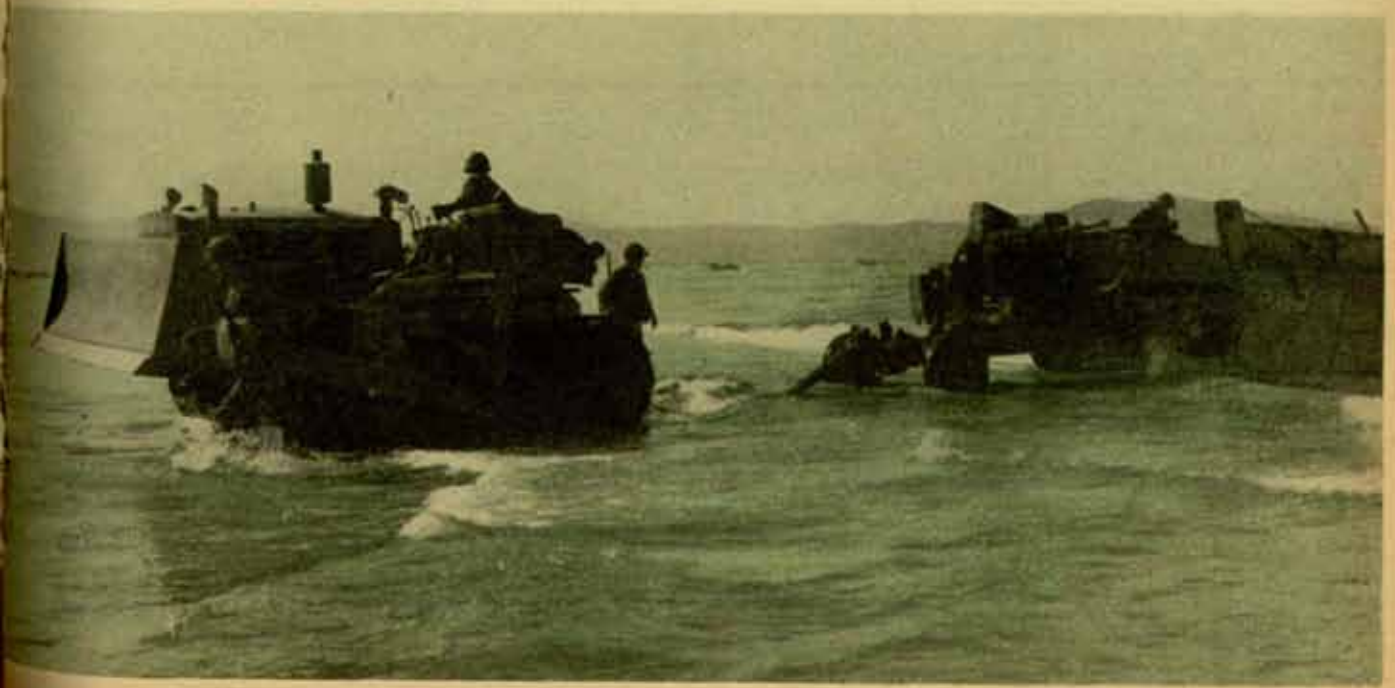
Many more difficulties were encountered with the 40mm …ns. They were unloaded from transports into LCV's and …CM's to come ashore in the sixth wave. These landing

On the beach at Paestum, Italy. The American AA battery that dropped this one left no room for doubt.

craft are not big enough to carry both the gun and its prime mover. Therefore our trucks (in the loading plan we were allowed only three trucks per battery) and guns were loaded in separate boats. Consequently guns and trucks hit the shore separately and at different times. It is easy to imagine the results of such a maneuver. The guns could not be pulled over the beaches in sand by hand. Tractors and "Ducks" had to be called on to drag the guns into positions. In many cases, like the .50 caliber machine guns they had to be set up in temporary positions and later shifted.

After the guns are ashore and in position with a crew and ammunition, they can perform their missions at reduced efficiency until additional transportation with necessary equipment for communication can be landed. This may take from one to four or five days, depending upon the combat situation in the landing area.

Even after we had the initial beach defense set up our troubles were not over. On D + 1 we were relieved from the defense of the beach below Scoglitti and ordered to support an RCT of the 45th Division. We found the 2½-ton trucks could not move through the sand. Again we had to call upon the Engineers, this time to tow our trucks to



"Tractors . . . had to be called on to drag the guns. . . .

the first hard surface road, and then with "Cats" and "Ducks" tow our guns up to the trucks. It took over eighteen hours to move two batteries and part of Headquarters a distance of fifteen miles.

Consider, however, in contrast, the self-propelled mount. This battalion is now equipped with thirty-two M-15 half-tracks which mount one 37mm gun and two .50 caliber aircooled guns, and thirty-two M-13 half-tracks which mount two .50 caliber aircooled guns in an electrically driven turret. Each half-track carries its crew, a unit of fire and has a radio. Therefore it is a complete, self-contained unit with communication with other units.

It was our experience, as I have shown above, that the 40mm gun must rely on outside help to get off the beach and into position. The half-track weapons need no such help. Furthermore, in addition to moving itself into position, the half-track can assist others on occasion without interfering with its mission. A good illustration of this occurred in a shore-to-shore operation in Sicily.

We had one half-track battery attached to an RCT for the operation. The battery's mission was to protect the Field Artillery. Upon hitting the beach, the Field Artillery trucks could not pull their guns through the sand and into position. We were called upon for help. In a matter of minutes we hitched on the guns and pulled them into the positions they selected. We then occupied our positions around them to protect them from air attack.

In the operations for the landing at Nettuno, two bat-

Half-track near Anzio, Italy.

were loaded on LCT's. Four LCT's were used. Four M-15's and four M-13's were loaded on each LCT. It was the mission of these two batteries with their thirty-two self-propelled mounts to get ashore and into position to protect the landing beach before daylight.

One officer from each battery went ashore with the Infantry to make a ground reconnaissance and to be on the beach to meet their half-tracks when they landed. The LCT's were scheduled to land at H + 200, or 0520, an hour before daylight, on the 22d of January. Sunrise was at 0727. The weather was perfect for the operation. The water was calm, and the sky overcast with light clouds. A thin sliver of moon shown through the clouds just sufficiently to give outline to nearby objects. It was three days before the new moon.

The LCT's hit the beach between 0500 and 0520. The tracks were unloaded with very little difficulty in spite of a sandbar, which grounded the LCT's almost 100 yards off shore. The 'tracks were water-proofed except for the exhaust. Therefore, if the engine stalled it could not start again. By a strange coincidence, one 'track from each LCT stalled, but they were quickly winched out by other 'tracks and all 'tracks were in position ready to fire before daylight.

One 'track hit a land mine while going into position. The explosion immobilized the track, but the gun was undamaged and it was manned and fired from its position for four days until it was salvaged by our Ordnance personnel.

In connection with the landing on the LCT's, an interesting experiment was tried on one of the craft. Besides our half-tracks, each LCT carried several jeeps with trailers for the reconnaissance party. According to plan and good naval practice the half-tracks, being heavy, were loaded in the stern with the jeeps forward.

On the LCT in which I rode a discussion arose as to the difficulty the jeeps might encounter in the water if the craft could not clear the bar. It was decided that if the jeeps came off last, the craft could meanwhile inch over the bar because of decreased draft due to unloading of the half-tracks, and they would have easier going. The craft was reloaded, therefore, to accomplish this. After the reloading was completed, I compared the craft with the one next to it loaded according to the original plan. The difference in the amount of draft in the bow was only one foot. On the landing the unloading went off as we had planned and only one jeep stalled from our craft, while on other craft they had considerably more difficulty getting ashore. The one jeep from our LCT that stalled was quickly winched in by one of our half-tracks. On the other craft, when the first ones stalled, other remaining jeeps were towed right off the craft by our 'tracks and onto the beach.

Our other batteries were assigned two missions: first to protect LST's in the fleet, and second, to strengthen the beach defenses when landed. For the first mission, the weapons were loaded on the top deck of nine LST's. None of the LST's unloaded until well into the day, but the guns were manned and took part in combating the raids on the landing area. As the LST's were unloaded, these 'tracks came ashore and were placed in position. All but the two 'tracks with the Cub planes were ashore by nightfall.

We wish to emphasize that the whole operation was accomplished without confusion or any calls to other organizations for help. The 'tracks were able to negotiate the water, which was four feet deep in places, and once ashore, travelled through sand and slightly muddy ground to their assigned positions. In addition to the effective movement of the weapons themselves, they carry everything needed. Each track arrived in position with crew, ammunition, tools, radio for communication and AAAIS. Each 'track had a five-gallon can of water and each man had two rations. As a consequence, every weapon was up to A-1 efficiency as soon as it hit the beach with nothing to interfere with the proper accomplishment of its mission.

Employment of SCA in Island Warfare

By Lieutenant Colonel H. G. Fowler, Coast Artillery Corps

Experience in the South Pacific Area

Almost every task force sent out to occupy islands in the South Pacific directly after Pearl Harbor included some seacoast artillery. These units were normally used to protect the base port of the task force from hostile naval attack. In some few instances the armament was already emplaced, but for the greater part the units were equipped with G.P.F's with or without plates for Panama mounts, and were organized under the tables of organization for tractor-drawn units. Frequently the small harbor defenses so organized were later supplemented by 5-inch and 6-inch naval guns on barbette mounts. But the largest caliber was the 155mm gun.

So equipped, these units could, of course, provide protection only against unarmored or lightly armored ships, and support the beach defense against landing attacks. Sole dependence for defense against hostile capital vessels rested on the Navy and Air Force.

As operations developed in the Area some of the Seacoast Artillery units were called upon to perform field artillery missions in support of ground forces. It appears probable that, with a growing realization of the capabilities of such units, they will be used more and more as dual purpose artillery to provide long range support in ground operations as well as seaward defense against hostile raids by fast, light craft. Prepared to accomplish both missions, they rep-

resent an economy of personnel and equipment highly valuable in amphibious operations.

It is the purpose here to discuss some of the more important problems involved in this employment of Seacoast Artillery and to submit recommendations for their solution or, at least, to tell how they have been met in some instances. The discussion and findings are based on experiences as commander of a battalion so employed, and in organizing temporary harbor defenses which required the coördination of Seacoast Artillery units with Marine Defense Battalions, French and New Zealand Coast Artillery and, in one instance, Field Artillery.

Reconnaissance, Selection of Positions

For missions in support of ground operations this procedure will follow the rules prescribed in appropriate Field Manuals. Where, on the other hand, organization of the available armament for seaward defense is undertaken, the following summary of procedure may prove helpful.

If accurate maps and hydrographic charts are available it will be possible to fix the general areas for emplacement prior to actual occupation by analyzing the situation in the following sequence:

a. Set up the capabilities of the hostile fleet, confined to those which can be countered by the available weapons. A report to higher command should be made of enemy capabilities against which the available seacoast weapons would be ineffective.
b. On a hydrographic chart of the adjacent water areas prepare a graphic presentation of the approaches, critical points, and dangerous water areas as deduced from *a*.
c. Block out the areas fully covered by existing defenses of any type, *i.e.*, natural or artificial obstacles, submarine mines, previously emplaced seacoast armament or other supporting weapons.
d. Summarize the new armament available, analyzing the characteristics, capabilities, and limitations.
e. Select the general areas in which the new armament can be emplaced so as to complete or increase coverage of the dangerous water areas.
f. Make a detailed reconnaissance of all possible positions within the selected general areas.
g. Compare the possible positions, weighing all considerations, advantages and disadvantages.
h. Decision—choose those positions which will permit the most effective combination of defense against those hostile elements capable of being effectively attacked by the available weapons.

Depending on the priority of missions and the availability of mounts for all-round fire, consideration in the selection of positions should be given to landward firing in support of the ground defense.

Mounts for All-round Fire

Mounts capable of being rapidly constructed which will increase the field of fire of the 155mm G.P.F. and M-1 greatly enhance the capabilities of the weapons and should be standard equipment with all units. The standard Panama mount for the G.P.F. requires so much time for construction as to be virtually worthless. A 180° mount has been developed which can be emplaced within from twenty-four to forty-eight hours. With the exception of the standard ra most of the required materials will be found available in Engineer dumps, but where possible, units should procure and carry the materials with them.

The so-called Kelly Mount for the M-1 gun for all-round fire was developed by the Marine Corps and has been used at harbor defenses in this country.

For barbette guns both the Marines and the New Zealanders have devised mounts which reduce the emplacement of such guns to a matter of days rather than weeks and months.

Movement to Positions

In movements to positions in the islands, and in the organization of the positions, almost invariably it was necessary to borrow Engineer bulldozers. With Engineer priorities what they are, the equipment of our tractors with attachable blades would have saved precious time.

On long hauls over good roads we often saved time by borrowing 6-ton 6 x 6's from the AA. The new M-4 tractor will do away with any need for that.

G.P.F. vs. M-1

The M1918-A-1 on M-3 carriage and equipped with Panama mount plates still has certain definite advantages over the 155mm gun M-1. It will roll through softer ground than the M-1 can negotiate. It is simpler and more rugged and consequently less vulnerable. With a timber, rail and bolt modification of the Panama mount it can be emplaced more quickly, at least for 180° fire. Its accuracy in combat fire is as great, if not greater. As against this the M-1 has a desirable longer range and can be more quickly emplaced in normal position. Given a choice I would take four of each for a two-battery battalion, in island warfare.

Position Finding

M-1 Depression Position Finders, which we acquired apparently by mistake, were the most consistently dependable accurate means available and the quickest to install but suitable sites were not always available. Coincidence Range Finders were used with questionable results due in part to the age and condition of the instruments and in part to range limitations.

Where time and terrain permitted, horizontal base systems were installed but they are not suitable as the primary means of position finding in island warfare because

a. In a large percentage of the positions dictated by the mission a base line of anything like adequate length is impossible.
b. Communications were rarely dependable due to the obstacles to installation and maintenance of wire lines through jungles, and the length of field lines required along heavily-indented coasts. Almost invariably lines to at least one base end station had to be laid in part through water.
c. There are often difficulties in providing security for isolated stations.
d. Speeds and maneuverability of modern vessels reduce the accuracy of the system below acceptable standards.

In one situation, where other means was lacking, reason

ly accurate estimation of ranges by observers at 500 feet evation, directly behind the battery, was made possible by arting the reefs and small islands, and all other fixed arkers in or adjacent to the field of fire as reference points. he results in actual tracking, when checked by instruents, were encouraging.

Fire Adjustment

Strict application of the rules of bracketing adjustment the only sure method of adjusting on modern high speed gets. With adequately trained gun pointers, jumping ashes are safe for lateral adjustment, but in the same circumstances equal or better results will be obtained by using observer to supply corrections to the deflection board.

For land firing the best results were obtained from airane spotting with battalion officers acting as the observers. ll seacoast artillery units should train forward observers this will often be the only practical means of adjusting re.

When high ground was won, effective use was made oriented instruments for locating targets and for bilateral otting in landward firing.

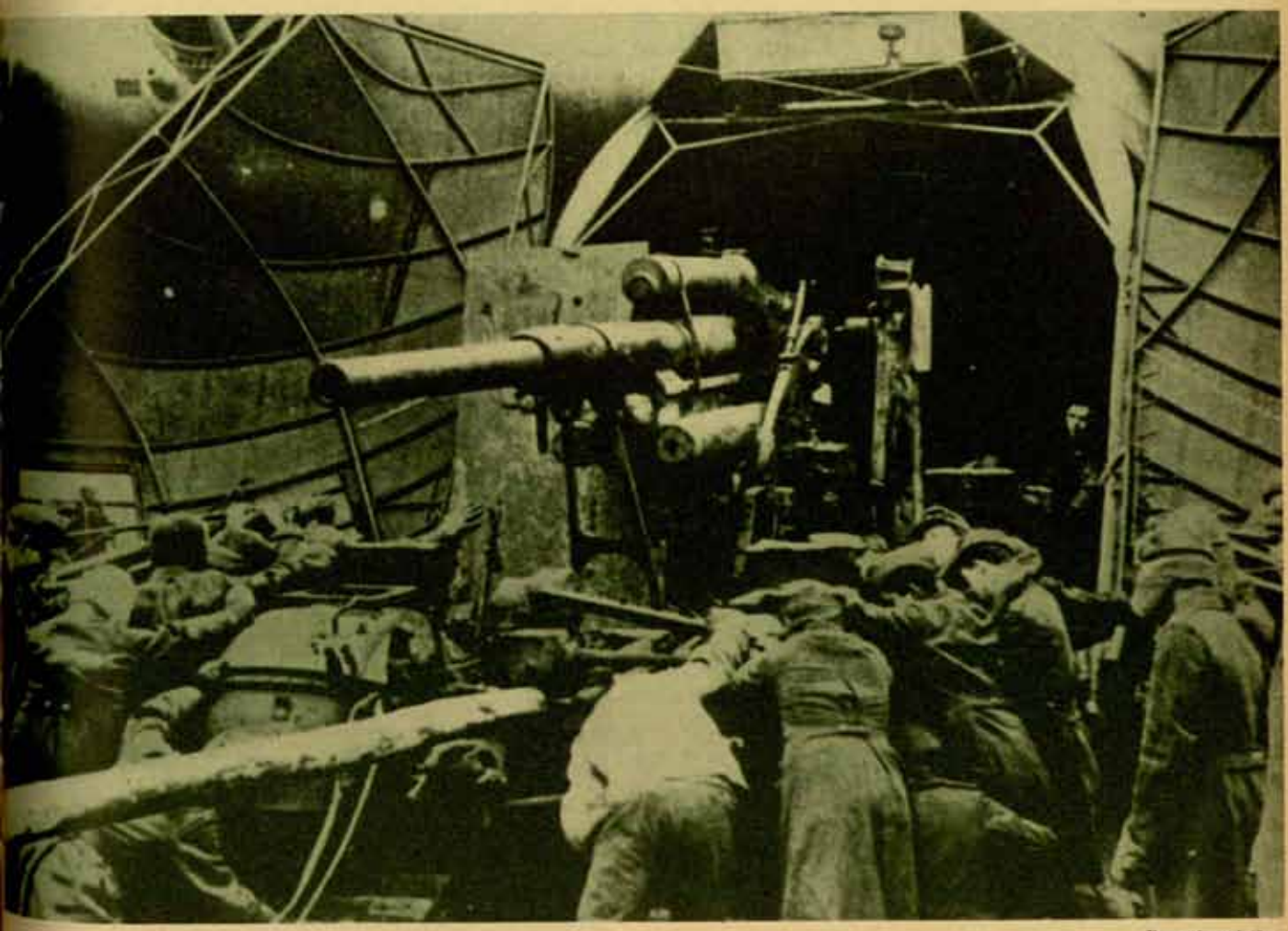
Communications

Under the old TBA and the new T/O&E the radio uipment, and the number of operators, allowed is far below the requirements of island warfare. Plenty of equipment was obtainable in the field when the need was shown but operators cannot be trained over night. Radio training should be an important part of the preparatory training of all seacoast units. The normal distances between units in temporary island base defenses, and the need for simultaneous operation of several forward observation posts in land firing (due to the broad front covered) make it imperative to have plenty of sets and operators.

Water

In several positions occupied by seacoast artillery units in the South Pacific water supply was a serious problem. Each battalion should have one water distillation unit kept in good working order against the day that one of its batteries must man a small island position.

The discussion above covers the more important problems with which we were confronted which are not normally encountered by seacoast artillery units. Like target practice, when you have prepared for these, undoubtedly others will pop up. There will be some for which no solution exists except to do something not quite as good, but ingenuity, a thorough understanding of your weapons, and knowing where to look in the book will overcome most of them. The only answer not found yet is how to get the enemy to come around when you get all set for him.



Press Association

Heavy AA gun being loaded into German transport plane. The picture and the caption both came from German sources, *via* Lisbon.

The Rocket Target

By Captain M. F. Sullivan, Coast Artillery Corps

At the beginning of operations of this war and from the start of the German campaigns, the need for a solution to the problem of providing effective defense from the ground against low-level, high-speed air attack in mobile operations became apparent. American antiaircraft artillery met and solved, amidst the many other perplexities of manifold expansion, this specific problem. Well-trained troops manning the finest antiaircraft automatic weapons matériel stand as the solution. With their training and equipment, American automatic weapons personnel can effectively accomplish their mission. That they can, is proved every day in combat areas from Nettuno to New Guinea.

A discussion of the rocket target, which as much as any other item, has contributed to the realistic gunnery training of automatic weapons personnel, should be of interest to all coast artillerymen. And so a brief history of the rocket target ensues.

The purpose of all firing problems is the training of the command for battle. The closest possible approximation of such conditions is directed for target practices. That premise and qualification held just as true in 1941 as it does at present. But then, despite urgent need, many of the means which would enable commanders to realize a combat standard in training were lacking. The rapidly expanding antiaircraft artillery, with the coöperation of the Army Air Corps, toiled at the task of preparing for combat with the best available, but largely inadequate means of service practices—firing at relatively slow-moving sleeve targets towed by the durable but lumbering B-10's, B-18's and 0-47's. War experience pointed to the need for a more realistic target for use in the advanced gunnery training of antiaircraft automatic weapons units. The necessity for a maneuverable high-speed aerial target to simulate low-level or diving attacks by 300 to 400 m.p.h. planes was acute.

At the suggestion of Major General Joseph A. Green, then Chief of Coast Artillery, the War Department requested the National Defense Research Committee, an agency of the newly formed Office of Scientific Research and Development, to investigate and study the problem of development of a rocket target, suitable for use in the gunnery training of AAA automatic weapons personnel. An item with a performance characteristic of low-level, high-speed attack aviation was sought.

Development of a rocket target was undertaken, and after some preliminary experimentation, the National Defense Research Committee delivered to Fort Monroe eleven such targets for test by the Coast Artillery Board. The first test was conducted on 11 October 1941.

Considerable interest was shown in the trial, and in addition to representatives from the Office of the Chief of Coast Artillery, NDRC personnel were present, and conducted the actual loading and firing of the projectile. Of the eleven targets delivered for test, nine were provided with a smoke-producing charge to facilitate observation in flight. The propelling charge of all those first rockets was ballistite. The targets, each approximately 5 feet long, 3[illegible] inches in diameter, and weighting approximately 25 pound[illegible] were fitted with four large semi-circular fins, 20 inches [illegible] diameter. Because of the need for the item, this original [illegible] sign had been dictated by the immediate availability of [illegible] component parts.

As a result of this test, it was determined that, while not meeting in full the ideal characteristics for a rocket target pending further development, the immediate procurement of a quantity of that type would be of great value for the training of antiaircraft gunners. To allow employment in limited numbers at all antiaircraft training centers, and in garrisons in Panama, Hawaii and the Philippines, a minimum number of targets and launchers was determined upon as an essential requirement. On that basis, appropriate recommendation was made to the War Department and immediate procurement of these items was approved. Under the supervision of the Chief of Ordnance, production of rocket targets began, which has now been so expanded that at a single plant more than one million rockets have been produced to date.

After further tests of the equipment, the Chief of Coast Artillery recommended that the antiaircraft target rocket and the projector, antiaircraft target rocket, which had been developed, be adopted as standard articles. The Ordnance Technical Committee, reporting on these items at a meeting early in 1942, recommended standardization, designating "for procurement in peace and in war," the Target, Antiaircraft, Rocket M8 and the Projector, Target Rocket M1. This report was approved 5 March 1942. A subsequent report of this committee, approved 2 April 1942, changed the designation of the rocket target to "Rocket Target, Antiaircraft M2."

Meanwhile, preparation of appropriate instructions for use in connection with the employment of the first target

Signal Corps Photo

General Green and General Schuyler watch Sergeant John Jarvis prepare a rocket target for firing at Camp Davis.

kets and launchers was undertaken upon approval of e recommendation for immediate procurement of the ly type. Dated 7 March 1942, the first War Department hnical manual on rocket targets, TM 4-236, was pub-ed. Production of the M2 target and of the launcher, l, outmoded these first instructions, however, and the ent manual, dated 29 September 1942, was published. ther tests of the equipment necessitated two subsequent nges to this manual.

That the rocket target has filled a pressing and vital need the advanced gunnery training of AAA automatic weap-s personnel is clear. Currently expanded in AAA train-g centers at the rate of thousands per month, the rocket, addition to its physical features while in flight, approach-g the characteristics of a high-speed, hostile target, is also great value in AAA training because of its psychological fect. For AAA gunners, in firing at this fleeting target, ac-ire an appreciation of the difficulties to be experienced in livering effective fire at the "real thing" in action. With healthy respect for their mission, they work harder at the d of training for combat.

Rocket targets lend themselves to varied use under di-se conditions, and have become an integral part of AAA tomatic weapons training. An example of their adapta-ity for training purposes is found in the training centers the Antiaircraft Command. At several of these installa-ns, mobile combat courses have been developed. These mbat courses are designed and laid out so as to afford an tended area wherein gunners manning vehicular mounted tomatic weapons may be trained in firing at fleeting, sur-se targets of opportunity while their vehicles are in tion. As they move through the course, target planes fly over the area, drawing the gunners' fire, and suddenly, released from a hidden launcher, a rocket is in flight, diving on the column. In this training activity rockets are given high priority as targets. Lest they be penalized, air guards must be alert and ready to order a change of targets, from the target plane to one which closely approximates, both in its approach and in its speed, a sudden low-level attack by a hostile fighter plane. It is doubtful if, for AAA training purposes, any other means could be devised to make possible the realistic approximation of combat conditions which is afforded by the imaginative use of rocket targets.

An idea of how much a part of the automatic weapons training picture rocket targets have become is possible when it is considered that the average automatic weapons battalion uses many hundreds of rockets during its training period. The truth of the maxim that training never ceases is insured by the compact and portable features of rocket targets. In places like far-off Tongatabu, Curacao, or Iceland, the difficulties incident to frequent target practices—needed to maintain combat standards—are lessened considerably, insofar as automatic weapons training is concerned, by having rocket targets available for use. Helping to insure the high standard of readiness for combat of AAA troops in distant bases, where conditions are far from ideal for the purpose, rocket targets have provided a sorely needed aid for gunnery training and are being used effectively.

To date more than 150,000 rocket targets have been expended in training. It is probable that a good percentage of the FW 190's, ME 109's and Zeros which have also been "expended" as a result of the accurate gun fire of American AAA personnel, may be credited to the item, Rocket Target M2.

Press Association

A 40mm crew watches a DC3 transport take off from a landing strip in the Russell Islands

British AA Rockets*

Unloading the rocket projectors from trucks into firing position.

One of Britain's new rocket guns is a crude looking contraption which, manned by a crew of two, fires two projectiles at a time. The rockets are laid on steel tubes, shouted orders give the elevation and bearing, there are cries of "Ready!" and "Stand By!" and then through the headphones comes the order "Fire!" to the No. 1 of each gun. This liberates a roar like the Century Limited tearing through Jones' Corners. The roar is introduced by a blinding orange flash, followed by myriads of red points speckling the sky with an incandescent rash as a prelude to the rattle of explosions in mid-air. The effect is impressive becau normally all projectors in a rocket battery are fired simul taneously to produce a shotgun effect. Salvos can be fired a short intervals.

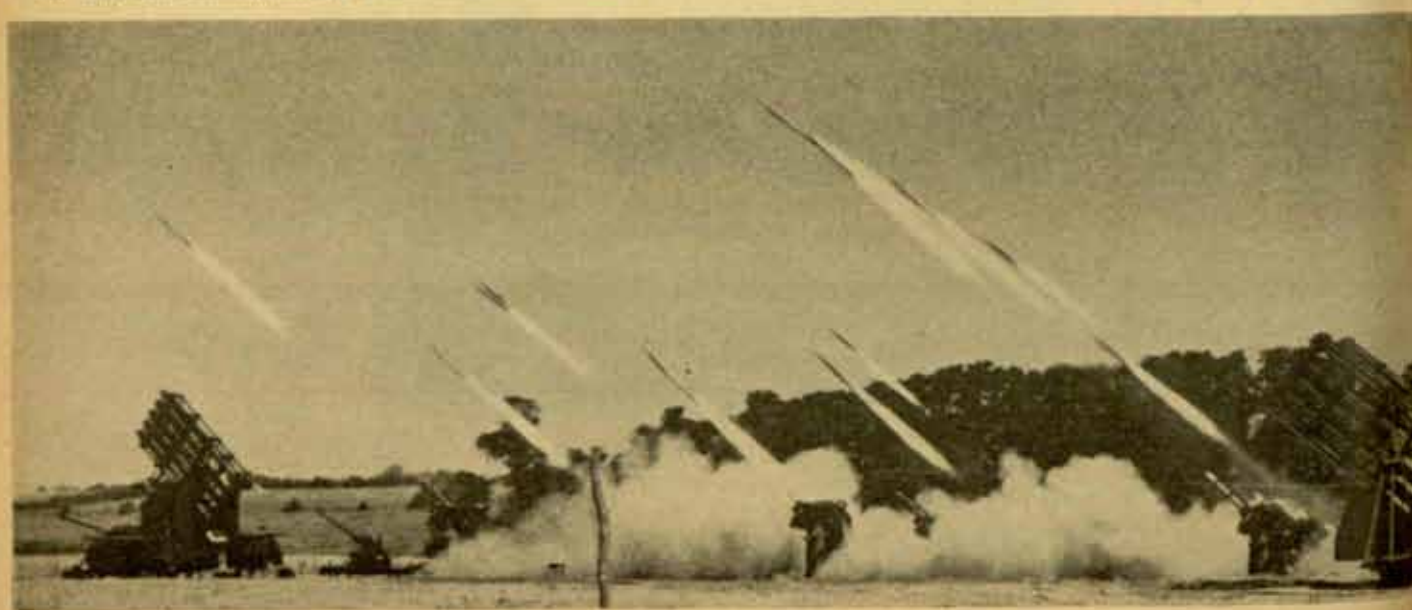
The Home Guard, who man ten per cent of London AA guns, have in many cases complete control of rock batteries, relieving regular personnel for other duties, an General Sir Frederick Pile of the AA Command intend to extend this plan.

Though the weapon was not available for the Battle o Britain, it is now in ample production. Originally intended for use against dive-bombers, it was specially adapted fo high-angle fire, and is now proving effective against raiders.

By September, 1938 the research work on the rocket was very nearly complete. The rockets were officially called

Smoke and flame lend a 4th of July touch.

*By cable from London, through British Information Services.



Density of fire is one of the secrets of success.

UP" (unrotated projectiles) and later rechristened Whoopees" by the troops.

In March, 1939, everything was ready for fullscale tests. Because of climatic conditions in Britain it was not possible to carry out the trials there and a group of scientists went to Jamaica for the purpose. There the weather is reliable, and clear skies provide the best conditions for observing results. The trials were concluded with success in just over two months. But there were many more difficulties to be overcome before the Ministry of Supply could get mass production under way.

The propellant for the rockets was difficult to handle; all the work demanded the most minute accuracy; the workers had to be trained to new and strange tasks. Eventually the difficulties were surmounted and production began to flow.

The rocket weapon in its original form was highly suitable for defense against the low-flying night bombers and an experiment to test its efficiency was carried out under the orders of the War Office by the Anti-Aircraft Command. It arranged for a battery to go into action in the spring of 1941 at a coastal site where air attacks were frequent. With their first salvo the gunners missed their target; however, the second salvo was completely successful and a night raider was destroyed. One hit in two salvos looked like success, and so it proved.

Since that time rockets have been made in enoromous numbers in Ministry of Supply factories all over Britain but the number of batteries which have contributed to the defense of Britain cannot yet be disclosed. The number of "kills" is, however, proof that they are a very potent weapon.

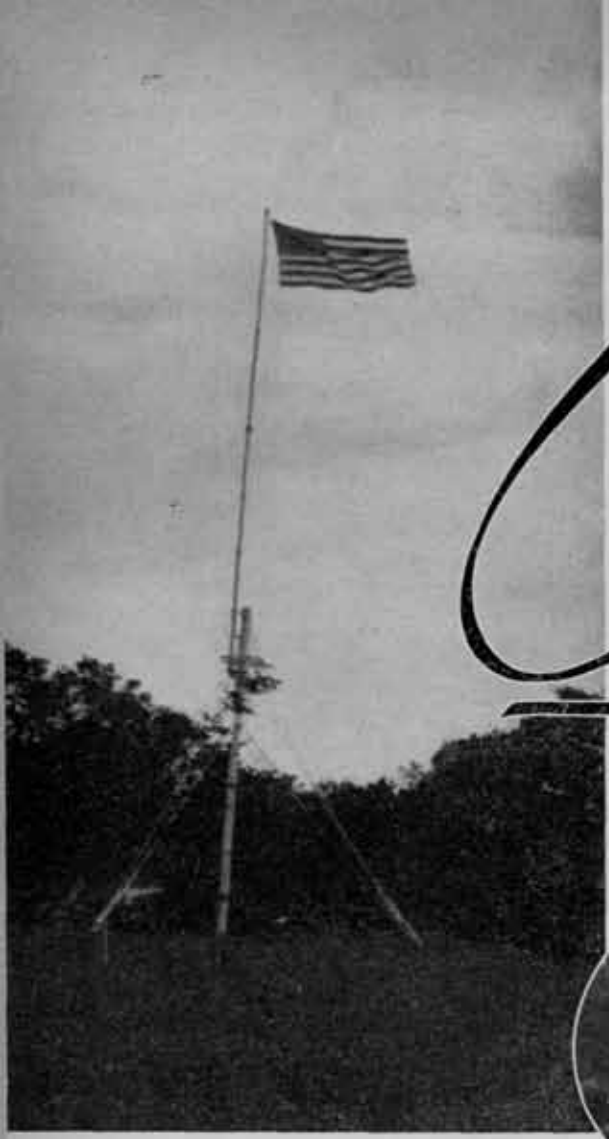
Wide World

British soldiers examine the interior of the case of a "Butterfly Bomb," a German weapon which opens to release a number of small, delayed-action, antipersonnel bombs.

Corre

Two years have passed since the Japs took Corregidor. From Anzio to Tongatabu, Coast Artillerymen await the day when "Old Betsy" will again fly from The Rock.

(Pictures from the collection of CWO Shirley Chapman)



"Old Betsy" was shot down twice from this pole at Topside, but was quickly replaced. She'll be back.

Headquarters, Harbor Defenses of Manila and Subic Bays, Topside.

Looking upward from Middleside.

Perhaps even the tramway will run again.

The barrio at Bottomside.

dor

Fort Hughes from Corregidor.

Corregidor from Cemetery Hill, Mariveles.

The long barracks at Topside.

AAA With Amphibious Forces

By Lieutenant Colonel Maxwell H. Thompson, Coast Artillery Corps

The term amphibious operation refers to any operation of a task force that requires movement by water to get to enemy-held land. Such operations may involve movement across a relatively narrow expanse of water—a shore-to-shore operation, or as the British say, a short sea voyage; it may involve movement across hundreds of miles of water—the ship-to-shore operation; or it may be a waterborne envelopment. These expeditions are transported in landing craft, lighters and special ships for the purpose of landing on, seizing and occupying hostile territory. The task force mission may be one of the following: the seizure and holding of a beachhead from which to project major landing operations; the seizure and holding of an area for use in connection with other military operations; the seizure and holding of an area as a naval or air base; the seizure and holding of an area to deny its use to the enemy; or the destruction of enemy military or naval forces, or vital enemy installations and facilities.

The successful accomplishment of an amphibious operation depends upon the efficient joint employment of ground, naval and air forces. Each amphibious task force is organized and equipped specifically for the task it is to perform. Complete command and control should be vested in one commander with a selected staff representing all arms and services involved in the operation in order to secure unity of effort.

To be successful, the command of the sea and air is essential. The threat of enemy naval forces must be removed. Similarly, enemy air power must be reduced to prevent harmful interference with the landings. Experience indicates the uselessness of attempting landings in an area in which the hostile naval and air forces have not been neutralized. Inasmuch as land-based planes are essential for adequate air support and counter air activities, the early seizure by our forces of an airfield or fields in enemy territory is vital.

Once the commander, staff and composition of the task force has been decided upon the next big problem is the actual planning for the expedition and the training and equipping of the assault forces. Accurate and comprehensive military intelligence will form the basis for complete planning. Tactical planning must take into consideration the sea and weather conditions to be expected in the theater of operations during the landing and supply phases as both may become major obstacles and jeopardize the best conceived plan. Conditions under which landings may conceivably be made by ground troops may be totally unsatisfactory for air support and/or naval bombardment. This planning must also provide for controlled and coördinated dispersion of key personnel, weapons, matériel, essential supplies and vital communication equipment among the various ships and landing craft. Disperse for protection, but retain control and coördination.

Complete and detailed administrative planning prior to embarkation is essential to insure the success of the operation. The tactical and administrative plans should be developed concurrently and must be complete in all details. They should be simple, flexible and as detailed as conditions and time will permit.

Landing beaches must be carefully chosen, taking into consideration the topographical features, tidal conditions, beach gradients and means of exit from the beaches. Frontal attacks on strongly held beaches should not be attempted without exceptionally powerful fire power to support the landing. Feints and diversionary landings may be utilized to accomplish successful landings.

Surprise in the operations must be sought by every means and by every individual involved. Without surprise this difficult operation will be harder to accomplish. Effective surprise can and will reduce the demands for gunfire support for the landing. Night landings may offer considerable advantage in this respect, although control will be correspondingly more difficult to maintain. The use of paratroops and airborne troops on key objectives is also a valuable means of securing initial surprise.

All personnel should secure thorough and specialized training and be given adequate opportunities to practice individual and combined amphibious operations. Physical conditioning must be stressed with emphasis placed on night training. Terrain, weather and surf conditions comparable to those in the proposed theater should be sought. All equipment to be used in the operation should be available for training.

Landings will be effected by boat teams, organized to fit the capacities of the craft and formed with the view of fighting their way inland from the beach. They must possess sufficient combat strength to secure a unit objective without necessity of regrouping. The actual regrouping into normal combat formations will be accomplished as soon after landing as practicable.

Successive boat waves must be mutually supporting and their landings must be so timed as to prevent congestion of boats, men and matériel on the beach and the intermingling of boat teams ashore. The actual landing times between waves may be determined during training and in accordance with an estimate of the situation.

Accurate and timely information of the operations progress and the means whereby it can be expedited are essential to success. Efficient communication will materially aid in the exploitation of successful landings. Flexibility is somewhat based upon the ability of the commander to receive up-to-the-minute reports and to take prompt action upon them. Much will depend upon communication between units afloat and ashore, and with supporting naval warships and aircraft.

In order that any amphibious operation may be successful, the proposed movement of the ground forces, from embarkation to inclusion of the attack through the enemy-held beaches and the capture of the beachhead should be fully rehearsed over similar friendly terrain and under conditions of weather and sea to be expected. The intercommunication system—air, sea and ground—should be tested

exercises of this nature. When practicable, large-scale rehearsals with all troops and craft participating should be conducted before the operation is launched.

Having considered a few general principles for an amphibious operation let us now consider the possible employment of AA units in such an effort. The best defense against air power is a bigger and better air force of our own. The next best defense, includes all measures of concealment and protection and might even include the use of VLA barrage balloons. All three of these form a team for AA defense. They are all needed and they supplement each other.

The mission of AA in this type of operation will be to provide protection for elements, establishments, personnel and matériel from hostile aviation and very probably from enemy mechanized, airborne and waterborne units. The biggest difference that will occur in the tactical disposition of the fire units for this type of operation comes from the fact that the landing beaches to be defended may be widely separated. This means that even small units must be capable of operating independently for days, if necessary. This may well include all supply phases as well as replacement requirements. Control in each echelon of command will be lacking for days in some cases.

