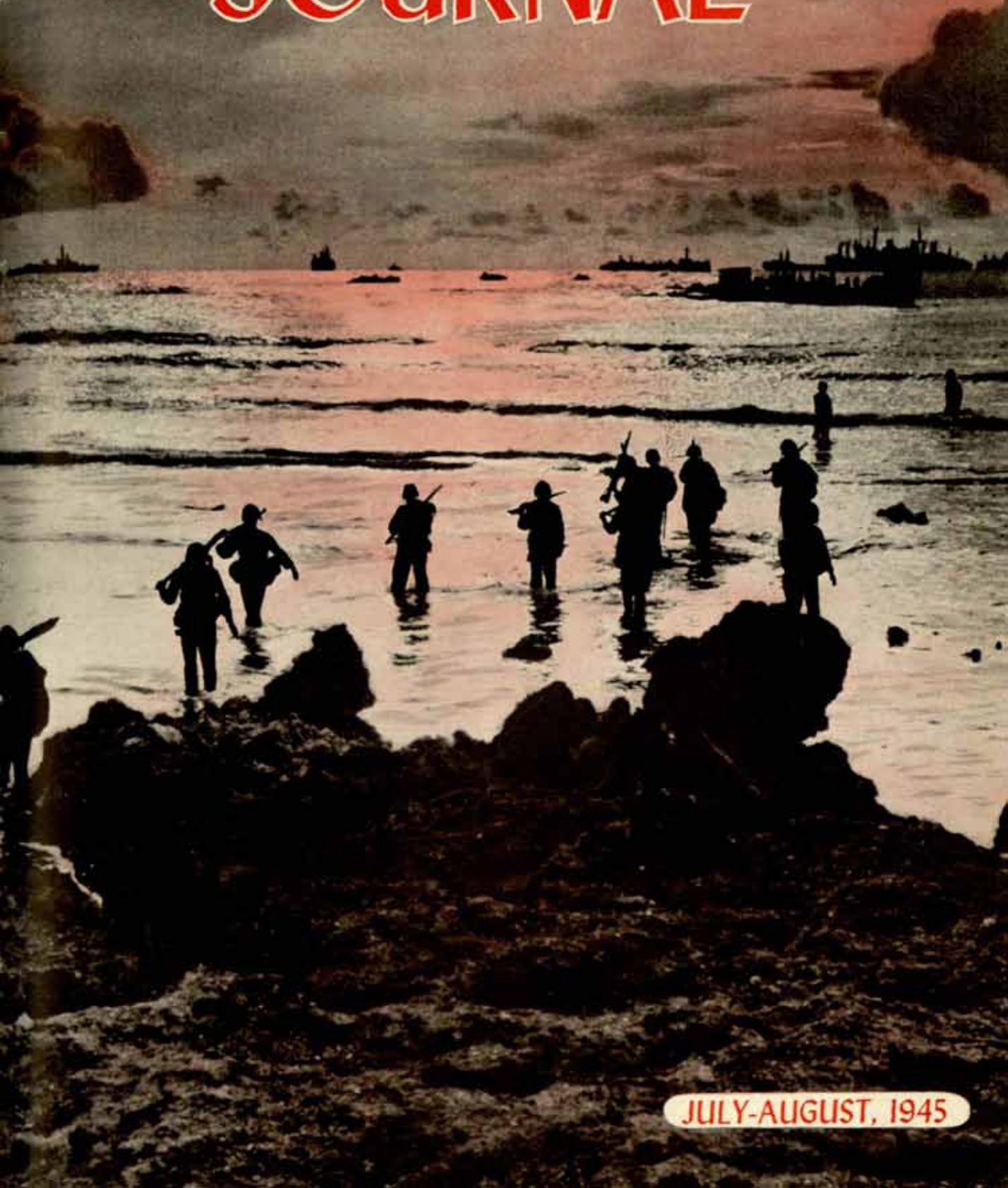


COAST ARTILLERY JOURNAL



JULY-AUGUST, 1945

Christmas Is Coming!

Let the JOURNAL do your Christmas Shopping
(and Shipping) for you!

Books:

Books make the perfect Christmas Gift; they are appreciated by all. The JOURNAL will wrap your selection as a Christmas Gift, inclose a suitable card, and relieve you of all the bother and work.

You name the title (give second choice) and the recipient; we do the rest.

To assure proper handling of Christmas Gift book orders, cash should accompany the order. *We will refund overpayments in cash, and give discounts in book dividend coupons, which may be used for the purchase of other books, or magazines.*

Remember when you order that all titles are not always available, due to wartime conditions, but that the JOURNAL will make every effort to send the book you want. Alternate selections are desirable.

Order early to assure delivery by Christmas.

Magazines:

There are many wartime restrictions on magazine subscriptions, but a surprisingly large number of publications can accept new subscriptions. Write the JOURNAL for specific information on Christmas Gift Subscriptions.

When cash accompanies your order, *we will refund overpayments in cash, and give discounts in book dividend coupons, which may be used to pay for other magazines, or for books.*

Again, send your inquiries early, to assure delivery by Christmas.

COAST ARTILLERY JOURNAL

FOUNDED IN 1892 AS THE JOURNAL OF THE UNITED STATES ARTILLERY

VOLUME LXXXVIII

JULY-AUGUST, 1945

NUMBER 4

CONTENTS



COVER: <i>Marines wade ashore at Timian. Coast Guard Photo.</i>	
THE FUTURE OF THE COAST ARTILLERY CORPS. <i>By Major General G. Ralph Meyer</i>	2
RETAKING THE HARBOR DEFENSES OF MANILA AND SUBIC BAYS. <i>By Lieutenant Perry Reed McMabon</i>	4
DROP ON CORREGIDOR. <i>By Major Thomas C. Hardman</i>	20
THE GENESIS OF FORT DRUM. <i>By Brigadier General John J. Kingman</i>	23
FROM THE FIGHTING FRONTS:	
THE 90MM SNIPER	27
ANTITANK MISSION. <i>By Lieutenant Stanley A. Roicki</i>	31
BATTERY B's REVENGE	32
THE 863d AAA AW BATTALION IN THE BATTLE OF THE BULGE. <i>By Major William J. Krzton and Captain Warren G. Tyson, Jr.</i>	35
ONE AA MAN'S INFANTRY EXPERIENCE. <i>By Lieutenant E. G. Vendetti</i>	41
FIFTEEN DAYS ON THE GRIDDLE	42
TURNING ON THE HEAT	45
LITTLE-KNOWN FACTS ABOUT TRACKING RATES. <i>By Lieutenant Colonel K. G. Merriam</i> ...	48
TRACKING WITH THE M5 DIRECTOR. <i>By Lieutenant Frank B. Aycok, Jr.</i>	52
AAA NOTES NO. 20, ETO	55
WAR MAPS	63
COAST ARTILLERY CITATIONS AND COMMENDATIONS	67
COAST ARTILLERY BOARD NOTES	71
NEWS AND COMMENTS	74
NEWS LETTERS	82
BOOK REVIEWS	88