If the enemy succeeds in breaking through friendly air cover and attacks the many small craft moving ashore or the elements on the beach proper, the AA fire units should be so dispersed as to protect the troops as the craft come in and are beached and as they cross the beach and move inland. If employed on the beaches or on barges anchored off shore, AA units can cover unloading operations of the larger craft and may cover operations of the tanks and other vehicles as they move across the beaches to the assembly areas and move inland. As the foot troops move inland, and assuming adequate AA units are available, certain units may be displaced to cover narrow defiles, beach exits, maintenance areas, dumps, command posts, and the like. Once troops have moved on inland, the support of the land battle will differ in no way from the normal.

From the AA standpoint, the big problem may well be one of transportation. Present-day units are highly mobile and the equipment is heavy and bulky. It must be recognized in an operation of this nature that a certain amount of mobility must be sacrificed in order to offer adequate support. Then too the high percentage of casualties initially to be expected must be taken into consideration and it may demand complete improvision to get the AA equipment in firing order on the far shore. In the early stages of the landing operations prime movers, if required, may have to be left behind and other means employed for moving the weapons from the craft and ships to the beaches and into position. The gun crews must be able to work short-handed and probably for long periods of time without relief.

As far as means of moving equipment and troops across large bodies of water are concerned, both the British and ourselves have made great strides. Starting out, as we did, with only the small assault boats, LCP and LCV used by the Marines and infantry assault units, we have progressed through the LCM (capable of carrying a medium tank) and the LCT (capable of loads in excess of 150 tons) to the LCI (landing craft, infantry) and the LST (landing ship, tank). These latter ships are very sea-worthy and handle large numbers of troops and heavy matériel, thus decreasing the convoy requirements of large vessels of all types to transport the smaller landing craft.

Actually AA matériel may be loaded in practically all of the types of craft now available and it must not be assumed that only LST's will be made available for such equipment. The AA machine gun may be emplaced in the LCV and used, if necessary, to fire on enemy planes and surface craft while at sea. In all probability the augmented crew will have to manhandle the piece ashore and emplace it near the shoreline. All necessary supplies must accompany this crew. The Bofors gun may also be loaded in the LCV together with crew and necessary supplies. Space will not permit the inclusion of the fire-control equipment, but during the assault phase forward area sights will be adequate, with the control equipment being brought in as soon as craft space and conditions warrant.

The LCM (Higgins Type) can carry a Bofors gun or a 90mm gun less their prime movers. Extra man power or equipment on the far shore beaches will have to be pressed into service to aid in the unloading and placing of such a loading plan. The self-propelled units, together with trailer, are easily loaded and unloaded from both types of LCM's.

The LCT's, with their large entrances, long ramps and broad deck space will accommodate all types of matériel, with or without their prime movers attached. It must be remembered, however, that craft of this size will be tactically loaded, and perhaps only one or two fire units will be included on the load. This will give dispersion. All vehicles and equipment will have to be lashed to the decks and water conditioned (protected against salt spray) and capable of moving through deep water in unloading operations on the far shore in event the craft are beached out away from the water line. The vehicles must be tactically loaded and carry only the essential needs of the crew for the time required until resupply will be possible. This latter will be an estimate at best.

The inclusion of AA personnel on LCI's will probably be limited to those used as advance reconnaissance parties, command, etc. The LST's will offer no problem to any AA equipment. Proper dispersion of this matériel on the deck is essential.

For the purpose of discussing the tactics and technique of employment of AAA in amphibious operations, the mission may be divided into five phases as follows:

1. Protection of the near shore concentrations.
2. Protection of the near shore proper while boats are being loaded with troops and supplies.
3. Protection of the boats while crossing from the near to the far shore.
4. Protection of the landing beaches on the far shore.
5. Protection of the assault elements after landing operations have advanced inland.

All phases are obviously required for a shore-to-shore operation or for a water envelopment whereas phases 3, 4, and 5 only will be required for the ship-to-shore expedition.

Enemy attacks to be expected from the air must be considered before establishing the AA defenses for the different phases of the operation. The tactics expected to be em-

ployed by him will depend upon, (1) The capabilities and limitations of his aircraft, (2) The local situation with respect to the control of the air, (3) The size and nature of the objective, (4) The weather, and (5) The enemy estimate of the ground defenses in the area. Although in some instances the enemy may employ high-level bombing, it is believed that a defense must be provided primarily against all types of low-flying planes.

Admittedly there will be insufficient AA units to protect properly all elements of the task force. Factors to be balanced in attaching these units to elements and commands within the force may be some of the following:

(1) Consideration must be given to the widths of the different landing beaches and the number of beaches allotted to any one unit, say an infantry or armored division, as compared with the number of AA units available to that division.

(2) An estimate must be made of the scale of enemy attacks to be expected in terms of sorties per day. Fire units must be disposed and ammunition provided for the maximum possible protection.

(3) Consideration must be given to the number of craft and ships, vehicles, supplies, etc., that may require protection on the beaches, and the time element in connection therewith.

(4) Any proper defense must be considered with reference to the friendly aviation protection to be offered, the adequacy of which may at times allow the withholding of the landing of fire units until such time as the hostile beaches are more clear of enemy fire.

(5) Consideration must be given to the possible protection to be offered by barrage balloons.

(6) The use of smoke by friendly naval and air units must be considered.

With these factors in mind, the phases for protection may be considered in sequence irrespective of the type of operation involved. For the protection of the concentration area it is visualized that Army or Corps will assign the necessary AA units. Upon completion of the embarkation of the assault troops the control of these units will revert to the higher echelon. This embarkation area may well become the scene of great enemy activity if discovered by him in time. If the enemy can break up such an operation at the outset he will certainly gain much. Depending upon the number of boats being concentrated and the vulnerability of the beaches and harbor to air attack, various calibers and numbers of AA weapons will be required for this phase.

The tactical principles contained in current Field Manuals will govern the assignment and use of weapons protecting the harbor and loading beaches. A possible difference will occur when fire units which have been supplementing the harbor defenses are pulled out to move to the far shore with the attacking troops. In such a case there must have been sufficient AA assigned to this area to assure adequate protection after these units leave.

While the troops and craft are in the harbor and using the loading beaches and other facilities it is evident that some form of AA protection will be desirable to seaward and for that protection naval vessels of various types will be required. These may be craft sent in for that particular job or they may be those to be used as a part of the expedition. Lacking the naval craft, it may be possible to place the AA fire units on barges, lighters, etc., and distribute them to seaward.

If barrage balloons are to be used for protection of the near shore installations during this operation they should be employed in such a manner as to preserve secrecy.

For the actual crossing at sea it will be found that all small landing craft are equipped with machine guns which are either manned by the crew or by the "carried troops." The LCT's and the larger ships carry 20mm cannon and larger weapons which are manned by the respective crews. Flak ships should offer added protection in the crossing and anchor off-shore of the hostile beach to provide depth to the AA defense plan therefor. Further protection during the sea voyage will be offered by the weapons and small arms of all carried troops and especially by the AA units on board each craft and ship. These fire units should be dispersed among the boats in the different waves to offer the best possible security.

Since firing from cramped quarters on the craft, and perhaps on a rolling sea, is difficult at best, the possible expenditure of ammunition must be carefully considered during the planning stages and provisions made for same. Planes should not be fired upon at ranges exceeding four hundred yards. If necessary, all weapons on board any boat should be employed against enemy waterborne targets and against ground targets as the beaches are approached.

The possible use of VLA Barrage Balloons during the crossing and on the far shore has been given careful consideration and under certain conditions such use is considered to be feasible. At the present time British ships fly these balloons in all coastwise shipping around the homeland and their use in the Mediterranean has increased immensely. It has been found that this equipment can readily be attached to all types of landing craft now in use, but the control in bad weather is something of a problem. A command decision, as it were, on the use of these balloons will be required to determine if the boat spaces occupied by the balloon crew, together with their equipment and necessary supplies of spare balloons, gas and rigging, and the anticipated protection to be provided will compensate for the ground troops and weapons that might be taken along instead. By transferring the balloons flown from the craft to the shore an effective barrage may be placed over the beaches very quickly.

Before considering the actual AA protection to be offered on the far shore a brief discussion of a possible assault organization seems pertinent. The ground troops of any task force may consist of a number of different type divisions, reinforced by special troops in order to accomplish its mission. For purposes of control, however, each division may be given certain beaches on which to effect its landings, and it will in turn assign certain beaches to its combat elements, normally the regimental combat team. This combat team, likewise, will break down into what might be called battalion landing teams, reinforced as required, and considered to be the smallest tactical unit within the division. In all probability each and all of these command units will have to be landed in successive waves during the assault phase. These waves must be tactically complete and each successive wave must reinforce its predecessor and

build up fire power. Thus the initial waves may consist of foot troops and engineers for the destruction of enemy infantry and emplacements on the beach, followed by successive waves containing automatic weapons, antitank weapons, artillery pieces and supplies. Sufficient time must be allowed between successive waves to allow all boat teams to complete unloading operations and the crossing of the beaches. The time required for this may vary from a very few minutes for the foot troops to many minutes for the crew-manned weapons. Reserve units, kept afloat as long as possible, will be landed on call and will require cover while at sea.

Generally speaking, during the assault stage the minimum number of AA weapons required to protect a beach to be occupied by a battalion landing team will be four machine guns and four automatic weapons. For two battalion landing teams, landing abreast, a battery of automatic weapons will normally be sufficient.

It is visualized that the automatic weapons units landing with the assault troops will remain to protect the beach area until such time as one or more beaches are developed as divisional or unit distributing points, at which time additional weapons will be brought in on the larger ships, consisting of the large caliber guns, location equipment, and searchlights. This defense, organized in accordance with current AAA practices, will remain to protect the supply, replacement and evacuation activities until such time as a port or ports are taken as a part of the big operation and without which such operations are very seriously handicapped. Once the port is secured, the AA units will be moved to cover the area, all as called for in the tactical plan.

If it is assumed that the mission of the assault troops of the task force is to seize and hold the beachhead and that forces landing sometime later will move through this beachhead and on inland, it may then be assumed that the AA units present will dig in, select alternate positions, and secure all possible protection. Granting that much matériel and many personnel will have been expended in this assault phase, a regrouping and reëquipping may be necessary under adverse conditions of enemy air and long range artillery fire.

The attachment of AAA units to the troops moving inland through the beachhead will be covered in force orders and the employment of such units with the ground forces is well covered in current Field Manuals. They may be called upon to provide cover for defiles leading from the beaches and farther inland, bridges, corridors and other critical points and areas.

Consideration will now be given to some of the minor, although very important, items to be taken into consideration in the planning for and execution of this type of operation as far as the AAA is concerned. Unit commanders from the battery to the brigade, will find that certain phases of their staff work have been radically changed due to the new mode of transportation offered, the peculiarities of the operation and the necessity for a possible curtailment in transportation with the corresponding amplification of the supply problem. In addition, the attachment of fire units and larger units to the elements of the ground forces make difficult the control and supply once the far shore has been reached. Commanders must be familiar with the limitations and capabilities of the craft and ships available and advise the ground force commanders as to space requirements for the various weapons and supplies to be loaded. They must also aid in the coördination of all AA defenses for the operation, especially with friendly air forces if balloons are to be used.

Every effort should be made to maintain radio silence until such time as the expedition has been discovered at sea or until the far shore has been reached. Once this silence is broken the air will be full of voice and code with units making every effort to get organized and to learn the progress of their advance units, calls for naval gunfire support and air-ground support. Since few AA radio sets net readily with those of the infantry divisions, communication by such means will be difficult. All radio sets in transit across salt water must be protected from the spray and other possible damage.

Other means of communication available to the AAA units are wire, messenger, hand semaphore and voice. The normal wire networks will be used where possible, but initially on the far shore it will be impracticable and radio or other means must be relied upon. It should be the responsibility of the senior signal officer of the landing force to procure proper crystals for channels allotted the AAA units.

Messengers, mounted or on foot, may well be used on the far shore. Hand semaphore may be necessary and in addition to his duties as radio operator, each soldier with that assignment should be trained in the use of semaphore flags. Whenever possible, unit commanders should transmit their will to the firing units by voice but here again the widely separated units will make this almost impossible to accomplish.

The problems of limited transportation and of supply go hand in hand. A battery of Bofors attached to a regimental combat team may well find that insufficient room has been allotted it to allow for the loading of many vehicles carrying ammunition and Class 3 supplies, let alone maintenance and spare parts. Careful planning will be required to have these items available in bulk on the beaches where they can be drawn from the beach supply organizations as needed. The self-propelled units, materially solve this problem.

Experience on maneuvers and in operations to date has indicated that, the 2½-ton, 6 x 6 truck, with cleats, operates well on sandy beaches, but in many cases when operating without cleats, help, either by manpower with prolonges or by other power devices, must be provided in getting them across the beaches.

In all probability the far shore defenses will be centralized under one designated individual who will be responsible for the local security thereof. The plans for the defense may well provide for the AAA units to repel both enemy infantry and mechanized attacks, and infantry and engineer troops may or may not afford whatever support the AAA units lack in such a defense.

Very little cover or means of concealment will be found on the beaches. The armor of the firing units will afford protection to the gunners under normal conditions. Foxholes and slit trenches must be dug as soon as possible, however, for the protection of troops, water and ammuni-

tion. Camouflage must be commenced as soon as possible.

The tentative selection of gun positions on the hostile shore most probably will have been made from available maps, aerial photographs, sketches and special reports. However, reconnaissance parties from the proposed AAA landing units should be landed in the advance waves to verify the map selection and to be on the beach to guide these same fire units to the proper position. Here it must be remembered that units in craft may land many yards or even miles from the planned land beach and the reorganization of the defenses of any one beach is most difficult under such conditions. Then too, if the beach defense plan is not coördinated with the beach organization plan for the handling of supplies a conflict may result. Gun positions must be kept away from Class 3 and Class 5 supplies.

As with all units that enter into an operation like this, unit planning and special training will be required, and the following points may be worth while considering. Plans should provide for the landing of fire units in the proper tactical order, with the minimum dispersion of sub-units. All personnel, selected as to physical stamina, ability to swim, natural immunity to seasickness, etc., must be properly clothed and equipped. Vehicles must be properly packed with essentials only. Drivers must be trained in the embarking and debarking of vehicles from craft by day and by night and in the operation of their vehicles on beaches of various soils and under dry and wet conditions. Gun crews must be trained to manhandle equipment although short handed. Skill in lashing, storage and water conditioning of vehicles and equipment is essential. All personnel must be trained in the identification and the use of captured weapons, and in firing from moving craft. The use of cargo nets and rope ladders, together with a knowledge of lowering equipment and supplies from various heights to landing craft, both by day and by night, may prove to be useful and a great time saver. Special means of wearing individual equipment while on board the craft and ships may save many lives in the event such boats are hit while at sea.

In addition to the special training mentioned above, the following training topics are considered worthy of emphasis: types, nomenclature and characteristics of ships and landing craft; Navy customs, terms, rules aboard ship, etc.; and removal of beach obstacles and mines, booby traps and the placing and removal of demolitions.

The prompt and accurate identification of friendly and enemy aircraft and armored vehicles in this type of an operation is of paramount importance. In the excitement, noise, and confusion during the initial landings, together with the milling around of troops and piling of impedimenta on these beaches, the tendency seems to be for one and all to fire on anything that seems to be a favorable target, irrespective of identity. Unfortunately in all of our landings to date a certain number of friendly aircraft have been fired upon by these ground troops, due in part to faulty identification, to excitement or to itchy trigger fingers. This is a matter of training and discipline.

The orders for the Task Force covering the complete operation will be voluminous indeed and will be as minute and meticulous in detail as time will permit. Written orders will be required for all units down to the company or battery, the details of which will again depend upon the time made available to these lower units. Paragraphs in these orders pertaining to the AAA units may cover such items as the following: attachments, mission, craft assignments, target priorities, time of loading, ammunition allowances, ammunition sources of supply, special signals, time units revert to higher control and many others.

Liaison between all AAA units and higher commands must be maintained and the liaison AA officers may become special staff members of the higher command and act as advisers on all AAA matters.

Ammunition requirements during the early stages of the operation, both as to type and quantity, will be an estimate at best. As more and more landings are accomplished, however, figures covering this will be made available to the interested troops. In any event it is safe to say that all available space in gun carriers, ammunition carriers and other vehicles will be utilized for this purpose on the initial trip. Ammunition not capable of being loaded on wheel or track vehicles may be loaded on the craft and manhandled on the beaches by the beach organization personnel, be they army, navy, or coast guard. It will then be issued on a controlled basis as needed.

War Department Training Circular No. 19, 1942 and subsequent publications cover very clearly the possible alternate use of AAA weapons. In this type of an operation it may be necessary for the AAA to aid in the assault of fortifications; quite definitely it will be required in the antimechanized defense of the beaches and quite probably for firing upon enemy surface craft. In this latter case, however, gunfire must be coördinated with higher authority so that the AA weapons will not be used to fire upon such targets when other friendly ground weapons, aircraft, or naval units may be better utilized to destroy or neutralized this type of attack.

It has been the intention herewith to present a few general principles for amphibious operations and to cover the high sport that might affect the AAA officer if his unit is called upon to participate therein. Although the number and strength of the AAA units participating in this sort of an expedition will be very small as compared with that of the entire force, the relative importance must not be lost sight of. The "big picture" must be accomplished well ahead of the time for the proposed operation. The actual plan must be adequate, complete, and vigorously pushed. Troops must realize that the crossing of the water obstacle and the beaching of the craft and boats are only the beginning of the fight. A mediocre plan, vigorously executed, may secure highly successful results; a superior plan, weakly executed, will doubtless fail.

They never thought a Bofors was that heavy.

The 40's come off early.

Official Navy Photographs

Amphibious Training

Members of all arms and services have learned to appreciate AAA during landing operations. As an Infantry friend put it, "It's a comfort to see those barrels sticking straight up."

The heavy stuff comes off last.

The landing mat makes it easier.

Combat Reports—For "Tired Training"

By Lieutenants James Raley and John Thornton, Coast Artillery Corps

"The AATC at Camp Haan presents . . . COMBAT OVERSEAS. . . . My name is Eugene S. Anttonen. . . . I am 27 years old and used to work in a copper mine in Michigan. . . . We landed on Attu May the 20th and I was in C Battery of the —— Coast Artillery Battalion. . . . It was a 90mm battalion . . . the Navy and ourselves set up our equipment on the beach. . . . We waited a couple of days and on the morning of May 29th the First Sergeant called us up about 5 o'clock, got us out, so we lined up, we didn't know what was coming on . . . the First Sergeant spoke up and said, 'Well, boys, we're going into battle . . . the Japs broke through the main line and they have our supplies and we got to go and fight them out. . . .'"

A Camp Haan day room, troops jam-packed in training, listen spellbound at the record playing on the stage. For it is the voice of one of their own coming out of the speaker. No fancy words, no flowery phrases, just the plain story of a soldier, an antiaircraft artillery soldier, faced for the first time with the real meaning of war. And as the words continue to come out of the loud speaker, just as if they were being spoken around the stove in the barracks, the audience hunches forward listening more intently.

". . . We started to fight at 0545, the main attack . . . when we started off the whole skirmish line fellows would throw hand grenades, the rest would fire and when we'd think we killed a few, we'd make another attack and go through the same procedure. . . . I didn't get very far after that . . . a buddy of mine, we had a tommy gun and were firing from our foxhole. The fire was getting so darn hot we had to get out. It was getting so darn hot in the foxhole, the Japs spotted us in there, so I told my buddy, I said, 'We'd better get out.' I got out of there and ran about twenty feet or so when they shot me in the right arm and knocked the rifle right out of my hand. They still insisted on getting me, they were shooting right at me while I was trying to get out, so I had to look for a foxhole. . . . I didn't bleed much but the arm swelled up on me. . . . I observed a fight . . . this here officer, I don't know, they told us he was a captain and he must of been a baseball player at some time, because he was very accurate with the hand grenades. . . every time you throw a hand grenade in one of their foxholes you get about four of them. You see arms, legs and the whole works fly up sometimes. . . . I was in an artillery outfit and we killed practically all the Japs, all except two prisoners we took when the fight ended . . . infantry training sure comes in handy because I was in a gun battery and we never expected to get into infantry fighting . . . you never know when you are going to be called to do some of that there regular fighting . . . there is nothing to do but get in there and fight . . . every man for himself. . . ."

As the recording closes, a spontaneous burst of applause salutes this newest of training aids at the Antiaircraft Artillery Training Center, Camp Haan. For this is the real thing, and enlisted men in the training camps are hungry for any scrap of information about these unknown battlegrounds, where they themselves will soon take places.

The popularity of this word-of-mouth training idea has been growing at Camp Haan ever since its conception some months ago, when returning enlisted men seemed to be a source of combat information through which elements of training and military fundamentals could be driven home in the minds of soldiers just preparing for battle.

Presenting these graphic stories of men who had been with the first antiaircraft artillery units to go overseas was a problem until the idea of making electrical transcriptions occurred. Schools and colleges had been teaching for years by electrical transcriptions. It was decided at General Handwerk's headquarters that many of the fundamental principles of military training could be indelibly impressed on enlisted men through stimulation of their own imaginations in dramatic combat reports by other enlisted men just returned from the theaters of operations. In this way it was believed possible to bring home the connection between the obvious tasks which most soldiers believe they will face in combat and the innumerable smaller tasks which are fully as important but difficult to impress in a training camp.

Thus, Camp Haan's AAATC Combat Reports were initiated. The basic form chosen for the records is the simple narrative, skillfully written to create in the man listening a sense of personal participation in the "combat experience."

Each transcription has its basic battle lesson, whether it be the necessity for air guards and slit trenches or the checking of headspace on the machine gun—and all taken from personal interviews with returned antiaircraft artillery veterans of the world's battle fronts. By using the story form in the records the "lecture atmosphere" is avoided and the idea of "talking at" the man omitted, for the principals in the story learned the lessons which must be impressed on the troops in training.

Fortunately for the producers of the Combat Reports, at the time of their inception the first British Composite Antiaircraft Artillery Battery was visiting General Handwerk's command and more than 50,000 words of informal interviews were granted by these veterans of Narvik, Dunkirk, Malta, and the Battle of Britain. These have been reshaped by a staff of trained script writers into a series of records, five minutes per side, which tell the story of British antiaircraft at the height of its fury, each with one or two lucid training lessons. At the close of each record the lessons are summed up in a short question and answer period between the announcer and the principal character in the story.

Later enlisted men returned to Camp Haan from all the world's battle fronts, from the Aleutians, the South Seas, from Iceland, Greenland, Africa. Each of these was asked

tell the story to the recording machine—informally, no flourishes, just tell everything about his overseas experience he could remember. These transcriptions furnish the background information and the "flavor" to guide the script writers, who select the most important elements of the tale so far as training is concerned and then construct a dramatic incident which is rehearsed and finally put on the finished "platter," a cohesive narrative which builds into a dramatic climax, hammering home the essential points.

The finished Combat Reports are cut on a special record made of flexible acetate which is virtually unbreakable. They lend themselves to any type of rough treatment as they are handed from battalion to battalion, indoors, outdoors, in any sort of weather. Coupled with this practical aspect of their use, the transcriptions do not require special equipment for playing. A standard amplifying device which is issued to each antiaircraft artillery unit in a training center is ideal for their reproduction. In this way, for example, a unit may halt in the gun park at artillery drill for a few minutes and, grouped around the 40mm guns, hear the thrilling tale of a British Bofors unit which was caught short one day while in convoy along a peaceful country lane in England, and then sprang into action and proceeded to destroy three of the attackers in short order, all because of months spent perfecting artillery drill. Or they may hear the exploits of a private first class in an American battery who saved an entire column of infantry in Africa, when he had the courage to stick by his .50 caliber machine gun and fight off the strafing planes.

Camp Haan's AAATC Combat Reports may be played in day rooms or recreation halls, on the firing range; in fact, any place where power is available. It has been discovered that the battery is the ideal size for use of the transcriptions but they have been successfully employed in units of battalion size.

Some of the Reports include experiences as early in the war as the initial battles in France. One popular transcription tells the experience of a British Sergeant in charge of a 40mm gun which was set up to protect a bridge vital to a British Armored Division. In the story, a German plane comes over at 3,000 yards and the inexperienced crew fires at the distant target and misses because it is out of range. As a result, the position is immediately attacked by three Stukas which come over from different sides. One is destroyed but another scores a direct hit with a 500 pound bomb. The gun position, being a lone emplacement with no support, is demolished and thirteen of the fifteen members of the crew killed. So with this costly experience the Sergeant (a Royal Artillery Lieutenant at the time of the interview) realizes his mistake of firing at a lone reconnaissance plane and giving away his unprotected position.

Proof of the instant popularity of these training records was evident at Camp Haan in the discussion periods which follow each playing. A set of questions and answers, based on the training fundamentals contained in the recording, is furnished with each record, and the interest of the enlisted men no more clearly demonstrated than by their heated discussions following the performance. The usual Combat Report presentation consists of two ten-minute records on different subjects or a single one of twenty minutes. Scripts are carefully checked by training specialists for accuracy and brought up to date at intervals whenever more recent reports from overseas theaters indicate a change necessary.

There has been no salesmanship necessary with this training aid. Hearing is believing. It may be a twenty-one-year-old private, who has come back from Tunisia, speaking to the other enlisted men from the recording:

> "In strafing you've got as good a chance, if not a better chance of getting that plane than he has of getting you . . . one thing to do is stay by that gun . . . you're safe there, safe as you'd be anywhere . . . all of you fellows may figure, you may say, oh, a .50 caliber is just a machine gun and can't do much, just because maybe you've seen a 37mm or 40mm or 90mm. Maybe you think the big shells is all that does it . . . but a .50 caliber machine gun is a mighty wicked little weapon . . . many a time I've seen planes when you start shooting a .50 caliber at them veer off to get out of the way of them. They don't like it . . . but if you don't know how to use that gun when something goes wrong, it's no good at all . . . over here in the United States, you fellows that are doing your training now, you're just learning the first things about your gun . . . maybe they were talking to you for hours and hours . . . maybe you've been out on that gun for the last two hours just running around, taking number one man position . . . maybe you've been through it a dozen times, sure you may think it is a lot of hooey over here, but wait until you get over there . . . if you didn't learn it back here, you're going to sit down over there and start thinking, now what am I supposed to do when we start shooting that gun . . . and you get all mixed up . . . it won't be any worrying or fretting . . . it may cost you more than just a lot of worry if you don't learn it."

When the men hear the familiar phrases of this Pfc., who used to work in a sawmill and talks just like the rest of the others there in the audience—except that he had already been out there and known the rush and confusion and fear of war in the flesh—when they get it straight from the shoulder, these untried antiaircraft artillerymen really sit up and take notice. The Combat Reports are speaking their own language and providing for them a peek into the tomorrow about which they are so curious.

Stepping Up AW Speed in Panama

By Private William Tusher

Two Army trucks, one of them a prime mover, churned up pockets of dust which left a billowing buff smokescreen in their wake as they lurched to a halt at the selected jungle clearing. Moving noiselessly, with the precision of a well-oiled machine, thirteen bronzed soldiers leaped out of the vehicles as one man, took pre-arranged positions, and unloaded. They functioned faultlessly. There wasn't a false gesture or a wasted second. At the chief of section's "Prepare for action!" the gun crew swept off the mud-caked master tarpaulin, the muzzle and the barrel covers; brought up the out-riggers, lowered the carriage and went into FAS. The director and power plant were whisked to installation points, and the range section set up the .50 caliber machine gun. The maneuver unraveled with silken smoothness. There was no ganging up, no collision of men as emplacement was accomplished.

Lieutenant Colonel Adolph B. Juell, of Oak Park, Ill., commandant of the Coast Artillery Command Training Center in Panama, clocked the operation. Again it had been completed with increased speed. It was the fifth successive demonstration that week during which the crack crew had whittled down its previous timing. Twenty-five seconds less than established par. Under combat conditions there would be no tarpaulin to remove. That would eliminate at least thirty seconds more from the operation. Colonel Juell was well pleased. The experiment was paying off—paying off in results, paying off in automatic weapons know-how.

The campaign to step up automatic weapons efficiency, now in its second phase, was undertaken simultaneously in the field and in the classroom in January 1943. Before it was one year old, its success became so marked that the drill under which emplacement was achieved below par had been accepted as standard not only for the highly trained demonstration crew which introduced it, but for every AW battery guarding the crossroads of the world against aerial marauders.

When the Automatic Weapons Section was added to the Officers Division of the Coast Artillery Command Training Center, the demonstration crew plan was born. Object: No AW eightballs in Panama. Means: Adoption of the best possible uniform drill procedure. Colonel Juell gave the green light to Major (then captain) Parnell M. Pafford, of Atlantic City, N. J., the command's AW expert, and AW instructor Captain (then lieutenant) Louis M. Wilson, of Sioux Falls, S. D., who later became a battery commander. Captain Wilson mustered thirteen enlisted men from advanced jungle positions, and three from the recruit training center. They were the personnel of the first demonstration crew.

At that time, a three man British Military group was visiting Panama Canal defenses at the invitation of the United States Government. One of the members was Major Richard G. Steele, outspoken, disarming English AW authority, battle schooled veteran of the 1940 blitz.

Major Pafford and Captain Wilson eagerly accepted Major Steele's offer to place before them the results of British AW experience under fire. They welcomed his critical analysis and constructive suggestions when the demonstration crew performed. They were able to aim, with reasonable hope of success, at a drill procedure combining the best features of established British and American methods, as well as such advances that might be realized in experimentation. The days of differing drill formulae in the field were numbered.

Consulting frequently with Colonel Juell and Major Pafford, Captain Wilson tackled the problem as the late Knute Rockne might have girded for a crucial football contest.

In subsequent months, demonstration crews were to consist only of thirteen men, but at the inception sixteen were used to provide wider latitude for experimentation. Soldiers called in from the field were average enlisted men. Experts and wizards were not wanted. Maximum AW efficiency was sought with the run-of-the-battery soldier, not through individual grandstanding, but through teamwork based upon scientific drill.

Britain's Major Steele was an interested spectator during the first week of training. He drove home again and again the transcending importance of alertness, discipline and attention to the details of each job, however seemingly insignificant. Captain Wilson put the demonstrators through their paces relentlessly. He schooled them in fundamentals, oriented them in nomenclature, rehearsed them in firing and fire control methods, worked them without let-up on march order and emplacement. Then he gave them the flag on speed, and they shot hell out of existing records, got going faster, aimed more accurately.

Captain Wilson studied the results like a scientist in a laboratory, periodically discussing his findings with Major Pafford and Major Steele. He operated by trial and error, analyzed cause and effect. He kept paper and pencil handy at all times. When the best method of organization was attained, when the fastest means of handling the gun was realized, he wrote it down for later inclusion in a uniform drill procedure.

At the outset the crew required two minutes above par to ready the firing unit for action. Crowding and congestion ate up precious seconds. Lack of maximum planning was another bottleneck. The sequence of movement was

shifted around until the complete operation was reduced to a minimum of time. Crew men were allowed maximum ease and smoothness in the performance of their duties. Every ounce of energy, every atom of time was harnessed in a brilliantly coördinated effort of preparation and attack.

Seating positions in the prime mover were determined in advance to preclude late starts. Each man was so placed when the trucks rolled, that at "Prepare for action!" he would be ready to dismount the equipment instantly, and conversely, reload it just as quickly. No man acted independently. Duties were distributed so that all worked simultaneously, the perfection of one task linked to the performance of another. While members of the crew were assigned to permanent posts, there were no specialists, no prima donnas. Every soldier was trained thoroughly to fill in on all possible positions.

Within a week there were positive results. Emplacement was completed in one minute above par, then in par. Two weeks after the demonstration crew was organized, awkwardness and fumbling and delay were licked. Timing was cut down to below battle standard. Captain Wilson embodied the formula in the drill procedure, and it was adopted as a command-wide standard when it was written into the Panama Coast Artillery's 40mm manual in February 1943.

Its teamwork perfected, the demonstration gang embarked upon a tour embracing every automatic weapons battery on the bushbound Isthmus. They were now ready to impart their AW know-how to their buddies in outlying positions. For more than three months the crew played the jungles. Before Captain Wilson's men were returned to their original organizations on May 11, 1943, every AW man in Panama had witnessed at least one demonstration, and had participated in drills whose objective was the same speed, the same coördinated performance.

Demonstrations lasted two hours. They were thorough and painstaking. While the crew brought the firing unit into action and simulated firing, either Captain Wilson or Lieutenant Norman E. Cole, another AW instructor, lectured on the handling of equipment. Demonstrations were not geared to dazzle the spectators. They were keyed for instructive value. The crew performed first in slow motion, with the officer delivering a running explanation. In the end, the demonstrators bolted through the exhibition at high speed—the new normal in Panama. Question periods ranging from one-half hour to an hour followed. Permanent crews at AW batteries forthwith adopted the new drill procedure and practiced until they mastered it with speed, efficiency and precision equal to that displayed by the demonstration outfit.

In mid-May, when the original demonstrators were returned to their permanent organizations, the method of crew selection was modified. Instead of gathering men from scattered positions, it was decided to draft fully staffed 13-man AW crews as units, crews that were accustomed to working as a combination, crews that would continue to operate as a combination when their demonstration period expired. The new refresher project called for batteries in the field to supply a different crew with each successive AW course for officers.

Coast Artillery Command Photo

Officer students take a refresher.

Now that a single drill procedure prevailed in the jungles, the demonstrators exhibited their AW know-how before commissioned students, made a concrete contribution to the extension of hemispheric defense. For, from month to month, the roster of the Officers Division of the C.A.C.T.C. included enrollees from Latin America, as well as continentals, Puerto Ricans and American Naval officers.

Jungle crews relish detached service with the training center, value their specialized instruction, enjoy the prestige of their work, make the most of free evenings. They respond with a will to preliminary drill by Corporal Meier, a member of the original demonstration unit who has been kept at the school as an instructor.

Officer students watch the enlisted men intently as they maneuver AW firing units. At a propitious time, the officers are organized into gun crews of their own, while the soldiers play teacher and correct mistakes. The officers learn quickly the details of each job, since they receive specialized instruction on every phase of AW drill procedure. The soldiers profit by their teaching experience. When they are not giving pointers to officers, the demonstration crews experiment with new ideas.

Captain Howard R. Walton, present chief AW instructor of the Officers Division, is enthusiastic about the rotating demonstration crew program. He has found jungle AW men quick to improve, eager to learn, and competent to pass on their knowledge.

Colonel Juell said that the back-to-the-school project will continue against even the most imperceptible letdown in the high standard of 40mm training in Panama.

Trainee Commencement*

By Private Joseph E. Hoffmann, Coast Artillery

The scene is the commencement exercises after basic training. A thousand-odd trainees are assembled to hear the Commanding General's farewell address. These trainees have just ended a three-month period designed to convert them from civilians to soldiers.

The General enumerated the events of the past weeks. The trainees listened and the General's words suggested recollections of their army life.

"*. . . Thirteen weeks ago you were raw recruits. . . .*"

Yes, about three months ago I was on the outside. I read about the army and the war in newspaper articles. I was worried about getting gasoline; if we had enough coupons for steaks—if we could find the steaks; whether I should buy a new pair of shoes with my 17 coupon. Then the draft board tapped me on the shoulder with "Greetings from the President" and I went off to the Reception Center to get a new suit and free tickets to USO dances.

"*. . . You have successfully completed your basic training and are now soldiers. . . .*"

Well—So I'm a soldier now! Funny, but I don't feel any different. I still like crunchy chocolate and catsup on my hamburgers. But I have learned to button my clothing and hang it, first raincoat, then overcoat, field jacket, blouse, etc. I've learned to say "Sir" to commissioned officers, to skip into step with hup, tu, tree, four, to Fall Out and Fall In. What worries me, General, is what happens when I'm supposed to use the training I've received. I don't think I'll really be a soldier until I actually have what the books call a "baptism of fire."

"*. . . You were given the fundamentals of soldiering. . . .*"

Yes, I did receive all the fundamentals. I learned how to shoot my rifle—I've got a Sharpshooter's medal to prove that. I learned to use my bayonet. I learned the proper method of throwing grenades, of digging fox holes, of crawling, of camouflage. But I know one thing, General, before I get into that landing barge, I sure want that practice that makes perfect.

"*. . . You've learned something of what it means to be a soldier and you've probably enjoyed the process. . . .*"

Yes, I did. Everything we did in basic was new, and new things are always fun. Even KP was fun the *first* time. But, sometimes when I thought about the things we were doing. Gosh! ! Soldiering began to mean much more than just USO dances and wearing uniforms. Take for instance when I was walking guard on alert battery detail. Then was a time to use your imagination. There I marched, silhouetted against the moonlit skyline—a slow moving and distinct target. Suppose someone had crawled up in the bushes? They could have easily picked me off. Soldiering means many hours in dangerous spots alone with your imagination.

Then there was the trip through the infiltration course. I don't remember that the overhead bullets worried me at all. You see I believed my officers when they told me the bullets were too high to hit me . . . if I kept low. What was tough was the crawling on my belly, with sand coming in buckets-full down my shirt-sleeves, down my back, into my mouth and ears, crawling with my helmet scooping the earth and seeing only about three feet of dirt in front of me. Soldiering means many hours of physical discomfort, hard work and sweat.

Too, there was the time several of us put on camouflage suits and tried to take a "machine gun nest" without being seen. I had a feeling of being alone, my safety depending only on my ability to keep hidden and still crawl toward the nest. I became a "flower girl" that day because my rump stuck up when I rolled over a hump in the ground.

Soldiering, I found then, takes a great deal of individual skill. When you're out on an assignment you're on your own.

It took us eight weeks of dry runs before we finally fired the big guns. Then when we loaded on twenty second intervals I realized the meaning of teamwork. I realized it further when we fired on a nine-foot target four miles out in the bay. About thirty men, all working together in thirty seconds, were necessary to aim and fire the gun. This, General, makes me realize that being a soldier means more than marching in step, hanging clothes and saying "Sir." These things are necessary, they're garrison manifestations of a trained soldier. A trained soldier knows his job, he can do it when he alone must do it or when he must work as a member of a team and he must be ready for plain dirty and hard work.

"*. . . You had a bivouac and lived on special rations and learned to camouflage. . . .*"

Yes Sir. We lived on special rations. The boys called it C for Cold beans, D for Damned Chocolate and K for Ken-L ration and then ate smuggled Crunch bars from the PX. The camouflage was a blessing to the "tired" boys. The trails marked off to protect the camouflage were studiously followed whenever we were on detail because so much time could be consumed wandering from place to place. But did you see the boys bee-lining it for the latrine about 5 a.m.? Looking at it academically, General, I wonder how those boys would like ten days in bivouac, shaving out of a canteen, bathing I don't know where, and eating special rations after they run out of Crunch bars. Too, I wonder how the vegetation and the neat wired-off trails would look after ten days of bivouac.

"*. . . You learned to take orders and live under discipline. . . .*"

You put it mildly, General. I had to learn to live under discipline. Nothing irritated me more than those swarms of noncoms heckling us when we tried to "Left Flank, Right Flank, and To the Rear, Harch." Then the business of raincoat, overcoat, field jacket, blouse, all hung in order with

*Private Hoffmann wrote this article after completing thirteen weeks of basic training at the CARTC, Camp McQuaide, California. "The General" is Brigadier General C.D.Y. Ostrom, then Commanding General of the CARTC.

every button buttoned drove us crazy. To top it off, we made our beds differently every day and finally ended by tearing them up every morning and making them fresh every noon. Cute, too, were the many times we came back from the obstacle course, dripping with sweat, just in time to jump into our OD's for retreat. But after thirteen weeks I'm at least accustomed to it.

". . . *You took hikes, ran the obstacle course, and were toughened physically.* . . ."

General, you forgot "Double Time, Harch." That was the exercise that drove us simple. The only thing that kept me going was the little underweight kid who ran in the rank ahead of me. I figured that if he could keep going, I could also. And he probably had his eye on the fat fellow ahead of him. I was toughened physically though. Double time is now a waltz and the obstacle course is like a Sunday picnic (with ants, flies and rain).

". . . *You learned to live with your fellow soldiers.* . . ."

Right! I remember a fat-boy from a wealthy family. He disdainfully refrained from speaking to any of us on the train out. Last week I saw him, minus fifty pounds of lard, in a friendly wrestle with a burly ex-farmer from Texas. And I suspect, too, that some of the hillbillies from West Virginia and Tennessee, as well as some of the boys from the city slums, are learning for the first time to get regular hair cuts and to wear creases in their trousers. I discovered something, too. Do things when you are supposed to. Do what you're supposed to. In other words, "keep on the ball," and you'll end up a Gigless Joe and a great deal happier. I believe this is the first time in my life I've forgotten to remind myself I was a born procrastinator. Procrastination, I've learned, is an invalid excuse to a sergeant.

". . . *You are going out into other units.* . . ."

Yes, and we all wonder where. Will we sit somewhere on a coast and dry run on the 155's day in and day out? Will we be transferred to the infantry? Will we go to the tropics, to Alaska, to Africa? In spite of the many rumors from heretofore authentic sources in the latrine—we are all wondering. Basic training was an adventure to us. It was all new enough to be exciting and interesting. Those of us who weren't resentful of being taken from the girl friend or wife, rankled by the discipline, or beat down by the PT really enjoyed basic. In fact we felt sometimes a little guilty. We were having a good time . . . helping to win the war should be more difficult. It'll probably be so when we get to a permanent unit.

". . . *You have received returns from your training in proportion to what you have individually put into it.* . . ."

That's about right, General. Sometimes that obstacle course just seemed to leer, taunting me to gold brick. But it seemed that every time we went over it became easier. Then, too, looking at it seriously, someday each of us may be alone, out on a field crawling on our bellies. Then every helpful hint that we can remember will be like a word of advice from our guardian angel. But there are still many lugs here who feel they are doing the Army a favor by attending classes.

"And I wish you good luck and may God bless you."

Thank you, General, we'll probably need it.

British Official

British Bofors await D-Day.

Can YOU Use Film Strips?

By Lieutenant John D. Neill, Coast Artillery Corps
and Tec 5 H. D. McKee

Are you suffering from a "film strip phobia"? You are? Perhaps you do not understand the correct meaning and usage of the film strip. A film strip is a Visual Aid and does just what its name implies—AIDS VISUALLY. It is not intended to be, and never will be, a complete lecture in itself. The film strip is written, illustrated, and produced with the sole purpose of helping the instructor; when used properly it can be of the greatest assistance to him. The proper use of the film strip requires no mammoth production plans or extensive study. Its success depends only upon a simple, common-sense procedure. When used improperly, the film strip is of no aid at all and, in most instances, will hinder the instructor and confuse the student.

Once the film strip is in your hands, it is yours to use as you see fit. But be smart about it. Treat it right. Do you believe that any man in your battery is going to like sitting in a stuffy room with the lights out while an inexperienced projectionist wrestles with a projector and a piece of film? Or while you go on interminably in a voice of dull uniformity concerning the proper method of "detaching the joint interlock cam swivel arm from the main cransten adjustable sleeve bushing"? The probability is *1.00* that he won't like it and will undoubtedly take advantage of the darkness, stuffiness, and droning voice to fall sound asleep.

There are endless suggestions that could be given to the instructor to help him make a film strip showing a success. But simpler than that, there are a few "DON'TS" which, if followed, will assure the instructor of an adequate, comprehensive lesson.

Listed below will be found twenty (20) questions on the showing of film strips.

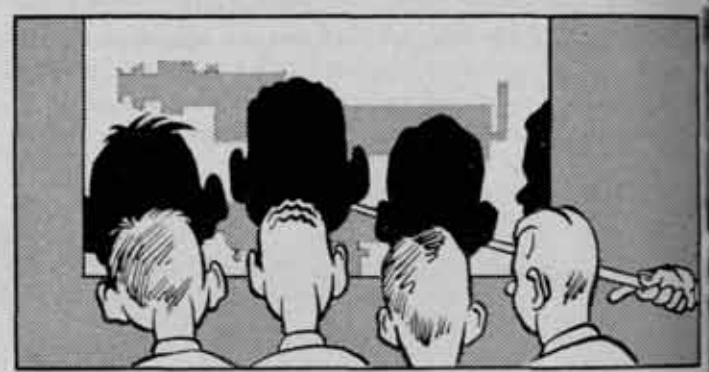
If your answer (truthfully) is NO to any five or less, then it is not surprising that you believe your whole battery to be suffering from sleeping sickness.

Should your answer be NO to any ten or more, then you are on the right road.

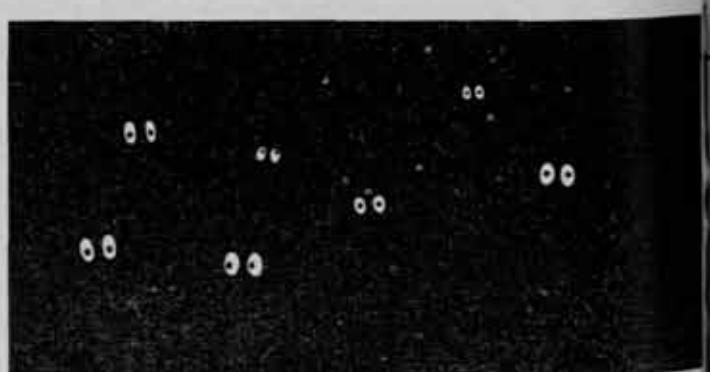
When you can answer NO to all twenty, you are then taking full advantage of an excellent visual aid and the educational result will verify its worth.

1. Do you need an excuse such as a blizzard or a monsoon to keep the men indoors to see a film strip? (It can be shown outdoors.)

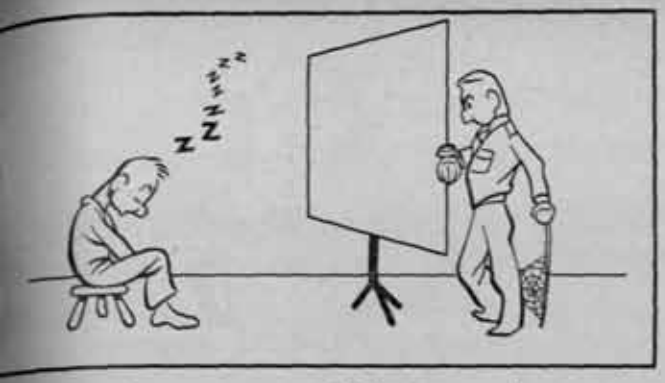
2. Is it your belief that a room must be air-tight, with a minimum temperature reading of 90° before the film strip can be started? (OH! You let them take off their neckties?)



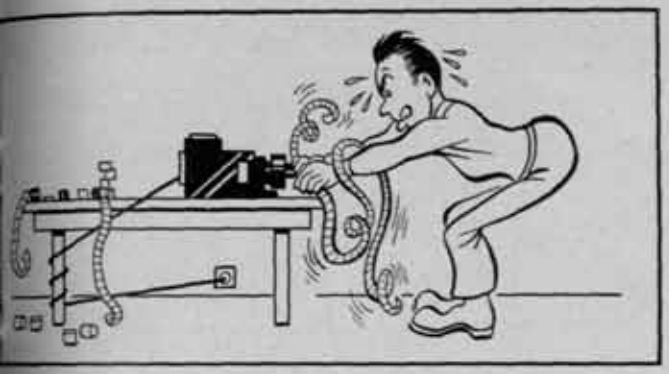
3. Is your projector placed so that the men's heads are shadowed on the lower half of the screen which is placed in a corner of the room? (They only miss half of the frame that way.)



4. When you put out the overhead lights in the room, does your projector light go out too? (Both on the same circuit, no doubt.)

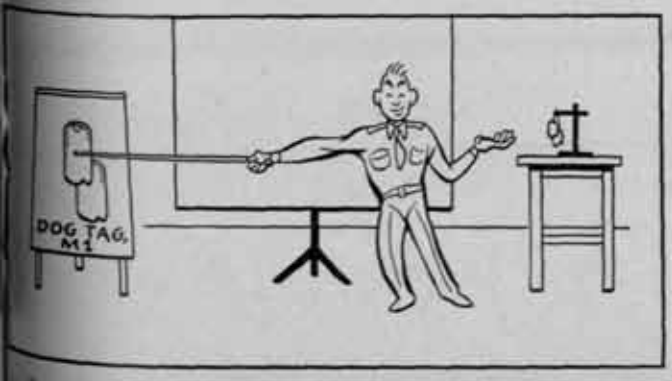


5. After the men are assembled, does it take your projectionist five minutes to run all over the battery area looking for the correct film strip? (Fast, isn't he?)



6. When he returns from the hunt, is it a good fifteen minutes before the film strip is ready to be shown—CORRECTLY? (He is speedy!)

7. Do you NEGLECT to preview the film strip before giving a lecture on it? (Must be a four-letter man.)

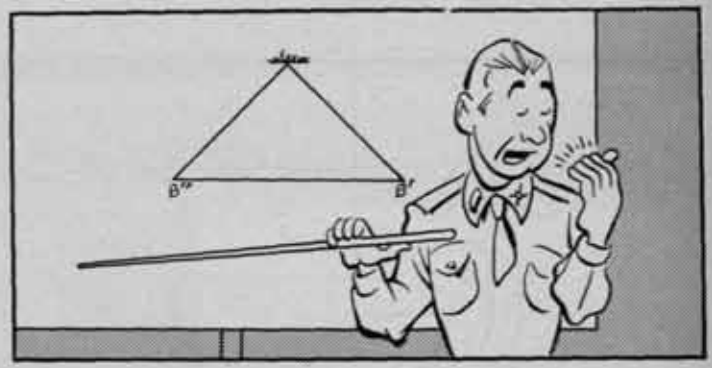


8. Are you allergic to using other visual aids along with the film strip? (They would certainly add interest.)

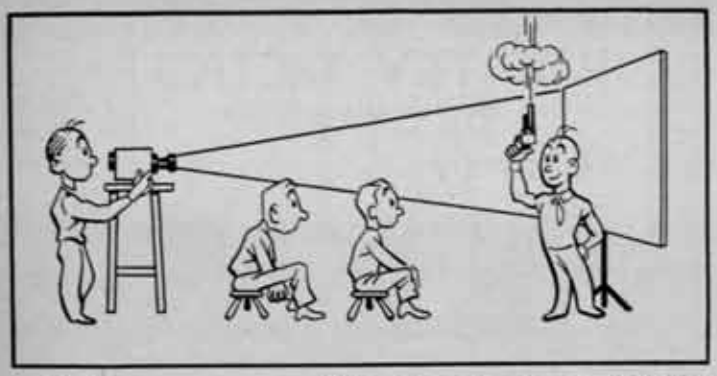
9. Does your introduction to a film strip consist only of: "This is a film strip"? (That's a good cold beginning.)

10. Do you enjoy the silence of the room and refrain from reading the frames to the class? (Of course, they can read, but repetition never hurts.)

11. Are you proud of your intimate voice with the inaudible tones? (Is your class proud of it, too?)



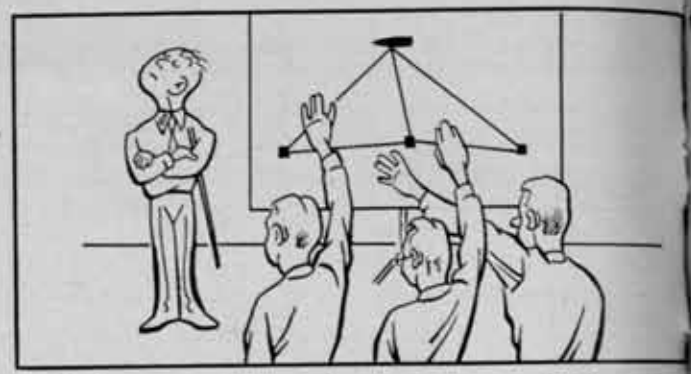
12. Do you get a symphonic conductor's complex when you have a pointer in your hand? (It can be distracting.)



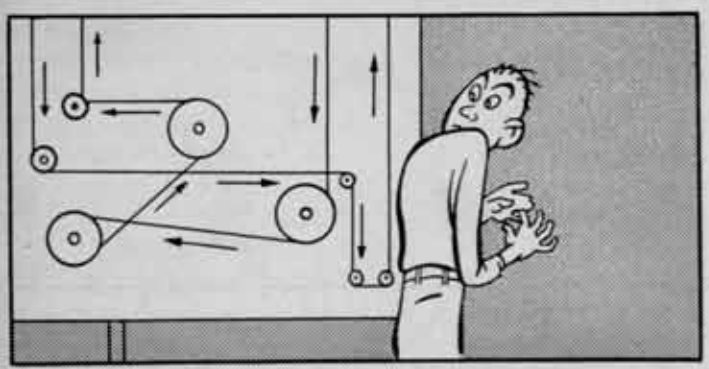
13. Does your manner of signaling when through with a frame resemble the impact of a shell, H.E.? (Anything to take their minds off the film strip.)

17. Do you exhibit your Institute of Technology vocabulary to the greatest of your ability? (Might as well speak in Lithuanian.)

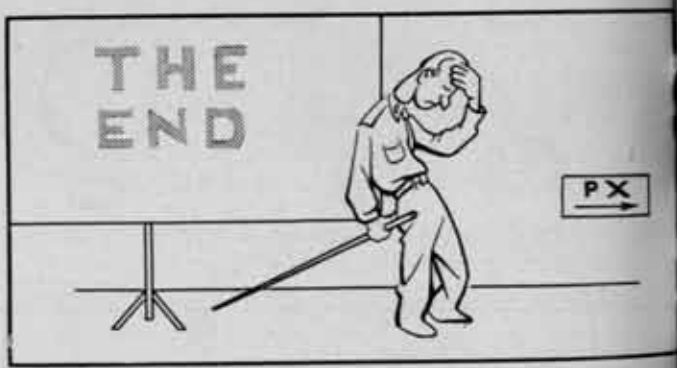
14. Is it necessary for you to stand in the middle of the screen while looking for the recoil piston that you are talking about? (Do you look well in the bright light?)



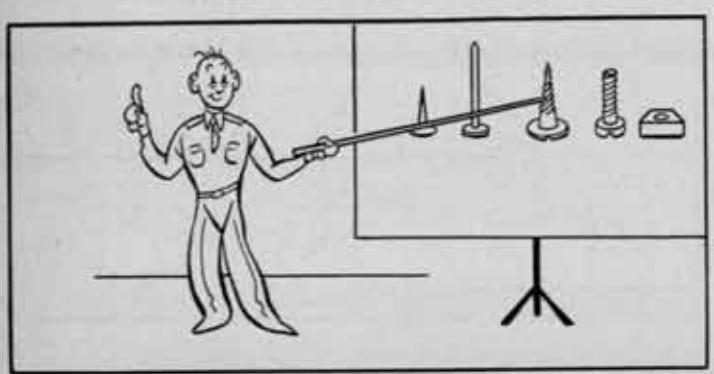
18. In your opinion, is it unnecessary to ask the students from time to time if they have any questions? (Come now, you're not *that* good.)



15. Do you pass over a complicated frame, leaving the student to think it out for himself? (What are YOU there for?)



19. Are you too tired at the end of the film strip showing to give a summary of what has been shown? (Maybe *they* are too tired to listen.)



16. Are the key points so well stressed that they need no emphasis from you? (Surprising!)

20. Do you ignore the reaction of the class to the lecture? (It's a sure-fire test of YOU.)

→ The M 4 Tractor takes heavy AA guns over practically any terrain.

The M 16 Half-track makes a pretty early-morning picture. But get off that sky-line!

Mobility Plus

New wrinkles enable our AA weapons to follow right along with the action. Tractors and half-tracks replace wheeled vehicles.

AAA School Photos

↑ The same M 16 proves it's not a fair-weather friend.

← The business end of the M 16 seems to be quite an improvement over the 50's

Firing on Water-Borne Targets*

By Tec 4 John L. Denning, Jr., Field Artillery

EDITOR'S NOTE: *The methods described by this Field Artillery author recall to Coast Artillerymen the Whistler-Hearn and the 110° plotting boards. On many locations the Field Artillery is required to solve the basic seacoast artillery problem, and in many other locations the seacoast and antiaircraft weapons manned by the Coast Artillery Corps are employed to support the ground forces. These overlapping or parallel missions with their accompanying problems furnish some ground for argument for a single artillery. At least they furnish a common meeting ground.*

Our mission included the covering of an almost circular coast. This made it necessary to be capable of all-around fire. In view of this, FDC (*Fire Direction Center*) constructed a circular firing chart with the battery positions in the center (see diagram).

Each battery established OP's to view the maximum amount of coastline. Site tables were made at each OP, using Angle of Site to determine ranges to sea level. Using this method the range to a target can be determined instantly with a fair degree of accuracy. A range and chart azimuth are used to locate a target only when the target is visible from only one OP. A more accurate method to locate targets is by Long Base Intersection, taking chart azimuth readings from two or more OP's—which in our case is nearly always possible as the OP's are far enough apart to give a good angle of intersection.

Azimuth arcs were plotted around each OP on the firing chart (see diagram). This eliminates the clumsy and slow use of a protractor. Azimuth arms were made from plastic graduated in the same manner as a range deflection fan. A pin through the azimuth arm into the OP position acts as a pivot for the arm; this makes it possible to measure azimuths on the firing chart in a matter of seconds. BC 'scopes at each OP are laid on a reference point with a chart direction taken from the firing chart; this proved to be a more accurate way of locating targets than a true azimuth.

A timing telegraph set (ML-110) from the metro section of Division Artillery is set up in FDC, and time coordinated there. This is so installed that the time buzz could be heard at all OP's and GP's. With this system OP observers can take their instrument readings at exactly the same instant. The instrument buzzes for five seconds ending on the minute every minute; readings are taken at the end of the buzz. Initially four or five readings were required to determine the course and speed of the target.

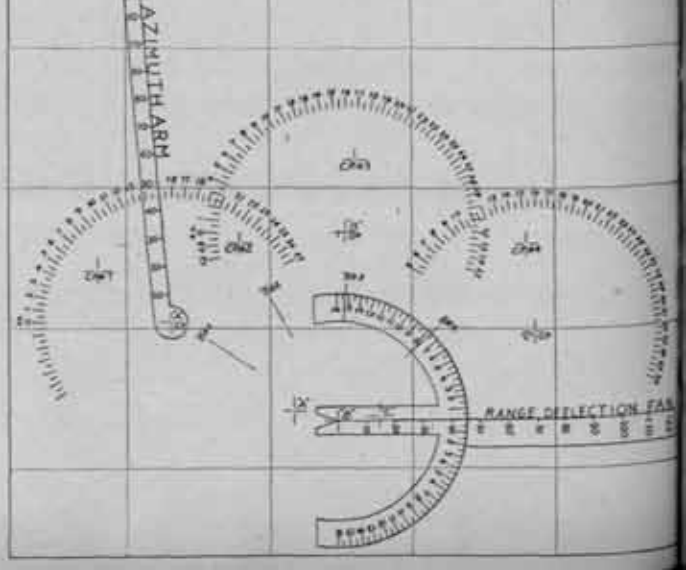
The target's position has to be estimated two minutes in advance (set forward point) plus the distance it will travel during the flight of the projectile (predicted point). This distance is drawn and measured along a line to conform to the direction of the course of the target.

A table was made to determine the distance the target travels during the time of flight. At the mean range of the batteries we enter this to a column that gives the distance a target would travel during the time of flight—this column is for a target traveling at the speed of the one to be attacked. For example, if a target travels 100 yds/min the column listed "100 yds." gives the number of yards it travels during the time of flight of the projectile for the range in question. The distance (yards traveled per minute) is measured from the firing chart between several plots, to obtain an average distance; once determined it rarely changes. Most vessels travel around 200 yds/min incidentally.

Site tables (including the "complimentary angle of site") were made for sea level, to eliminate any loss of time computing sites. The Vertical Correction Operator works with the Horizontal Correction Operator on the firing chart, each setting an azimuth arm as an instrument reading is obtained. HCO reads the range, VCO the deflection.

As soon as a target is located an approximate range and deflection shift are given the computers and the guns are so laid at once. In one minute two instrument readings are reported from the controlling OP's. The intersection of the readings is plotted, and ranges and deflections read to all computers. In the following minute the computers send the guns a shift and new elevation; the guns set these off and fire at the end of the minute. A battalion volley can be repeated every two minutes as long as the target travels in a regular course. It is not necessary for the target to travel in a straight line—which was rarely the case. Two instruments are used at each OP: one tracks the target and the other reads azimuths to splashes. Corrections are applied to the next volleys to improve accuracy. Using this method the second volley is always on the target (predicted point).

Telephone lines run directly to each individual gun from the executive's post. The chief of section repeats the commands to the gun crew and gives the command to fire at the end of every 5-second buzz he hears, provided he has



*Reprinted from the *Field Artillery Journal*, by permission.

eported his gun ready. The computer can connect the uzzer to his GP line by means of a switch, but he does ot connect it unless he is ready for his battery to fire.

Comments

Speed is of the utmost importance at the OP's and in DC. Every second lost decreases the possibility of good esults. It requires quite a bit of time and work to perfect is method. It is, however, good training for the person el—they take an interest in it and enjoy doing it.

As the firing chart takes quite a bit of abuse it is almost ecessary to countersink something hard around the GP's nd OP's to keep the pin holes from becoming too large. ur chart is also covered with Dura-seal and lacquered.

The range deflection fan shown in the diagram was ade to fit the chart. It works exceptionally well as it is easy handle. The issue type range deflection fan is too wide at maximum ranges: it interferes with the smooth operation of the azimuth arms. With our type the base-line extensions are formed neatly around the GP's, easily found and distinguishable yet far enough away to interpolate deflections accurately. Our fan also facilitates the reading of large deflection shifts. "B" Btry base line extensions are illustrated in the diagram for check points 1 to 4.

A buzzer system is not necessary as long as the time is coördinated. Using the words "Ready . . . take" works very well with the OP's, and the command "Fire" can be given to the guns by the computers.

Corrections are determined from firing CI's on check points (grid intersections in the water). They are kept up to date with meteorological data which is received regularly; consequently no previous adjustment is necessary.

Fire for effect is started as soon as possible.

War Department Lubrication Orders

War Department Lubrication Guides, helpful and failiar wherever military equipment is maintained, are now be known as War Department Lubrication Orders. This redesignation is made in Circular No. 114, dated 21 March 1944. The following are the paragraphs in the circular which refer to the Lubrication Orders:

1—LUBRICATING ORDERS.—1. a. War Department Lubrication Guides are redesignated as War Department Lubrication Orders.

b. War Department Lubrication Orders are illustrated, waterproof, numbered and dated cards or decalcomania labels which prescribe approved first and second echelon lubrication instructions for mechanical equipment issued by the technical services, Army Service Forces. They will be carried with, or attached to, the equipment to which they pertain. Instructions contained therein are mandatory.

2. Lubrication Orders presently available will be listed in FM 21-6, 1 February 1944, and subsequent monthly changes thereto.

3. Unit Commanders will be responsible for obtaining, installing and complying fully with all current War Department Lubrication Orders that are applicable to equipment within their commands. Difficulties experienced in the performance of these responsibilities will be reported through technical channels to the Commanding General, Army Service Forces, Attention, Maintenance Division.

It should be noted that the use of the Lubrication Order is now mandatory, and that unit commanders will be held responsible for obtaining them and seeing that they are used in connection with the equipment in their commands.

But while Lubrication Orders are now made mandatory, it has been shown that using organizations are quick to demand them as soon as it is known they are available.

In recent months a poster explaining the advantages of the Lubrication Orders and telling where they could be obtained was prepared by Maintenance Division, A.S.F., and distributed to posts, camps, and stations. On the heels of the poster's distribution came word from the manufacturer of the Lubrication Orders that requisitions from the field had risen in one month six hundred per cent.

Technical Manuals now in preparation avoid any direct mention of lubricants by specification. Emphasis is placed squarely on the Lubrication Order as the latest and most reliable authority on lubricants to be used.

With the Technical Manuals covering the subject in a general way and the Lubrication Orders giving the specific detailed information required, changes can be made as desired in later editions of Lubrication Orders without bringing manuals and orders into conflict.

This is all as it should be. One edition of a Lubrication Order can be superseded by a new one almost overnight. Technical Manuals cannot be so readily revised and republished.

Improving the Panama Mount

By Captain Richard M. Conti, Coast Artillery Corps
and Sergeant William Bailey

Figure 1

Panama Mount Concrete Emplacements (Fig. 1) for 155mm guns present certain difficulties in our present tactical situation, which necessitates a rapid 360 degree traverse of the entire gun.

a. Our guns are equipped with balloon inflated tires (14.00 x 24), and consequently there was a binding effect (Fig. 2) of these tires against the curbed steel band on the raised inner circle of the mount. As a result, the guide plates on the trails also bound against the curved railroad iron (Fig. 3) several times in a 360 degree traverse. In the original construction plans for the mount we anticipated this difficulty, and increased the height of the steel band from four inches to six inches. This improvement alone proved insufficient.

b. Because of the gripping and binding effect caused by these large tires, it was almost a physical impossibility for a full gun crew to traverse the gun by hand on the greased rail. At each stoppage, the gun wheels had to be re-centered on the inner concrete circle before continuing.

Figure 2

c. Our original attempt to overcome this friction resulted in the use of a crowbar to impel the trails inch by inch utilizing the steel teeth imbedded in the inner rim (Fig. 3) of the outer circle. Traversing the gun in this manner had a jarring effect on all movable parts of the piece, particularly the lower carriage and the traverse mechanism. At one timing test, it took us forty minutes to traverse the gun 160 degrees.

To overcome these difficulties:

a. Our first problem was to eliminate the gripping and binding effect of the balloon tires. This was accomplished by the use of a hydraulic jack (Fig. 2) placed under the center point of the gun. This point is located immediately behind the center hole in the spring mounting. (This machined steel facing is accessible only on the 155mm gun equipped with the balloon tires, and with the rear wheel spring removed.) The average time required to raise the jack to the necessary height is fifty seconds.

Figure 3

The gun was now traversed on a three point pivot, but the trail guide plates still bound at various places around the circumference of the curved railroad iron, due to misplacement of the jack. This obstacle was later eliminated as described below.

b. Our next step was to design and attach a wheel (Fig. 4) to each trail, this riding the curved railroad iron and giving the gun a rapid traverse. It is operated merely by tilting the wheel handle down onto the trail itself. The cam attached to the wheel bushing lifts the trail one-half inch off the railroad iron. With this new addition, one man operating each trail wheel can traverse the gun at a walking pace with little exertion.

c. Our last problem, the binding of the trail guide plates against the curved railroad iron due to misplacement of the jack, was overcome (Fig. 5) by the design and installation of the upper and lower jack plates, and the upper and lower steel balls on the jack itself. Due to even minute var

Figure 4

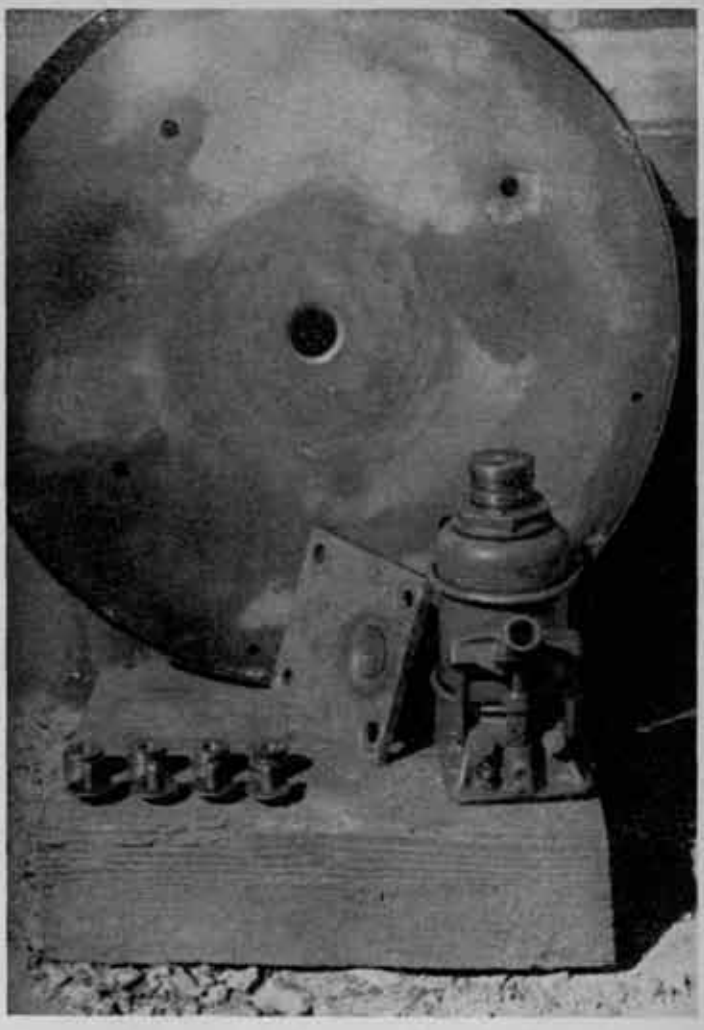


Figure 5

ions in the curvature of the railroad iron, several trials of traversing the gun to find the true center of this circle are necessary. This is done (Fig. 6) with the upper and lower jack plates installed, but with the lower plate not attached to the raised concrete inner circle. This permits trial adjustments. Once the gun is traversed several times the full 360 degrees with average guide plate clearance the full circumference, the lower jack plate is fixed to the raised concrete inner circle with expansion bolts.

At this point our solution was completed. The ball on the base of the jack will always give it a seat in the exact center of our 360 degree traverse, which is the socket in the lower plate. Should the gun be forced slightly off center due to recoil effect, it will automatically re-center itself by merely raising the hydraulic jack. Since the jack cannot move from its center position, the steel ball on the jack head centers itself into the upper plate socket, drawing the entire gun back on center. This is only necessary, however, when resuming your original field of fire or traversing from there to a new aiming point.

We suggest that a rigid drill be observed to remove the jack from underneath the upper plate before firing. Since the fall of the gun depresses the jack shaft only until the weight is relieved by the tires, the downward recoil of the carriage on firing would undoubtedly destroy the hydraulic seals of the jack. For that purpose, the lower jack plate is made wide enough that the outer rim (Fig. 6) stops the removal of the jack at a point just clear of the upper plate.

Many advantages are derived from the addition of these simple aids to the permanent mount, two of which merit a brief discussion. The first of these is the great saving in time and effort required to move the gun from one aiming point to another. Since only three men, under the direction of the gun commander, are used in the actual movement, the remaining fourteen men are free to move ammunition, shell tray and rack, sponge, sponge tub, and rammer. Our drill was further simplified by mounting

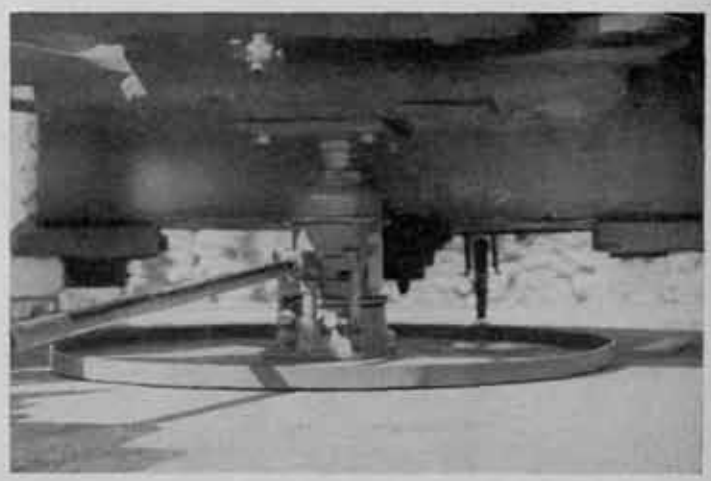
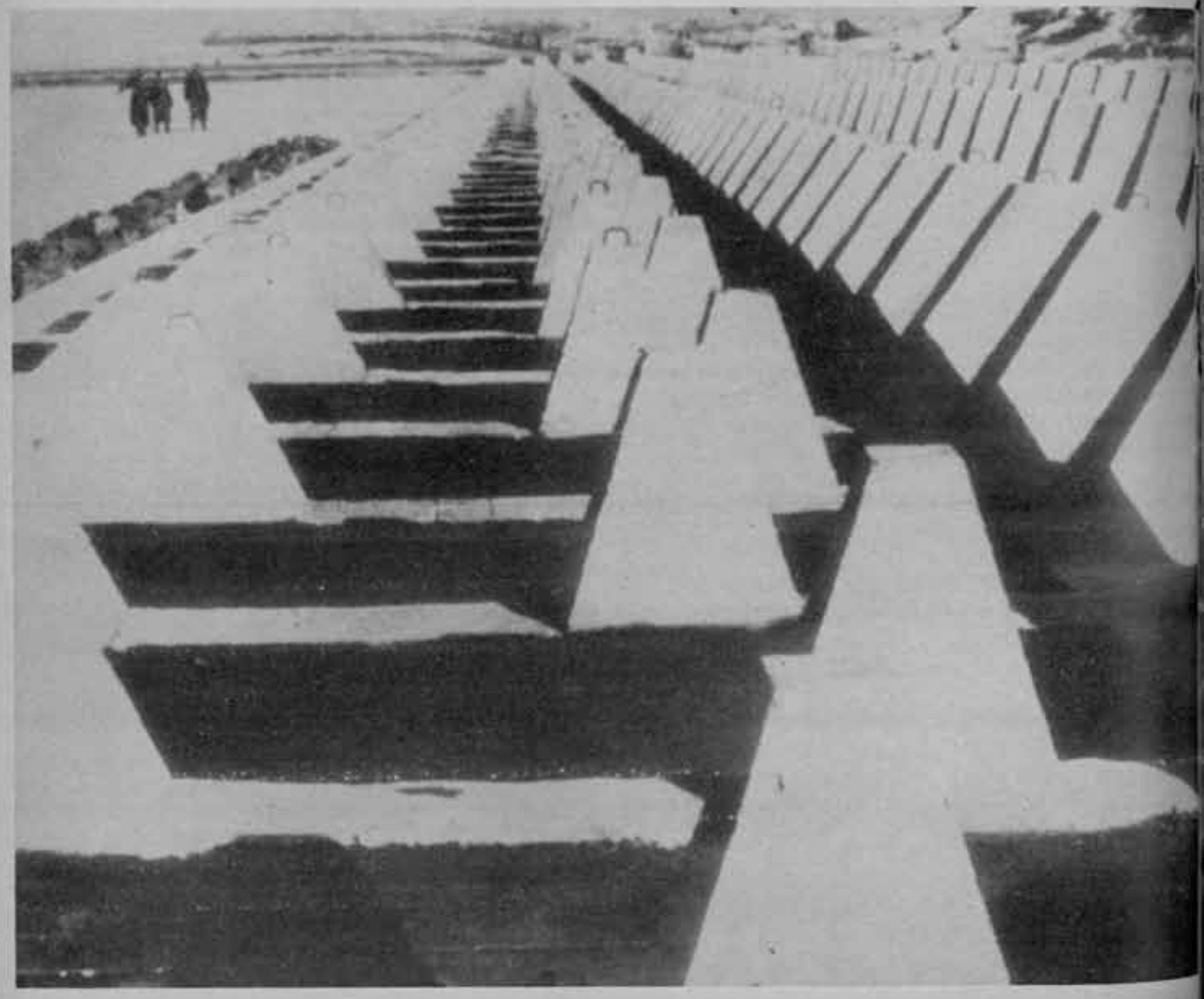


Figure 6

rammer and sponge racks on the gun trails, these being utilized as a feature of every practice drill.

The second and most important advantage concerns an emergency system for accurate orientation on a distant aiming point that has been obscured because of fog, mist, or darkness, or when the aiming light has been moved or destroyed by enemy action. An improvised pointer, preferably made of etched glass, is suspended from the gun pointer's platform as shown in figure 6. Predetermined distant aiming points are then accurately scratched into the surface of the steel band on the raised inner circle of the mount. When the barrel is centered in the field of fire, the piece is pointed as accurately as the normal play in the gun mechanisms will permit. By actual experiment this error was discovered not to exceed two mils, or twenty yards lateral deviation at a range of ten thousand yards. No doubt this play varies slightly among guns. By further experiment it was determined that the ball on the head of the jack, when raised into position into the socket of the upper jack plate, actually drew the lower carriage onto any aiming point with absolute accuracy. Because of this, it is suggested that a complete aiming circle can be used on the raised inner circle of the mount in emergencies to supplement the regular aiming light or aiming point system for Case III fire, merely by centering the barrel and traversing the trails on data from the plotting room. A crowbar, utilizing the steel teeth imbedded in the outer rim of the mount, has proven to be a satisfactory lever for this purpose.

In conclusion, a practice fire that we conducted on July 4, 1942 will explain the efficiency of operation and minimized time element acquired with these devices. We fired a four-gun salvo, Case III, at azimuth 3870. We then traversed all guns 6400 mils to our original aiming point, depressed and removed the jacks, and fired a second salvo. All four rounds fell in the same spot, as determined by an O.P. instrument. This took two minutes and thirty seconds.



Tank obstacles; the second line of Nazi defense in Holland. This picture from Swedish sources.

The SWPA Deflection Board

By Colonel Louis H. Thompson, Coast Artillery Corps

This device is a combination deflection and lateral adjustment board. It is characterized by its simplicity of operation, light weight, small space required for operation, and economy of operating personnel. It will normally be operated in the BC station in order to relieve congestion in the plotting room. The operator maintains a graphical record of all lateral deviations reported and all deflections sent to the gun. Further, it makes a saving in personnel possible.

Design

The deflection and adjustment board consists of the following parts:

1 A rectangular board approximately 12" x 20".
2 A slide carrier having "T square" ends, carrying the plotting and deflection scale slide and holding it perpendicular to the normal line of the deflection and adjustment charts.
3 Plotting and deflection scales glued to the scale slide.
4 A deflection chart of wind and drift curves.
5 A lateral adjustment chart.

Scale A as shown in Figure 1 was constructed for plotting lateral deviations as read from an M 1910A1 azimuth instrument and scale B was constructed for reading deflections in mils for use on an M6 panoramic gun sight. These scales may be constructed for any combination of observing instrument and gun sight. All scales and charts shown in Figure 1 were constructed to a scale of one inch equals one half degree. Any scale desired may be used in construction, provided it is used for all the scales and charts on the board. The charts must be mounted on the board in such a fashion that the normal of scale A will follow the normal line of both charts throughout the length of the board without lateral movement of the scale slide. To assist any one who may desire to construct this board, a detailed drawing is shown in Figure 2.

Operation

1 Move the slide carrier over the deflection chart until the reading edge of scale A is at the set-forward point range as shown on the range scale at left of deflection chart.
2 Slide scale A until its normal (300) is over the proper wind curve.
3 Place a pencil point on the chart opposite the normal of scale A and move the scale until the reading showing travel during the time of flight, obtained from the BC observer, is opposite the pencil point.
4 Read deflection to guns from scale B opposite the index on slide carrier.
5 Draw a short vertical line across the first salvo line of the adjustment chart at the same deflection as that called off to the guns. This will represent the line of targets for the first salvo.
6 Move the slide carrier down to the adjustment chart, keeping the normal of scale A at the line of targets.
7 As soon as the lateral deviation observer calls off the deviations of splashes, plot these deviations along scale A and immediately read to the guns the closing corrections, if any, and then the lateral deflection to be used by all guns. This may be obtained by reading the deflection directly from the chart at the point where the splash of base piece is plotted, or it may be read from scale B. The deflection will be the same from either the chart or the scale. If the spotting instrument and gun sight are both graduated in mils, neither scale A or B will be required for the adjustment chart.
8 If another trial salvo is to be fired, draw another vertical line across the second salvo line at the deflection sent to the guns and plot the splashes of the second salvo from this line. Read the new deflection at the center of impact of these splashes. Continue this process until trial fire has been completed.
9 As soon as the order for fire for effect is given, continue the last line of targets down across two or three salvo lines, the distance depending upon the time of flight and the dead time of operation. If the time of flight is not over 15 seconds, with a firing interval of 15 seconds, it will normally be sufficient to carry the line of targets across only two salvo lines. This would give 15 seconds to plot the splashes, call off the new deflection and have it set on the gun sights before the next firing bell.
10 After each salvo a new deflection is called off if the deviation of the splashes from the line of targets warrants a new correction. Each time a new deflection is called off a new line of targets is established, care being exercised to drop down the required number of salvo lines below the plotted splashes to establish the new line of targets.