PUBLICATION DATE: August 1, 1945

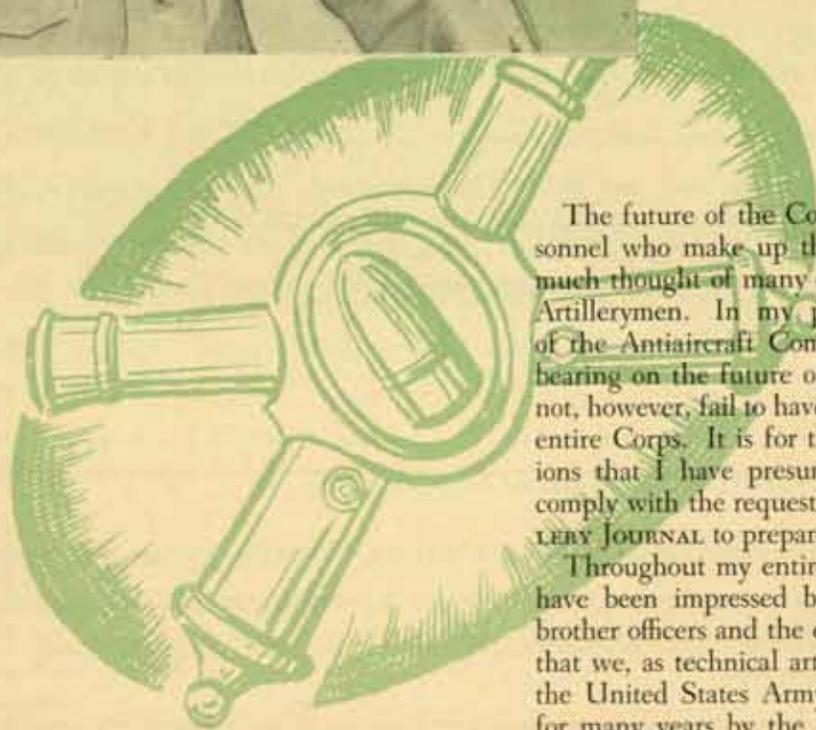




THE

Future

OF T



The future of the Coast Artillery Corps and of the personnel who make up that Corps has been the subject of much thought of many of us who have grown up as Coast Artillerymen. In my position as Commanding General of the Antiaircraft Command, my views may have some bearing on the future of the Antiaircraft Artillery. I cannot, however, fail to have given thought to the future of the entire Corps. It is for the purpose of presenting my opinions that I have presumed upon my present position to comply with the request of the Editor of the COAST ARTILLERY JOURNAL to prepare this article.

Throughout my entire service as a Coast Artilleryman I have been impressed by the technical excellence of my brother officers and the enlisted personnel. I am convinced that we, as technical artillerymen, are the equal of any in the United States Army. I have been equally impressed for many years by the casual or even careless manner in which we have dealt with the tactical side of our problem. We have been so absorbed in perfecting our weapons and our methods, from a purely technical point of view, that we have lost sight, to a great extent, of the fact that our weapons and methods are of value only to the extent that they enable us accomplish our missions despite any enemy capability. This concentration on technical excellence in our specialty has resulted in placing us in an isolated compartment where the activities of other arms have been of only academic interest to most of us. Those who did take an interest in the other arms did so largely on their own

By Major General
G. RALPH MEYER
USA

initiative. Our self-imposed isolation has been recognized and accepted by the rest of the army over a period of years. In consequence we have been accepted as specialists. This has led to hesitancy on the part of the high command to use our field grade officers in positions where a knowledge of the tactics of the combined arms was essential. A contributing factor in this situation was the sudden and tremendous expansion of the Coast Artillery, particularly Antiaircraft, at the outbreak of the war, necessitating specialization by most of the newly commissioned officers. Many officers received rapid promotion to field grade without ever having any experience with the combined arms.

arms and with the Navy. Those units have proven their worth in actual combat. Other Antiaircraft units have been working most successfully with Air Forces. Antiaircraft officers must, therefore, be familiar with the operations of Air Defenses and with airdrome procedure in order to carry out their missions more effectively. Here again the need for teamwork and knowledge of how the other member of the team performs is necessary if we are to make full use of our capabilities. Our units have performed with great credit to our Corps in many different rôles within as well as without their specialty. That reputation must be retained in the future.

COAST ARTILLERY CORPS

When the need for our specialty diminished, we had a surplus of such officers who were unprepared to function outside their specialty. They transferred to other activities, and we have seen expert artillerymen performing duties which, in some cases at least, could be performed more efficiently by men brought in direct from civil life.

Specialization is a desirable activity, but when it is carried to extremes and at the expense of the acquisition of general knowledge, it becomes a menace to the future of the specialist. When the need for his specialty disappears, he will be used for something else, and what he is used for will be dependent on what he is capable of doing outside his specialty. This is an unjustifiable waste in the case of officers of the Regular Army who devote their lifetime to their profession.

One thing which has been brought home most forcibly in this war is the necessity for teamwork in all military operations. The importance of team play has always been known, but modern warfare makes it mandatory to insure success. The basis of success as a member of a team is knowledge of what the other members of the team are going to do in any action; an intimate knowledge of your own capabilities and limitations and of where and how you can fit into the team, coupled with a desire to do so. Each of us must, therefore, be familiar with the way in which the components of the ground forces carry out their tasks in various operations; we must be able to understand the scheme of maneuver in any particular action; and, finally, we must have such complete knowledge of the capabilities of our own units that we can take the steps necessary to carry out any part of the task assigned to us and even suggest where we might be of still greater assistance. Wherever we have reached this stage of understanding of the way in which the team of the combined arms works we have been welcomed as valuable members of that team. We have the unquestioned technical ability to do our part. What we must acquire is the complete understanding of the tactics of team play so we can see where and how our technical excellence can be applied to the best advantage for the entire team.

Many of our Antiaircraft and 155mm seacoast units have already had the experience of working with the combined

It is my firm conviction that any artilleryman worthy of the name can learn to perform in any artillery rôle. The basis of artillery fire is to place the center of a zone of dispersion on a given target. The means and methods used in keeping that zone of dispersion to a minimum size and placing it on the desired target with the minimum expenditure of ammunition are technical. The selection of the target and the nature of the fire to be delivered thereon constitute tactical problems.

The solution of the technical problem varies between wide limits because the targets fired upon vary so widely in their characteristics of movement, location, and degree of vulnerability. The machines developed to meet the differing requirements of fire direction and fire control range from a pencil and paper to an M9 or a seacoast director. These machines in some cases may be complicated, but the essentials which must be known in order to use them can be learned by any artillery officer who is willing to devote the time which many professional men in civil life devote to becoming familiar with the machines they use.

The solution of the tactical problem is dependent upon a complete understanding of the artillery rôle at the moment and the capabilities of the enemy. There is no rule of thumb which will give the answer. But any intelligent man can learn how to reason his way to a sound decision in any situation.

In consonance with my convictions I have recommended to the Commanding General, Army Ground Forces, that there be a single Artillery in the postwar Army. I have written Antiaircraft Brigade Commanders urging the importance of having all officers and higher grades of non-commissioned officers take an active interest in learning how our teammates in the Ground and Air Forces work so that we can fit our strength in with theirs. In the Antiaircraft Artillery School and in training literature now in preparation greater attention is being given to encouraging tactical thinking in terms of the combined arms as well as our own. May I be permitted to suggest that everybody in the Coast Artillery Corps follow that path? We have done many things exceedingly well in the past. We have earned a place on the team in this war. Let us make certain that we retain that place in the army of the future.

Retaking

THE HARBOR DEFENSES OF MANILA AND SUBIC BAYS

Top: WP had burned off the vegetation on Caballo. Japanese, with few places to hide, still sniped at our Engineers as they pushed the pipe line to the crest.

Bottom: The remains of the North, or QM Dock.