It will be noted that this adjustment chart has the following distinctive advantages:

1 A graphical record is maintained of:
   a The deviation of all splashes from the target.
   b The deflection that was sent to the guns for each salvo.
   c The deflection that would have caused any particular shot to be a hit or the deflection that would have placed the center of impact of all shots on the target.
   d The value of the stripped deviation of each shot or salvo.
   e The amount of the closing correction for any gun.
2 The chart permits new corrections to be applied after each salvo regardless of when the last correction was applied. With any other method a new correction cannot be applied until a splash occurs which carries the last correction, which may necessitate skipping two or three salvos before applying a new correction. With a maneuvering target this feature is of great value in keeping up with the target.
3 The battery commander has available at all times a graphical representation of his lateral adjustment.

The method of plotting individual splashes as described herein is based upon a two-gun battery. If four guns [illegible]

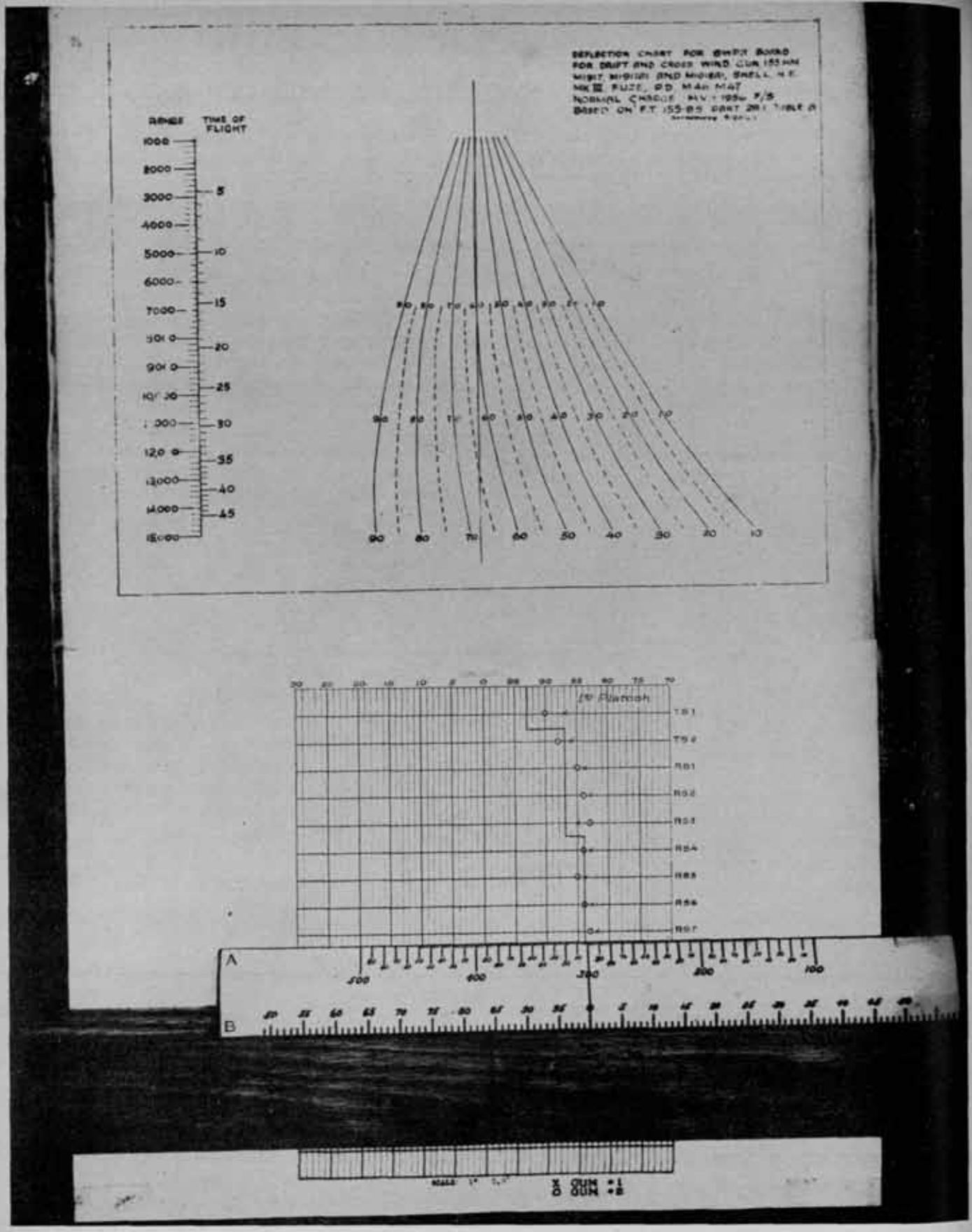


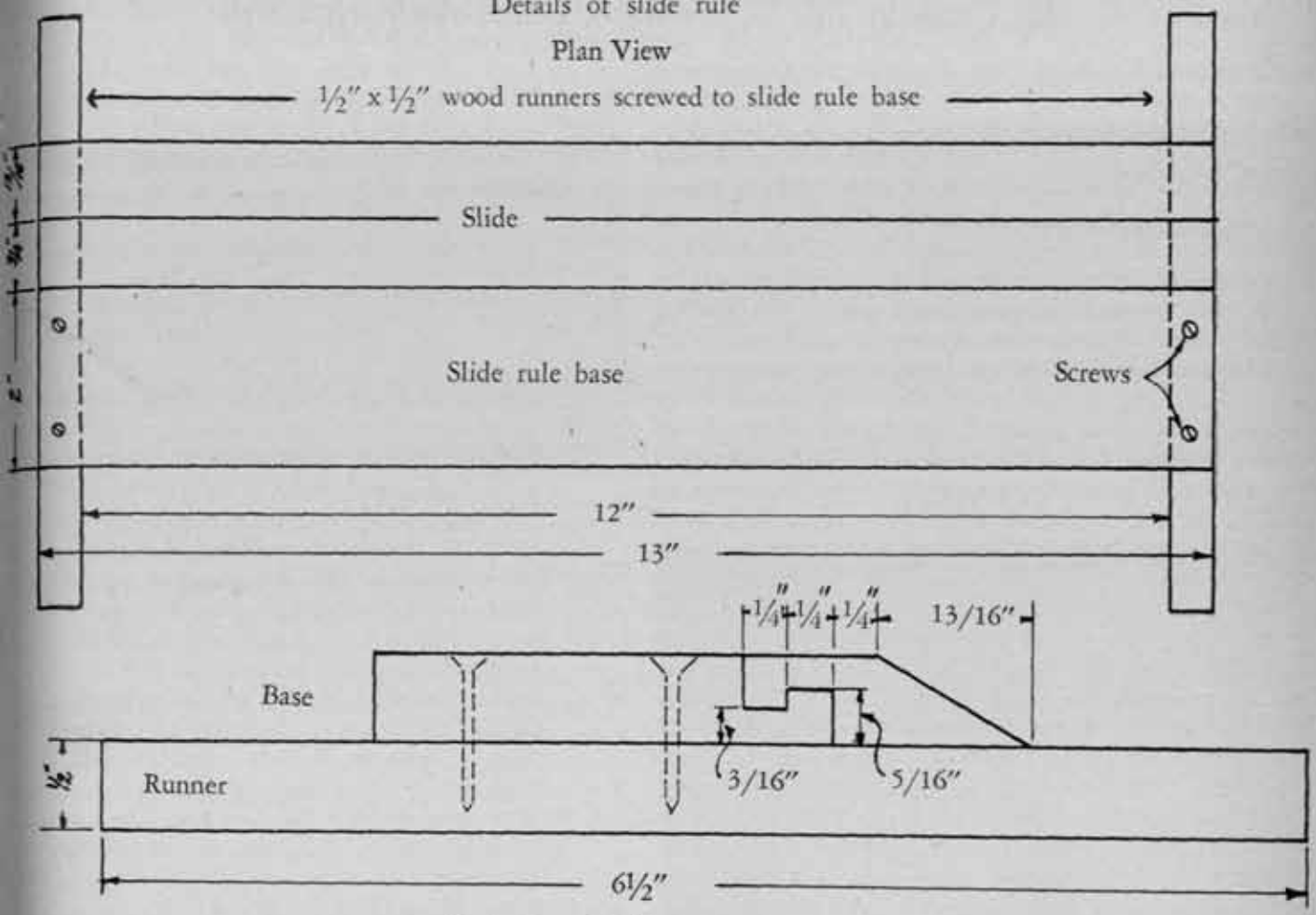
Figure 1.

guns are firing, it may be necessary for the lateral spotter to spot and the plotter to plot centers of impact of salvos rather than individual splashes.

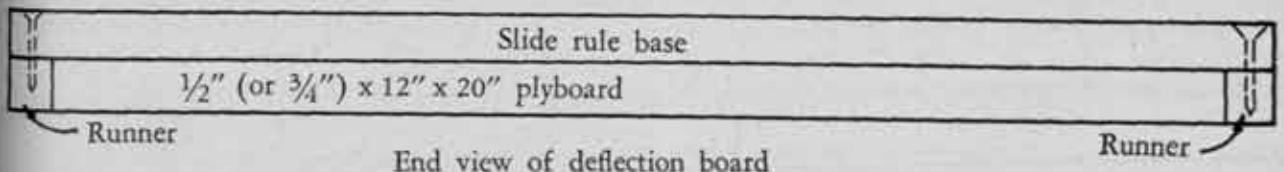
The deflection board described herein was designed by the writer while serving in the Southwest Pacific area. It is now in use by certain batteries in that area. It has recently been used in eight service target practices and many subcaliber practices in the regiment in which the writer is now serving. Due to the enthusiasm of the battery commanders who have used it over the results obtained and the simplicity of operation, it is believed that others may desire to try it out.

SWPA DEFLECTION BOARD

Details of slide rule



End view of slide rule



End view of deflection board

BILL OF MATERIALS

1 piece Plyboard, ½" (or ¾") x 12" x 20" (deflection board)
1 " Hardwood, ½" x 2½" x 13" (grooved as shown)
3* " Hardwood, ½" x 1 9/16" x 13" (grooved as shown)
2 pieces Hardwood, ½" x ½" x 6½"
4 each Screws, ¾" long

*Note: 3 separate slides grooved to fit same base.

SPECIFICATIONS

Hardwood must be well seasoned. Grooves must be sanded smooth to permit slide to move when pressure is applied, but there should be some friction. The complete slide rule must slide over the deflection board without wobble, therefore the deflection board must be exactly 12" wide throughout its length. Runners must be fastened to slide rule base so as to form perfect 90 degree angle. The deflection board and slide rule to be given two coats of clear shellac on all sides. Wind and drift chart must be glued to board so the center line of chart is parallel to edges of board. After chart has been glued to board it should be sprayed with two coats of clear varnish.

Figure 2.

Editor's Note: *This device does not include provision for Case III firing. No correction for rotation of the earth is included, and to the extent that such a correction is inapplicable, appears more adaptable to rapid fire than for long-range batteries; neither does it provide for continuous corrections for drift, crosswind effects, and changes in angular travel. However, it is simple, workable, and adapted for Case II firing.*

Training in Slant Range Estimation

By Captain Jay W. Tolman, Coast Artillery Corps

A system for training range setters in the estimation of slant range, and for use in obtaining records of antiaircraft target practices, has been developed by the 379th AAA AW Bn. This system involves the use of two specially designed flank spotting instruments, and a plotting board.

The flank spotting instruments are located at each end of a 1,000 yard base line. The angle between the base line and the target in the slant plane is read simultaneously at each flank spotting instrument, and sent to the plotting board, located at B_1, for determining the slant range.

The procedure followed in training student range setters in the estimation of slant range is to locate student range setters, in organized groups under the supervision of an officer, at either end of the base line. Range setters are equipped with pencils, writing pads, and special forms on which to record estimations of the slant range. Five range estimations are made by each range setter on each course. Two estimations are made on the approaching leg of the course, two on the receding leg, and one at midpoint. All estimations, except the one at midpoint, are made on five-second time signals. Records section personnel manning the flank spotting instruments and the plotting board, immediately determine the slant ranges to the target for each five second time signal, and for midpoint. During the interval between courses flown by the plane, student range setters compare their estimations of the slant range with the slant range read from the plotting board.

Records of slant range estimations indicate that all range setters improve in their ability to estimate slant ranges under this system. During a week of continuous practice in range estimation and comparison with the range determined from the plotting board range setters have been found to decrease their average range estimation error as much as fifty yards. Also, an important aspect of this training is that the battery commander can determine which men of the battery have the natural ability to estimate slant ranges with accuracy, thereby using this knowledge in the selection of range setters.

The special flank spotting instruments and the plotting board are described as follows:

a. *Flank Spotting Instruments:* These instruments are standard M1917 altimeters modified so the azimuth in the slant plane can be read instead of azimuth in the horizontal plane. The modifications:

(1) The regular telescopes were removed from the shaft on which they were mounted and a movable flanged and hubbed collar (called Collar A) was built by Ordnance to fit this shaft. As fitted the collar was free to rotate on the shaft.

(2) A 30-inch diameter semicircular azimuth segment was made of masonite and securely and permanently fastened to the flange of Collar A. An azimuth scale from 0 to 3200 mils was inscribed on the perimeter of the segment.

(3) A set screw in Collar A enables the tracker to orient accurately the diameter of the segment (0 to 3200 mil line) so that it is parallel to the vertical axis of rotation of the instrument and yet cannot be moved in a horizontal direction with respect to the shaft on which it fits.

(4) An additional flanged collar (called Collar B) was constructed to fit on and rotate about the hub of Collar A. The flange of Collar B was designed to accommodate an M17 telescope, the scope being fastened to the flange by three bolts. Attached to Collar B is a short handle by which the collar is rotated. Also attached to the collar and positioned so that it is on line with and parallel to the line of sight of the telescope is a pointer whose length equals the radius of the azimuth segment.

(5) The two tracking instruments are oriented by placing the telescope pointer of each instrument on the 1600 mil graduation of the azimuth segment. Then using the regular azimuth and elevation scales on the instruments, align the scopes of the two instruments on each other while the elevation scale is at zero. The instruments at B_1 and B_2 are next turned 1600 mils in a counter-clockwise and clockwise direction, respectively. The regular azimuth scales of the M1917 altimeter are locked at this point. The segment diameter of each instrument will now be parallel to the base line and the scope pointers will be at right angles to the base line. The instruments are now oriented with respect to each other.

(6) To obtain slant plane azimuths the tracking instruments are operated as follows:

(a) Elevation and depression of the azimuth segment is in one plane only, namely at right angles to the base line.

(b) Azimuth in the slant plane is obtained by rotating the telescope to the target position by means of the handle on Collar B.

(c) Azimuth readings are taken by B_1 and B_2 azimuth readers on a time signal every five seconds by watching the scope pointer as it moves around the azimuth scale on the segment.

b. *Plotting Board:* The plotting board designed for use with the flank spotting instruments described above is constructed of masonite and wood, and is mounted on three wooden horses. All elements of the board are built to a scale of 1 inch to 60 yards. The plotting board is equipped with two plotting arms each approximately 54 inches in length by 1 inch in width and 3/16 inches thick. The arms are pivoted on ½ inch studs. On each arm is glued a range scale. Studs on which the arms are pivoted are located at either end of a base line representing 1,000 yards. Large azimuth scales are laid out on the board for each plotting arm. The slant plane azimuth readings recorded at B_1 and B_2 observing stations for any five second time signal are plotted on the plotting board to determine the slant range from either B_1 or B_2 base end stations. This is done by setting the B_1 and B_2 plotting arms to the respective azimuths on the B_1 and B_2 plotting board azimuth scales. The point of intersection of the two arms deter

AAATC in the South Pacific

By Colonel H. S. Tubbs, Coast Artillery Corps

Main entrance to the AAATC.

Lieutenant General Millard F. Harmon, Commanding General of the United States Army Forces in the South Pacific Theater, has recently established an Antiaircraft Artillery Combat Training Center at an advance island base for the purpose of maintaining a high state of efficiency and training in the antiaircraft units in the area. In addition, the AAATC acquaints these units and new units arriving, with the most recent developments in antiaircraft artillery tactics, technique, and equipment as well as conditions peculiar to that theater of operations.

The training center was established under the direct control of a brigade headquarters and the officers and enlisted personnel of a group headquarters and headquarters battery, augmented by instructors who have been obtained from the Antiaircraft School at Camp Davis and from combat experienced AAA units in the area. The instructors were especially selected for their technical qualifications to conduct courses in the maintenance and use of all types of AAA matériel in the hands of AAA troops in the theater.

The courses are normally of two months duration, and include considerable practical instruction in AAA under conditions of amphibious operations and jungle warfare encountered in the theater, with emphasis on accurate firing of all weapons at towing missions of all types furnished by the Army Air Force and a Navy Utility Squadron. Actual tactical positions occupied by units at the same base are utilized for demonstrations.

Interior of classroom.

Class in nomenclature and maintenance.

Commissioned and enlisted personnel receive the same instructions and attend on the basis of a quota allotted to each unit. The quota also includes officers and men from Marine Defense Battalions in the area.

All the necessary facilities, including classrooms, quarters, and an excellent firing point have been constructed by AAA troops.

Progress of the school thus far has been most gratifying. Brigadier General Charles A. French organized the school and supervises it. Lieutenant Colonel Charles W. Hill is Commandant.

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mines the slant range which can be read from the range scales glued to either arm.

Since most range estimation practice in the 379th AAA AW Bn must be conducted in conjunction with basic and preliminary target practice firings, the instruments described above also serve for obtaining the necessary data for analysis and critique of target practices. This is accomplished by locating the base line on and parallel to the firing line. Gun positions are laid out along the plotting board base line so that they correspond to the exact positions of the guns. An additional gun arm similar to the B_1 and B_2 plotting arms is used to get the slant range from any gun position. This is best accomplished by first plotting the flight of the target and later measuring the slant ranges.

Ballistic Correction Rule

By Lieutenant R. E. Nelson, Coast Artillery Corps

In the M7 Director the effect on non-standard ballistic conditions is compensated for by spot corrections, mainly in terms of quadrant elevation and present altitude. These corrections vary over the field of fire; yet the computation of enough values to cover all possible places where the target might have to be engaged is so cumbersome by the usual methods that ordinarily only a single set is found, based on some point of "probable" engagement. The only modification usually made thereafter is the conversion of the altitude correction from per cent to yards after the altitude of the target to be engaged is known. Even this is often omitted or inaccurately done.

Obviously some means for finding the right corrections rapidly at the time of firing would be highly desirable. It was for this purpose that the rule to be described was developed. The first rule was completed in December, 1943, at Camp Haan, California, and subsequently tested during firings at Camp Irwin, California, where it demonstrated its ability to find both dH and dΦ after the altitude of the target is accurately known and with sufficient rapidity to allow ample time for setting in corrections before firing begins.

Figure 1 shows the rule in its simplest form. A stationary base scale is employed, consisting of a set of concentric circles representing altitudes from 2,000 to 10,000 yards and a series of radial lines logarithmically spaced and graduated to permit setting of the quantity for which correction is to be made and reading of the corrections which result.

Curves of correction in altitude (dH) and quadrant elevation (dΦ) are plotted from the 90 AA-B-3 tables on a transparent overlay which may be rotated over the base scale to position the curves to read correctly for any value of muzzle velocity (MV) difference from standard, which will be called Δ MV. This value is set in by matching the index line of the overlay with the proper outer graduation. In Figure 1 the index line is on 1, representing 100 f/s Δ MV.

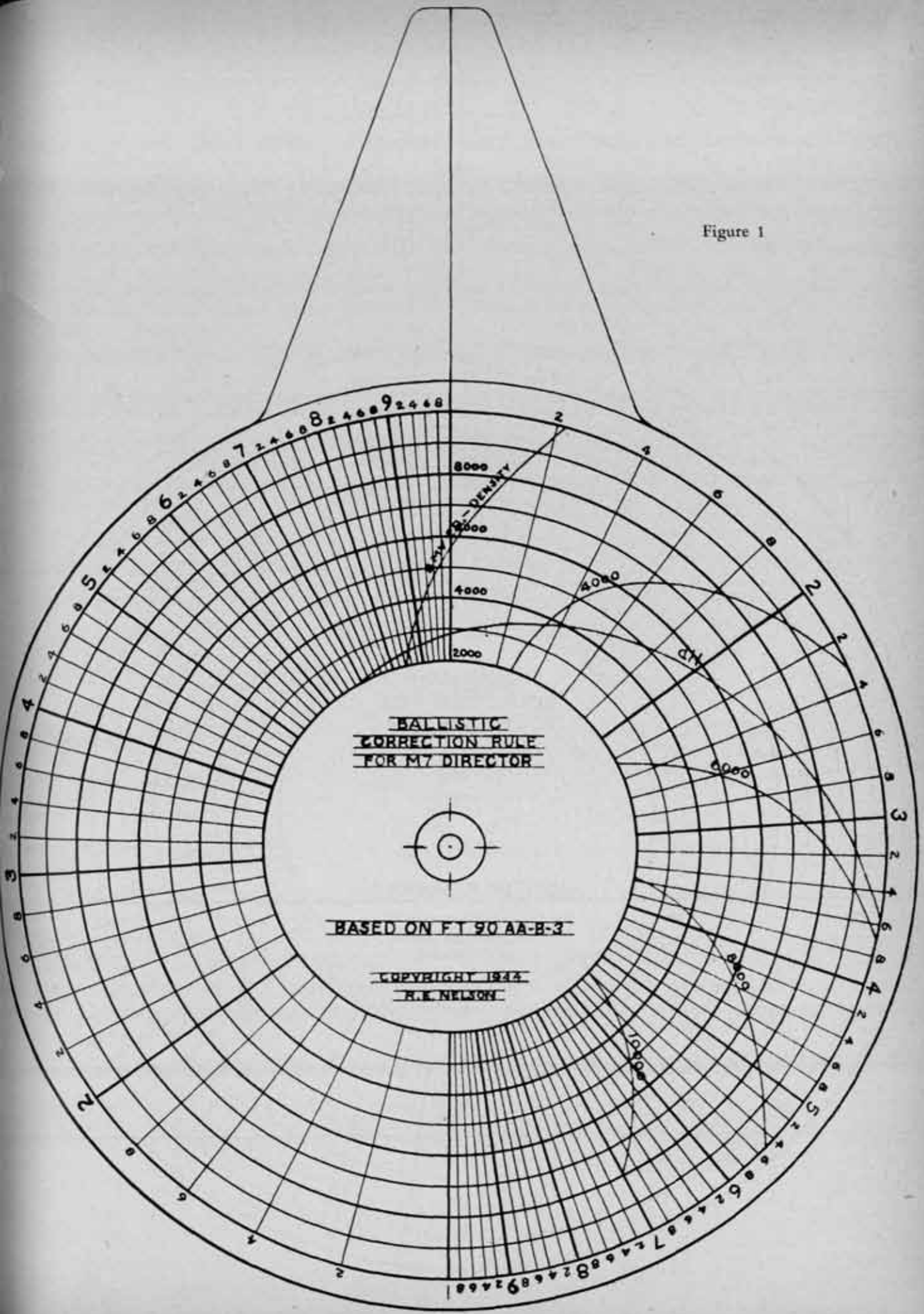
To illustrate the reading of the curves, suppose that dH and dΦ are required for 100 f/s and for an altitude of 4,000 yards and range of 8,000 yards. Follow the curve marked "dH" to its intersection with the circle marked "4,000" and read out to the edge. To the nearest 10 yards the correction will be read as 140. This correction is found independently of range, since in fire for effect a mean value must be used which, fortunately, varies but little with range. On the other hand, dΦ does change sharply with range. Four dΦ curves are shown for ranges from 4,000 to 10,000 yards, allowing the correction for other ranges to be found by visual interpolation. For the conditions given, dΦ, to the nearest whole mil, is 4. In actual fire under conditions where range changes during engagement, it is possible to vary dΦ by jumping from curve to curve according to the reading on the R_p dial of the director.

In order to allow rapid determination of dH and dΦ at the time of firing, the proper value of *total* equivalent Δ MV should be determined for each altitude zone to include MV equivalents of density as well as of ground air temperature. The density equivalent may be read from the curve marked "Δ MV Eq.-Density" at its intersection with the proper altitude circle after setting the density difference in per cent with the index line on the outer scale. Thus, in Figure 1, the density equivalent of 10% Δ density at 4,000 yards altitude will be read as 92 f/s. For air temperature, a flat equivalent of 5 f/s per 10 degrees difference from 59 degrees can be used.

If the density difference is large, the MV equivalent method will introduce an error in dΦ amounting to about 1 mil per 10% Δ density. If the actual MV difference is low (likely with cams based on 2,700 f/s), corrections might more reasonably be based on density than on MV. The second overlay shown in Figure 2 is provided for this purpose. Its curves, based on density, are read in exactly the same way as are the curves on the MV overlay, the only difference being that the index line is set to total equivalent density difference instead of total Δ MV. The curve marked "Δ Density Eq.-Δ MV" converts MV differences to their density equivalents, which must be added to actual density differences to obtain total equivalent Δ density. In Figure 2 the index line is on 1, representing 10% density difference. For 4,000 yards altitude, dH will read as 130 yards; dΦ for 4,000 yards altitude and 8,000 yards range will be read as 2 mils. From the equivalent curve, the density equivalent of 100 f/s Δ MV will be read as 10.9%.

The correction rule can be combined very conveniently with the well-known Crichlow rule by cementing the base scale into the center space and combining the overlays with the arms of the rule. A new center will be needed; a common 3/16" diameter screw post such as can be obtained at stationery stores serves very well. The density curves should be in red to avoid confusing with MV curves. The base scale is reproduced to full size in Figure 3, as are the curves in Figures 1 and 2, which can be traced without difficulty.

The rule is not intended for trial fire, the corrections for which can best be found in the usual way. It should not be thought of as a labor saver primarily, but rather as an aid in insuring that the corrections actually used in fire for effect are those appropriate for the target being fired upon.


8000
6000
4000
2000
AIR DENSITY
4000
DIA
6000
8000
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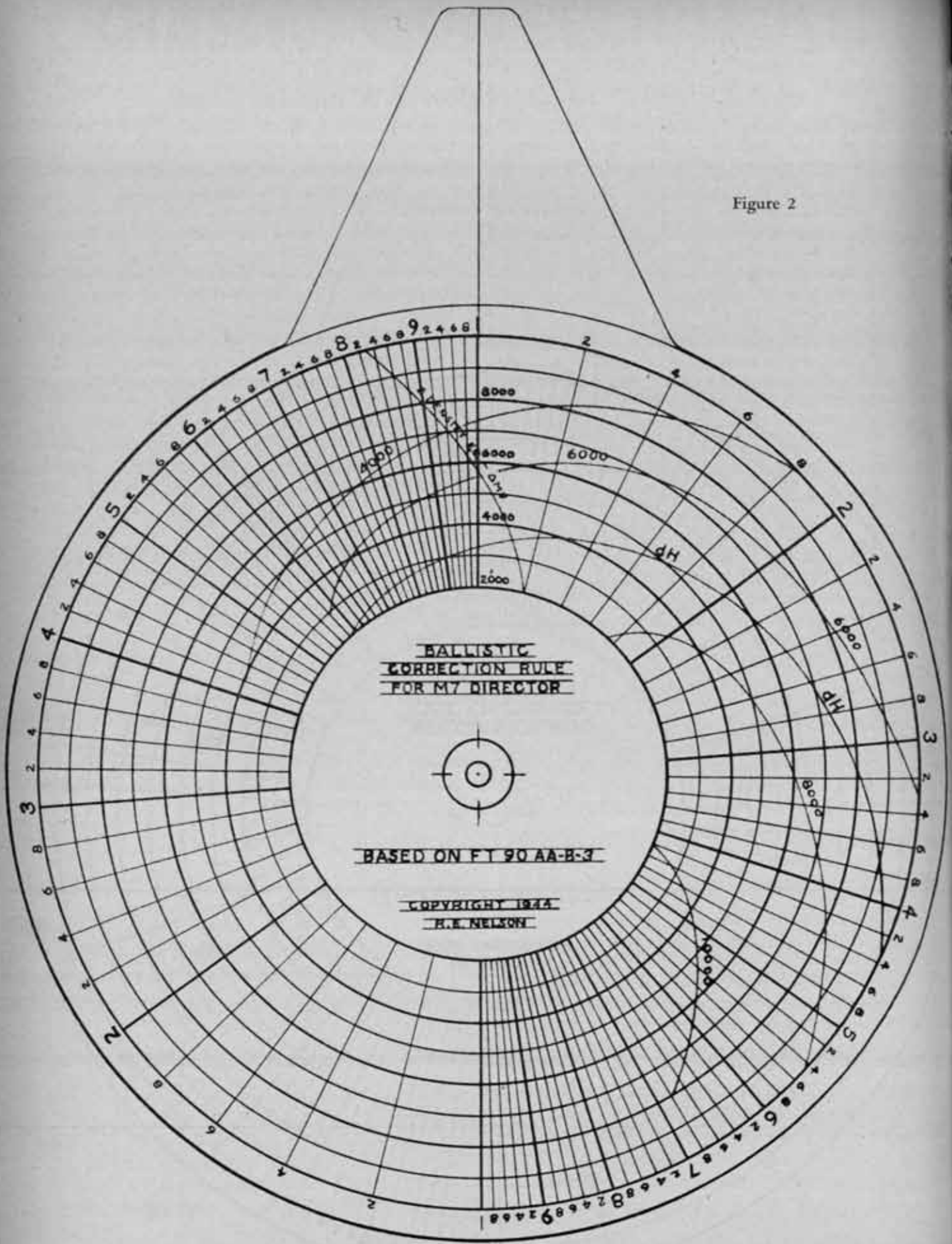
BALLISTIC
CORRECTION RULE
FOR M7 DIRECTOR
BASED ON FT 90 AA-B-3
COPYRIGHT 1944
R.K. NELSON

Figure 1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FOR M7 DIRECTOR
BASED ON FT 90 AA-B-3
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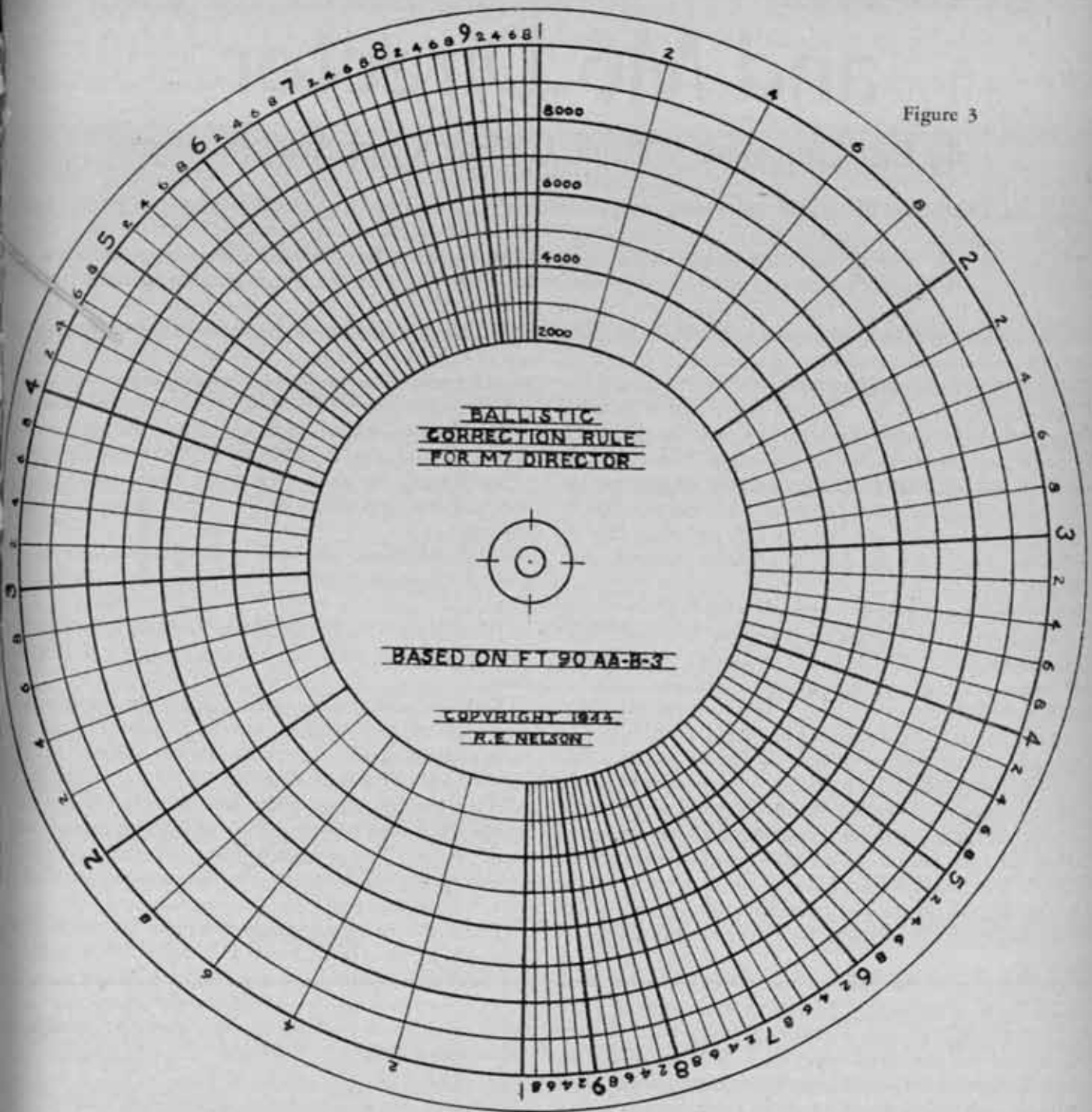
Figure 2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BALLISTIC
CORRECTION RULE
FOR M7 DIRECTOR
BASED ON FT 90 AA-B-3
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Figure 3

A Tracer Trainer for the M5 and M6 Director

By First Lieutenant William J. White, Coast Artillery Corps

"But Sir, I didn't see the tracer." How often is this one of the first statements of a new tracker on the firing range.

During the basic training stage the members of the range crew becomes thoroughly acquainted with the operation and control of the director. Their instruction in tracking in the class room together with the experience which they gain through air missions contribute the smoothness that is essential to good firing on the range.

But what about another training factor that is essential if hits are to be secured? The book tells and illustrates with diagrams how the tracer looks if the range is short, if it is over, if it is a hit. And various devices and gadgets are improvised by the instructor to explain to the class and to try to make clear to them just what to look for when they go out on the range and just how to interpret correctly what they see.

The problem of trying to find the best method was put up to the officers of the 638th Coast Artillery Battalion (AA) by the commanding officer. While a number of interesting and ingenious things were developed, from neon tubes to flashlight bulbs sliding on a wire, it was finally decided that any such trainer to be successful must add actual action to the tracer stream and must make it appear realistic. The trainer I had submitted was decided the most satisfactory.

When using this trainer in the class room it so illustrated the action of the tracer in the scopes that trackers were given a more accurate picture of what to expect when on the range. It was found infinitely easier to teach men how to call sensings to the range setter with the trainer. Thus another essential was added to the training before going into the range.

The sketches of the trainer give all the necessary information for its construction. It consists essentially of a box containing a light source, a revolving disc with a slot cut into it, and the simulated tracer path. When the disc revolves the lighted slot makes repeated and rapid passes along the tracer path giving the effect of the moving tracer bullet. It can be constructed of scrap lumber, cardboard, a foot of number 10 wire, two light bulbs and a square foot of cellulose acetate paper. Two enlarged scopes are printed on cellulose acetate paper and put in a frame to allow rotation clockwise or counter-clockwise. The one on the left is used for crossing courses and the one on the right for incoming courses.

To give the picture of a tracer traveling through the scopes on a crossing course, from left to right, the crank is turned counter-clockwise. The paddle shaped disc can be moved up and down to give high, line and low shots. The reticles of the scope can be rotated clockwise for the elevation scope and counter-clockwise for the azimuth scope.

To illustrate a "short" the target plane is transparent and gives the appearance of the tracer silhouetted against the target.

To illustrate an "over" the target plane is opaque and gives the appearance of the tracer disappearing behind the plane.

To give shots high, low, ahead or astern, the paddle shaped disc is placed in the position the tracer is desired to travel.

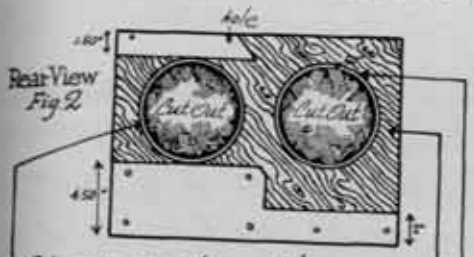
To illustrate incoming courses, the right scope is used. The spade shaped celluloid disc can be moved to the right or left, allowing shots to appear whose trajectory is to the right or left of the line of sight.

When the director men have been trained with the tracer trainer, they have a clear picture of what to expect in the scopes at their first attempt at firing. The trackers will be able to give accurate sensings to the range setter allowing him to make corrections and account for more hits.

The trainer is light and easy to handle. Its cost is slight materials are usually at hand, and skilled labor is not essential. Furthermore the general reaction of the men who have trained with the device indicate that the picture given by the trainer very closely approximates that seen in the scopes when firing.

EDITOR'S NOTE: *Tracers have an infinite number of apparent paths and the device described provides for only a minimum number of types.*

White TRACER TRAINER BOX



Fit a piece of Celluloid in each circular hole (6.50" diameter) then paste a thin sheet of Acetate behind the entire cutout shape, leaving the celluloid circles free to rotate.

Fig. 5

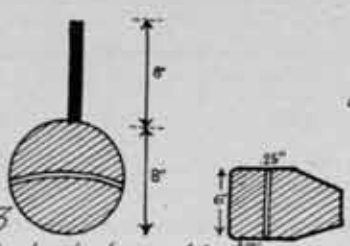


Fig. 3

Fig. 4

Paint shaded area black. Both are made of 1/30" celluloid.

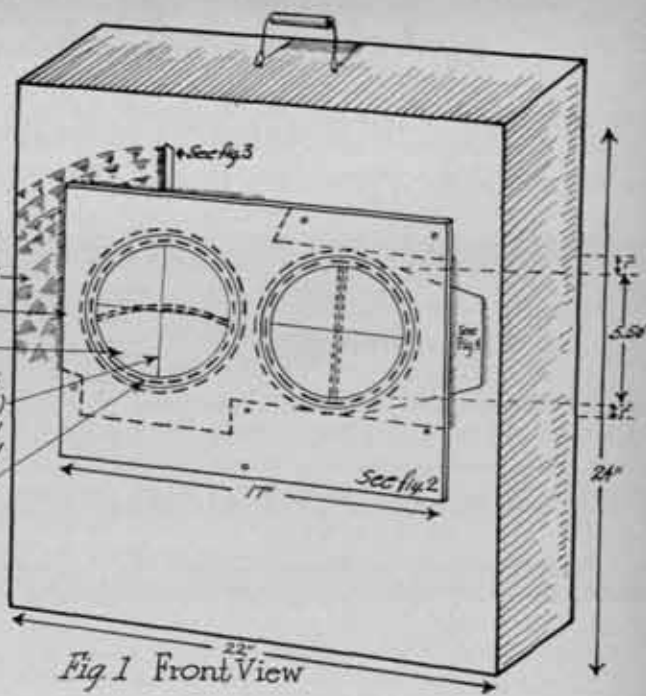


Fig. 1 Front View

The unpainted slots in tracer control discs (fig. 3 and 4) are the channels through which the apparent tracer travels.

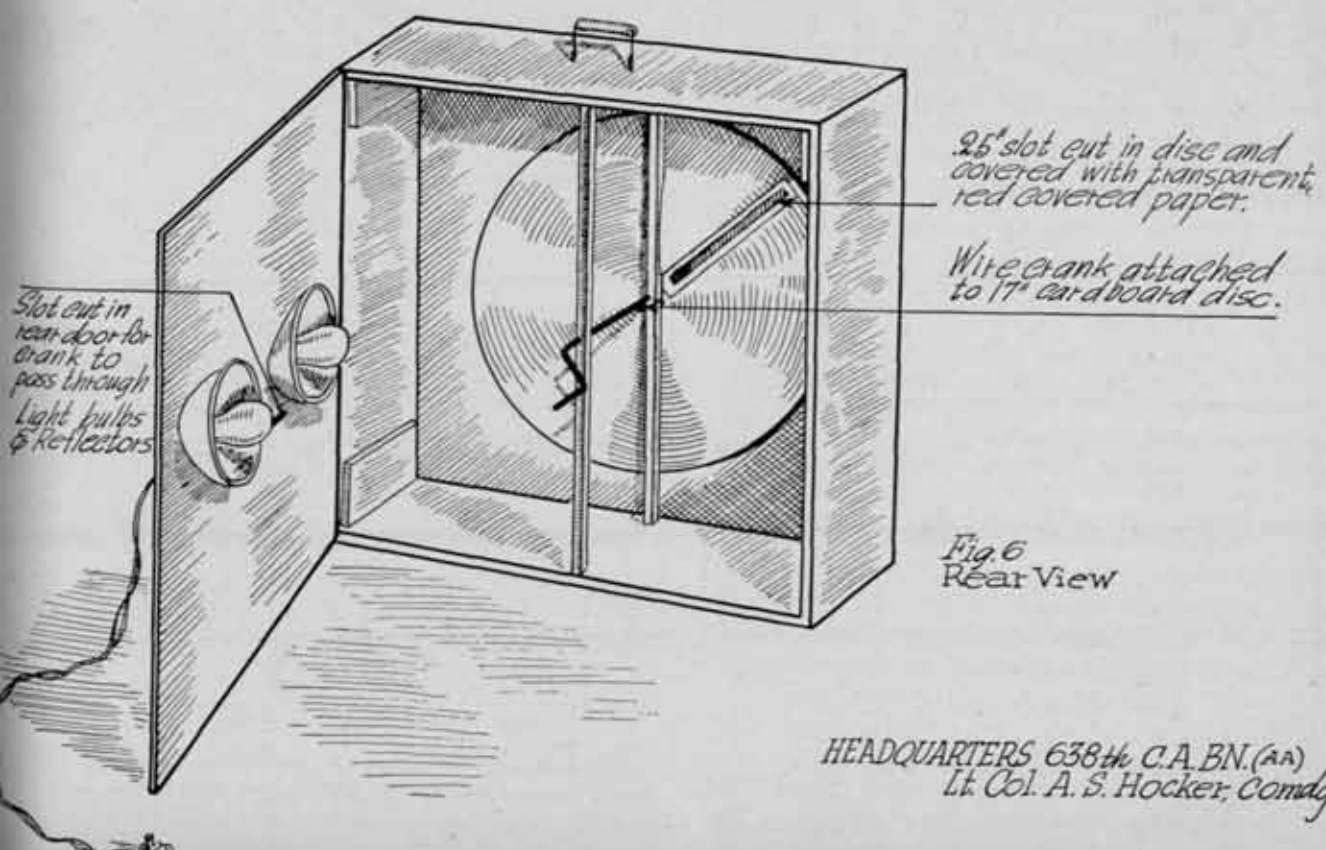


Fig. 6
Rear View

HEADQUARTERS 638th C.A.BN. (AA)
Lt. Col. A. S. Hocker, Comdg.

Safe Leads for AA Gun Target Practices

By Lieutenant Colonel John Parmakian, Coast Artillery Corps

Army regulations prescribe that in general during target practices no antiaircraft gun will be fired when it is pointed at or ahead of the towing plane. In order to accomplish this the length of the towline must always exceed the travel of the target during the time of flight of the projectile. On target practice courses firing at long ranges and high speeds, however, compliance with the above regulations will usually require a towline in excess of the length that could be towed by the plane. Under these conditions special requirements must be laid down to insure the safety of the towing plane. The following analysis has been made to assist the safety officers in quickly determining the safe leads that can be taken when the guns have to point ahead of the towing plane. The analysis is applicable for any towline length or target speed, for antiaircraft guns of all calibers and for targets at any altitude.

Derivation of Formulas

In the following analysis the target is assumed to be in non-maneuvering, rectilinear flight:

S_g = ground speed of target in miles per hour.
F = fuze setting in seconds (the fuze setting and time of flight are nearly equal for mechanical fuzes and are assumed to be equal).
L = length of towline in feet.
A_1 = safe lead in towline lengths ahead of towing plane for crossing courses.
A_2 = safe lead in towline length ahead of towing plane for incoming courses.

(a) *CROSSING COURSES*—The travel of the target in feet during the time of flight of the projectile is equal to $\frac{3S_gF}{2}$. When this travel is expressed in terms of towline lengths, the required lateral lead is equal to $\frac{3S_gF}{2L}$. This lead will give bursts at the target. If the bursts are allowed to occur at a point one third of the way up the towline, the safe lead in towline lengths ahead of the towing plane will be given by:

$$A_1 = \frac{3S_gF}{2L} + \frac{1}{3} - 1 = \frac{3S_gF}{2L} - \frac{2}{3}$$

(b) *INCOMING COURSES*—The vertical lead in towline lengths during the time of flight of the projectile for an incoming course is also equal to $\frac{3S_gF}{2L}$. In order to allow the bursts to occur at a point about one third of the way up the towline, the following method is used. For zero superelevation, which is approached for a quadrant elevation of about 1400 mils, the closest bursts will be allowed to occur at a point nearly halfway up the towline. For all other quadrant elevations where the superelevation is larger the bursts will occur considerably further down the towline. The safe lead for incoming courses in towline lengths ahead of the towing plane will then be given by:

$$A_2 = \frac{3S_gF}{2L} + \frac{1}{2} - 1 = \frac{3S_gF}{2L} - \frac{1}{2}$$

Safe Lead Tables

The two tables below have been prepared using the above formulas. These tables can be used as follows:

(a) Calculate the ratio L/S_g and use the nearest value for this ratio given in the table.

(b) For any fuze setting the safe lead in towline lengths ahead of the towing plane can then be obtained from the table.

ILLUSTRATION—For a towline length of 4000 feet and a ground speed of 140 miles per hour the ratio L/S_g is about 29. Using 30 which is the nearest value of this ratio in the table, it can be seen that for a crossing course at a fuze of 24 the safe lead is a half towline length ahead of the plane. On an incoming course for a fuze of 14 the safe lead is two tenths of a towline length ahead of the plane.

TABLE I

CROSSING COURSES

(Closest bursts about ⅓ way up towline)

Ratio L/S_g	Fuze 6	8	10	12	14	16	18	20	22	24	26	28	30
60													0.1
55												0.1	0.2
50											0.1	0.2	0.2
45									0.1	0.1	0.2	0.3	0.3
40								0.1	0.2	0.2	0.3	0.4	0.5
35							0.1	0.2	0.3	0.4	0.5	0.5	0.6
30						0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
25					0.2	0.3	0.4	0.5	0.7	0.8	0.9	1.0	1.1
20				0.2	0.4	0.5	0.7	0.8	1.0	1.1	1.3	1.4	
15		0.1	0.3	0.5	0.7	0.9	1.1	1.3	1.5				
10	0.2	0.5	0.8	1.1	1.4								

Gun line of metal will always point behind plane in this zone.

Unsafe to fire in this zone.

Safe lead in towline lengths ahead of plane.

F = Fuze in seconds.
L = Towline length in feet.
S_g = Target speed in miles per hour.

TABLE II

INCOMING COURSES

(Closest bursts about ⅓ way up towline)

Ratio L/S_g	Fuze 6	8	10	12	14	16	18	20	22	24	26	28	30
60									0.1	0.1	0.2	0.2	0.3
55									0.1	0.1	0.2	0.2	0.3
50									0.1	0.2	0.2	0.3	0.3
45								0.1	0.2	0.2	0.3	0.4	0.4
40							0.1	0.2	0.3	0.3	0.4	0.5	0.6
35						0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7
30					0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
25				0.1	0.2	0.3	0.5	0.6	0.7	0.8	0.9	1.1	1.2
20			0.1	0.3	0.4	0.6	0.7	0.9	1.0	1.2	1.3	1.5	
15	0.1	0.3	0.5	0.7	0.9	1.1	1.3	1.5					
10	0.4	0.7	0.1	1.3									

Gun line of metal will always point behind plane in this zone.

Unsafe to fire in this zone.

Safe lead in towline lengths ahead of plane.

F = Fuze in seconds.
L = Towline length in feet.
S_g = Target speed in miles per hour.

COAST ARTILLERY

Citations and Commendations

Oak Leaf Cluster to Distinguished Service Medal

TO: Sanderford Jarman, Major General, U. S. Army, Monroe, Louisiana.

FOR: Exceptionally meritorious service in a position of great responsibility. As Commanding General, Panama Coast Artillery Command, from November 1, 1939, to August 2, 1941, he demonstrated exceptional energy and ability by his reorganization and rehabilitation of the Harbor Defense and Antiaircraft Artillery defenses of the Panama Canal. He organized the Panama Coast Artillery Command, accomplished expeditiously and with marked economy a unique jungle housing project for numerous remote batteries and maintained this large command, under war conditions of alert, at a degree of combat efficiency and of high morale that was most notable. (General Jarman was awarded the Distinguished Service Medal for his World War service, the citation stating that "from September 14 to November 26, 1918, as G-3, and later Chief of Staff of the Commanding General, Army Railway Artillery Reserve, with the First and Second American Armies during the Meuse-Argonne Offensive and the offensive planned to be launched by the Second American Army on November 11, 1918, he displayed the highest qualities as an organizer, and by his untiring energy and zeal, good judgment and general excellence, as well as great technical ability, contributed largely to the success of the command.")

Legion of Merit

TO: Leslie W. Jefferson, Colonel, Coast Artillery Corps (then General Staff Corps). Owatonna, Minnesota.

FOR: Exceptionally meritorious conduct in the performance of outstanding service. As Chief of the Program Branch, Requirements Division, Headquarters, Army Service Forces, Washington, D. C., from May 10, 1942, to June 21, 1943, Colonel Jefferson demonstrated a high quality of leadership and executive ability and displayed unusual professional attainments, superior judgment, foresight and devotion to duty in the formulation and administration of the Army supply program. His shrewd direction of difficult situations in the determination of over-all requirements for anticipated combat essentials for a rapidly expanding army and in balancing the armament requirements to the capabilities of industry were vital contributions to the armies of the United States and the United Nations.

TO: Joy T. Wrean, Colonel, CAC. 2506 Gilford Avenue, Forest Hills, Wilmington, North Carolina.

FOR: Exceptionally meritorious conduct in the performance of outstanding services at Port Moresby, New Guinea, from April 4 to November 7, 1943. Colonel Wrean, in command of the antiaircraft defense of Port Moresby, was charged with defending highly vulnerable anchorages, wharfs, airdromes and supply installations. Despite the fact that during this period the exigencies of the service necessitated many changes of plans, he maintained a thoroughly effective antiaircraft artillery defense. Colonel Wrean by his initiative, sound judgment and expert knowledge of tactics both of enemy aviation and friendly forces made a substantial contribution to our operations.

TO: Marvin L. Mulkaske, Tec. 5th Gr. CAC, 4728 N. Keystone Ave., Chicago.

FOR: Exceptionally meritorious conduct in the performance of outstanding service from July 14 to August 16, 1943. Throughout the entire period of the Sicilian Campaign, as Chaplain's assistant while his battalion was without a Chaplain, he spent all his time in the forward area, holding devotional services during rest periods and constantly seeking ways and means of giving spiritual and moral aid and comfort. Although the units of the battalion were widely separated, he managed to spend some time with each gun section. These duties were executed in such a superior manner as to become an inspiration to other enlisted men associated with him at a time when circumstances placed additional hardship and dangers upon members of his organization.

TO: Raymond W. Blattenberger, Private, Coast Artillery Corps, 431 Addison Avenue, Emerald Hills, Camden, New Jersey.

FOR: Exceptionally meritorious conduct in the performance of outstanding service. As technical advisor in planning and putting into operation improved methods of graphic reproduction work at Camp Davis, North Carolina, from August 2 to December 14, 1943, Private Blattenberger displayed outstanding initiative, superior tact, a high degree of technical skill and extraordinary devotion to duty. As a result of his efforts, reproductions of training publications have been made more readable, serviceable and attractive, with attendant economies in labor and critical materials.

Silver Star

TO: RALPH A. LINNEMANN, 1st Lieut., CAC, 4881A Kossuth Ave., St. Louis.

FOR: Gallantry in action near Gela, Sicily, July 10, 1943. When a landing craft received a direct hit from enemy planes during a landing operation, he courageously proceeded to the aid of the wounded. He swam to the burning ship and, despite heavy enemy fire, assisted in the evacuation of the wounded.

* * *

TO: ROBERT J. FISHER, 1st Lieut., CAC, 128 Wade St., Jersey City, N. J.

JOHN L. MCCLOREY, Sergeant, CA, 60 Beaver St., Brooklyn, N. Y.

WILLIAM D. SWICK, Sergeant, CA, 8821 187th St., Hollis, N. Y.

RAYMOND A. WICKERT, Tec. 4, CA, 638 Manor Road, West New Brighton, N. Y.

RANDOLPH DOERNER, Tec. 5, CA, 51 Bay 17th St., Brooklyn, N. Y.

WILLIAM A. BROOKS, Pfc., CA, Route 2, Gibsonville, N. C.

RAYMOND E. BURTON, Private, CA, 120 South St., Vineland, N. J.

Hampered by enemy strafing attacks and sweeping ground fire, these seven men of an antiaircraft barrage balloon crew ran along an Italian beach during an invasion landing, shifting positions of a 35-foot balloon flying above them and thus provided an effective cover that probably saved many lives.

Low altitude balloons, which fly at less than 2,000 feet, came under direct enemy fire soon after the men had inflated them. Sergeant McClorey realized that if the balloon barrage were not established, ground troops which landed with the first wave would be subject to enemy strafing from the air. The action he took with his crew occurred after a balloon barrage wave in which he was participating had run into trouble.

Before reaching the beach, the wave had been broken up, separated and forced back to sea. But some of the squads, including Sergeant McClorey's, moved on toward the enemy on the shore. German 88mm shells were dropping among the landing craft and on the shore. Enemy machine-gun fire peppered the beach.

Sergeant McClorey knew the balloons had to be "sited" to protect the landing troops, now moving ashore in great numbers. McClorey and his men worked fast with their equipment, and the first balloon was quickly inflated. But it was in the air only a short time when it was hit by a German shell and tumbled earthward, burning fiercely. Although the enemy fire continued, the balloon unit gambled on a second try; another balloon was soon in the air, only to be destroyed as quickly.

Realizing that the only method of operation was to keep a balloon moving, Sergeant McClorey and his squad uncoupled the wires from the winch which secured one on the balloons and ran with it back and forth along the beach to keep the German ground fire from shooting it down. The balloon remained flying at operational height for several hours, helping to prevent enemy air attacks.

Soldier's Medal

TO: WILLIAM G. GOODNER, Capt., CAC, Donaldsonville, Georgia.

FOR: Heroism at Nadzab, New Guinea, on December 27, 1943.

TO: MELDON C. KERR, Staff Sgt., CA, Box 356, Newberry, Michigan.

FOR: Heroism at Goodenough Island on December 20, 1943.

TO: NORMAN C. SCOTT, Sgt., CA, Anselmo, Nebraska.

FOR: Heroism on Hurricane Creek in Tennessee on November 29, 1943. When a half-track, engaged in the Second Army Maneuvers during a blackout, turned upside down in two to four feet of freezing water, Sergeant Scott, on his hands and knees and at the risk of his life, entered the overturned half-track and rescued an officer and two enlisted men who were unable to extricate themselves.

TO: ROBERT E. DEZELL, Corporal, CA, 1717 West Burnside, Portland, Oregon.

FOR: Heroism displayed in the Central Pacific Area on the night of October 15, 1943 near the field position of his unit. A truck, carrying twenty enlisted men, which was being driven up a steep mountain road, struck a soft shoulder and overturned, pinning an enlisted man underneath. When the rescue party succeeded sufficiently in raising the truck, which was resting at a precarious position on the edge of a steep embankment, Corporal DeZell with utter disregard for his own safety, crawled beneath and freed the man, thereby saving his life. During this time the overturned chassis was at such a hazardous angle that the slightest downward movement would have resulted in the crushing of both. The heroism displayed by Corporal DeZell on this occasion reflects great credit upon himself and the military service.

TO: MARVIN L. MCLEOD, Cpl., CA, Pontatoc, Texas.

FOR: Heroism in attempting to rescue a comrade from drowning and in assisting to shore a Coast Guardsman in danger of drowning. On December 7, 1943, at Rocky Point, Nort Palos Verdes, California, with utter disregard for his own safety, he rushed down an 85-foot cliff and dived into rough ocean waters in an attempt to rescue a comrade who was clinging to a capsized boat. Although succeeding in swimming to within 15 feet of the soldier in distress, he was finally driven back to shore by the heavy seas. He courageously repeated his attempts several times, being thrown back by the waves each time. Later, although exhausted, he swam out and was successful in reaching and bringing to shore the Coast Guardsman whose boat had overturned and was suffering from shock and a head injury.

TO: Dennis L. Sullivan, Tec 5, CA, Trenton, Georgia.

FOR: Heroism at Goodenough Island, Territory of New Guinea, on December 2, 1943.

TO: Dominick Gicabazi, Pfc. (then Pvt.), CA, 1038 Ellis St., San Francisco, California.

FOR: Heroism at Goodenough Island, Territory of New Guinea, on December 2, 1943.

* * *

Harold L. Rowland, Sergeant, CA, Willow Springs, North Carolina.

Marvin Nelson, Corporal, CA, Thor, Iowa.

James M. Henry, Pfc., CA, Bankston, Alabama.

Oliver F. Knudsen, Pfc., CA, Algona, Iowa.

A soldier, engaged November 5, 1943, in excavating at Fort Rosecrans, California, was buried by a cave-in. Risking their lives, Sergeant Rowland and Corporal Nelson held back the sliding earth with their own bodies, and Privates Henry and Knudsen dug their unconscious comrade out.

Immediately after the rescue, tons of earth broke from the embankments, filling the excavation from which the soldiers had been removed.

Bronze Star

TO: John M. McCormick, Major (then Capt.), CAC, 210 N. Washington St., Butler, Pa.

FOR: Service from March 20, 1942 to February 28, 1943. He was unusually successful in teaching officers and enlisted men of a Coast Artillery brigade (antiaircraft) in the Central Pacific Area the operation and maintenance of certain complicated radio equipment. Before courses of instruction were organized and made available to personnel of the brigade, he qualified himself by prolonged and diligent study. It was through his initiative and close attention to duty that competent details of enlisted men were trained for the efficient operation of this equipment. The problem of maintaining these sets in operation, complicated by a lack of spare parts, was solved in many instances by his resourcefulness and industry in improvising parts from available materials. His services were outstanding and proved of great material benefit to his command. His services were clearly above and beyond the usual performance of duty.

TO: James B. Copelan, Staff Sgt. (then Sgt.), CAC, 521C Lusitania St., Honolulu, T. H.

FOR: During the Japanese air raid on Pearl Harbor Naval Base on December 7, 1941, as gun commander of an antiaircraft battery, he distinguished himself by opening fire promptly with his antiaircraft gun before receiving firing data from the range section which had been unable to set up its equipment. To enable him to bring fire to bear on approaching hostile airplanes, he estimated fuse ranges and leads and aimed the gun by sighting along the barrel. His initiative, quick thinking and skill caused two flights of hostile bombers to break formation in their approach to the target area. His coolness and leadership in the midst of the enemy air raid reflect credit upon himself and the military service.

Commendations of 105th CA Bn. (AA)

Commendation of 105th CA Bn. (AA) by CG, II Corps, 29 March 1943.

1. During the period 19 March to 23 March 1943, while located in the vicinity of ———, Tunisia, North Africa, your unit definitely destroyed 14 and probably destroyed 9 enemy aircraft. During the morning of 23 March, positions of Battery "C" and 1st Platoon, Battery "A," were overrun by enemy tanks. Before abandoning their positions as ordered, your men removed vital parts of their guns, rendering them useless to the enemy. On 24 March, all equipment except some motor vehicles was recovered and units resumed functioning.

2. I desire to commend you and the men of your command for their outstanding performance in destroying enemy planes and their devotion to duty.

G. S. Patton, Jr.,
Lieutenant General, U.S.A.
Commanding.

* * *

Commendation from Headquarters, 7th Field Artillery Battalion, 10 April 1943, to CO 105th CA Bn. (AA).

1. In the period of attachment of Battery "B," your organization, to this organization, 14 March to 9 April 1943, said Battery accomplished its tactical mission with great efficiency. At no time was any responsible individual of the battery found off the alert. On the contrary, it appeared that every member of the battery was particularly eager, alert, and proud of his assignment and ability to perform it. As a result the Battery, hence our protected Battalion, was never caught napping by enemy aircraft.

2. The superior leadership of 1st Lieutenant Joe Hubbard and the excellent coöperation of his lieutenants deserve commendation. His unceasing and untiring reconnaissance and position inspections made for daily increased protection of this unit, and of the personnel and equipment of his battery.

3. Lieutenant Hubbard is a credit to his branch, and his Battery a credit to the Army.

George W. Gibbs,
Lt. Col., 7th F.A. Bn.
Commanding.

Commendation from Headquarters, First Battalion, 17th Field Artillery, 21 April 1943, to CO 105th CA Bn. (AA).

1. It is with deepest gratitude and pleasure that I wish to thank you for the splendid work of Battery "A" of your organization. This battery was attached to 1st Bn., 17th F.A. during the period of March 16-April 8, 1943.

The work of the officers and men, especially of Captain Pierce was of the highest type. Intense bombing attacks were again and again met with efficiency and bravery by this battery.

The bravery, efficiency and skill demonstrated under fire by this organization reflected great credit upon this bat-

talion, and has drawn the praises of every man of the 1st Bn., 17th Field Artillery.

JOSEPH R. COUCH,
Lt. Col., 1st Bn., 17th F.A.
Commanding.

Indorsement from Headquarters, 17th Field Artillery, 22 April 1943.

1. Basic communication concurred in and forwarded with pleasure.

H. J. D. MEYER,
Colonel, 17th Field Artillery,
Commanding.

Commendation from Headquarters, 1st U. S. Infantry Division Artillery, 8 May 1943.

1. I wish to take this opportunity to commend the work of the 105th CA Bn. (AA).

2. This organization was attached to the 1st U. S. Division for the landing at Oran, at Gafsa, El Guettar, and for the present operation. At various other times, it has been protecting parts of the Division. Its work has been most accurate at all times and especially under exceptionally trying and adverse conditions.

3. The spirit of coöperation and the enthusiastic attitude shown by Lt. Col. Barkley, his officers, and men have been an inspiration to all with whom they have come in contact.

CLIFT ANDRUS,
Brig. Gen. Comd'g.
1st U. S. Inf. Div. Artillery.

Indorsement from Headquarters, 1st U. S. Infantry Division, 9 May 1943.

It gives me great pleasure to forward this commendation and wish to add my personal appreciation for the excellent work done by this unit while attached to my command.

TERRY ALLEN,
Major General, U. S. Army,
Commanding.

Indorsement from Headquarters, II Corps, 9 May 1943.

I take pleasure in forwarding this commendation.

O. N. BRADLEY,
Lieutenant General, U.S.A.,
Commanding.

HEADQUARTERS, 1ST U. S. INFANTRY DIVISION ARTILLERY
A.P.O. No. 1, U. S. ARMY
3 September 1943.

SUBJECT: Commendation of 105th AAA AW Bn.
TO : Commanding General, 1st U. S. Infantry Division.

1. The 105th AAA AW Battalion has recently been relieved from attachment to this Division, and I desire to commend to your attention the superior service rendered by the Battalion during combat with this Division.

2. The 105th AAA AW Battalion, then the 105th CA Battalion (AA), was first attached to this Division at Tidworth Barracks, England, in August, 1942. It participated in Division amphibious training and landed with us in North Africa on November 8, 1942. Upon the conclusion of fighting in that area the Battalion was detached.

3. As units of the Division were detached and sent to Tunisia from the vicinity of Oran, the companion units of the 105th CA Battalion (AA) were again attached and accompanied our units starting in December, 1942. From that date to on or about May 10, 1943, when the Division left Tunisia at the conclusion of the Tunisian Campaign, the attachment of the 105th CA Battalion (AA) was continuous.

4. During the final preparations for the Sicilian Campaign the 105th CA Battalion (AA) was again attached to this Division and remained in that status until last week.

5. Throughout all operations the AA support rendered by this Battalion has been superior. There has never been a time when it was necessary to in any way find fault with its performance of duty.

6. The method of employment was the attaching of the Battalion to Division Artillery. The four batteries were attached to our four battalions, A Battery to the 5th FA Battalion, B Battery to the 7th FA Battalion, C Battery to the 32d FA Battalion and D Battery to the 33d FA Battalion. These batteries accompanied and closely supported their respective battalions under all the adverse conditions or terrain, weather and battle to which we were subjected. Their association was so close and cordial that our units considered them almost as organic parts of the Division Artillery.

7. The Battalion was commanded after the Oran operation by Lieutenant Colonel John Barkley.

8. I wish to express appreciation, respect and admiration for the manner in which the 105th AAA AW Battalion has performed its duties while under my command.

CLIFT ANDRUS,
Brigadier General, U. S. Army,
Artillery Commander.

FIRST IND.

HEADQUARTERS, 1ST U. S. INFANTRY DIVISION
A.P.O. No. 1, U. S. ARMY
5 September 1943.

TO: Commanding General, II Corps, A.P.O. 302, U. S. Army.

In forwarding this communication, I wish to add my expression of appreciation for the services rendered by this battalion.

C. R. HUEBNER,
Major General, U. S. Army,
Commanding.

SECOND IND.

HEADQUARTERS, II CORPS, A.P.O. No. 302, U. S. ARMY
7 September 1943.

TO: CO, 105th AAA AW Bn.

I take pleasure in forwarding this letter of commendation and in adding my personal appreciation thereto.

O. N. BRADLEY,
Lieutenant General, U.S.A.,
Commanding.

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 problem that properly may be considered by the Board. Communications should be addressed to the President, Coast Artillery Board, Fort Monroe, Virginia.

Items pertaining to Antiaircraft Artillery should be sent to the Antiaircraft Command, Richmond 10, Virginia.

6-inch High Explosive Shell Mk IIA2. Information has been received to the effect that, as a result of range firings conducted by the Ordnance Department during the summer and fall of 1943 with the 6-inch High Explosive Shell Mk IIA1, variant E (later standardized as High Explosive Shell Mk IIA2), all 6-inch High Explosive Shells Mk IIA1 will be recalled by the Ordnance Department, modified to High Explosive Shell Mk IIA2, and reissued. Charts and scales based on Firing Tables 6-F-1 are now available for the 6-inch High Explosive Shell Mk IIA2 with Point Detonating Fuze M51 and modifications. Batteries at which the 6-inch High Explosive Mk IIA2 ammunition is available or is scheduled for issue should forward requests for applicable charts and scales in accordance with instructions contained in Appendix VII of FM 4-15 (5 November 1943).

Navy caliber .50 machine-gun mount. The Board has recently completed tests of the Navy dual caliber .50 machine-gun Mount Mark XX, for installation on U. S. Army mine planters. The mounts are provided with handle bar control which is easily adjustable for high or low angle fire. Both guns are fired by the same control. The mount is free of vibration and is exceptionally easy to control at any angle of elevation.

The gunner does not use any part of the mount as a brace and hence any movement of his body due to roll of the ship is not communicated to the guns. The position of the gunner is such as to insure a good view of the tracer stream.

Only minor modifications to the M-1 planters are required when the subject mounts are installed. The speaker on top of the pilot house must be lowered approximately 18", and the outboard portion of the rail should be replaced by chain and fittings to permit the guns to be fired at maximum depression angle.

Two particular features worthy of note are provided on the mount. A "tailor-made" safety stop, provided for each gun, can be secured to the top of the pedestal. This prevents depressing the gun to angles at which damage to ship, rigging, or adjacent gun crew could result. A hand-operated pump provides circulation of the coolant in the event of electrical power failure.

Sound powered telephones. Existing sound powered telephone equipment has been examined by the Coast Artillery Board and found to be suitable for only limited application in Seacoast Artillery fire control systems because of the relatively low output of the sound powered transmitters. Certain changes have been recommended, however, which it is believed will make it possible to apply them rather generally to Coast Artillery communication systems. Pending the provision of the new sound powered telephone and head and chest sets, the issue of existing equipment for special projects approved by the Signal Corps Plant Engineering Agency was recommended.

This type of telephone does not require battery power for its operation and, consequently, will have a decided advantage over the Telephone EE-8-( ) in hot humid weather where batteries corrode rapidly and in extremely cold areas where batteries cease to function properly. Its employment in fixed seacoast defenses will materially reduce the cable requirements between the gun battery and the fire control switchboard and make it possible to keep important circuits within the emplacement area of the battery itself. It is well adapted to situations where telephone equipment may not be used for long periods of time but which must be ready at all times for instantaneous use.

Accessory kit for Radio Sets SCR-808 and SCR-828. Recommendations have been made for the issue of accessory kits for Radio Sets SCR-808 and SCR-828 used by the Coast Artillery for emergency transmission of base-end data. The contents of these kits vary slightly depending on whether they are for use with Radio Set SCR-808 or Radio Set SCR-828 and whether the sets are used in harbor defenses or mobile seacoast artillery batteries. The kits for sets in harbor defenses include a 110-volt alternating current power supply unit and dipole antennae with sufficient coaxial cable and couplings to insure a proper antenna installation. The kits for sets in mobile Coast Artillery bat-

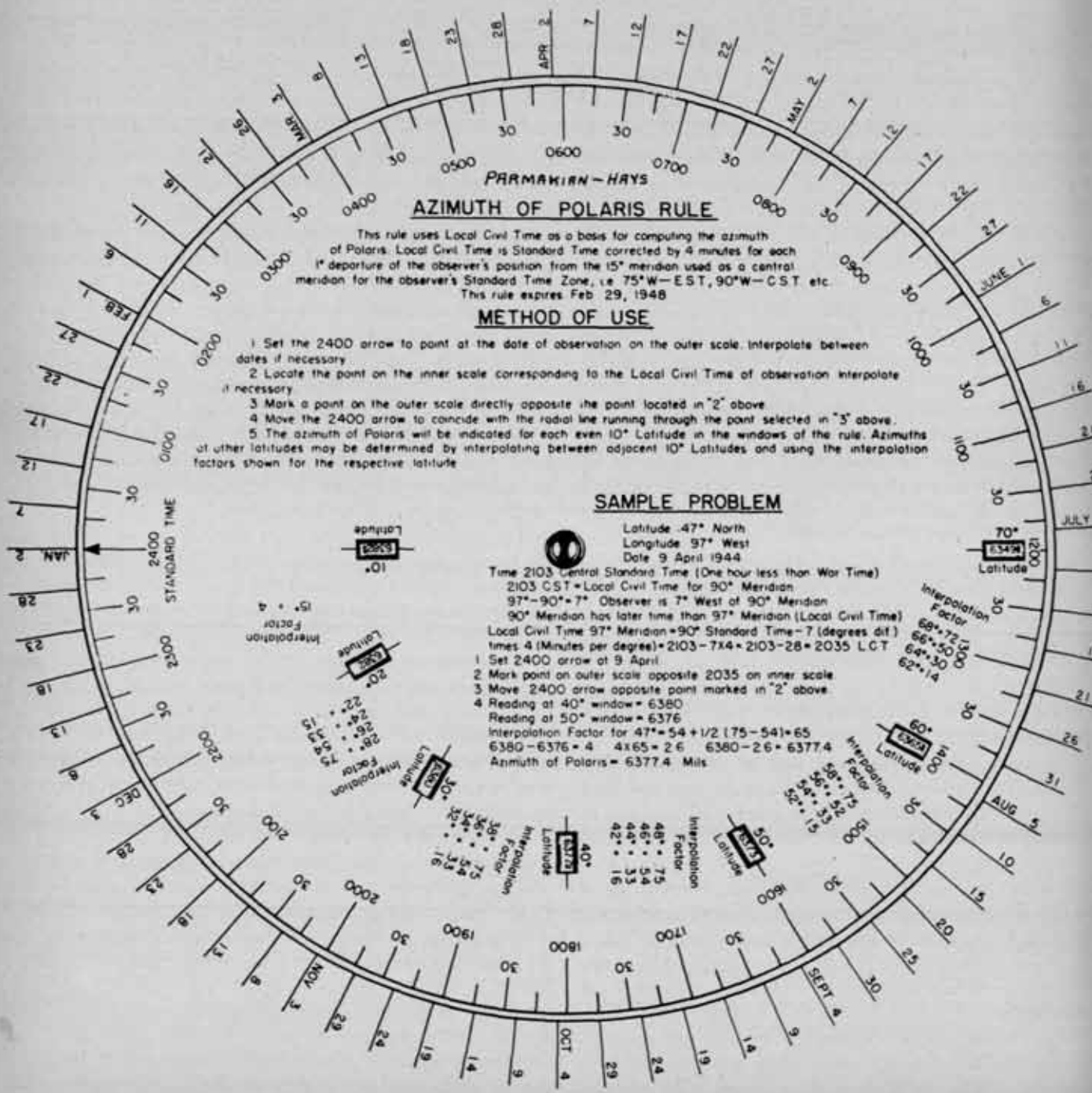
teries contain 12-volt storage batteries and supplementary engine-driven charging generators in place of the 110-volt alternating current power supply unit. They provide dipole antennae with sufficient coaxial cable and couplings to insure proper installation. They also provide whip antennae to be used in situations where it is not practical to erect the dipole antennae. In addition to these major items, certain miscellaneous items are included to make it possible properly to coördinate the radio circuits with the battery communication circuits. Recommendations have also been made for the designation of frequencies to be used for these sets by the Coast Artillery.

Cleaning of boilers, M-1 mine planters. Changes No. 2 to AR 90-150 pertaining to the cleaning of boilers on the M-1 planters provides for cleaning after 720 hours of steaming, or after 3 months boiler operation, whichever occurs sooner. The term "steaming" is intended to mean actual hours that the ship is under way. The intent of the regulation is not to count the number of hours that steam is maintained in the boiler, except for the three-month period.

It is understood that some M-1 mine planters are still cleaning boilers at the end of each 720-hour period during which steam is maintained, thus taking the ships out of service for four to five days each month for unwarranted and unauthorized reasons.

Modifications to Gun Data Computer M1. The Board has recommended that the Gun Data Computer M1 be modified as follows:

a. The A_p spot dial be replaced with a counter reading to the nearest one-hundredth degree. Lateral deviations are read in hundredths of degrees, and it is believed that A_p spots of the same degree of accuracy are warranted.



Azimuth of Polaris Rule.

h. Provision be made to correct for elevation and azi-uth difference between guns.

The above recommendations were approved and the parts ecessary to accomplish these modifications will be issued the field in the form of kits.

Maintenance personnel for M8 type gun data computors. nder existing regulations, third- and fourth-echelon main-nance must be accomplished by Ordnance Department rsonnel. Experience with gun data computors and di-ctors has shown that Ordnance personnel, specially ined on such equipment, are not always available to ac-mplish this maintenance. To alleviate this situation, the ard recommended that a qualified Ordnance enlisted an, specially trained in maintenance of M8 type com-utors, be attached to each Coast Artillery battalion or in-pendent battery manning such computors.

Although Army Ground Forces did not concur with the bular assignment of Ordnance enlisted technicians to oast Artillery organizations, they did state that steps are ow under way to secure the training of a sufficient number f enlisted technicians and officers to handle the number of 8 computors which are proposed for manufacture. They ated further that the matter would be brought before the ar Department with the request that this maintenance formation be published to the attention of the theaters and fense commands, and recommending that the various adquarters concerned, if not automatically supplied with dnance personnel trained in the subject computor, be dvised to request suitable replacements properly trained.

Provision of electrical outlets on M8 type gun data com-utors for use with automatic plotting board. The Board as under development at the present time an automatic otting board which will reproduce an accurate trace of the rget path in addition to the path of set-forward points as edicted by the gun data computor used therewith. The rst model of this type board has been tested but was not cepted, chiefly because it was too elaborate. A much mpler board is now being constructed by Bell Telephone aboratories.

In order to insure that facilities are available for the use M8 type gun data computors, now in production, with he proposed plotting board, when and if standardized, the oard recommended that outlets be provided in the com-utors to allow for connection with the subject plotting oards. The recommendation was approved.

Test equipment, tools, and spare parts for first- and econd-echelon maintenance of M8 type gun data com-utors. In order to avoid the difficulties previously experi-nced by the using arm in obtaining spare parts for newly anufactured equipment, the Board has recommended that st equipment, tools, and spare parts for first- and second-chelon maintenance of M8 type gun data computors be pplied with each production model. The first model is heduled for delivery in October 1944. The Board's recom-endation was approved and Army Service Forces will aintain close liaison with Frankford Arsenal to insure its ccomplishment.

Azimuth of Polaris Rule. The Azimuth of Polaris Rule repared by Major G. M. Hays of the Division of Training ublications of the Antiaircraft Artillery School was sub-itted recently for test. This rule consists of two concen-

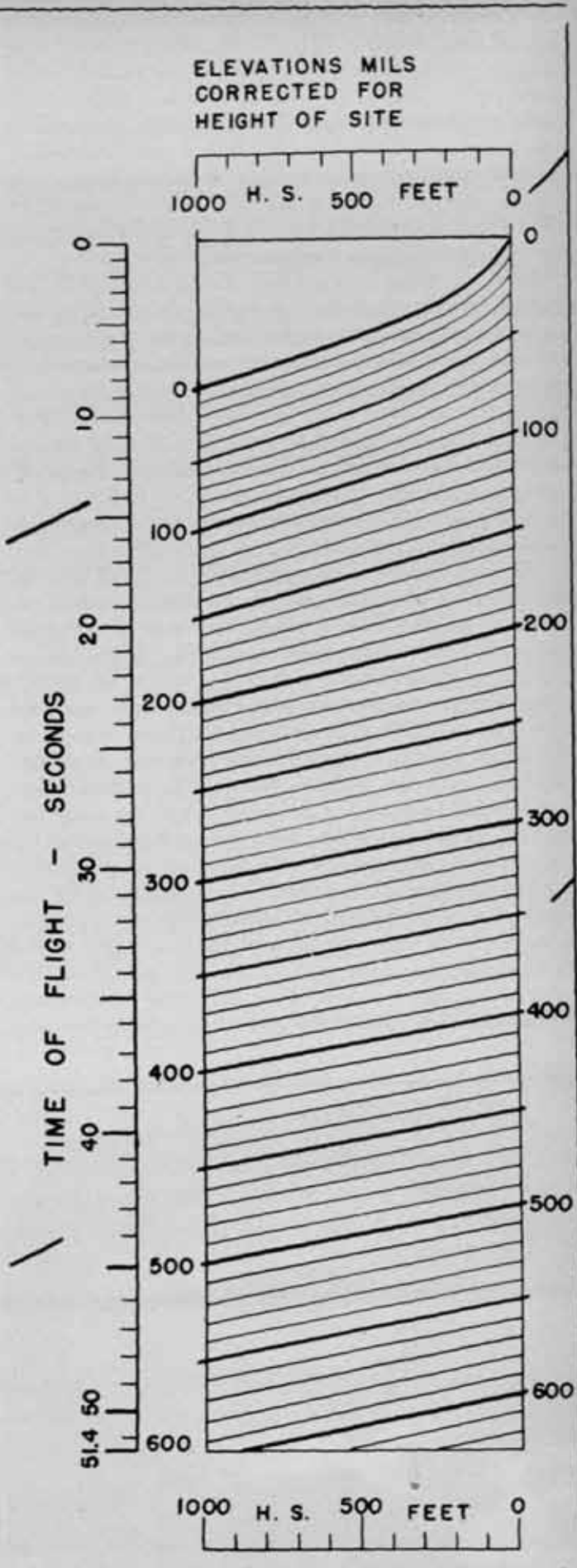


Figure 1, Revised Ordinate Scales on Ballistic Correction Charts for Deflection Board M1.

trically mounted discs with appropriate scales with which to compute the Azimuth of Polaris using the date, Local Civil Time, and the latitude and longitude of the point of observation.