Division Photos



By Lieutenant
Perry Reed McMahon

The Fall of Corregidor

America's Coast Artillery bastions in the Philippines, although neutralized during the withdrawal from Bataan and the subsequent fall of Corregidor, nevertheless were difficult places to retake.

Their big teeth had been pulled—but the concrete and steel emplacements remained, and the tunnel workings were utilized to the utmost by the Japanese.

Army engineers had built well. Even against the most modern of weapons the Coast Artillery positions stood up and it required intense efforts of all branches finally to reduce them. The Navy, the Air Corps, Artillery, Paratroopers, Engineers, Tanks and Infantry were used at some time or another in the operations against Fort Mills (Corregidor), Fort Hughes (Caballo), Fort Drum (El Fraile) and Fort Frank (Carabao Island). But it was only after ingenious usage of these arms that success was finally ours.

The following account of the Corregidor operation, furnished largely by eyewitnesses quoted, and by the S-2 of the Battalion which did most of the mopping up after the assault troops were withdrawn, depicts to some extent the difficulties encountered, and steps taken to surmount them.



One of the best pictures taken of the assault of Fort Mills. On the right over Topside paratroops of the 503d RCT settle to earth as assault waves of the 34th RCT (upper) streak around the west bulge toward the San Jose beachhead. Air bombs are bursting on the east side of Malinta Hill, and naval units are shelling the San Jose upper area.

Naturally enough, defenses in Subic Bay had to be first reduced, the approaches to Corregidor then swept of mines, and Manila Harbor's defenses retaken step by step.

However, because of the interest in Corregidor, this narrative will first attempt to outline that operation, then return to Subic Bay for the account of the assault on Fort Wint, on Grande Island, and from there proceed through the retaking of Caballo, El Fraile, and Carabao in order.

Considering the area of the ground taken, and that the effectiveness of the positions had been largely destroyed at the time of our withdrawal nearly three years previously, Japanese defense, although expected to be fanatical, was phenomenal.

THE ROCK RETAKEN

Fittingly enough from where the "Death March" was begun early in May 1942, the assault of Corregidor started from Bataan, 16 February, 1945—three years later. The strength of Lt. Gen. Masaharu's arrogant legions, which then overwhelmed the defenders of the "Rock," was as nothing compared to the might of American arms which retook it.

For days Corregidor had been pounded from the air and

from the sea. Even on the mainland some twenty-five miles to Manila, where General Walter Krueger's Sixth Army was busy slaughtering the Japs in the Walled City, soldiers often looked up from their labors to gaze out across the Bay to see flashes from 1,000-pound bomb bursts and minutes later hear the resounding roar.

Now was the time to close with the enemy.

Subic Bay and Olongapo Naval base had been cleared earlier in the month. Then as troops of the 38th Infantry Division sailed into the harbor at Mariveles, the town on Bataan from where the Death March started, four miles away across the channel a pall of smoke hung over Corregidor.

The next day to Mariveles came the 3d Battalion, augmented by an extra company, of the 34th Regimental Combat Team, which stayed overnight. As the LCPR's were swinging into the harbor, proud in their mission, a five-inch shell from Corregidor screamed across their bows. Another struck the stern of an APD, and others sent up splashes in the sea.

Despite the preparation the Japs were still defiant on the Rock.



South Dock, with San Jose in the background before Malinta Hill. West tunnel opening is the small black dot at left center. Camp and Ordnance Points in the right background, with Monkey Point beyond.

Next morning the sun was rising over Corregidor as the LCM's bounced away from Mariveles jetty, and far to the south, like avengers from the blue, out of Mindoro came the troop-laden air transports of the 503d Regimental Combat team, paratroopers who had first jumped at Markham Valley in far away New Guinea nearly 20 months ago, and had waited long for this opportunity.

One-half of the Regiment were aboard the troop carrying planes. The little dark spots grew larger, and the drone of the motors became discernible. Soon the water-borne 3d Battalion could see the morning sun rays glinting off the silver planes.

They circled wide over the one-mile square head of three-mile long Corregidor—once the strongest fortress in the world. How strong it was now would soon be known.

The amphibious flotilla with white wake streaking behind was making a crescent moon as they turned about the west bulge of the islet, headed for San Jose Bay. Troopers who would soon assault the shore climbed high on the sides of the LCM's the better to see the paratroopers jump.

The air transports curved gracefully over Topside, and out of their open doors blossomed the chutes of the paratroopers, to float down and bloom like so many white mushrooms in an early morning pasture. Supplies were dropped in colored chutes—rose, green, yellow and blue.

Here on Topside, the western plateau of the island, the paratroopers would meet the enemy where the bougainvillea vines tried bravely to hide the skeleton frames of the officers' quarters and EM barracks, and hibiscus' scarlet trumpets, stubbornly tried to bring back memories of a happier day.

Before the hour was over the scarlet of the hibiscus flower would be matched with the color of American and Japanese blood.

Corregidor had been the pride of the Pacific. Its parade

ground was once velvet-smooth, and right smart men marched there. The big guns gleamed in their mechanical perfection, and revolved, ready to roar defiance to aggression in any direction—that was three years ago.

This day, raw, dun-colored rock, pock-marked by the disease of war, greeted the eyes of the approaching avengers. Whole hillsides were bare of vegetation, the little railroad's rails were twisted like pretzels, the emplacements of the big rifles, concrete and steel, were shattered remnants. The hour was 0830.

A 35-mile wind blew over Corregidor. Paratroopers drifting toward the parade ground began to slide to the south, some settled over the cliff, some went drifting down to sea. But the majority landed on the plateau, some among the yellow rocks and boulders, some among the chunks of buildings, some hung up in trees. Many began shooting before they hit the ground.

Mission of the paratroopers was to clean off Topside and advance to the east, having advantage of higher terrain, thus driving the Japs into a pocket in the low ground. While this was going on the 34th would make its beach head at San Jose and take Malinta Hill.

Malinta Hill, which rises sheer almost in the center of the island, has sides of rock and cliffs almost perpendicular. It was up this hill the 34th was to go.

A concentration from the Navy had silenced temporarily the barrage of Jap gun and mortar fire which greeted the LCM's as they grated ashore on the beach—but the beach was dangerous with mines.

Several of the first vehicles run ashore struck mines. It was several hours before vehicles were landed safely. There were casualties. Aid men and litter bearers began gathering up the wounded. Assault waves of the 34th continued to drag themselves up the hill; on the east side the Japs were also trying to make the crest. It was a question there of

who would first gain the commanding features of the terrain.

Now as there are two phases of the operation underway at the same time, the paratroopers on Topside, the 34th on Malinta Hill and San Jose, besides the continuing air strikes, and occasional calling in of warships for special missions, it becomes apparent that a chronological sequence in this narrative is almost impossible.

Besides this, since the various groups have their natural *esprit*, it can be expected that they regarded their particular parts in the assault as being of prime importance.

Therefore, after a brief description of the action on Topside, an attempt will be made to present more of the background on the battle.

The paratroopers had gained their first objective and had fanned out. Their job was to kill the Japs in the middle area occupied by the officers' quarters and EM barracks. They had landed in the middle of the Japs and then moved outward to prevent them from organizing into groups of resistance.

Then they systematically hacked up the small units and kept them out of contact with any others. As stated before many of the paratroopers had shot their first Japs before they reached the ground. One, Pfc. Donald Rich, Mount Pleasant, Texas, was credited with two while he hung in a tree. Pvt. Carl J. Williams, Hazelton, Pa., shot two with a revolver while he was twisted in his chute.