The advantages possessed by this rule are its simplicity of operation and the ease with which it can be supplied. Like the Ephemeris, the Azimuth of Polaris Rule should be replaced periodically to avoid small errors in azimuth incurred through use of the rule at dates subsequent to the year for which the rule data are calculated.

The Board recommended that the Azimuth of Polaris Rule be issued on the basis of one per mobile battalion and that provision be made to renew and replace expired rules at periodic intervals to maintain an average accuracy of 0.5 mil.

Ballistic correction chart for Deflection Board M1—Height of site correction. The method of plotting the ballistic (wind and drift) charts for the Deflection Board M1 is given in paragraph 13 of Appendix VI of FM 4-15. The computations given therein are based on the assumption that the height of site of the battery is zero. If such a chart is used for a battery at an appreciable height of site, appreciable errors in direction may be introduced unless a correction for height of site is made. This may appear as an error in the ballistic correction, and, in Case II pointing, as an error in angular travel also. These errors are greatest at short ranges and decrease rapidly as the range increases.

In order to correct this condition, the ordinate scales on the ballistic correction charts for the Deflection Board M1 have been revised so that the chart may be positioned correctly depending upon the height of site of the using battery. The original scale has been extended to assume the form of a grid (see figure No. 1) giving correct positioning ordinates for batteries emplaced at from zero to 1000 feet height of site. A modified elevation index is supplied to permit the same charts to be used for any height of site within the limits of the grid by correctly positioning the pointer to the proper height of site graduation on the chart.

The right-hand edge of the grid is the same as the older elevation scale for zero height of site. The left-hand edge is the elevation scale corrected for the maximum height of site for which the chart is constructed. Across the top and bottom are height of site scales. The curves are so plotted that a vertical line through any particular height of site graduation in the top or bottom scales will intersect the curves and give the proper elevation scale for that particular height of site. For fixed batteries, if the height of site is given, the Coast Artillery Board will issue these charts with the height of site line drawn in the proper position. For mobile batteries, the height of site line is omitted.

The improvised index pointer is made of xylonite with a horizontal index line inscribed so as to extend over the width of the grid and beyond to the time of flight scale. It replaces the original metal index when the grid type chart is used. Small paper pointers are pasted on the index to assist in setting to the proper elevation and reading the time of flight. To position the paper pointer, move the chart until the height of site scale is under the index line scribed on the xylonite, and then paste the pointer so that the tip is on the index line and over the proper height of site graduation, or just touching the height of site line (when drawn). When a mobile battery moves, it is, of course, necessary to reset the paper pointer to the new height of site.

The revised charts under discussion are currently available for issue along with suitably modified index pointers. Seacoast batteries should replace existing ballistic correction charts for the Deflection Board M1 by forwarding requests for the newly revised charts to the Coast Artillery Board in accordance with instructions contained in Appendix VII of FM 4-15 (5 November 1943). These requests also should supply data giving the height of site of the gun trunnions to the nearest foot.

Forthcoming Changes No. 1 to FM 4-15, when published, will discuss the subject modifications in more detail.

6-inch Barbette Carriage M2. The first complete installation of 6-inch Barbette Carriages M2 has been under service test since December 1943. Many desirable minor

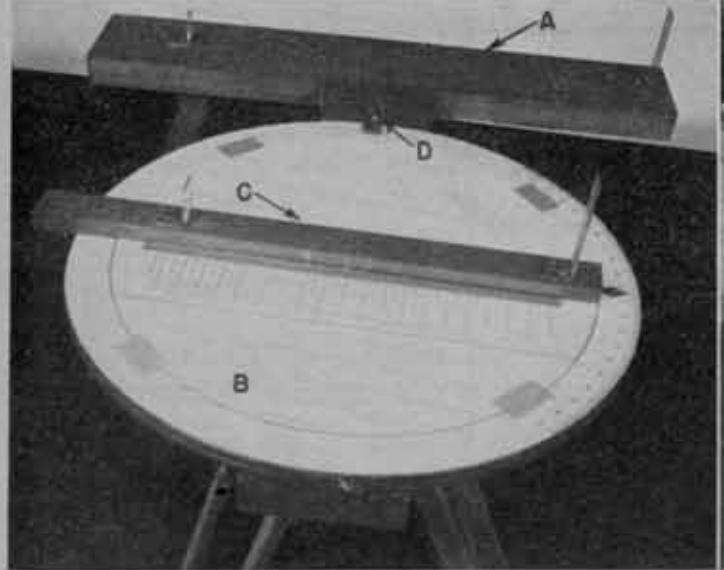


Figure 2.

Figure 3.

The Ryan TVS Recorder.

modifications to this battery became apparent during its installation. In general, such modifications also apply to Barbette Carriages M1, M3, and M4, and have been so recommended. The M1 and M2 carriages mount either the M1903A2 or M1905A2 gun, while the M3 and M4 mount the T2. The M1 and M3 carriages are equipped with the Waterbury speed gear elevation drive; the M2 and M4, the Atlantic Elevator Company's electric elevation drive. All carriages use manual traverse.

As this type battery will employ M8C electric data computors (now in production), the service test included a day record practice using "creeping" firing data. Guns were fired as soon as loaded and elevated. Data were photographed at time intervals in the plotting room, and the overall excellence of transmission and laying in both elevation and direction is exemplified by the fact that of 20 record rounds 9 were reported "line," 6 were five yards off, 3 were ten yards off, and 2 were fourteen yards off, in direction. The best time was turned in by the No. 2 gun crew; 10.5 seconds per round. An action shot during the actual practice, and a dummy transmitter used, are shown below.

Although this installation (splinter-proof central traverse and shielded guns) is not as satisfactory as a turret type, it can be considered very satisfactory for 6" guns at the present time.

Ryan TVS Recorder. This recorder is a training aid which provides target-towing vessel-splash (TVS) angles during target practice with a much higher degree of accuracy than possible with range rakes. For any two-gun practices with 6-inch guns and above, the data obtained are equivalent to camera records. The Coast Artillery School is experimenting with the use of two recorders during 155-mm four-gun and AMTB battery practices.

Two arms of the recorder (see figures above) are aligned by means of open sights upon the target. A target sighting arm (A, Fig. 2) is mortised to a base mounting a circular plotting board (B) and a splash sighting arm (C). An arc graduated fifty degrees each side of center is inscribed on a linenback or heavy drafting paper disc glued to the circular plotting board. The board is clamped (D) to the base after the target sighting arm and the zeroed splash sighting arm have been aligned on the target. Another smaller paper disc is fastened by tape to the board and may be easily replaced. One-twelfth inch slots are cut in a xylonite platen fastened under the sighting arm and numbered consecutively. Impacts are marked in order. Although the base has a universal motion, this motion should not be used except for orientation. The open sights function satisfactorily even in fairly rough water.

Three operators are required; one to track the target, one to point the splash sighting arm, and one to mark each impact by pencil through the slots cut in the xylonite platen.

Figure 3 shows the recorder and a base to prevent damage to decks. The base may be anchored by means of arms to deck fixtures. A training bulletin published by the Coast Artillery School will describe the recorder and its use. Plans for the recorder may be obtained from the Coast Artillery Board.

Coast Artillery Journal

Fifty-third Year of Publication

COLONEL E. B. WALKER, Editor

LT. COL. ARTHUR SYMONS, Associate Editor

TEC 5 HARRY F. CAMPBELL,
Acting Circulation Manager

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The purpose of the Association shall be to promote the efficiency of the Coast Artillery Corps by maintaining its standards and traditions, by disseminating professional knowledge, by inspiring greater effort towards the improvement of 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

Whose JOURNAL Is It?

Every so often we get a letter here at the JOURNAL that says, "The trouble with the JOURNAL is that it doesn't have enough material from the fighting fronts. Here we are fighting Japs (or Germans) and knocking down planes, and we never read anything about our battle experiences."

The editors have the same complaint. We can't very well write battle experience stories for the troops—our battles over paper-rationing and censorship aren't the type that would interest you folks out in the active theaters. But how about you at the front! *You* know what is happening—you help make it happen. Why not write up the story of your experiences, pepper it well with descriptions of your mistakes (if you make them), and then salt it with the wisdom you have gained the hard way. Our readers are anxious for this type of material.

Remember—the JOURNAL does not belong to the editors, or to the Commanding General, Army Ground Forces, or to anybody else except *you!* Every military subscriber is a member of the United States Coast Artillery Association, and the Association owns the JOURNAL. You can help your JOURNAL by writing of your battle experiences, and then getting it through the theater censorship to us here at the office. We are getting a few more of these stories each issue, but we need still more. It's up to you.

* * *

Group Subscription Orders

The 604th AAA Group, Colonel F. S. Swett, commanding, leads off this time with eleven subscriptions, to bring the unit back to the 100% list. The fact that Colonel Swett's unit is 100% in JOURNAL subscriptions is nothing new—Colonel Swett's organizations seem to stay that way. But worthy of note is the fact that the colonel keeps a check file of JOURNAL subscribers. He and Captain Christ, whose letter appears in this section, are of one mind regarding the value of the JOURNAL.

Another eleven-subscription order, plus one renewal, came from the 785th AAA Battalion, Captain Richard E. Roach, adjutant. The renewal was for the subscription of Lieutenant Colonel Perley L. Everett.

From Lieutenant Colonel E. W. Hiddleston, 603d AAA Gun Battalion, came six subscriptions, five from officers and one from a first sergeant.

Although we do not usually mention group subscriptions of less than five, Captain Wilson C. P. Jones' three-subscription order is worthy of note because two of the subscriptions put his battery, B of the 30th Coast Artillery, in the 100% group. The third one was from Headquarters Battery of the 1st Battalion, 30th Coast Artillery.

The largest single order for mention this issue came from the 588th AAA AW Battalion, Lieutenant Colonel Karl C. Frank, commanding, for thirty-five subscriptions. The

order was signed by Lieutenant Nathan Levine. An order that size is something for other battalions to ponder.

The 93d AAA Group stepped into the 100% circle with ten subscriptions. Lieutenant Colonel John C. Smith commands the 93d. The 62d AAA Brigade's S-1, Major R. S. Campbell, submitted seven subscriptions from his unit. Lieutenant Hector J. Horcasitis forwarded five subscription orders from Battery B, 339th AAA Searchlight Battalion.

The Battalion Fund, 168th AAA Gun Battalion, bought five subscriptions for units within the battalion. Lieutenant Benjamin Milliken is the custodian of the Fund. Battery C, 379th AAA AW Battalion, sent in an unusually large order to come from one battery—nine subscriptions. Captain Joseph W. Gardner is the battery commander.

Lieutenant Clarence T. Callahan, adjutant of the 559th AAA AW Battalion, sent in six subscriptions. Colonel Ronald M. Harris, commanding the 58th AAA Group sent in eight, six for the Group and one each for battalions within the group.

* * *

Thanks, Captain!

April 21, 1944.

In view of the fact that it is impossible to obtain a life-long subscription please send me a bill which will cover the next ten years.

Thank you for your fine coöperation.

Very truly yours,

JOSEPH P. CHRIST,
Captain, CAC.

* * *

Captain Christ applied for a life subscription to the JOURNAL—the first of its kind as far as is known—and, since life subscriptions are not available, requests a ten-year subscription, also the first of its kind. The JOURNAL hopes that it will continue to deserve this confidence.

* * *

Those November-December Inserts

APO ——
1 March 1944.

The November-December issue of the C. A. JOURNAL has just arrived at this Southwest Pacific outpost, and as usual we received it with great enthusiasm.

The insert, the picture of the heavy AA gun and searchlight, particularly struck my fancy, and I showed it to several men in the battery. The result was that they desired to have a copy of that photo and they requested that I write to see whether or not they are obtainable.

LT. HUGH DRYFOOS.

* * *

There have been many requests for copies of the full-color picture that was included with the November-December issue. More copies are available, but the JOURNAL must charge $1.00 per hundred copies on additional requests, to pay handling and shipping charges. The minimum charge, for 25 copies, will be 50¢.

OCS Program Cut

With the initial pressing demand for junior officers met and the need for the Officer Candidate School program decreasing rapidly, not more than eleven of the original twenty-six schools in continental United States will be in operation this fall, the War Department has announced.

During March, the following Officer Candidate Schools were suspended: Fort Riley, Kansas (Cavalry); Fort Monroe, Virginia (Coast Artillery); Camp Hood, Texas (Tank Destroyer).

On March 1, the Military Police Officer Candidate School at Fort Custer, Michigan, accepted its last class and will be suspended after graduation of this class on June 27, 1944. The Antiaircraft Artillery Officer Candidate School at Camp Davis, North Carolina, enrolled its last class on February 20 and will close on June 15, 1944.

The Chemical Warfare Service Officer Candidate School, Edgewood Arsenal, Maryland, which enrolled a class last March 13 for graduation this July 8, will be suspended on completion of this class. The Armored Officer Candidate School, at Fort Knox, Kentucky, will be suspended on September 23, 1944, when its last class, enrolled May 29, will be graduated.

When the peak of the program was reached in December, 1942, more than 23,000 enrollees were graduated in that month from Officer Candidate Schools. Since then, the number of monthly graduates has steadily dropped until now it is below 2,500. Of the four Officer Candidate Schools overseas, only the one in Australia now is in operation.

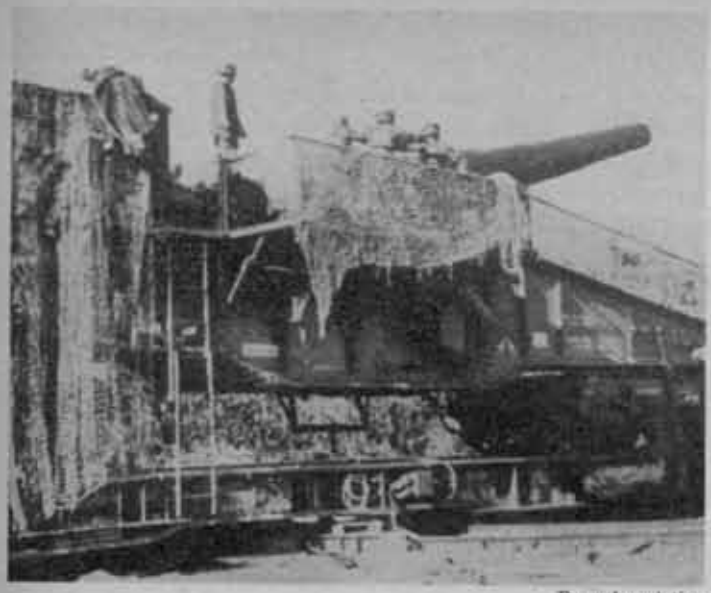
Officer Candidate Schools which at present accept candidates are: Fort Belvoir, Virginia (Engineer); Fort Sill, Oklahoma (Field Artillery); Durham, North Carolina (Finance); Fort Benning, Georgia (Infantry); Ann Arbor, Michigan (Judge Advocate General); Camp Barkeley, Texas (Medical Administration); Aberdeen Proving Ground, Maryland (Ordnance); Camp Lee, Virginia (Quartermaster); Fort Monmouth, New Jersey (Signal); New Orleans, Louisiana (Transportation); San Antonio, Texas (Army Air Forces) which will supplant the Army Air Force Officer Candidate School at Miami, Florida.

Officer Candidate Schools which were suspended prior to those already mentioned include: Fort Washington, Maryland (Adjutant General's Department); Fort Warren, Wyoming (Quartermaster); Carlisle Barracks, Pennsylvania (Medical Administration); Fargo, North Dakota (Army Administration); Grinnell, Iowa (Army Administration); Gainesville, Florida (Army Administration); Fort Washington, Maryland (Army Administration).

* * *

British Armed Forces

Our allies, the British have had more than 667,000 casualties, according to the British Minister of Production. Without considering the Home Guard, the British have under arms nearly nine million men and half a million women.



Press Association

The Germans, who supplied this picture to Swedish sources, say this railway gun is used for cross-Channel shelling.

* * *

Merger of U. S. Armed Forces

WASHINGTON—Secretary of War Stimson Tuesday (April 25) asked Congress to decide "as soon as possible" to merge land, sea and air forces of the United States under a single Department of the Armed Forces.

Once the decision is made, Stimson asserted, "even though not carried out until after the termination of hostilities (at least in the European theater)" many present military questions could be more easily resolved.

Members of the Special House Committee on Postwar Military Policy, who heard Stimson, said that legislation to effect such a merger was likely to be reported soon. Secretary of Navy Knox is reported to favor the merger.

Proposal Outlined

The proposal as outlined by Lt. Gen. Joseph T. McNarney, Deputy Chief of Staff, includes:

A Secretary of the Armed Forces, under whom Undersecretaries of Army, Navy, and Air would function;

The addition of a common supply department;

A U. S. joint chiefs of staff organization headed by a chief of staff to the Constitutional Commander in Chief and including the Chiefs of Staff of Army, Navy, and Air Forces. A director of common supply services, subordinate in rank, would be added to the group.

Secretary Stimson paid tribute to the voluntary cooperation during the war by both Army and Navy personnel but pointed out that "our experiences in the war have abundantly brought out that voluntary coöperation, no matter how successful, cannot under any conditions of warfare, and particularly triphibious warfare, be as effective in the handling of great military problems as some form of combined and concentrated authority at the level of staff planning, supervision and control."

Duplication

He revealed that despite the efforts of the two services there were many duplications of time, matériel, and manpower with resulting loss of effectiveness, resources, and power.

Stimson warned that although the actual changes could not be made in the critical period of the war, it is "of the greatest importance that the general principle of consolidation be determined as soon as possible."

General McNarney stated that the consolidation was needed not only to increase effectiveness in war, but in the coming peacetime demobilization.

Brig. Gen. John M. Palmer, recalled to active service about two years ago to study demobilization and postwar problems, urged the nation to remember Washington's advice which called for universal military training so that a "citizen army" of substantial size is always ready.—*Army Times.*

* * *

Barrage Balloons in Italy

Barrage-balloon operations have played an effective part in invasion tactics and have helped screen all ports occupied by American troops in Italy, the War Department has disclosed.

The commanding general of the Fifth Army said:

"Very-low-altitude balloons were used over both British and United States beaches in Fifth Army landings and have been used over all ports subsequently occupied. They have also been used in protecting critical defiles."

The commanding general of an AAA brigade in the Fifth Army reported:

"I believe that the presence of the balloons on the beach on D-Day and the following days was a most important factor in preventing hostile aircraft from flying low over the beaches. I also believe that barrage balloons are a vital element of the defense of a vulnerable area, such as a port or landing beach."

* * *

Science Items

Glass fibers are stronger in proportion to their weight than any known metal or alloy. Their tensile strength exceeds 250,000 pounds per square inch for the finer fibers. A wartime development is the use of these fine fibers as reinforcement for plastics to produce a structural material possessing hitherto unobtainable strength in proportion to weight.

* * *

Promising results with onion paste used as dressing for infected wounds are reported from Russia.

The experiments with onion paste as a weapon against infection and an aid to healing of wounds followed reports that the essential oils of onions, garlic, and other certain strong-scented vegetables contained substances that kill bacteria, protozoa, and even larger organisms like yeast cells and the eggs of certain lower animals.

The preparation consists simply in grinding the onion or a portion of it after the dry leaves have been removed. The paste is then put into a glass dish with a diameter equal to that of the wound and is applied so that the paste does not come in contact with the wound, which is exposed only to the onion vapor.—*Science News Letter.*

Making of Wills

The War Department has reiterated to military personnel the importance of making a will.

Calling attention to a tendency by large numbers of military personnel to await their arrival at staging areas or ports of embarkation before taking this step, the announcement emphasized that wills can be drawn more suitably at permanent Army installations, where adequate provisions are made for legal assistance.

Military personnel whose wishes and circumstances make it necessary or desirable to make a will after entering service may seek advice from the following:

Civilian attorneys; the legal assistant officer at any Army post, camp or station; a member of the Committee on War Work of any State, County or City Bar Association or of an established legal aid organization; any staff judge advocate, assistant staff judge advocate, or other officer of the Judge Advocate General's Department; a member of any Selective Service Advisory Board who is an attorney; or a member of the armed forces who is an attorney.

Under no circumstances will a member of the Army be directed or urged to prepare a will against his wishes, since to be legally effective it must be drawn voluntarily. However, all men and women in the Army are reminded of the importance of giving consideration to the matter, with an eye to deciding whether or not it is necessary or desirable in the individual case.

* * *

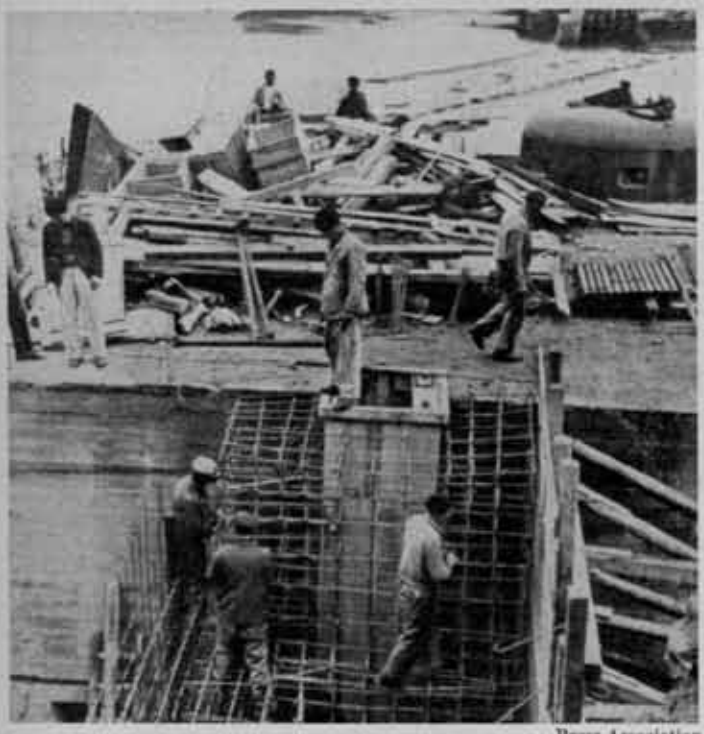
The Sam Browne Belt

In the October issue I wrote: "The paternity of the Sam Browne belt is still in doubt. . . . Perhaps Major General S. D. Browne will enlighten us?" I have since been privileged to see a MS note in the handwriting of Sir Sam Browne from which I quote the following passage (the italics are mine):

"Mr. R. Garden, saddler, 200 Piccadilly . . . was the only maker who used to make my belts properly. He made *the original one in* 1856 from a pattern I brought that year from India. He used to seat the purchaser on a horse block and fitted him exactly. . . . He did credit to *my invention*; but soon all sorts of patterns under my name were made." —"F. O. O." in *The Gunner*.

Signal Corps Photos

An Italian gun crew swabs out its 194mm railroad gun, now in use on the Cassino front. The big Italian gun has a range of seventeen kilometers and a crew of twenty-five men.



Press Association

Of German origin, this picture purports to show the construction of a heavily reinforced fortress on the French coast. Note gun turret at right.

* * *

Synthetic Quinine

A chemical method for duplicating quinine identical in every respect to the antimalarial drug extracted from the bark of cinchona trees has finally been developed after almost a hundred years of attempts by chemists seeking the correct process, it was announced by Polaroid Corporation.

Announcement of this achievement in organic chemistry coincided with the publication of the May, 1944, *Journal of the American Chemical Society*. In a communication to the editor of the *Journal* entitled, "The Total Synthesis of Quinine," by Dr. Robert B. Woodward and Dr. William E. Doering describe how they solved the classic problem. The plan for synthesizing the complex drug was originated by Woodward and incorporated as a project in the basic research program of Polaroid Corporation early last year. It is by no means certain, however, that the synthetic drug can be manufactured on a large scale for use during the war.

Commenting on the new synthesis, Edwin H. Land, president and director of research of Polaroid Corporation, declared, "As yet it has not been determined whether the rather intricate process involved in this synthesis can be made commercially practicable.

* * *

Landlubbers Rejoice

Motion sickness preventive has recently been added to the Medical Department Supply Catalogue as a standard item of equipment. The *Army Medical Department Bulletin* points out that it may produce at least a 50% reduction in the incidence of motion sickness.

Marine Railway Ordnance*

By Engineer Lieutenant Georgi Padalka

The time will come when historians of war will analyze the reasons why the Germans, when they had nearly completed the encirclement of Leningrad, could take the city neither during their initial drive nor during the subsequent and repeated efforts to storm the place. Special attention will then undoubtedly be paid to that phase of the struggle which took place in the autumn of 1941, when the Nazis still possessed considerable offensive potential and numerical superiority in men and armaments in this sector of the front.

Soviet firescreens played no mean rôle in the defense of Leningrad. These barrages were maintained not only by the Red Army field guns, by primary batteries of Soviet warships, and the forts at Kronstadt which preserved vital territory for Soviet troops south of Oranienbaum, but also by marine railway ordnance. The creation of this arm of the service attests the adaptability of the Soviet Command to discover quickly, during the course of battle, new and additional methods to struggle and to avail themselves most effectively of local facilities. A glance at the map will show that the environs of Leningrad are checkered by a ramified network of railway lines. Radiating from the city they frequently intercept. These geometric railway patterns were ably used by the defenders of Leningrad.

While Soviet troops were wearing down the enemy at the distant approaches to the city, medium and heavy ordnance were mounted on rails and organized as batteries and divisions of naval special artillery—naval because these monster cannon much resembled those on warships. The guns were manned by sailors and officers of the Red Navy.

Thus the firescreen about Leningrad was maintained by an invincible barrier of gunmetal, the *panzer* avalanche of the Nazis was brought to a standstill. Their way was blocked effectively. Railway guns together with ordnance on ships and in forts, and the guns of the Red Army now forced the Germans to dig in and pass from the offensive to siege operations. Thus precious time was gained in this phase of the struggle.

Having coped with their primary task the naval guns were immediately confronted with another—suppression of the enemy's batteries. Despairing of taking Leningrad by storm and unable to subdue the city by blockade, the Germans brought up their heaviest guns and began methodically to shell the city. Leningrad's firescreen then played an important rôle. To begin with, naval guns ferreted out and strafed the German batteries before the latter were in action. Secondly, no sooner did the German guns begin to shell the residential sections of the city when Soviet guns deluged them with fire, thereby drawing the enemy's shells upon themselves. Great artillery duels ensued and continued up to January, 1944, when Soviet batteries were confronted with a third task: aiding advancing Soviet forces.

It was then Leningrad's screen of fire turned to a flaming sword which mercilessly cremated the enemy's strong

*By radio from Moscow, direct to the JOURNAL.

...nts, hammered his communication lines, and shattered ...artillery. This last was particularly important. The ...rmans had numerous guns, among them heavy guns ...ging from 150mm to siege guns of 406mm, brought ...from Sebastopol. These too failed to avert defeat for ...Nazis.

Armed with the wealth of experience gained during the ..., the Soviet naval guns coped brilliantly with their ...d task. By that time the marine gunners had learned ...coordinate perfectly their fire with that of the warships, ...army's artillery, and the movements of their advancing ...fantry. They had also learned much during the breach-...g of the blockade in January, 1943. Maximum benefit ...derived from the maneuverability of the batteries. ...With the rail network about the town the navy men were ...le to transfer guns quickly from one section to another ...d increase the fire potential where it was needed most. ...They grew adept at switching to new positions while still ...ticipating in artillery duels, and to approach forward ...sitions unseen, to unloose concentrated barrages and to ...withdraw before the enemy could reply. Quick switches, ...ving from position to position, clever camouflage, and ...ell-equipped emplacements—all these nearly always foiled ...e enemy's attempts to destroy the Soviet batteries.

One hour and thirty minutes after the marine railway ...ns let fly their first salvos Soviet infantry attacked. By ...en the German defenses had been shattered or disrupted ...a considerable depth. Major General Smirnov's First ...arine Railway Artillery Brigade, which earned the desig-...tion of "Guards" troops during the Leningrad offensive ...erations, is still a particularly distinguished unit. By ...nuary, 1944, this brigade had destroyed 95 enemy artil-...ry and 22 enemy trench mortar batteries, 37 trains which ...ried ammunition, equipment, and troops, 75 tanks, sev-...al hundred trucks, and 87 supply bases. The brigade ...ded considerably to its successes during the Leningrad ...fensive. A single unit of the brigade dispelled enemy ...ncentrations of troops and armaments 22 times in the ...rse of one day. Within several days fighting, the gun-...n of the brigade suppressed fire from the enemy's heavy ...teries 250 times, thereby clearing a path for the Soviet ...fantry.

All units of the Soviet Baltic artillery had records nearly ...good as this Guards brigade. His defenses smashed, the ...emy was hurled far from Leningrad.

* * *

Swimming Soldiers

One of our friends came to us the other day and called ...ntion to a passage in the book by Frederick Funston ...tled *Memories of Two Wars*. The particular pages told ...a force in the Philippine Islands attempting to cross a ...r in the face of insurrecto opposition. It was a different ...y in those days from what it has been for nearly two ...ades. There was a tradition in one company, which ...had to leave much of its strength on the wrong side ...river, that every recruit was early marched to a near-by ...and taught to swim.

The World War was fought in large formations, with ...marching forward under artillery bombardment, plod-ding their way to new positions which they would organize and defend against the almost inevitable counterattack. As a consequence, the few soldiers who saw and knew the value of military watermanship were in the minority and almost a despised minority.

A company commander, now a general, by instruction and competitions tried to qualify his men in aquatics, but was smiled at for this being just an example of what was considered his excessive overthoroughness. Those were the days of the spit-and-polish, whitewashed ash cans, shellacked escort wagons, close-order-drill army.

In two particulars the situation is changing. Our Army is becoming practical minded and is beginning to learn—perhaps from the Japanese—that water may be an avenue of approach instead of an obstacle. We are progressing. —*Army and Navy Register*.

* * *

British Self-Propelled Bofors

Details of Britain's 40mm Bofors self-propelled (wheeled) antiaircraft gun were released for the first time March 31 by the War Office in London and the British Army Staff here. The Bofors gun, already well known in the rôle of antiaircraft weapon, has long been a mainstay of Britain's defenses.

Now, mounted on a Morris chassis, it has added mobility and maneuverability to its other virtues, still retaining the ability to engage tanks. The chassis, being a modified version of the well-known artillery quad or tractor, has a road speed up to 40 miles an hour, with good cross-country performance. The engine gives maximum 70 horsepower four-wheel drive.

One of the best features of the gun is its rapid rate of fire. It is automatic and throws 2-pound shells to a height of 9,000 feet at 120 rounds a minute.

To improve the effectiveness of the gun, a new sight and new method of elevating and traversing were added. The sight, called "stiffkey stick," provides a simple method of assessing the difference between the point where the target

British Official Photo

The new British self-propelled Bofors.

is and where it will be by the time the shell reaches it. The gun can be elevated and traversed by power.

The Bofors self-propelled is a fast mobile weapon, invaluable in the protection of road convoys en route.

Coöperation between Canadian ordnance experts and the British Ministry of Supply and War Office made rapid production of the equipment possible in both Great Britain and Canada.—*British Information Services.*

* * *

Troop Carrier Command

The I Troop Carrier Command, youngest of the Army Air Forces' major branches, was two years old Sunday, April 30, 1944.

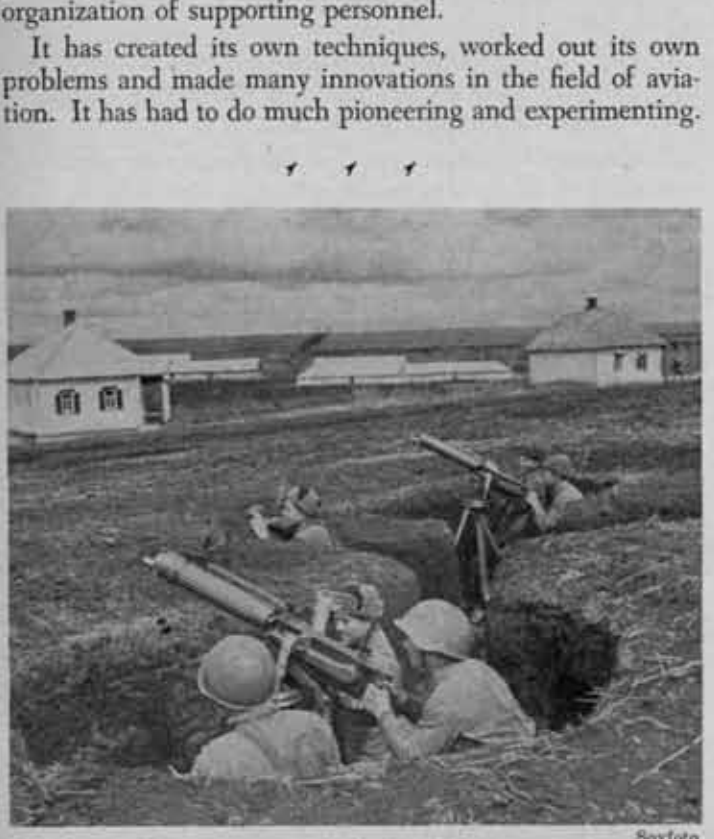
Troop carrier forces, often referred to as "Invaders," since they carry the troops which spearhead an invasion, have one of the most dangerous flying operations in the Army Air Forces and are specially organized, trained, and equipped to transport airborne troops and supplies into combat. They are distinct from the units of the Air Transport Command, which have the primary mission of transporting personnel, supplies, and mail between theaters.

In less than two years, planes and pilots of the I Troop Carrier Command have participated in combat operations in every major war theater, and have overcome numerous tactical and operational difficulties in achieving their record of success.

The command started with fifty planes and a handful of flyers, most of them former air-lines pilots. Today, the command is bigger than the Army Air Forces was three years ago, it has thousands of pilots and planes and a vast organization of supporting personnel.

It has created its own techniques, worked out its own problems and made many innovations in the field of aviation. It has had to do much pioneering and experimenting.

* * *



Sovfoto

Russian machine gunners await the Germans on the Southwestern front.

Combat Formation of an Antiaircraft Regiment While Protecting Troops

[Translated for the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Captain V. C. Tocarsky in *Artilleriiskii Zhurnal (The Artillery Journal)* No. 4, April, 1943.]

When we are on the defensive, the enemy usually not only subjects our forward lines to artillery and mortar fire but also to bombing from the air, as well as conducting aerial reconnaissance. Thus the problem of antiaircraft protection arises. Small caliber antiaircraft artillery and antiaircraft machine guns can furnish sufficient protection if they are placed directly on the first lines of defense.

In battle, the following pattern is employed for the disposition of an antiaircraft regiment. Motorized antiaircraft artillery batteries are usually arranged in line formation; less often in group formation. Machine-gun platoons are placed with the batteries (in effect, are attached). One antiaircraft machine-gun platoon protects the regimental command post. Command posts of antiaircraft machine-gun companies are usually located with those of the battery commanders.

Such a battle formation results in concentrated fire power at single points. On the other hand, such concentration of antiaircraft weapons at one firing position entails great losses of matériel and personnel since it provides a tempting target for enemy artillery and mortar fire. Moreover, the possibility of independent action by the commander of the antiaircraft machine-gun company is lost, since direction and control of fire from that position pass entirely into the hands of the battery commander.

There is no reason to attach antiaircraft machine-gun platoons to motorized antiaircraft batteries. These batteries can protect themselves against any enemy aviation. Moreover, concentration of firepower at a few points lessens antiaircraft protection of front-line troops, who need as much protection as possible, especially those in the most exposed positions.

The following scheme for the disposition of an antiaircraft artillery regiment is recommended on the basis of actual combat experience and because of the above objections. The batteries of the regiment are, as a rule, to be arranged in line formation. The antiaircraft machine-gun companies are deployed by platoons, also usually in line formation. They should be brought up to within 500 meters of the forward defense line. Behind them at a distance of 800 to 1,000 meters the batteries are located (about 1,300 to 1,500 meters in rear of the front lines), and provisions are made for coöperation of fire between artillery batteries and machine-gun companies.

Thus the positions appear as two lines: first, machine guns; second, batteries. In addition, they may be echeloned to the right or left. Sometimes it is desirable to place separate antiaircraft machine-gun emplacements, and even platoons, between the lines. In no case, however, should batteries be strengthened by antiaircraft machine-gun platoons, as this is absolutely inconsistent.

The command post of the regiment should be placed in the second line of antiaircraft defense, or slightly behind

As much as one antiaircraft machine-gun platoon may be employed for its protection. The company command post is placed with one of its platoons (the middle one) or separately, but preferably at an equal distance from the platoons.

The battle disposition here recommended has the following advantages: the largest possible area is protected by the available antiaircraft defenses; fire coördination between artillery batteries and machine-gun companies provides two layers of fire for medium ranges; the machine-gun company commander can direct his fire independently; and decentralization of antiaircraft units insures continued effectiveness, since fewer losses are suffered.

The proposed battle disposition remains equally effective in the attack. During offensive operations, even more than in the defense, antiaircraft units need to be deployed in a line formation along the front, as the attacking troops will be even less echeloned in depth.

It must be remembered that the battle disposition here advocated is not the only possible solution. It can be varied in accordance with the type of terrain, the mission to be accomplished, the means of communication, and other changeable factors.—*Military Review.*

* * *

Observer Reports

Colonel Fenton G. Epling, CAC, who has returned from the Pacific area, reported that massed antiaircraft fire not only deters Jap bombers, but provides a vigorous boost to morale among American troops.

"I saw the faces of a new outfit which had just come to the Cape Gloucester section of New Britain," he said. "Jap planes came over and the men, not yet battle tested, were naturally depressed and somewhat demoralized. Then our antiaircraft artillery searchlights flashed on and the AA sent up a massed fire. Cheers went up, and from then on the men had no fear of sporadic Jap bombings.

"In general," Colonel Epling said, "the accuracy of the antiaircraft artillery has been very good."