Paratroopers were being killed too. One was shot in the doorway of his plane before he jumped, and a stick of six artillerymen were killed before they reached the ground. Patrols were still looking for disabled men on the second day, according to Sgt. Charles Pearson, *Yank* staff writer who had gone in with the assault. It took a patrol all day to bring back a man shot in the stomach.

On the second morning a patrol of paratroopers watched what appeared to be another group of paratroopers setting

up a machine gun on a slope. One of the paratroopers noticed it was a Jap machine gun and a closer look through a pair of glasses revealed they were Japanese wearing American paratrooper uniforms which they had stripped from the dead. While this is an old Jap trick, it sometimes works.

A machine gun was trained on them and they were driven into a cave. A paratrooper kept them bottled up until a 75mm gun firing point-blank sealed them to their doom.

But Topside was cleaned up on the surface. The paratroopers had gone from wrecked building to wrecked building, through the battery emplacements, into the gun wells, and magazines, step by step, creeping and crawling and killing. Gradually they worked down the slope toward north and south docks and junction with the 34th.

To those Coast Artillerymen who haven't been back to Corregidor since '42, terrain conditions as they now exist are beyond imagination, and an accurate description would seem exaggeration. Corregidor today is chaos, churned and strewn as if an earthquake had struck it. It would require a minute search to find the smallest installation intact, or usable. Even the slopes of the golf course are strewn with boulders weighing tons, and punctuated with 1,000-pound bomb craters. In this mass of destruction, the Japs dug tunnels and caves, and camouflaged their openings to perfection.

More than two months later Japs were coming out of these holes in the ravines and cliffs like animals at night, and search as our patrols did, they were unable to locate all the hiding places.

Some weeks after the assault a group of Coast Artillery officers made an inspection tour of the island. Many of these men in earlier days had commanded batteries on the Rock and had their homes there.



Many paratroops, overshooting the parade ground in the 35-mile an hour wind, landed here at Battery Wheeler. Some went over the cliff into the sea.



Top: General MacArthur views the wreckage of Malinta Tunnel. The ashes of more than 300 Japs lie here.

Middle: Hunting Japs around the barracks on the south side of Grande Island.

Bottom: Searching Battery Warwick, Fort Wint, for hidden Japs.

Among this group were Brig. Gen. LaRhett L. Stuart, now commanding the 102d AAA Brigade on Luzon; Brig. Gen. Homer Case, commanding the 32d AAA Brigade also in Luzon; Col. Frank T. Ostenberg, Sixth Army AA officer; Col. Maitland Bottoms, Sixth Army Public Relations officer; Col. J. R. Burns, Sixth Army Chemical officer; Col. Carl T. Tischbein, Chief of Staff of the 14th AA Com-

mand; Major John B. Maynard, Jr., and Major E. J. Belle, also of the 14th AA Command.

Jap snipers were still hidden on the island as these officers went through their former homes. Major Maynard, the son of the late Brig. Gen. John B. Maynard, went by what had been his home twenty-three years before when his father was Post Adjutant, and he was a small boy.

What had been homes was a mass of jagged concrete. Not a stick of furniture remained. Corregidor was more like an Aztec ruin than a spit-and-polish Regular-Army Post. The Japs had lived as beasts.

It was like cornered animals, too, that they defended it. Our intelligence prior to the operation held that there was a force of 800 Japanese on the Island. When the last organized resistance had ended, nearly 6,000 Jap bodies had been counted, and that was a conservative count according to the officer that made it. "We did not count odd arms and legs, and as we buried masses of Japanese caught in some huge explosion, we did the best we could. How many were buried deep in the sealed tunnels and caves we have no way of knowing. Many of these tunnels had been dug by the Japs, and some of them they blew in on themselves," he said.

But if our intelligence was off, the Japs missed by a mile. According to a statement of a Jap prisoner of war, the Commanding Officer of the Japanese forces on Corregidor through his sources of information, had word that the Americans were going to use two divisions in the retaking of the island. Therefore, he immediately decided on defensive tactics. If he had known the size of the opposing force he would have launched more counterattacks, and many of the Japs who ended their own lives in the harakiri way would have had more courage, in the opinion of the PW.

Be that as it may, Corregidor with its major defenses smashed was still a difficult place to take.

On the second afternoon of invasion the 1st Battalion of the 503d came in by water, and joined the paratroopers who were still mopping up on Topside.

The 3d Battalion of the 34th had made the top of 280-foot Malinta Hill—at least part of the companies got there and they dug in, and not too soon. The Japs had been knocked back on their side of the hill because of the speed of the 34th's climb but that night they had launched a banzai attack, leaving more than 100 dead sprawled out against the hillside.

The 34th did not advance far beyond Malinta Hill, but did work around the road that bends around the hill to the right from San Jose dock. Men here began to fear the landslides that subsequently cost American lives. One platoon of the 34th was stalking a Jap pillbox against this side of the hill—a destroyer had been firing on it. Suddenly there was an explosion and landslide; most of the platoon was wiped out. The slide carried away a section of the roadway and continued down into the sea.

But just because we commanded top terrain is no indication that we had secured the island. In rushing to the top the first assault waves of the 34th had made no attempts to mop up the caves, tunnels, and holes the Japs were in on the west side of Malinta. Other units were to do this job.

At the west end of the main electrical tunnels going into Malinta from the San Jose side squads of riflemen had

covered the entrance very night since D-Day; they had got results, about four Japs a night, but the night of the first big explosion they got a real haul. First a red flash of flame rolled out of the tunnel. Then the troops heard Jap jabbering.

The infantrymen thinking none could have lived through the explosion couldn't believe their ears, but the Japs' jabbering increased and then they started to pour out of the tunnel. "We poured in rifle, carbine, BAR, pistol and grenade fire from our three sides, and across the way a machine gun opened up—they never had a chance, but all night they kept coming out," an infantryman told Cpl. John McLeod, *Yank* staff writer, "then," he added, "just before dawn we heard some more jabbering in the tunnel and about fifteen or twenty shots. A bunch must have committed suicide."

This was on the night of 21 February, D plus 5; there were to be more explosions on Corregidor.

On D plus 4, the 2d Battalion, 151st Infantry, came in to relieve the pressure on the D-Day troops. By this time the 503d had worked down to north dock and had started up the road that leads past Malinta Point and continues to the eastern end of the island. It was slow work, and mop-up as they might, they had by-passed pockets of Japs who were still deep in their underground workings in the ravines, the cliff sides, and even the more level terrain on Topside.

As an illustration of this, Lt. Maurice P. Murphy, S-2 of the 2d Battalion, explained the fighting on Corregidor at this phase as "tough, but not spectacular." We just had dig them out, or seal them in. We lost some men doing it, and it was hard work; it was what the experts call a war of attrition, I suppose. There was the Jap pocket in caves between Wheeler and Searchlight Points.

"These caves were just above water's edge at high tide, and approach from the sea side was difficult. A sheer cliff protected them from above. The 503d had tried to get them out. They had lowered a man with a tommy gun

down on ropes, and when they pulled the ropes up, the soldier was dead."

Then at low tide they attempted to make a frontal attack; the Company Commander was killed, as was another officer and two enlisted men. Several others were wounded.

When the 151st took over this sector the Japs were still defiant in their caves. A destroyer was called in to fire point blank at the caves, and two alligators with 20mm cannons went in close. The Japs opened up with mortar and machine guns, and the alligators were caught in the cross fire. "We had to get out," said the officer in charge, "but we got off several rounds of WP and bazooka fire. Later Japs were seen trying to escape on rafts. They were picked off by rifle fire. We kept hacking away with patrols, cleaning up the pockets."

That is an example of the incongruous story of Corregidor; one action leads to another, then back to the first action again for some new exploit of the Japanese.

The Japs' final attempt to blow up Malinta Tunnel and the hill over them came on 24 February just before dawn. Platoons dug in on the top of the hill had been fearful of this—minor explosions had shaken the hill like an earthquake, and they were fearful of landslides burying them alive.

Very earliest reports indicated that the Japs intended to blow up the whole hill and everything in it and on it. They had waited until the American force had gained strength on the top.

If their demolition experts had been a little more expert their plan may have worked, but the Japs got fouled up too. Instead of one huge blast there was a series of six.

The beachhead was scattered with debris and rocks blown from the tunnel mouths. From the west entrance an automobile engine block was hurled 200 yards. From ventilator shafts on the top of the hill fire and smoke poured for the next twenty-four hours. Men in foxholes were blown two feet in the air by the concussion.

Just before the Japs set off their final blast on Malinta,

Armor-piercing shells from our planes penetrated the tube of this gun and came out the other side, at the muzzle end.

Japs do get taken prisoner. The lieutenant of Engineers carrying this one was killed later on Corregidor.





The pipe line passes over a forward battery on the south side of the island.

according to Cpl. McLeod, the *Yank* writer who was there, they poured out of the hospital lateral entrance and made a banzai charge. Shooting from the old American Coast Artillery position just over the road at Malinta Point, seven men accounted for twenty-three Japs in as many seconds. That dampened the enthusiasm of the others and they hid as best they could from the murderous fire.

This fits in with subsequent events. Some observers surmised that the Japs finally blew up the tunnels and virtually committed mass hara-kiri because they were out of water and thirsting to death. Canteens of a few dead Japs contained only drops of water. A water point near the hospital entrance was under our constant small-arms fire, yet dozens of Japs made the dash for the point every night. While the Japs may have been without water, and it was one of the causes for their realization that they had lost the Malinta area, they were not, according to a Jap prisoner of war, attempting a mass hara-kiri.

According to the story this PW told through an interpreter to Lt. Murphy, the Japs, once they saw they had lost the main tunnels about Malinta, drew up a daring plan.

Their demolition engineers were to set charges sufficient to blow up the whole hill, and powerful enough to kill the Americans on the top. The main force of the explosion was to be directed toward the west end; the explosion was not to interfere with the east entrance. The Japs were to gather here and as the blast went off make a dash for it in the confusion and assemble in the vicinity of Monkey Point for a new stand.

But hundreds of them were caught in the blast which roared through the famed underground defenses of Malinta. Something must have gone wrong with the plan. When a few days later General Douglas MacArthur went down into Malinta Tunnel at the west end he had to step about the ashes and charnel of these Japs to conduct his

inspection. In parts of the area the heat had been so intense that all that remained were the half melted metal parts of their accoutrements, and the fire-glazed steel of helmets strewn about in the grotesque positions in which their onetime owners had died and were consumed by flame.

We were winning the battle of Corregidor but it was not over.

As the mop-up proceeded down the tail of the pollywog toward Monkey Point the Japs repeated the tactic of blowing themselves and as many of their enemies with them as they could into the next world. In the area near where the Navy had its handball courts before the war there was a big underground powder magazine.

Many of the Americans killed on Corregidor died when the Japs blew up this area. How many Japs died no one knows. The crater cuts away part of the hillside.

Now we swing back again to Topside, where the paratroopers had floated out of the skies many days ago. Japs were still there. A PW picked up by the Navy trying to leave the inferno of Corregidor on a raft at night, and being as loquacious as most captured Japs, said there were 300 hidden in a cave in the cliffs between Morrison and Battery Points.

Both Paratroopers and Infantrymen of the 2d Battalion had been killed while patrolling in that area but as Lt. Murphy said "we could never find where they were coming from." Additional patrols were sent to scour the terrain, one man was killed and a section pinned down by machine-gun fire. Next day a larger patrol was organized, engineers were included, and a ventilating shaft was discovered. Twenty-one men were busy pouring oil down the shaft; some of them had by this time been in the Caballo operation where this device was first tried—suddenly a terrific explosion blew out the side of the hill.

Many claim it was the largest explosion on Corregidor. It blew a crater so large that a football field could be laid out in the bottom of it, and the sides used for tiers of seats.

The lieutenant of engineers in charge of the men was blown 200 feet into the air. Two days later, one half of his body was found. Others in the crew were never seen again.

"I'm sorry to say," recalled Lt. Murphy, still busy keeping the journal on Corregidor, "we didn't get many of the men back."

"We were in mess line when we heard the explosion. We knew immediately what it meant. We fell out with picks and shovels to dig the men out. We found an arm here and a leg there."

"It was the biggest explosion I ever saw or heard," added the lieutenant. "It blew so much dirt and shale into the sea the water was discolored for two hundred yards off shore. Boulders five or six feet in diameter were hurled into the sea like pebbles."

"We now believe we had stumbled onto the cave of the 300 Japs, and when they realized that they were going to be killed decided to set off the explosion themselves. We had not poured enough oil in and had not set any fuses. If there were 300 there, then 300 died."

This hunting of Japs continued on Corregidor for weeks, and about the middle of April, American patrols were occasionally seeing Japs.

The Rock was a tough place to retake; not ordinary warfare and the Japs fought to the last man. The 503d took twenty-two prisoners, the 34th none, and the 2d Battalion, 151st, a total of seven.

The key to the harbor defense of Manila Bay had fallen, but there were others, and next on the agenda came Fort Hughes on near-by Caballo, but before that, we will review the fall of Fort Wint.

* * *

Retaking Fort Wint

As Corregidor guarded Manila Harbor, Fort Wint, on Grande Island, guarded Subic Bay and Olongapo Naval base. Subic Bay, with deeper water than Manila Bay, was a favorite with the Navy, whereas the shallow waters surrounding Manila made ship maneuvering in this area sometimes difficult.

Fort Wint was thus known in the past as "Little Corregidor," because of its similarity of position and importance in the combined defense of the Naval base in Subic Bay, and its acting as a bulwark to Bataan and the famed Zig Zag pass which could afford a flanking attack on Manila proper.

Therefore, on 30th January, one day after the 38th Division's landing in Subic Bay at San Narcisco, west coast of Zambales Province, not far from the San Marcelino airport (of which readers of the Pacific War will hear more), "Little Corregidor" was assaulted, and taken.

While this was another instance of the unpredictable ways of the Japanese, for the purpose of this article, the planning, tactics and final capture of the island will be described in a step by step manner.

As early as Leyte, officers of the 2d Battalion, 151st

Infantry, had learned that they might be called upon to lead the assault. It was the first time most of them had ever heard of Grande Island.

The Battalion Commander, Lt. Col. L. Robert Mottern, of Indianapolis, Ind., now Regimental executive officer, was alerted on the subject, and intimation made that his battalion might be called upon on the first, second, or third day following D-Day in Subic Bay to make the assault.

He was given aerial photos and all the way up from Leyte to Luzon his officers spent most of their time studying them, spending an estimated sixty to seventy-five hours in the work with a pair of stereoscopic glasses. A huge drawing of the island was marked with all possible plans for the island's capture.

Before the battalion disembarked, Col. Mottern had called in all company commanders and platoon leaders and went over in detail the plan and tactics to be employed, so that every man had a complete picture of the terrain involved.