* * *

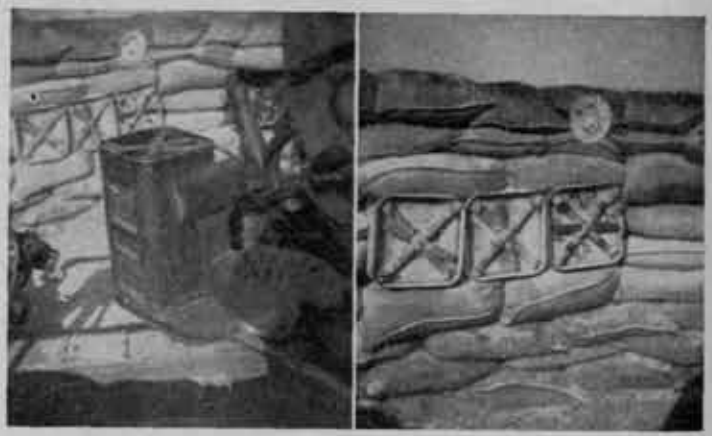
Cost of Maintaining a Soldier

The cost of initially clothing and equipping a soldier and feeding him for a year in the continental United States is $36 lower than it was a year ago.

Included are the costs of all food and clothing issued to the soldier as well as many items of personal equipment, but not arms, ammunition, medical supplies, gas masks and certain other items which vary according to the soldier's assignments.

To maintain the average soldier in continental United States during his first year of service, the Quartermaster Corps spends $215.35 for his food, $173.70 for his clothing, $44.70 for his individual equipment and $31.31 for his barrack equipment, a total of $465.06. The cost of feeding a soldier is now 59 cents a day, 3 cents a day less than a year ago.

40mm Ammunition Cases



Left: Navy case bolted to loading platform.
Right: Cases in revetment.

Btry. H, —CA (AA)
APO 512 c/o Postmaster
New York, N. Y.
Feb. 12, 1944.

Dear Sirs:

As a chief of Section of a 40mm Bofors (AA) gun I would like to pass on a suggestion about ammunition cases.

We have been overseas about eleven months and it seems to me that we've built at least eleven revetments in that time. To save time and to keep ammunition clean and handy at all times the best ammunition case we have come across is the Navy ammunition case of which I have enclosed a picture.

It fits easily into any part of the revetment and does away with the usual ammunition pockets for the old 24-round British type cases.

The navy case holds sixteen rounds of ammunition and is completely waterproof. Once ammunition is checked and put into these cases our worries about grit and water are ended.

The number of cases that can be put in a revetment is unlimited. We always put as many in our revetment as we can lay our hands on.

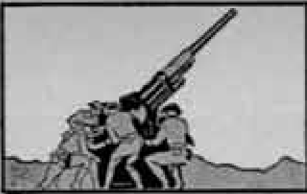
We also have a case bolted to the right side of our loading platform. This insures sixteen rounds handy at all times for the loader when on the move or in position when it is necessary to operate with a short crew.

Still another advantage over the old type case is had when loading ammunition on a vehicle on the move. We always put six of these boxes across the rear end of the vehicle so all we have to do in an emergency is drop the tail-gate and lift the tops out of the cases.

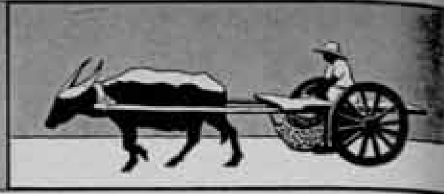
I haven't found out how our battalion munitions officer managed to obtain these boxes but from experience I believe that these navy type ammunition cases would become as much a part of a 40mm gun crews equipment as the ammunition itself.

Very truly yours,

SGT. JERRY SACKS.



Corregidor



Brigadier General George F. Moore, *U. S. Army,*
Commanding Philippine Coast Artillery Command

By Lieutenant Burton R. Brown

Change of command designation, tragedies, near tragedies, celebrations, and distinguished visitors have been as much a part of Corregidor during August and September as the rain. Orders from Headquarters, United States Forces in the Far East, have created the Philippine Coast Artillery Command with Brigadier General George F. Moore as Commanding General. The Harbor Defenses of Manila an[illegible] part of this command and Fort M[illegible] quarters.

The Harbor Boat [illegible] of trips from Fort Mil[illegible] the past quarter of a [illegible] morning of A[illegible] to Fort Mills she [illegible] rolled over on [illegible] few minutes [illegible] Wint in fifty [illegible] work on th[illegible] of all except [illegible] time of ac[illegible] Hultquist, [illegible] F. W. B[illegible] when they w[illegible] down [illegible] they managed [illegible] boat. For tw[illegible] kept afloat [illegible] before th[illegible] By slow stage[illegible] while, the assistance [illegible] our own harbor boats w[illegible] missing boat. The survivors w[illegible] beach by a destroyer on the [illegible] and a small boat was sent as[illegible] for them. All survivors have now completely recovered and have rejoined the busy round of work at Corregidor.

A month after this near-tragedy part of the post engaged in a celebration when Colonel P. D. Bunker's regiment celebrated its twenty-third anniversary. It was especially gratifying to Colonel Bunker since this is the third time he has commanded this regiment and is justly proud of it. Lieutenant Colonel Valentine P. Foster, who was with this organization at its inception and served with it all during World War I in France reviewed the history of the regiment from his own personal experiences with it. General Moore, who in one of his previous tours at Corregidor, had also served in the regiment, complimented the regiment on its past and present achievement. On this same occasion the newly authorized regimental band made its first public appearance.

On September 3d, Lieutenant General Douglas MacArthur, Commanding General of the United States [illegible] in the Far East, accompanied by Brigadier General [illegible] Sutherland, his Chief of Staff, made [illegible] of Fort Mills [illegible] armament, in- [illegible] General MacArthur having at [illegible] of the Philippine [illegible] Corregidor, but much [illegible] upon his de- [illegible] ity but [illegible] diligently ap- [illegible] and little [illegible] the vast [illegible]ing [illegible] been ac- [illegible] years, an ap- [illegible] door instruc- [illegible] rs' In- [illegible] by batteries [illegible] and Lieuten- [illegible] slackening of the [illegible] completely outdoors [illegible] ns and beach defense [illegible] tly all over the [illegible] craft [illegible] ine gun, and [illegible] being conducted by all regi- [illegible] too early to comment on the record of [illegible] zation, but observation of the first firings [illegible] well of the preparedness of Corregidor for any eventuality in these lines. General Moore, just completing a quarterly inspection of all phases of the training and installations in the Harbor Defenses, noticed a vast improvement in all cases over that displayed in his last inspection.

Frequent "conditioning marches" under full pack are made by all units. During these marches the organizations engage in gas defense and extended order problems. The improved physical condition of the personnel is very noticeable. Meanwhile several officers and noncommissioned officers are detailed for a short time with the Philippine Army to assist in their training. During this same rainy season, Mine Command of Lieutenant Colonel Kohn's regiment has worked day and night, in

Brigadier General Cortlandt Van R. Schuyler,
Commanding AAATC

By Captain Roger B. Doulens

On April 1 the new proficiency tests for AAA battalions began and provided a major theme for the ever developing training program in the Antiaircraft Artillery Training Center here. For some time before, most of the battalions had been working toward the day when they would have to undergo the examinations of officers assigned to rate them on their proficiency.

Brigadier General Schuyler, in a meeting with a large group of battalion and group commanders early in April, added further impetus to the training tempo—already increased by impending proficiency tests—by ordering a new, all-out drive for "positive, unquestionable efficiency."

The battalion commanders were informed that "we have before us a war that is potentially longer than well-meaning optimists would have the public believe," adding:

"It is our duty to see that any complacency which might exist does not permeate the ranks of our soldiers."

Among varied developments and improvements in the training program of the AAATC were the further growth of the Holly Shelter firing range, where a complicated and highly effective "anti-mech" target system has been set up; continued proof of the efficacy of the Close Combat School of the AAATC; the institution of skeet shooting as a method of increasing and determining coördinative efficiency of antiaircraft artillerymen.

The Holly Shelter range is situated several miles west of the camp proper in a huge clearing hewn out of a veritable wilderness of pine thickets, swamps and forest land. It is, incidentally, situated in an area where in prewar years sportsmen from all over the nation came to hunt deer, bear, and other game. Sports lovers who have noted that men are now using the area to learn to "bag" human prey in the air and on the ground, have been gratified to learn that hundreds of thousands of rounds of cannon shells and machine gun slugs have merely sent the remaining stock of game further into the forest and the game killed by the AA gunners has been negligible.

A chief feature of the Holly Shelter range is the small railroad system built to tow the "anti-mech" targets over a maze of tracks. Targets are mounted on small flat cars pulled by a gasoline powered "locomotive" which twist through the ingeniously devised maze as 40's, 90's and .50's pour a hail of lead at the targets. The flat cars travel beneath the trajectory of fire and the targets, made of wire mesh on frames, project above protecting embankments to provide realistic moving subjects for the schooling of the gunners.

The Close Combat School, begun in late summer of '43, has demonstrated it fosters a large uplift in individual morale of its continually graduating classes—all members of which are qualified to act as instructors in turn to their respective battery mates. The prime objective of the school is to teach artillerymen to be masters of close physical combat unarmed, against unarmed or heavily armed enemies. The two "professors," Lieutenants Egan and Kester are, to use the "undergraduates" term, "plenty tough guys" and in the three-week, eight hour-a-day course they transform generally unschooled men into expert instructors of the art of crush and mangle. The course is a combination of judo, jiujitsu, wrestling, boxing and a seasoning of all types of rough hand to hand fighting. The toughest problems planned for in Commando and Ranger training form a parallel for the course. Included in the curriculum are a 36-foot debarkation tower and a 15-foot rope climb and jump-off tower. Both Lieutenants Egan and Kester daily go through the routines with their pupils.

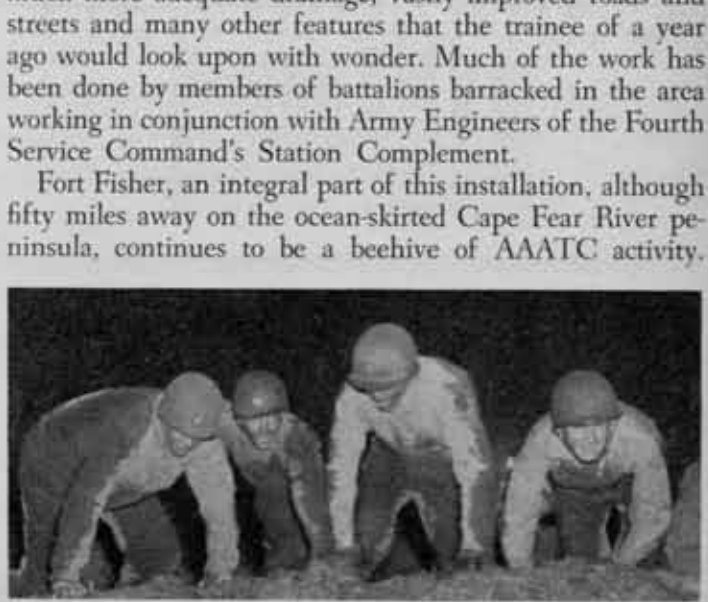
Chief purpose of skeet firing as a method of training AA gunners is to them training at fast flying, moving targets to teach them initial leads. Another purpose is a test to see if the men have coördination and timing that would be necessary for good machine gunners.

The skeet course fired gives the men targets from every angle. The clay pigeons simulate a plane 450 yards away traveling 350 miles per hour. The first shots the men fire are at targets going straight from them—consequently requiring no lead. When they have become proficient on this target, they are then given targets that travel away from the firer at an angle—consequently requiring a lead. The men then move away from the trap houses—following a semi-circular course around the houses, thereby giving them shots from an increasing angle and requiring an increasing amount of lead. For example, the shot from No. 4 station, which is in the center of the guns, will require a lead of four feet.

A record is kept of each man's firing and a report is made to each battalion commander of the results of his firing. Already battalion commanders have agreed that this firing has been a help to them in weeding out machine gunners who do not have proper coördination and timing.

The "Maple Hill" section of Camp Davis, which many thousands of antiaircraft artillerymen now all over the world will remember vividly, as "over in the swamps," had gradually taken on a new face. What was once a mushroom town of TO buildings set up in a maze of swampy ditches, has developed into a liveable military community—with much more adequate drainage, vastly improved roads and streets and many other features that the trainee of a year ago would look upon with wonder. Much of the work has been done by members of battalions barracked in the area working in conjunction with Army Engineers of the Fourth Service Command's Station Complement.

Fort Fisher, an integral part of this installation, although fifty miles away on the ocean-skirted Cape Fear River peninsula, continues to be a beehive of AAATC activity.



General Schuyler tries the infiltration course at night.

Hawaiian Seacoast Artillery Command

BRIGADIER GENERAL ROBERT C. GARRETT, *Commanding*

By Major Donald E. Barrett

Hawaii is on the offensive. Our defense outposts are being pushed far across the waters to the west. These islands have now become a vital intermediate point for the Army and Navy trans-Pacific drive toward the Philippines, the China Coast and to Tokyo.

From industrial plants and training centers of the mainland come the implements of war and the men to wield them. Hawaii is the depot from which they are speeded forward against the enemy. That is the importance today of this fort in the mid-Pacific.

Holding the fort is the job of the "Pineapple Soldiers," and looming large among them, the men of the Hawaiian Seacoast Artillery Command.

These are the troops who keep the day-and-night vigil to guard our most important base in the Pacific war. These are the troops who will man the defenses in case the enemy, in the desperation of growing defeat, should attempt to retaliate for our smashing attacks on the Marshalls, Truk, and the Marianas.

The Seacoast Cannoneers haven't had the glamor treatment accorded some branches of the service. Their job of manning the isolated gun and searchlight positions calls for constant battle alertness, without the lift of battle excitement. It calls for morale, maintained at a constant high level. Morale, stemming from a strong and unflagging conviction in the cause for which we fight.

The men of the Hawaiian Seacoast Artillery Command deserve great credit for all-out application to this, their major assignment, and for their further contribution to eventual victory—above and beyond the call of duty.

Consider the Fourth War Loan drive, recently completed. Not content with paving the way for the attack by guaranteeing the security of this base, they backed the attack to the tune of $28,197.25 in cash purchases of War Bonds.

In the month of January, 1944, as a sample, cash purchases plus the regular payroll deductions for War Bonds totaled $62,099. Four men out of every ten in the command have voluntarily authorized that regular monthly deductions be withheld from their pay.

Thus, the Cannoneers keep pace with all America and demonstrate their faith in the future.

The men gave $3,700 to the 1944 March of Dimes campaign to combat infantile paralysis.

Voluntary contribution to the Army Fund amounted to $8,409.82, demonstrating a full realization of social responsibility. Proceeds were divided among such agencies as the Tuberculosis Association of Hawaii, the Honolulu Community Chest, the War Relief committees of our fighting allies, as well as the American Red Cross, USO, and Army Emergency Relief.

In step with all America, Hawaii and its "Pineapple Soldiers," the Seacoast Cannoneers, are all-out for victory and for a future which we may shape in peace, both as individuals and as a nation.

Camp Stewart

BRIGADIER GENERAL E. A. STOCKTON, JR.
Commanding AAATC

BRIGADIER GENERAL WILLIAM HESKETH
Commanding AARTC

By Major Clenen J. Bishop

Increased antiaircraft artillery training activity at Camp Stewart was disclosed April 22 with the official announcement that the Antiaircraft Replacement Training Center of Fort Eustis, Virginia, had been transferred here.

Brigadier General William Hesketh, one of the founders of American antiaircraft in the last war and a general at Stewart in 1942, is commanding general of the new Stewart-based AARTC, which will work side by side with the AAATC. The AAATC will continue to train entire battalions of antiaircraft troops for combat destinations while the AARTC will train the individual soldiers as replacements for AA units.

Major General Sanderford Jarman, former commanding general of the AAATC and now in charge of all antiaircraft of the Eastern Defense Command and the First Army returned here for a brief visit early in the March-April period. The general stopped off here en route to his AA headquarters at Fort Totten, New York. The visit was the first he had made here in more than a year and one of the few times he had been back at Stewart since his transfer from here the day after Pearl Harbor.

The medical detachment of the station hospital won first place in a War Bond contest run in conjunction with the Fourth War Loan drive. The medics purchased $24,058 worth of bonds and were awarded a handsome Victory trophy, the prize for the outfit having the best per capita purchasing record in the drive. In second place was the 843d AAA AW Battalion, with a $14,175 total. Bond purchases by civilian and military personnel in the camp totaled $137,050 in maturity value.

the local Red Cross War Fund drive, soldiers and ians here dug deep to contribute more than $14,000, ly three times the amount donated a year ago.

March, before the advent of the AARTC, all AA its on the post entered an Enlisted Men's Drill Team test. Battalions competed in four divisions: 90 and mm, self-propelled, and searchlight. First place winners ived three-day passes and medals, as follows: 71st Gun alion team in 90mm division; 841st Battalion team in mm division; 298th Battalion team in searchlights and th Battalion team in half-tracks.

That the Army Service Forces at Stewart have trained Woman's Army Corps of the ASF here into "one of the in the Fourth Service Command" was the verdict of jor Lorene M. Wolcott, Fourth Service Command AC Director, who spent two days inspecting the ASF AC Detachment here. The ASF Wacs will mark their anniversary here in May. Recently activated at Stew- was an AAATC WAC Detachment, and the AARTC cs arrived here with the Fort Eustis trainees.

Other March-April events:

The 845th AAA AW Battalion did such an outstanding while on maneuvers at Harris Neck (Ga.) Airfield received a letter of commendation from the command- officer at Harris Neck. . . . The Stewart basketball m won the Southeastern Servicemen's AAU tourney at Macon. . . . Colonel Robert C. Alley, Director of supply, announced that U. S. coffers had been enriched by $40,000 as a result of an intensive scrap campaign. . . . A popular new entertainment feature was inaugurated—a weekly variety show presented every Sunday morning and featuring GI talent. Catoor Woolford, financier, who had entertained hundreds of Stewart soldiers at his plantation near Brunswick, died at the age of 77.

Colonel Joseph Fraser of near-by Hinesville, who received his early AA training here, was awarded the Legion of Merit for services in New Guinea. . . . Headquarters Battery of the 67th AAA Group maintained a near-perfect record for six weeks to win an Automotive Maintenance Spot Check contest. . . . The Military Police Detachment and the Special Service Branch received "superior" ratings in the annual IG inspection. . . . A Purple Heart Club for soldiers who won the award in this and the last war was organized, with Private Stanley I. Giltner, a veteran of the last war, becoming the first member. . . . The 62d Brigade started an orientation-slanted paper with a note it would be published "whenever there is something interesting to say—and only then." . . . The 563d AAA AW Battalion was commended by Brigadier General Stockton for making a high mark on an ASF test. . . . Plans for building a thirty by one hundred-foot addition to Service Club No. 1 were announced.

The Coast Artillery School

Brigadier General L. B. Weeks, *Commandant*

Spring at Fort Monroe found the Coast Artillery School dding old branches and growing a number of new ones. e last OCS class had graduated, and the final group in e Officers' Basic Course was well on its way toward grad- ion on 3 June. With the departure of the OCS and the C has come the inauguration of the Field Training and eplacement Department. Comprised of two sections, (1) ield Training and (2) Replacement, this department has de instructional latitude. One of the principal duties of e Field Training Section is preparation for overseas move- ent. In one of the many groups receiving field training d conditioning are men being trained for special equip- nt maintenance work. The Replacement Section is com- sed of three groups: the first is the Artillery Precourse, signed to give preinstruction to men about to enter the ecial Equipment Course or the Officers' Advanced urse; the second is the Army Instruction Group in which thods of instruction are considered; the third is the Post aduate Group wherein officers who have finished one of the courses at the school and are awaiting assignment receive further instruction.

The Officers' Advanced Course has been revised and lengthened. The course is now twelve weeks long instead of eight. Officers above the grade of 2d Lieutenant are eligible for it. In this course the artillery instruction has been increased by one week, with stress being placed on rapid-fire equipment and alternate methods of fire control. The course also has a new range finder section which is concerned with the methods of teaching operators and the practical use of the CRF, SRF, and the DPF. Other subjects added to the OAC include: M9 and M5 directors, preparation for overseas movements, classification, and tropical disease prevention. Additional instruction is being offered in submarine mining and special equipment.

A problem illustrating the problems confronting the commanders and staff of a small task force operating independently in unfamiliar territory must be solved by students in the Officers' Advanced Course. The situation calls for the organization of a task force for the purpose of seizing a tropical island and constructing an advanced landing field at that point. The class, while working on this 39-hour project, organizes itself as the command echelon of the task force. This highly practical and timely problem has been received with enthusiasm.

The Department of Submarine Mining is now conducting its fourteenth 10-week Officers' Submarine Mine Course and its ninth 14-week Enlisted Submarine Mine Maintenance Course. Instruction in the submarine ground mine and the new M4 mine control system has been added to the school curriculum. Since it is no longer practicable to restrict submarine mining instruction to graduates in engi-

neering, more time is now being devoted to basic electricity than heretofore. Most of the present students are coming from mine organizations of harbor defenses.

Some of the department staff and certain attached mine officers have set up a "writers' corner" where the new FM 4-7, *Tactics and Technique of Controlled Submarine Mines, Ground,* and TM 9-420, *Controlled Submarine Mine Matériel,* are being completed. The new TM 9-415, *Test and Repair of Submarine Mine Cable,* a product of the "writers' corner," has been distributed.

The students find the new classrooms in the submarine mine depot a great improvement over the old ones. The acoustics are better; training films can be shown in them. While the rooms were designed for the average-sized mine school class, they can satisfactorily accommodate larger groups of students.

To broaden the background of mine officers, particularly those planning on permanent careers in the Army, a few officers are being sent to the Naval Mine Warfare School. Officers chosen for this course are well-grounded in electricity and physics. Reports of their excellent progress are being received.

On 1 June a 17-week introductory Orientation course was started under the supervision of 1st Lt. James R. Brown, C.A.C., the newly appointed orientation officer for the school. The theme of this introductory course, "American Strategy in World Politics," will include such topics as the political, social, and economic causes of the war; historical background; American participation in the war and in the peace to follow. Bulletin boards have been placed in battery day rooms for the display of newsmaps and other pertinent orientation literature. Books and pamphlets on military and political subjects have been made available in the battery libraries.

The Department of Training Publications has prepared or is completing the preparation of the following technical manuals and field manuals: FM 4-74, *Service of the Piece, 6-Inch Gun M1903A2 or M1905A2, on Barbette Carriage, M1, M2, M3, or M4;* FM 4-86, *Service of the Piece, 16-Inch Gun, Casemated;* FM 4-90, *Service of the Piece, 3-Inch Rapid-Fire Gun, Barbette Carriage;* FM 4-91, *Service of the Piece, 90-mm Gun, Fixed Mount;* FM 4-97, *Service of the Radio Set SCR-682-A;* TM 4-210, *Coast Artillery Weapons and Matériel.*

Northwestern Sector

BRIGADIER GENERAL JAMES H. CUNNINGHAM, *Assistant Sector Commander for Harbor Defense Matters*

Intensive commando training has been conducted in the harbor defenses of the Northwestern Sector, Western Defense Command during the past month. Officers from the harbor defenses, who attended the five weeks' Commando School in California, are in charge of this training which has proved valuable not only from the standpoint of individual defense and physical hardening, but also for the enthusiasm and interest the participating troops have shown. In the Harbor Defenses of Puget Sound, one unit has been designated as the Harbor Defense Commando Battery and its C.O. is assigned as the HD Commando Officer. This battery has a highly trained group consisting of three officers and fifty enlisted men, which is used to stage surprise attacks on various forts in the harbor defenses, and to train for one full week at a time, harbor defense batteries in commando tactics. A commando school was conducted in the Harbor Defenses of the Columbia by a trained Commando Officer for a period of three weeks, following which the students were returned to their organizations to serve as instructors.

The target practice season is now in full swing with all calibers participating in regular, special, and surprise practices. An innovation in surprise practices was used recently in this area when Navy planes flew over the harbor defenses and dropped smoke bombs which were used as surprise targets by alert batteries. The element of surprise is complete in a practice of this nature as planes are continually flying over the harbor defenses. Unusually excellent time was recorded in going into action, and a high percentage of hits was obtained. Target practices have also been held recently on the high speed target boat. Considerable success was experienced in this practice. In order to provide a competitive record of hits, after the first hole is repaired a bull's-eye will be painted over the point of damage with the words "Hit, Btry H, — CA." Units seem to take more pride in this inscription than they do in the finest trophy in the harbor defenses.

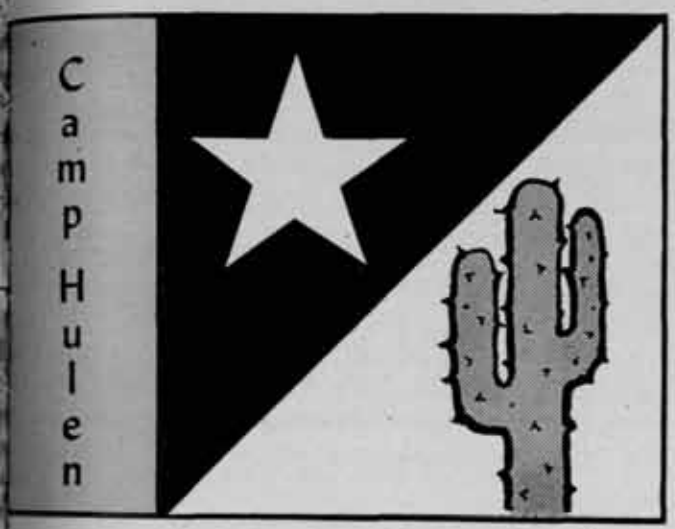
With the weather improving in this area, antiaircraft training of dual purpose batteries is being stressed. Several seacoast practices have been held by each of the dual purpose batteries in the Sector during the past few months.

antiaircraft instruction has been carried on concurrently
little change is necessary in training procedure to revert
antiaircraft firing.

U. S. Senator Guy Cordon of Roseburg, Oregon, and
ate Senator Marshall Cornett of Klamath Falls, Oregon,
ere visitors at the Harbor Defenses of the Columbia.
enator Cordon was stationed at Fort Stevens in 1911 and
he had not been back since that time, many changes were
vident to him.

A Sector Artillery Inspection Team under the direction
Brigadier General Cunningham and made up of officers
om each of the harbor defenses has just completed tactical inspections of each seacoast battery and tactical artillery group in the Northwestern Sector. These inspections serve as a check on the current training status of each harbor defense unit and provide an excellent medium for the exchange of ideas.

The basketball season closed this month with the Harbor Defenses of the Columbia producing one of the finest basketball teams on the West Coast. In the Harbor Defenses of Puget Sound, an inter-fort basketball tournament was held with local Coast Guard and Navy units participating. The tournament trophy was won by the Port Townsend Coast Guard team.



BRIGADIER GENERAL H. C. ALLEN, *Commanding*

By Major Prime F. Osborn

Clearing skies and summer temperatures are bringing
amp Hulen soldiers opportunity to continue their physi-
al conditioning in both military and nonmilitary fashion.
he baseball team has played several games, giving the
amp diamond its 1944 christening. Dropping the opener
n the home field, the Hulenites came back to win their
ext start, and confidently look forward to a busy and suc-
ssful season. The largest crowd ever to watch a baseball
ame on a Hulen diamond filled the bleachers and crowded
e sidelines. Interbattery and interbattalion games serve
o to keep all the diamonds busy and competition at fever
itch.

Physical hardening has taken a more vigorous twist with
he renewed emphasis on the development of greater
gility and coördination, and the stimulation of interest in
is important type of training. Athletics and calisthenics
ll seek these objectives, and both the physical harden-
g officer and athletic officer of the Training Center are
perating to build bodies which can take all the knocks
modern combat. One seven-league stride in this direction
as been taken by the combined efforts of the S-3 and S-4
ctions in the planning and construction of an "assault
ourse." This new combination cross-country run and bay-
et course is about 300 yards long and features log walls,
enches, bayonet, dummies, tunnels to be crawled, and the
ke. The task of training officers and noncommissioned officers to negotiate the course effectively has already begun. After these men have qualified they will pass on their knowledge to their respective units. The 300-yard run will become a weekly jaunt in addition to the regularly scheduled obstacle course. It is the desire of the instructors that all troops approach this new form of conditioning with the idea of gaining absolute control of and maneuverability with their rifles.

A contest recently concluded in recognition of aircraft assured itself of many entries each week by introducing a new idea in prizes. Winners were awarded a steak dinner at the Service Club and, as might be expected, the competition was spirited. Plane silhouettes printed each week in the *Searchlight*, the camp paper, provided the subject matter for the competition.

One unit here has devised and put into effect, also

Signal Corps Photo

Tripod for M32 Mount

through the *Searchlight*, a Men-of-the-Week Honor Roll. The plan calls for the selection each week, of the outstanding man in each battery. The men are photographed in a group and the picture printed in the camp paper. Below the picture appears a tabulation in which all the men are listed together with their organization, rank, home address, and the performance which earned the recognition. The pride the men take in receiving this acknowledgment is reflected in the many references to the Honor Roll appearing in the battalion columns of the *Searchlight*.

The AAATC surgeon and the schools officer have collaborated in the construction of a demonstration "Sanitary Area." Suitably located to provide draining of installations in all weather, the area will contain a dug-in battalion aid station, dug-in kitchen, straddle latrine, garbage soakagepit, cross trench incinerator, and other emplacements used in the field. The purpose is to give organizations the opportunity to study and learn the proper method of "setting up" a sanitary bivouac or command post area. The area is large enough to accommodate a battery at a time and units will be encouraged to work there with complete individual and unit field equipment. Photographs of recommended layouts for kitchens and aid stations will be posted at the respective areas to illustrate an acceptable and effective disposition of organizational equipment. A large graphic map set up at the entrance will point out and describe each position. Shell walks lead to all installations to further insure availability in all weather.

Units firing at the Hulen ranges are now able to practice with the M32 mounts without losing the use of a vehicle with the aid of an improvised tripod mount. Three heavy posts are emplaced to form a triangle on the firing line and an iron bracket attached to each. The mount is placed upon these L-irons and bolted securely in place and the gunner is able to operate the machine gun as though he were in the cab of his truck.

Noteworthy among new training aids has been the attachment of the M9 Trainer to a 40mm gun for subcaliber firing. The M9 Trainer has been in use in Hulen's Drill Hall for some time but to effectively accommodate it to the "Forty" some changes in each were necessary. From the Bofors, ordnance personnel removed the oil gear unit, breechblock, and carriage, and mounted the gun on a frame of 2" by 8" planking equipped with casters permitting the gun to be easily moved about the floor by three men. The automatic loader was replaced by an adapter fitted over the hole to take the trainer mount. This procedure has made bore sighting a simple and accurate process. Other alterations include the removal of the recoil magnet from the Trainer to permit a rate of fire approximating that of the Bofors; the use of BA23 batteries taped to the main support bar in place of flashlight batteries to permit extended indoor use; and the attachment of an electric motor and power winch to a target which can be geared for two constant speeds of 120 or 240 miles per hour. The training effectiveness of the device is apparent: it enables every man to be trained intensively to call shots correctly and to make and understand the required adjustments.

Southeastern Sector

BRIGADIER GENERAL ROLLIN L. TILTON, *Commanding*

By Major William A. Craig

The newly constructed HECP-HDCP and combined signal station for the Harbor Defenses of Charleston, Colonel L. W. Goeppert, Commanding, was recently fully completed and has been placed in operation. The design of this structure represents a departure from the standard War Department Type E plans. The standard plans were modified to provide for a command post observation station, a signal station and a signal platform among other things. The observation station and signal station are of reinforced concrete, splinter-proof construction. The local modification of design presents a comparatively low silhouette and at the same time provides effective all-around observation and a suitable height of site. These additions have not diminished the effectiveness of the splinter-proof and gas-proof features incorporated in the standard Type E plans.

A newly designed, high-speed target has been constructed at the Harbor Defenses of Key West, Colonel Ralph E. Hill, Commanding. The target is very simple in design. It consists of two pontoons, each made of three five-hundred-pound practice bomb cases welded together, and angle iron supports for the target itself. The over-all approximate dimensions of the target are: ten feet long, six feet wide, and six feet high.

Training programs have been increased throughout the Sector, and special emphasis is being placed on (1) POM exercises and (2) noncommissioned officer training schools.

Seacoast and mine batteries of the Harbor Defenses of Chesapeake Bay under the command of Brigadier General Rollin L. Tilton have stepped up their training program with the coming of warmer weather; units at Fort Monroe, Fort Custis, Fort Story, and the Little Creek Mine Base have fired a total of fifteen target practices during the past two months.

In addition to these practices, regular schedules for the infiltration and obstacle courses at Fort Monroe, Fort Story and Fort John Custis have been carried out each week. Small-arms firing has also held an important place here, as well as in all the harbor defenses.

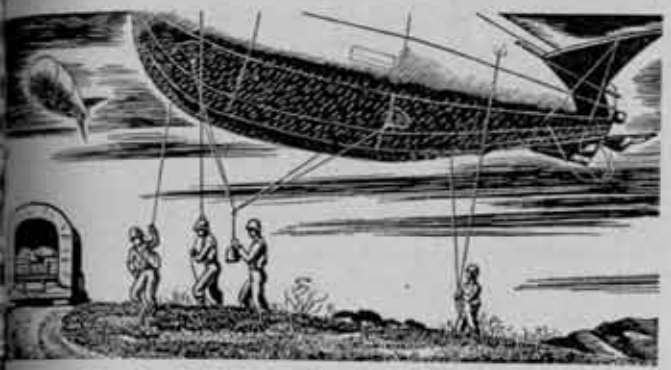
Schools for noncommissioned officers are being held at every major installation. At the Harbor Defenses of Beaufort Inlet, Fort Macon, North Carolina, the men attending this school are quartered and rationed separately and are being trained by officers of the command. The course of instruction is thorough and conducted similar to an OCS. The emphasis is placed on military bearing, strict discipline and the ability to lead and teach others.

All unit gas officers have recently attended a school given under the direction of Lieutenant Colonel Thomas O'Byrne, Chemical Officer of the Eastern Defense Command. These officers are now teaching the gas noncommissioned officers of each unit in four-day schools. The course

cludes field exercises and demonstrations, as well as heory.

A new program for training the personnel of headquar- batteries has been instituted at Fort Hancock, and ows much promise. The men from each section of the ttery are divided into two groups, one attending the rning training period between 0730 and 0830 and the her attending the afternoon period from 1300 to 1400. truction is in small-arms firing and other POR require- nts, as well as reviewing basic military subjects. For the most part, the instruction is carried on in small groups, so that as soon as an individual feels qualified he may take a test on the subject. Upon passing the test he goes on to another part of the training. Training films are shown twice a week and a night road march and bivouac is conducted once each month.

It is felt that this training will make for proficiency in basic military subjects and use of small arms without interfering greatly with the regular duties of the headquarters soldier.



CAMP TYSON

COLONEL WILLIAM H. KENDALL, *Commanding*

Barrage Balloon Training Center

By Lieutenant Earl C. Richardson

Colonel William H. Kendall, who has been associated h barrage balloon planning and training since the new apon was assigned to the Coast Artillery, became com- nding officer of the Barrage Balloon Training Center on ril 3, 1944. He replaced Colonel William H. Dunham, commanding officer since July 19, 1943.

In the training program which is concentrating on small it infantry combat tactics, junior officers and noncom- ssioned officers have been allowed to exercise independ- t command and gain confidence through experience. eports from overseas theaters, where barrage balloons have ved effective, have pointed to a need for a thorough owledge of infantry tactics and ability of small unit mmanders to provide for men when apart from their organization.

A typical small unit problem is of twenty-four hours ation with activity during most of the time. Patrols are out to locate enemy forces and action results.

Tests in basic medical subjects have been completed by units and results indicate the troops have a superior owledge of the subject. Tests were by batteries.

Every unit in the training center has completed firing basic arms on the known-distance range and some ex- nt records have been established. Approximately 25 cent of the command that has qualified, has rated ex- Carbine and submachine-gun records compare well h those with the rifle, as do those established on the d-grenade course.

All officers and warrant officers in the training center have qualified under WD Circular No. 6 on map reading and required instruction in POM has been completed by every officer. Twenty-five officers were given a special ten-hour course in umpire training to serve in the small unit tactical problems.

A recent War Department release highlighted the effectiveness of barrage-balloon operations during the Italian Campaign, and included mention of the citation of barrage-balloon soldiers who had been trained at Camp Tyson. Keynote of the War Department statement is reflected in the quoted report of the commanding general of an anti-aircraft artillery brigade to Lieutenant General Mark Clark, Fifth Army Commander, which said:

"I believe that the presence of balloons on the beach on D-Day and the following days was a most important factor in preventing hostile aircraft from flying low over the beaches. I also believe that barrage balloons are a vital element of defense of a vulnerable area, such as a port or landing beach." (See page 64.)

A very wet spring, which hampered training to some extent, also delayed the opening of play in the enlisted softball and baseball leagues. Extensive programs for athletics are underway with each platoon sponsoring teams in competition within units and each battery sponsoring teams in league play. A new nine-hole golf course, constructed by the Corps of Engineers with Special Service Funds, was opened this spring. Also opened is the new thirteen-acre lake which is designed both for training and recreational purposes.

Camp Tyson's civilian employees established a creditable record in the annual Red Cross campaign, subscribing ap-

Signal Corps Photo

When not flying, VLA Barrage Balloons may be easily taken into covered areas and concealed, yet quickly returned to flying status.

proximately $5,000 or far more per capita than the quota or than was raised a year ago.

In March, Camp Tyson's civilians were the top War Bond purchasers in the entire Fourth Service Command with 100 per cent participation in the payroll deduction plan and with an average deduction of 13.5 per cent of the total payroll. This was the best record of any camp or station in the service command.

BRIGADIER GENERAL BRYAN L. MILBURN, *Commandant*

By Lieutenant Colonel Charles H. Scott

With the graduation of Officer Candidate Class 100 on 26 May, finis was written at the end of an important chapter in the short but amazing history of the Antiaircraft Artillery School.

Just two months over two years of age, the AAA School has graduated thousands of Antiaircraft officers needed to train an adequate number of antiaircraft artillerymen for service throughout the world.

Other departments of the School remain but with increased emphasis being placed upon new phases of antiaircraft artillery. Additions to meet the ever-changing demands of modern warfare have been made to the Student Officers Courses and Enlisted Specialists requirements.

In the first award of its kind at the AAA School, the Legion of Merit was recently conferred upon Sergeant Raymond W. Blattenberger in recognition of meritorious service as technical adviser in planning and putting into operation improved methods of graphic reproduction work at the School.

The award was presented by Brigadier General Bryan L. Milburn, Commandant, before an impressive array of troops of the Enlisted Overhead Battalion.

Three officers, now assigned as Instructors at the AAA School, were recently awarded Distinguished Unit Badges for being assigned to a unit receiving a Presidential Citation for its conduct in breaking up Jap strafing raids over Port Moresby during the Papuan Campaign in the spring of 1942. They are Majors William A. Smith and William H. Lindsey, and Captain Mike Y. Hendrix.

A new training device, an Air Defense Demonstration Center, has been constructed and is now in operation under the Searchlight and Electrical Department.

The Center represents a large city in miniature, all laid out in a converted mess hall, partitioned into three parts. Much of the equipment in the displays is secret. Only one section, the searchlight training table, is unrestricted. The other two sections are open only to officers and antiaircraft specialists.

The searchlight training table demonstrates the beam technique of searchlight teams following the courses of miniature planes that fly overhead. By the use of neon-like tubes, controlled by an ingenious flexible handle device, the light beams can track the flying targets. Sound effects give the whole operation a realistic touch.

An over-all picture of the "Center" suggests a Norman Bel Geddes *Life* magazine creation.

The entire layout was evolved and constructed by AAA School personnel.

Another aid for training observers in field artillery fire with AA guns is now in operation. The "Terrain Room" has been set up by the School's Gun Department. A simulated countryside has been worked out in relief, and officer students are seated on a stand where they can direct the fire of the guns. Their information is transmitted to a control underneath the terrain which is suspended in mid-air by means of poles at the four corners. A realistic touch is added when smoke puffs are made to appear at the point where the fire is directed, and even a whining noise such as a shell makes in flight is used for effect.