However, upon landing, the Battalion was given the mission to take a wooded area on Luzon about four miles inland from San Narcisco, which it did, and by 1500 the troops, exhausted by the excitement and strain of the beach-head, were in need of rest.

But about this time an order was received from the Regimental Commanding officer, requesting Col. Mottern to report, and to march his battalion back to Yellow Beach. Upon reporting at Corps, he was told to make ready, assault and capture Grande Island. The order stated his battalion would set sail from Yellow Beach at 1700, run down the coast some sixty miles and make the attack the following day. This was deemed a physical impossibility. Just a few minutes before the Colonel was ordered to Corps, a number of patrols had been sent out which had to be rounded up. L Company of the 3d Battalion was to be taken as reinforcement, and this Battalion was some miles farther down the beach.

It was necessary to march them back and load equipment for an amphibious operation. All in all it was impossible to get underway at 1700 but by 2100 the task force was loaded on APD's (Army Personnel Destroyers) and ready to move. The men had not eaten, they had their original canteen of water, and they were tired soldiers.

There is somewhat of a digression here to point out the wonderful cooperation between the Navy and the Army in the Pacific War. But the Battalion Commander wants it pointed out, and the Infantry wants the sailors to know how they appreciate the kindness shown them that day.

The APD's had bunks, nice, neat and clean—there was no sleeping on steel decks. The Navy had plenty of ice water, and on one ship they broke out Coca-Cola, on another cold beer, and on a third, the Captain served ice-cold tomato juice. A special meal was cooked and hot coffee served. Several destroyers, one cruiser, and several mine sweepers accompanied the force, as Subic Bay was heavily mined.

In determining a plan, Col. Mottern had picked out a sandy beach on the north side of Grande Island, adjacent to the sea wall which rises some eight to ten feet above the waterline. He had not talked to Army headquarters or

other higher echelons, nor to the Navy, and soon after he got aboard ship he was called into conference on another ship. During this conference a Commodore pointed out that the landing would be made on the sea wall.

Col. Mottern explained that his plans called for a landing on the beach, and that the sea wall afforded cross machine-gun fire, similar to the situation at Tarawa.

He explained he was in command of the assault troops and he refused to land them against the sea wall. Consequently as this impasse developed, a further conference was held with Commodore Carlson on still another ship, and then with Rear Admiral Ralph S. Riggs, about 0800. Admiral Riggs refused to interfere, but suggested a compromise. The two places lie adjacent to each other, and there would be time to make a decision once the assault waves were on the way, he explained, but meanwhile the course would be steered toward the sea wall.

Therefore, Col. Mottern stayed on Commodore Carlson's CP boat until H-Hour, set for 1100. Just previous to this hour the battalion was formed and the first of the three waves started toward land. By this time the shore of the island was close enough to be studied through glasses, and just as Col. Mottern and staff left to get into the third wave boats Commodore Carlson said the beach looked to be a suitable landing place, and the course was changed by radio message.

A dry landing was made, and the infantry dispersed rapidly on shore. Subsequently it was learned that jagged rocks lined the approach to the sea wall and that a landing would have been difficult.

This just goes to show, it was pointed out, the Army and Navy can get together and make sound decisions when the chips are down.

The reason H-Hour was so late was due to sweeping mines out of Subic Bay, necessarily a daylight operation.

Now during the approach to Grande Island through Subic Bay, the first glimpse of island is from the south, and the landing beach is on the north; this meant a horse-shoe turn of the task force, and it was necessary to pass close by. An officer, later explaining his feeling on this, the first of the assaults on the Coast Artillery positions, said:

"All the time we could see those huge Coast Artillery guns up there and they were terrifying. We suffered more mental anguish and torture than on any other operation we were subsequently to make, and that includes Corregidor.

"All vegetation had been burned off the island by bombs in the softening-up process, and those huge guns stood out in silhouette, and those concrete emplacements which we at the time thought were going to be manned by Japs which we would face in the next few minutes were enough to make any man jittery."

Just before the landing, a Naval observation plane dipping low saw a small American flag hung on a pier, and a message printed out with white sand stating: "Zamboles Guerrillas—U. S. Army."

Seeing this, the Navy learned that Grande Island was in our hands, but the doughboys making the assault did not know it. Therefore, when we landed it was a walk-through, and here is the tactical scheme employed.

F Company, supported by machine guns from H Com-



The fuel mixture ignites. The Japs attempted to drain the fuel over the

pany, was to take the west third of the island, proceeding to the crest of the long ridge running north and south along the west coast.

G Company when it hit the beach was to turn to the left and clean out the barracks area, and once this area was cleared, it was to turn south and secure the east third of the island.

L Company, borrowed from the 3d Battalion, was to fill in the gap up the middle, using what platoons were necessary. The Navy stood offshore waiting to fire at whatever targets of opportunity presented themselves. The whole thing was all timed and by 1215, Col. Mottern sent the prearranged message:



...), but the machine-gunner in the
... set the flow afire with tracers.

"I am assuming control of the Island."

About 1300 the troops had a very joyful and colorful flag-raising ceremony. The old flagstaff stood near the center of the island and a soldier shinnied up the 75-foot pole, and threaded a rope through the pulley.

There was one casualty. The prime mover of a 57mm antitank gun ran over a bomb dud. No one was injured in the prime mover, but 100 yards away a lad in L Company was hit in the neck, severing the jugular vein. He died.

The Air Corps had done a wonderful job. The island was studded with craters and one direct hit—it must have been a 1,000-pound bomb—shattered the concrete about a

gun emplacement, but the gun, had it not been destroyed by the Americans when they moved out nearly three years before, could still have been fired.

The Guerrillas told us that a small garrison of Japs had remained on the island until a few days before we made the landing; a month or so previously they had several hundred on the small 600-yard almost square piece of land.

There were no tunnels on the island. It was the only one of the coastal defense sites that the Japs had not dug in much. They seemed content to use the old American emplacements.

Why they didn't defend it may never be known, but the Americans have given up trying to determine what the Japs are going to do long before this—maybe they just didn't have the manpower.

Today Grande Island, scarred and battered, has been made into a recreation site and rest camp for the Navy.

* * *

The Fort Hughes Operation

On 27th March, the 2d Battalion, 151st Infantry, 38th Division, reinforced by B Company, 113th Engineers, made the assault on Caballo, hard by Corregidor in Manila Bay. It was a small island heavily studded in the past with Coast Artillery matériel, mortar pits, tunnels, and the whole protected by steel reinforced concrete.

A week previously a reconnaissance platoon had gone in and had its ears pinned down and had to be withdrawn. They had trouble getting off because the Japs on the heights had mortar, machine-gun, and small-arms fire trained on the beaches, directed mostly from the plateau which lies halfway up the highest hill. The reconnaissance did reveal that the enemy's main defenses were on this plateau.

Then, on the morning of the 27th, the assault struck and in one and a half days the entire top surface was in our control, but the Japs were in force in the tunneled workings which enter the base of the hill, not unlike the Malinta Tunnel on Corregidor, and the two pits, called for convenience in this article, East Pit and West Pit.

The main hill, or dominating ground on the island, rises to a height of 371 feet, from the bench mark reading in the old OP there. The original plan called for E Company to make the assault on this hill (termed Hill 2) a difficult climb as it was bare of vegetation and almost entirely raw rock by this time of the operation.

G Company was to follow E and do the mopping up, while F was held in reserve at Corregidor.

Thus with E's mission to gain the eminence so speedily that no time was to be taken to knock out Jap pillboxes but to infiltrate to gain top terrain, the infantry pushed off.