Those members of the class not directing the fire observe from an elevated platform. This part of the course is completed before actual field artillery fire with AA guns is accomplished.

Additional captured enemy matériel has been added to the Tactics Department display.

Officers and enlisted men have evidenced a keen interest in the display, and effort is being made to procure additional enemy equipment.

Personnel of the AAA School contributed an average of eighty cents per man in the recent American Red Cross War Fund Drive. This is considered an extremely high average contribution. The purchase of War Bonds for the same period reached the highest month's purchases in percentage.

A new feature in the AAA School area at Camp Davis

AAA School Photo

German searchlight on display at the AAA School.

he new cafeteria which was opened recently. Under the pervision of Major Michael M. Mendlow, Mess Officer, ll officers and civilian personnel are fed in the cafeteria, liminating area messes and cutting two-thirds of the mess ersonnel required under the former system.

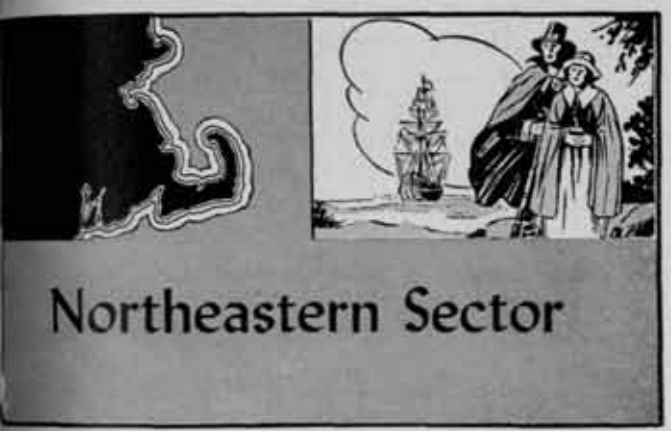
In the Division of Training Publications, work continues in high gear. The Visual Aid Department has been tting something of a record. In two years of operation hey have turned out ninety film strips, close to one per eek. And, with the aid of Major J. B. Kleinschmidt, AA rojects Officer at the Signal Corps Photographic Center n New York, the same two years have seen 188 reels of aining films written, produced, and released.

The training film series on the SCR 584 was requested great haste by an overseas headquarters. Photography as started immediately and rushed to completion after work at Camp Davis, Asheville, N. C., Camp Murphy, Fla., and Camp Evans, N. J. One of the films took just twenty-eight days to be written, produced, and approved in Washington. Others of the series, filmed concurrently, are now being released.

There will soon be film strips available on all direct-fire sights for Automatic Weapons.

In the Publications Department, work now consists mainly of bringing all training literature up to date. AA technique changes so rapidly that changes in literature are always in order. It is expected that the program of printed material will be completed by July 1, except for manuals on new and confidential equipment.

The two-year score of Publications Department is just as impressive as Visual Aid's: thirty FM's, five TM's, and more than fifty TB's of all sorts.



MAJOR GENERAL K. T. BLOOD, *Commanding*

By Lieutenant G. W. Caturani

Preparation for overseas has been, and will continue to e the concern of Northeastern Sector; and evidence that he troops in this command are complying with the schedled rigorous training program has been gathered in freent recent inspections by General Blood. Training is e keynote, perfecting techniques in the art of destroying he enemy with minimum loss—intensive, carefully supered review of basic elementals of artillery, small weapons, outing and patrolling, combat intelligence, aircraft recogition, first aid, land mines and booby traps, and so on ong with extensive exercises designed to harden soldiers survive the whims of terrain, weather and disease. It's large order, and Sector directly and indirectly is stressing e value of perfection in leadership of commissioned and oncommissioned officers. Inspections evaluate progress ong this line. Orientation lectures and highly professional ar Department films of action at the war fronts further ress the importance of the maxim that every soldier must ot only be versatile but expert as well.

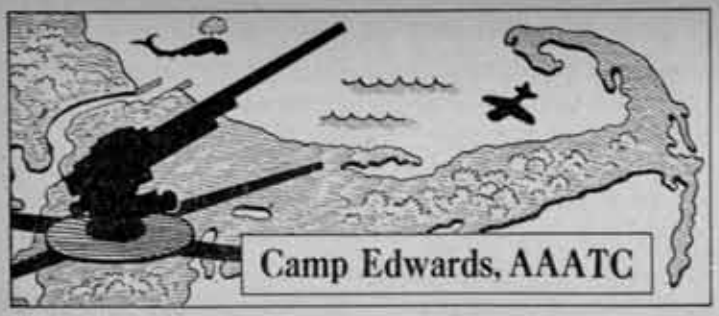
The Harbor Defenses of Boston's new commander, Brigadier General Phillip S. Gage, who formerly commanded the New York Subsector and Harbor Defenses of New York, has been busily engaged surveying his command. At Fort Ruckman there has been almost perpetual activity recently, for officers and enlisted men have been constantly oozing through the infiltration course. Meanwhile at Fort Banks final plans are being completed for a unique orientation outdoor billboard which will carry an ever-changing digest of world news supplemented by large maps. Similar orientation centers are being projected for other posts in the harbor.

The spectacular success of the Northeastern Sector War Bond Cavalcade which sold bonds to the total of $34,188,260 during the Fourth War Bond Drive has brought the request from the Department of Finance that Sector's Special Service Office assist in producing an all-services show for the Fifth War Bond Drive. The cast: a group of Soldiers, Sailors, Marines, Coastguardsmen, and, of course, the WACS, WAVES and Women Marines. The first performance, June 12 at the Boston Garden, will be the first shot fired in Boston for the Fifth War Loan Drive. Glen Miller's band will open with the still-unnamed show and tour with it for the first week.

The harbor defenses' special service activities continue unabated: U.S.O. Camp Shows regularly, plays on tour, frequent dances particularly appreciated at the outposts, distribution of a constant and generous supply of pocket-size books, cards, games, records, and athletic equipment.

In the Harbor Defenses of New Bedford several enlisted men from Fort Rodman participate weekly in a radio broadcast, "New Bedford on Parade," at Station WNBH.

The Armed Forces Institute correspondence courses have been vigorously promoted to all personnel within the Sector, and the initial interest has been amazingly high. Mathematics, physics, auto mechanics, history, accounting and photography topped the list.



BRIGADIER GENERAL JOSEPH E. HARRIMAN, *Commanding*

By Captain Richard J. Kane

The Commanding General of the Antiaircraft Command made a two-day inspection tour of the AAATC at Camp Edwards during the middle of April. A varied program including inspections of tactical positions and visits to the AA firing points at Scorton Neck and Wellfleet was arranged for the inspection party.

To familiarize AA half-track men with handling their juggernauts under the most adverse conditions and difficult terrain, a rugged obstacle course especially designed for such purpose at Camp Edwards, plays a vital part in the training program.

The AA half-track obstacle course has been so designed by nature, plus the ingenious refinements rigged by Army engineers, that practically any kind of a possible hurdle the crews and their machines will be subjected to in combat are encountered.

A novel innovation in the training program was afforded AAATC officers here recently through the medium of an instructive and enlightening seminar conducted by a board of six officers from the Research Section of the AA School at Camp Davis, North Carolina. The first in a series of seminars to be given at various AA installations throughout the country, these truly inspirational conferences gave the AA officers at this post a revealing insight behind the scenes from the various theaters of operation.

The visiting officers related graphic stories taken from their own personal experiences in the combat zones during the two-day sessions. The realistic picture provided by the seminar furnished the officers fortunate enough to hear the lectures with invaluable information which will undoubtedly pay big dividends in the future.

Battalion and group commanders, with a view of instilling leadership and self-reliance among their noncommissioned officers as well as stimulating increased spirit in the troops, have adopted a plan coinciding with the training program whereby the noncoms at stated intervals take over full command of the men.

Often this full command on the part of the noncoms is designed to take part during a retreat parade, but on other occasions they have been entrusted with commanding a motor march to the Wellfleet firing point, some fifty-one miles away from this installation, and with command of batteries during field exercises.

With the officers acting in the rôle of interested bystanders, the noncoms run the entire show from commanding officer down. Put on their mettle by the responsibility thrust upon them sometimes at a moment's notice, the non-commissioned officers have displayed qualities of leadership that have elicited warm approval from their superiors.

For the past five weeks a team of officers from the Antiaircraft Command, Richmond, has been conducting Proficiency Tests for AA Troops at this installation.

The time element enters all tests on gun drills, emplacements, night and day firing, and efficiency under simulated combat conditions. Particular emphasis is placed on the proper rotating of personnel, tactical disposition of materiel and casualty drills.

The half-track course at Camp Edwards

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TEXTS

No Royal Road

ITHMETIC FOR ADULTS. By Aaron Bakst. New York: F. S. Crofts and Company, 1944. 314 Pages; Index; Illustrated. $2.00.

Although definitely not one of the new "popular" books on mathematics, which attempt to make instruction painless by humor, this book does make use of an approach to the subject that is much more satisfactory than the texts we used in grade school. The book is readable, never loses sight of the fact that arithmetic is a tool instead of an abstruse mental exercise, and follows a logical plan to develop facility in the use of numbers. From 1 + 1 = 2, to logarithms and the use of the slide rule, the book is designed to refresh the reader on principles and to open up new avenues for application of those principles. But the author says, and this will be bad news for many, that there is still no royal road to learning arithmetic, any more than to any other subject. A knowledge of the principles and the applications, acquired by study and drill, is still the answer.

* * *

ATHEMATICS FOR EXTERIOR BALLISTICS. By Gilbert Ames Bliss. New York: John Wiley and Sons, Inc., 1944. 120 pages; Index. $2.00.

The author, during World War I, was employed as advisor on mathematical questions in the Range Firing Section at Aberdeen Proving Ground. He is Professor Emeritus of Mathematics of the University of Chicago.

Beginning with a short discussion of military maps and the data for determining the range and azimuth, the author develops formulae for trajectory in vacuo and then proceeds to introduce the factors which are applied to establish the standard trajectory. There follows a discussion of the application and limitation of Siacci's method and the Moulton method of approximations and the use of Ingall's tables. The steps to be taken in computing a trajectory are clearly given.

The author contributed a chapter on differential corrections wherein are considered the variations from the standard trajectory which must be taken into account in firings and the calculation of the corrections to be applied.

There is too much math to make the book one for casual reading or study.

An understanding of differential and integral calculus is essential to understanding the development and application of the many formulae given. It is not a book for the officer with a firing battery in the field. It is a book for the serious student of exterior ballistics.

The book is well arranged, clearly expressed, and will be found of much interest to the student who is mathematically inclined.

* * *

Beginner's Navigation

PRINCIPLES OF AIR NAVIGATION. By Bert A. Shields. New York: McGraw-Hill Book Company, 1943. 446 Pages; Index; Illustrated. $2.20.

Commander Shields wrote this text for students of high school age who hope to be flyers. With great skill the author managed to keep the discussion down to a language level that will not strain the intellect of a person without a Ph.D., but at the same time is far from Sixth Reader style.

The subject of air navigation is discussed thoroughly, and in a manner that develops the subject logically from the elementary applications to the advanced theory. The numerous photographs and art illustrations assist materially in making the text easily understood. The greatest value of the book, from the standpoint of a beginner, is that no previous knowledge of the subject is assumed.

* * *

Math Teacher's Guide

MILITARY APPLICATIONS OF MATHEMATICS. By Paul P. Hanson. New York: McGraw Hill Book Company, 1944. 447 Pages; Tables; Answers; Illustrated. $3.00.

Lieutenant Hanson has done something that needed doing. With his military background, he has succeeded in presenting a brief survey of the kinds of mathematical problems that are encountered in military work, and has done it in a way that the non-military reader can understand. In map-reading, orientation, Field Artillery, seacoast artillery, and AAA firing, he has outlined the types of problems that must be solved. There is a particularly long section, too, on air navigation. The 150-

page appendix is as valuable as the main part of the book, containing a long "refresher," tables, and answers to the questions.

The author very wisely did not attempt complete coverage in a book of this size, but limited himself to the general "big picture" of the mathematical requirements.

★ ★ ★

Improved Trig

ELEMENTS OF TRIGONOMETRY. By Kells, Kern, Bland, and Orleans. New York: McGraw-Hill Book Company, 1943. 324 Pages; Tables; Answers; Index; Illustrated. $1.80.

The authors have attempted to keep this text in balance between theory and practice. The problems assigned have definite bearings on day-to-day activities in many fields, and have the effect of impressing upon the student that trigonometry is not merely a mental exercise, but a very useful tool in many activities, military and civil.

No time is wasted on algebra—the student who wishes to get the most from this book must have a good solid grounding in algebra or he will find himself in trouble in the early stages. The instructor who uses the book as a text will find that it is particularly well-suited for flexibility in controlling the pace of the class, since the compartmentation is not so rigid that a few more pages or a few less will leave an assignment hanging in mid-air.

The treatment of spherical trigonometry is also kept on a down-to-earth basis, with emphasis on the problems of navigation.

★ ★ ★

Flintlock to M1

OUR RIFLES. By Charles Winthrop Sawyer. Boston: Williams Book Store, 1944. 388 Pages; Illustrated; Directory of American Rifle Makers; Index. $4.00.

It is obvious that Mr. Sawyer had a lot of fun writing this book. The reader gets the impression that the author "lives" rifles, and that here for once, he could have his say without argument. Mixing authentic history with biography, fiction, popular scientific writing and a dash of Jules Verne, he has created a fine reference book for collectors and admirers of rifles, ancient and modern. The book, in addition to being a reference work, is fine reading, and at least mentions every type of rifle that has had its part in the building of America.

The reader learns of double barreled rifles, of trick rifling that demonstrated imagination rather than practicality, of Rube Goldbergian special-purpose pieces, and of hundreds of other facts concerning both military and sporting rifles. No rifle is a matter of wood and metal to Mr. Sawyer—it is a combination of romance, ingenuity, and a problem to be overcome.

The value of the book might have been enhanced with clearer illustrations. Much of the detail of some of the photographs is lost because of a poor balance between engraving screen and quality of the paper.

★ ★ ★

Basic Flight Course

STICK AND RUDDER: An Explanation of the Art of Flying. By Wolfgang Langewiesche. New York: Whittlesey House, 1944. 384 Pages; Illustrated; Index. $3.75.

The reviewer, who is not an aviator and knows nothing about flying, can write freely because of his ignorance of the subject. Mr. Langewiesche's explanations are very clear, made st

learer by means of well-planned drawings, and very reasonable. The secret of all flying, according to the author, is a close familiarity with the Angle of Attack. Speeds, changes in direction, landings, take-offs, glides, climbs, and practically everything else having to do with flying the plane, as distinguished from maintaining it mechanically, are functions of the Angle of Attack of the wings. Because many pilots do not know this fact, or do not apply it correctly due to quite reasonable and plausible misconceptions, their flying leaves something to be desired.

The book is directed to private flyers and their light planes. It is written in non-technical language that makes sense even to groundlings, and indicates great familiarity with barnyard and county airport flying. We would renege at taking even a Cub aloft without an instructor, even if we knew the book by heart, but we have no doubt that the instructor's work would be made much easier. There is more to this business of flying than pulling back the stick and pouring on the coal.

* * *

Aye, Aye, Sir!

NAVAL LEADERSHIP AND THE AMERICAN BLUEJACKET. By Arthur A. Ageton. New York: Whittlesey House, 1944. 84 Pages; Bibliography; Index; Illustrated. $1.25.

Commander Ageton, whose writings have been known to military readers for years, offers some suggestions for naval leadership, bolstered by concrete instances of both good and bad examples. In addition to material on basic leadership, the book contains some valuable hints on getting along with superiors and those of parallel grade. Most of the material is the tried and true recipes that have stood up for years, and are applicable both to the army and the navy because they are basic. The most interesting impression the reviewer received from the book is that naval officers do not seem to place as much confidence in the willingness or ability of their senior noncoms as do army officers. This impression may not be warranted, but the book does leave that flavor.

* * *

FRIENDS AND ENEMIES

The Inside Story

TEN YEARS IN JAPAN. By Joseph C. Grew. New York: Simon and Schuster, 1944. 538 Pages; List of Officials; Index; Illustrated. $3.75.

The long-awaited inside story of our diplomatic maneuvers with Japan has been published—in part. Mr. Grew's diary tells as much as is safe about the double-dealing of the nation of the samurai. He tells of the artificially created anti-American feeling fanned by politicians and the press, of the attempts by wiser heads to ward off the conflict that could mean only suicide for a nation that had come far in the last hundred years, but not far enough. Mr. Grew's diary begins on a light note, but the shadows grow darker as the years go by, until by late November of 1941 the diary's rare notes of levity are soured by irony and futility.

There is no point in a short review to attempt to recapitulate the events that led to Pearl Harbor. The important features are known—Mr. Grew's lengthy book tells little that is new, but he does document and authenticate the salient points, and he does offer details that could be known accurately only to the State Department. After the self-appointed experts

had their say, colored by personal experiences and prejudices. Mr. Grew's diary, with its impersonal and businesslike weighing of the facts, will appeal to serious students and to seekers of the authentic.

* * *

Our Oldest Co-Belligerent

WAR-TIME CHINA. By Maxwell S. Stewart. New York: American Council, Institute of Pacific Relations, 1944. 60 Pages; Illustrated. 25¢.

The story this pamphlet tells of the situation in China, political, economic, and military, bears little relation to the stories we read in the commercial press. China has weaknesses in all three of these respects that are serious, even though in our admiration for our ally we are prone to overlook them. Graft, poor military leadership, misuse of political power, agricultural troubles, and external pressures all combine to weaken the country. Civil war looms in parts of the vast area. But the case is far from hopeless for our standpoint, and there are those in China who look forward with a clear view. But the author feels that we can do more for China by understanding her than we can by tinting our spectacles with rosy sunshades.

* * *

Trained for Conquest

THE GERMAN SOLDIER. Washington: The Infantry Journal, 1944. 97 Pages; Illustrated. 25¢.

Using the same format and literary style as in *The Japanese Soldier*, the Infantry Journal introduces us to Private Wat-nabe's ally, Private Schmidt. Private Schmidt is a trifle more appetizing than his Oriental comrade, but not much more. And he is even more dangerous, because he is a smarter soldier. With a page of text and a full-page picture, the anonymous author explains what makes the German soldier tick—and never fails to emphasize that it is you or him, by the German's own desire. It is your duty to help the German soldier to die for his *Vaterland*, and this book might help you perform your duty by showing you what type of person he is, by character and training. Some of the subtitles are, "Out of these Ranks . . . a Corporal," "The 100,000-Man OCS," and "Vengeance for 1918!"

* * *

Dissecting Tojo

JAPAN: Its Resources and Industries. By Clayton D. Carus and Charles L. McNichols. New York: Harper and Brothers, 1944. 233 Pages; Bibliography; Index; Illustrated. $3.50.

In this searching, unbiased, and objective study of Japanese resources and industries, the authors have managed to combine the scientific approach with readability. The book is well organized, logically planned, and avoids the highly technical jargon of economics and engineering that makes many such works unintelligible to the majority of readers.

With facts, figures, pictures, and graphs, the authors present an estimate of Japan from the standpoints of geography, human resources, agriculture, animal industries, mining, transportation, telecommunications, cities, commercial and industrial monopolies, finance, foreign trade, hydroelectric development, and manufacture. We cannot really understand the Japanese character or the direction of Japan's effort unless we know what she has, what she does with what she has, and what she wants

abundances and her lacks, in experience, culture, raw materials, skills, and philosophies indicate her weaknesses and strong points in the military field as well as the economic sphere. Japan has come a long way, but she still has a long way to go before she is either able or fit to be considered a modern nation.

The authors write from the standpoint of what we should permit Japan to do in the postwar world to exist, and yet not be a menace to other nations. For instance, they recommend that the manufacture of small cars be encouraged, to break up the feudal outlook of the untraveled poor Japanese, but that the manufacture of machine tools be rigidly controlled.

* * *

Ever-Present Problem

THE PEOPLE OF INDIA. By Kumar Goshal. New York: Sheridan House, 1944. 362 Pages; Bibliography; Index; Illustrated. $3.00.

The truth of the position of the people of India today probably lies somewhere in between the ideas of Mr. Goshal and those of the government of India. In a thick, well-filled volume, the author recites chapter and verse of the grievances of the Hindus against the British and the Moslem section of this unhappy land. Bringing in history, economics and the arts, the book gives England no unqualified praise, and much censure. The work would be more convincing if the author had suggested the answers to some of the problems he has glossed over, such as what to do with the Moslems (who are vastly outnumbered) if India receives her independence, and what to do about the caste system, which the author minimizes but does not succeed in disposing of altogether. There is little that is constructive here—the author has missed a great opportunity. Even if every word he writes is true, he still offers no real solutions.

* * *

Hardy Perennial

THE GERMAN ARMY. By Herbert Rosinski. Washington: The Infantry Journal, 1944. 215 Pages; Index. $3.00.

In this completely new and greatly expanded edition, Dr. Rosinski presents a rather meticulous study of the higher strata of the German army, beginning with Frederick the Great and continuing down to the present war. There is no discussion of weapons and tactics; the discussion is of command and strategy. The core of the German army is the General Staff, a body of intensely and extensively trained officers who have directed the army since the middle of the nineteenth century, and directed Germany as well since the later periods of World War I. The General Staff kept alive but under cover in the days of the 100,000-man post-Versailles army, and the impression is given that even today it rules the German war effort except for certain flashes of intuition from you-know-who. The General Staff, or its members, including Seeckt, Blomberg, and others made both Germany and her army together as a military and economic threat during tremendous upheavals.

Today's German army, although its officer corps is no longer a private preserve of the aristocracy, still maintains many of the traditions of the old army—it is a blend of the best of the old system with the best of the new. As Dr. Rosinski points out, even General Staff-trained officers are not perfect (although they are better than many of the best of other nations) and although they have been trained to flexibility and instant decision, they are often at a loss when a really radical change is required, either in battle or in preparation for battle.

To the Germans, war has always been as necessary a part life as food or funerals. It is not surprising that a large portion of what should be Germany's best brains have dedicated themselves to the study and practice of war. It is also surprising that Germany's prosecution of wars should have been so efficient and effective—up to a certain point. The professional should have the edge on the amateur. What is surprising is that when the scores are posted, Germany so often comes out second-best.

Except for a rather heavy dusting of German phrases the non-German speaking reader may find annoying, Rosinski presents a lot of material to help the reader form own conclusions as to what makes the German army the kind of army it is.

* * *

HISTORY

Basic & Authentic

26TH DIVISION SUMMARY OF OPERATIONS O THE WORLD WAR. American Battle Monuments Commission. Washington: Superintendent of Documents, 194 75 Pages; Maps; Index. $1.25.

The first of a series of twenty-eight volumes summarizing th operations of combat divisions in the World War, the book co sists of a pamphlet-like text and three large two-color maps, a tractively bound in an imitation-leather envelope binding. A though the book is essentially a front-line history, it also touch on the high-spots of other items of the Division's history. A ditional maps are found in the text. Casualty tables and streng tables are included in the Appendix, and source material is al listed. The day-to-day, even hour-to-hour changes of situati extracts form orders, and other authenticated information in cates that the books of this series will be a starting point many World War studies.

* * *

Death of a Nation

TRIUMPH OF TREASON. By Pierre Cot. New York: Z Davis Publishing Company, 1944. 432 Pages. $3.50.

This is far from just another "Why France fell" book. Wi the advantages of intimate association with events, mature flection, and careful preparation, M. Cot has written a defen of the Popular Front government, an indictment of the hi Army command, and a moving story about the suicide o great nation. The core of the book is the show at Riom, wh Vichy began a trial of Leon Blum and other members of t Popular Front, only to halt the trials when the evidence not seem to fulfill the necessity of convicting the defendants the death of France.

Cot, a member of the Popular Front who refused to retu to France to stand trial because he felt that neither Vichy its court had the authority to try him, writes the clearest defen of the Front that we have seen, although a large part of the e fense is based on charges against the Fascist elements of Fra and the ineptitude of her army's high command. He quot commanders, members of Rightist parties, who insisted th Communistic propaganda did not impair either the fighti qualities or the loyalty of the troops. He quotes facts and figu to indicate that the Popular Front's appropriations for defe were cut by the Army itself, and that its recommendati ht unheeded. The author leaves us with the idea that

...'s primary fault was its temporizing with the very elements ... later put it on trial at Riom.

* * *

Phoenicia to Coral Sea

...TRODUCTION TO NAVAL HISTORY: An Outline ...ITH Diagrams and Glossary. By Jacques Barzun, Paul ...H. Beik, George Crothers, and E. O. Golob. New York: J. ...B. Lippincott Company, 1944. 245 Pages. $1.50.

Quoting from the Note at the beginning of the book, "Al...ough this small workbook can pretend to give but the out...es of a great subject, it is something more than a synopsis of ...erials readily found elsewhere. It aims at providing the be...ner with a coherent, continuous, and readable account of ...sea power from Phoenician times to the present stage of the ...cond World War, laying stronger emphasis on the modern ...riod."

Bound in paper covers, with a plastic "backbone" so the ...k will lay open easily, the volume is essentially a statement, ...outline form, of the important happenings in naval history ...m earliest times. A bibliography, a glossary, and sample ex...inations round out the plan of the book, which is basically a ...nt of departure for serious students of naval history.

* * *

The President Said

...E AMERICAN WAY: Selections from the Public ...Addresses and Papers of Franklin D. Roosevelt. New ...York: Philosophical Library, 1944. 71 Pages; $1.50.

"The editor has gone through the massive body of the avail...le papers and utterances of Mr. Roosevelt and has drawn ...m them statements of the underlying principles and the ...ndamental faith that seem to have impelled the actions of this ...manual man. These statements are to be found within the tex... of many discussions on various phases of public policy. ...metimes as a brief assertion of a compelling cause of action, ...metimes almost as a casual aside, the words lead beyond the ...mentary issue to assertion of an abiding faith." This quota...n, from the editor's preface, tells the story of this short work.

* * *

PERSONAL EXPERIENCES

Americans will Remember

...N ESCAPE FROM TOJO. By Commander Melvyn H. ...McCoy and Lieutenant Colonel S. M. Mellnik. New York: ...Farrar and Rinehart, 1944. 106 Pages; $1.00.

...E DYESS STORY. By Lieutenant Colonel William E. ...Dyess. New York: G. P. Putnam's Sons, 1944. 182 Pages; ...Illustrated. $2.00.

Both of these books tell the story of the treatment (mistreat..., rather) by the Japs of our men captured in the Philip... Mellnik and McCoy served on Corregidor, Dyess with ...Air Forces on Bataan. The three stories are interwoven, and ...on the same facts—that the Jap murder and mistreatment ...American and Filipino soldiers bore no relation to interna...al law or custom concerning the handling of prisoners of ... nor did the actions of the Japs resemble anything that ...be expected from creatures who are built in the image of ...an beings.

It would be useless to attempt, in a short review, to g even a hint of the tortures and murders inflicted by the Ja both books together, inhibited by an effort to keep th within the bounds of what is printable, merely outline the p ture. Portions of both books have been reprinted in *Life* a the newspapers, but the books tell as much as can be told.

Every person who says, "The Japs aren't so bad after all," "They are our brothers and need our love and understanding or "They can't be as bad as our propaganda says," all of wh expressions the reviewer has heard from American citizen should read both of these accounts. Some opinions might changed.

* * *

Caduceus at Sea

THE WOUNDED GET BACK. By Albert Q. Maisel. N York: Harcourt, Brace and Company, 1944. 230 Pages. $2.

Mr. Maisel surveyed the Naval medical service in the P cific and liked what he found. Since Mr. Maisel is not a doct but a writer specializing in medical topics, his report of wh he saw makes sense to a layman, and carries much interest f any officer or soldier who expects to serve in the Pacific ar The author describes the techniques of treating battle injuri the fight against tropical diseases, the evacuation service, a the men who do the work. The hospital ships, the air evacuati service, the field hospitals, the base hospitals and the medic corpsmen are all wonderful institutions, according to M Maisel, who saw them operate.

The impressive statistics that indicate how much better a the wounded man's chances for survival should be heartenin to all fighting men. Those of us who were brought up on hor tales of the last war can appreciate the great strides that ha been made both in methods of treatment and in speed of evac ation. The paraffine treatment for burns, so highly praised very few years ago, is no longer considered good practice, for i stance. But the greatest advances in battle medical practice se to have been made in the recognition and treatment of bat neuroses. The fear of fear is being conquered.

* * *

Mauldin, Robinson & Co.

NEWS OF THE 45TH. By Sergeant Don Robinson. N man: University of Oklahoma Press, 1944. 158 Pages: I lustrated. $2.00.

The *45th Division News* has had more publicity in new papers and magazines of general circulation than almost a other unit's publication. Sergeant Robinson has kept the pap operating under conditions that would discourage almost an body else, and is proud of the fact that the paper is *printed* n matter where the Division happens to be—no mimeograph fo this elite crew. Sergeant Bill Mauldin, the *News'* cartoonis is considered by many to be the cartoonist "find" of this wa The book contains many of Mauldin's cartoons.

Sergeant Robinson tells the story of the *News* from its be ginnings to a late period in the fighting in Italy. Incidentall the book is also part of the story of the 45th Division, and fro the quality of the writing, Robinson should be the man to wri a popular history of the Division. The sergeant is an expert describing action without an air of "Oh, it was horrible," even, "We were very brave." War correspondents of the c citable school could learn a lot from Robinson's method of r portin g.

MIXED GRILL

Rugged Individualist

IVATE BREGER'S WAR. By Dave Breger. New York: Random House, 1944. Illustrated. $2.00.

Lieutenant Breger combines good drawing, a slightly pixie se of humor, and being his own stooge into cartoons that ly, if ever, fail to bring a laugh. His feud with the colonel, naïve feeling of equality with generals, and his fear of ser- nts are just far enough off base to be funny without being far-fetched for effect. Only Breger would think of inter- ing three generals at a staff conference to congratulate m on the last offensive. Only Breger would think of carry- his tommy gun in a violin case, like a Chicago gangster. Breger would have a colonel who would tell him, "Ar- ge these documents alphabetically and then burn them." get the idea. We like it.

The Man with the Pout

FRED AHOY. By Foster Humfreville. New York: Robert M. McBride & Company, 1944. 64 Pages. $1.00.

You're either an *Alfred* fan or you're not—there is no middle nd. If you are one of those poor, misguided people who nothing funny in the flat-footed dead-pan aberrations of ller's favorite sailor, we feel sorry for you. Alfred is jealous pouting because Milton's 3-inch gun makes a louder noise n Alfred's one-pounder; Alfred doesn't think he hit any planes today, but he's sure he frightened one of them te badly. If you're an Alfred fan, you'll know what we an.

Filipino Village

HE LAUGHTER OF MY FATHER. By Carlos Bulosan. New York: Harcourt, Brace and Company, 1944. 193 Pages. $2.00.

This is a series of short sketches, reprinted from *The New* rker, purporting to be descriptions of life in a small village Luzon. The stories are amusing and show evidence of the t of literary genius that is built on the observation of small ails that help to brush in the larger picture. It is doubtful e Filipinos themselves will approve of the book, portraying it does a type of peasantry who are a bit too simple-minded untutored in the outward forms, at least, of the moral and l laws as we know them.

Murder on the Beach

E GULL COVE MURDERS. By Eli Colter. New York: M. S. Mill Co., Inc., 1944. 182 Pages. $2.00.

Mr. Colter writes a plausible and exciting mystery story. The e is a rocky portion of the coast below Los Angeles, and actors are as strange a family of brothers as ever stuck a le into each other. The detective is, for a welcome change, workmanlike and human sort of fellow, far removed from eccentric wonder-children of most mystery writers. There enough murders to satisfy the most demanding readers. post literature has its uses, and this gory volume is better most of its kind.

Target Victory

BOMBARDMENT AVIATION. By Keith Ayling. Ha burg: Military Service Publishing Company, 1944. Pages; Index; Illustrated. $2.00.

In this companion volume to *Combat Aviation*, by the author, Mr. Ayling presents a primer of the strategy and t of bombing. In nontechnical language that nevertheles grounded on technical knowledge acquired in both W Wars, Mr. Ayling offers a considered study of the metho bombing, the Allied bombing planes, and their efficacy. usual in an airman, the author avoids faddism, over-enthusi and dogmatism. His discussion of the decline of the bomber in land warfare ignores the vulnerability of this of plane to AA automatic weapons, but otherwise there be little quarrel with his conclusions from the standpoint of AA soldier. His theme seems to be that bombardment avi has a definite assignment in the Allied war plan, that it is forming that assignment well, and that with proper equip and proper training we will continue to draw dividends f our investments in bombing planes. When bombardm aviation is given assignments for which it is not fitted, it o fails.

* * *

The Working Fleets

MERCHANT FLEETS: A Survey of the Merch Navies of the World. By Critchell Rimington. N York: Dodd, Mead and Company, 1944. 291 Pages; In Illustrated. $4.00.

Mr. Rimington and his collaborators have combined, to pare a book that is as exicting as a sea story, as instructive year before the mast, and as timely as today's newspaper. Navy's navy may be full of romance for those who know about the sea, but the grim fighting ships are too few and seldom where the public may see them to grip the imagina like the merchant ships. Freighters, tankers, passenger s "combination boats," tugs, barges, river steamboats, fer seatrains—Rimington tells about them all. Authentic info tion is so expertly interwoven with the tang of salt air that person who has ever felt a pitching deck will be delighte have this book.

Chapters on design, construction, maintenance, repair uses of merchant ships, glossaries of terms, and myriads of tures fill the pages of the volume. Seacoast artiller especially should find *Merchant Fleets* extremely interes they will be more familiar with the vessels that pass their g

* * *

Fact and Fancy

ROCKETS: The Future of Travel Beyond the Stra phere. By Willey Ley. New York: Viking Press, 1944. Pages; Bibliography; Index; Illustrated. $3.50.

Willey Ley, whose articles on rockets and other sub have appeared in the Journal, is a member of the sta *PM*. A former member of the German rocket society, he had much practical experience with these ancient but partly-untamed projectiles. It would not be unreasonable sume that Mr. Ley knows at least as much about rocket th as any civilian not now working in Government-contr laboratories. Added to this is his unchallenged literary ab The result is a book that is as interesting as it is open to a from many angles—mathematically, and in other ways. historical portions are probably the most interesting in

because there is more fact than fancy. The discussions present-day war developments are also valuable. But when Ley passes to the future of the rocket, including its use in alled space ships and other Buck Rogers developments, the der can take it or leave it. The reviewer, no die-hard or onel Blimp, prefers to leave large parts of it.

* * *

Law of Survival

QUISITION IN FRANCE AND ITALY. By Maurice K. Wise. New York: Columbia University Press, 1944. 200 Pages; Index. $2.75.

Requisition is the institution whereby the modern state, ough the exercise of its sovereignty, secures property and ices for the satisfaction of urgent needs." The book is a dy of the growth of the institution in two countries, France d Italy, with special reference to the safeguards for the indi idual. Dr. Wise shows that requisition as practiced in those countries has developed a large body of law, and that it is ible for any modern nation to use the power of requisition a manner that will protect the individual as well as the state. An interesting note on the study as presented is that although many ways the philosophy and background of France and ly were dissimilar, the institution of requisition in each untry showed marked resemblances to its form in the other untry. Dr. Wise explains this by suggesting that the reason he similarity of the emergencies the countries faced.

* * *

Keeping Current

TH CENTURY ENGINEERING. By C. H. S. Tupholme. New York: Philosophical Library, 1944. 195 Pages; Illustrated; Index. $3.00.

This book, written in Britain, is a quick review of some of the engineering and industrial processes that have been created or developed since the start of the war. Hitting the high spots in many fields, from air-conditioning to traction, it is a survey course in engineering progress. No field is treated in detail, but the descriptions of principles and some of the salient points of developments in many fields give the book a rather breathless pace in spite of its flatly scientific tone.

The author states frankly that his book is merely a record of achievement, and that for detailed accounts of the developments in any particular field, the reader must look elsewhere. He merely tells the reader what is happening—how it is done is beyond the scope of the book.

* * *

Dogs

DOGS FOR DEMOCRACY. By Thomas Young. New York: Bernard Ackerman, 1944. 32 Pages; $1.00.

There doesn't seem to be much book here for a dollar, but genuine dyed-in-the-wool dog lovers probably won't mind. Text and photographs combine to provide a tribute to the Army's dogs and the people who have lent them.

* * *

Next Best

ATLAS OF GLOBAL GEOGRAPHY. By Erwin Raisz. New York: Harper and Brothers, 1944. 63 Pages; Illustrated. $3.50.

Dr. Raisz, who is a lecturer in cartography at Harvard's Institute of Geographical Exploration, has drawn his maps from what might be considered a new theory of projection—one of perspective. By centering his map on the focal point of interest of the particular political or economic opinion he wishes to emphasize, and using perspective to emphasize his point, he is able to put over his ideas in a manner that is almost as effective as using a globe. For many of his ideas, his method might be considered more satisfactory than plotting on a globe.

The pages are large (9½ x 13). A liberal use of color, five-color maps in some cases, combined with the size of the pages, helps to put over his points without too much strain or study. In addition to the usefulness of the book as an atlas, it also indicates the geographical bases for many of the problems of the world today, as well as dipping slightly into geopolitics.

Geopolitics and Peace

THE GEOGRAPHY OF THE PEACE. By Nicholas John Spykman. Edited by Helen R. Nicholl. New York: Harcourt, Brace and Company, 1944. 61 Pages; Maps; Index. $2.75.

Without stepping into the argument as to whether or not geopolitics is a science, it does open new avenues of thought. This book, not quite finished before Dr. Spykman's death, is an attempt to make use of geopolitics in deciding the peace as well as in fighting the war. Dr. Spykman believed that purely geographical settlements, based on the error-studdied Mercator projection, would make the peace a temporary cessation of hostilities—that not only position, but climate and economic resources must be taken into account, as well as basing the whole on maps that are designed for the particular problem.

Flying Insignia

AIR HERALDRY. By Carl Mann. New York: Robert McBride & Company, 1944. 255 Pages; Illustrated. $3.50.

Mr. Mann's study of Army Air Force insignia consists essentially of two parts: one, a history of insignia that have a history behind them, and the other, reproductions of the insignia. The various pilot badges and wings, the shoulder patches, and the distinctive shoulder-loop insignia take up very small portion of the book. Page after page of squadron and group insignia make up the bulk of the book, and it is easy to believe that Mr. Mann was able to include every design that had been approved at the time the book went to press. The designs lose something since they are reproduced in black-and-white, but to do so in natural colors would have resulted in a volume that would cost more than all but a very few could pay. World War I airmen will find their squadrons represented also in a special section, and with more detail and history than is possible for the World War II section.

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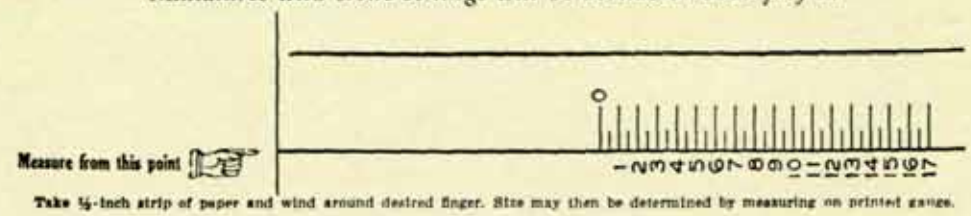

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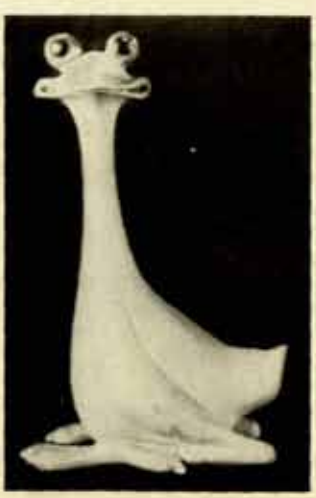

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