Dragging themselves upward as best they could, "E" had made only short progress when they were trapped by Jap mortar fire and pinned down. They could neither continue up nor come down because the Japs' well-aligned fire from the old mortar pits on the plateau had complete command of the terrain. The Japs had most of the fire power directed on the skyline.

E Company was finally able to withdraw under heavy

Right: At Fort Drum Jap sniper fire wounded three in the boarding boat, in spite of the preliminary softening of the concrete battleship. The holes in the turret were made by cruiser fire. Note that one of the guns is missing.

Below: The Infantry guarded every vent and opening a Jap might shoot through.



covering fire from G, and the use of smoke, and to shift their attack to the left, or southerly side of the hill. The ground was so chewed up by artillery fire and repeated bombings that this was almost a superhuman effort, but by night ten men had made the top of left knob.

The rocks dislodged by those in front caused slides on those in the rear and cover against the bare side of the slope was difficult, practically nonexistent, but our infantry accomplished its mission.

The object was to traverse the top of the hill from left to right ending on right knob. In so doing there was a gulch between the two knobs which was subjected to terrific machine-gun fire. The Japs could fire out of the pits with their guns prefixed. During the night the boys bragged that a whole platoon had crowded into and got protection in a depression not more than three feet deep and about ten feet square.

It required twenty hours to take the summit. Going was so slow and enemy fire so intense that a head raised slightly was the signal for immediate enemy fire.

One lad raised up and was hit in the head. Out of his mind, he was dragged back by his buddies, but in his struggle he broke away from a 200-pound infantryman and raised up again. He met a burst of machine-gun fire, killing him instantly.

The moonlit night added to the difficulty but finally by use of a length of rope the rest of the platoon was dragged up, and the hardest job, so the Battalion Commander (Lt.

Col. Paul R. Lemasters) thought, was over, but . . .

On the 28th, a smoke concentration was laid just under the crest of Hill 2 by artillery emplaced on Bataan, and infantrymen of G Company crawling within grenade range of the troublesome pits hurled phosphorus grenades into them.

"We knew we weren't killing the Nips but we wanted to keep their fire down, and block the targets we were offering them by our advance across the skyline, the only route over to right knob," said Lt. Maurice P. Murphy, the Battalion's S-2.

By this time E Company was getting across to right knob the highest point on the island. From here patrols were able to walk down the west side, and the whole island was or should have been, under our control.

But we fought eleven long days to clear the Japs out of the tunnels and pits, and some few were still there.

Possibly all veteran Coast Artillerymen know how these mortar pits were constructed and the general fortification plan of Caballo. Those at Fort Hughes were two in number, some forty feet square and approximately thirty feet deep, with tops open. The walls were constructed of concrete heavily reinforced with steel, and were from eight to ten feet thick.

The pits were about fifty feet apart, interconnected underground with a maze of tunnels and shafts running off each corner and sides of the pits proper. This vast underground network was well ventilated and well drained, the drainage system opening out of the side of the hill on the north.

The tunnels were so large the Japs could easily move around in the alleyways in the concrete, and were so interlaced, that an infantryman said later, "a couple of men could play tag in there and one wouldn't see the other in

two days." The Japs were sandbagged in, with slits so narrow that only machine-gun and rifle barrels could protrude. Grenades thrown against them did no damage. The Japs sat back in the darkness and as soon as an American stuck his head over the edge of the pit—"ping," and another casualty was counted.

Now came a series of plans. So many high-ranking officers had gathered from USAFFE by this time and so many suggestions made that the GI's called the CP the "Eagles Nest." So perplexed was the Battalion Commander he was willing to take a chance on almost all offers. The tactics used were so varied no effort was made to set them down in detail, but roughly this was the procedure:

1. Infantrymen crawled to grenade range and threw in grenades, both fragmentation and white phosphorus. They used the new bazooka, with both HE and WP rockets—the latter by the way, a wonderful weapon in the Pacific War. Strong boys of the battalion also were enlisted to throw 25-pound satchel charges (demolition) into the pits. Result: the Japs withdrew into the safety of the tunnels, and came back later to defend their positions.

2. It was now dark and efforts ceased to penetrate the pits until daylight. A harassing mortar barrage was laid down all night—as on subsequent nights, to keep the Japs in the tunnels. At dawn a battery of 155's on the mainland at Cabcan threw in a concentration of shells, using a special concrete-piercing shell, designed to penetrate eight feet or so before exploding. But the trajectory was so high the shells lost their effectiveness. Result: failure.

3. The idea of smoke pots was advanced. Dozens were brought to the scene, the plan being to smoke out the Japs, or failing to do this, reveal the general exits. The pots were fired and tossed in as simultaneously as possible. Some new exits were discovered, and smoke poured out of East tunnel, a huge reinforced tube similar to Malinta Tunnel on Corregidor. As to driving the Japs out into the open—result, failure.

4. During the use of the smoke, it was noticed that the Japs got very excited when anything happened about the entrance to East tunnel. The Japs had a machine gun in there and defended it with feverish intensity. A destroyer was called upon to fire point blank at the opening of the tunnel. After several hours of firing the opening was closed

except for two or three feet at the top. Engineers and infantrymen with pick and shovel mounted the hill above the opening and finished the job. This was merely an interval, and no hope was held that this would drive the Japs out.

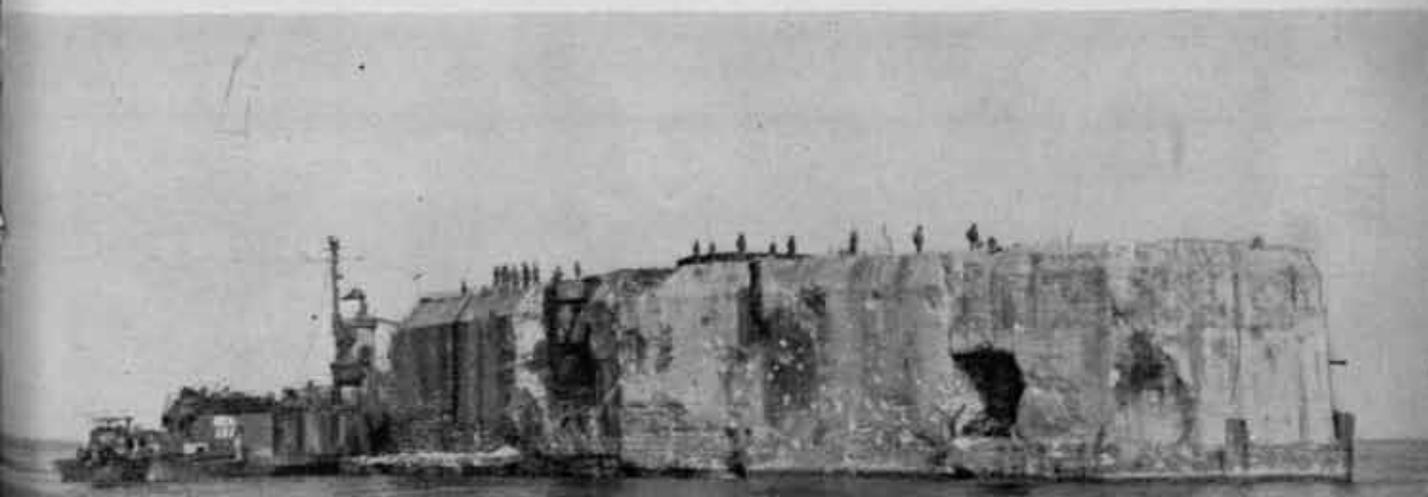
5. There were any number of dud bombs on Corregidor and a squad was over there blowing them up. Two 500-pound and two 250-pound bombs were deactivated, brought to Caballo, winched up to the ventilating shaft and lowered into the subterranean maze, where they were set off with a time fuse. The resultant explosion rocked the hill but it did not dispel the Japs.

6. Both rank and file were now groping for ideas, "crazy or not," and Psychological Warfare was called in. A 30-minute truce was fixed and the psychological boys set up loud speakers and broadcast a message in Japanese, outlining terms of surrender. Pamphlets were tossed about the pit. One Jap was seen to rush out, grab a pamphlet and dash back. This gave hope there might be a surrender. Another fifteen minutes was added to the truce. Result, failure.

Now, while it was later learned the Japs had the following plan in mind ever since the Americans landed, this action came without warning, and only alertness prevented it being more successful. The Japs pulled a banzai attack in commemoration of 4th April, their Army Day, or Heroes Day, and it was not merely a fanatical crazy thing, but well planned and executed. The Americans as they went to bed at dark had thought they could see twos and threes of Japs against the skyline and a little later heard digging. These strange doings led to suspicion but it was not realized that an attack was coming. All that night the Japs infiltrated out of the tunnels between mortar bursts, and gathered at a prearranged spot. The attack was launched at 0505—it had taken them all night to gather, and officers of the Battalion later admitted, "they damn near wiped out our CP."

E Company had been taken over to Corregidor for a rest and hot food, and an urgent radio message called them back. They arrived at 0730 and with their help the Japs outside the tunnel were killed. A total of eighty bodies was counted. A captured PW later told the S-2 that the force able to slip out and go to "glorious death" was 120 and that

What is left of Fort Drum.



thirty had survived the banzai, many of them wounded.

7. During the operation someone mentioned the use of oil, and other plans having failed, it was decided to try it. An LCM was engaged to pick up several drums of oil and gasoline on Corregidor and haul it to Caballo. With the use of a 6 by 6 truck and extra cable on the winch threaded to the ventilating shaft on the plateau, some 15 drums were winched up. The engineers had succeeded in pouring about three drums down the shaft—this shaft protruded some feet above the ground, and the drums had to be hoisted one at a time, a slow process. The Japs opened with mortar fire and tracers. They had to abandon the idea—it was too slow, and the men about the ventilating shaft could have been set afire. So, another failure.

8. Someone suggested the use of tanks. Three were brought from the mainland, and after difficulty were unloaded from the LCM's and attempts made to get them up the hill. One started out on a circuitous route upward. It toppled into a 1,000-pound bomb crater and is there yet. The second was almost in a position to fire into the pit when its commander attempted to change its position and ripped a track off. The engineers put it back on, and the

third decided there was no use trying to get up the hill.

Now about this time the pipeline was started. Four-inch pipe was procured and laid from the LCM's anchored on the south side of the island to the very edge of east pit, a distance of some hundred yards, and oil mixed with gasoline was pumped nearly all day. Thousands of gallons were spilled into the pit, and then set afire by mortar shells. There was a large fire, some minor explosions, but the Japs were still there.

The next day, after patrols went up to investigate, they were met with a hail of lead, but to less extent than formerly. Moreover, they discovered a Jap sniper had almost shot the line in two with continual rifle fire at one spot. Also, Japs during the night had planted land mines about the top of the pit, hoping no doubt, that they would be stepped on when work started again on the pipe. They had made no effort to destroy the pipe or throw it over the hill—just another problem for the psychology boys to figure out. The mines were removed and the pipe nozzle shifted over to the right pit and another 3,000 gallons of the gas-oil mixture pumped in. This fire really burned, and explosions were heard deep down in the earth for hours after the oil ignited.

As further example of the Japanese will to fight, despite the flood of oil and previous poundings they had taken, they made a futile attempt to drain the oil out the side of the hill. An alert machine gunner saw the oil spurting out the drainage system and set it afire with tracers.

The next day a patrol was sent into the workings to look for stragglers, or any Japs who still might be alive. One was found and killed.

Between fifty and sixty dead Japs were found in the tunnels. Where mortars had roared and rifles cracked for eleven days there was silence.

Corps headquarters gave permission for the Battalion to withdraw provided a patrol was sent over each day to reconnoiter the area. The very first day of such patrols, an American was killed by a sniper, and on the second day, two were killed and three wounded.

Search as they might the patrols could find no additional snipers. "We couldn't figure it out unless the Japs swam over from other islands," one officer said.

Then more than two weeks after Caballo fell and the 1st Battalion of the 151st Infantry was sent over, the Com-



↑ Taking no chances that the Japs would repeat the tactics used on Caballo, the Infantry and Engineers blast the causeway which connects the tunnels on Carabao.

→ The assault waves head for Carabao.



manding Officer was killed the first day as he peered into a tunnel.

Yet despite all this terrific effort and tough fighting, a total of only 280 dead Japs was counted. Three were taken prisoner. Truly a compliment to original planning of the coastal defenses of Fort Hughes.

• • •

The Assault on Fort Drum

It was like a midocean piratical raid on a rich and helpless merchant vessel; or maybe it was like a medieval battle with knights-in-armor thundering across the drawbridge into the castle grounds—it was like anything except what it actually was—an unusual instance of a highly developed phase of modern warfare—the commando raid on Fort Drum, "concrete battleship" in Manila Bay.

It was thus that Staff Sgt. Thomas J. Hooper, of the 38th "Cyclone" Division described the retaking of Fort Drum, on El Fraile Island. He was one of the troops who made the assault.

The operation which neutralized Fort Drum as a Jap listening post did not rate more than a few casual words in a passing communiqué. Behind the official phraseology, however, there is a story of one of the most unusual operations on record and one of the shortest.

It required only a few minutes to finally reduce the Manila Bay outpost—and here again it must be pointed out, the big-14-inch rifles which stood on the deck had been destroyed before the Americans pulled out in 1942. The Japs could not replace them. It was standing, more or less as a helpless hulk.

Yet, here is another example of the work of our Engineers. Heavy caliber bombs bounced off Drum's heavy concrete decks with little damage. The heavy rifles of cruisers fired point blank, pierced the heavy armor-plate of the portal guns, but Japs huddled in safety behind them, and came out to shoot when the infantry boarded the "ship."

What kind of a battle would have ensued if Old Drum had her original weapons is, of course, a matter of conjecture, but it certainly would have been a different story.

When Fort Drum was completed, it was 350 feet long and 135 feet wide—and something to be proud of. The concrete walls were 36 feet in width and the top deck 40 feet—strong enough to withstand land, naval, or air bombardment.

It mounted two twin 14-inch gun turrets on the top deck and two six-inch rifles built into the north (starboard) and south (port) sides of the island. There were four levels inside. At the east end or "stern" there were two sally ports on both port and starboard. It was here that boats carrying men, mail, and provisions to the Fort tied up. The ports opened onto an axial tunnel running through the island and connecting with all four levels.

Assigned to the task of cleaning out Fort Drum, the 2d Battalion, 151st Infantry, of the 38th Division, had already paved the way by mopping up on Corregidor, and invading and securing near-by Caballo.

Caballo was the inspiration for the plan by which Fort Drum was reduced. On this horse-shaped rock the entire

Jap garrison had been killed within a few days, except a band of sixty or so who had holed up in two huge mortar pits, which resisted all efforts of infantry engineers, and artillery to reduce them. Of reinforced concrete, eight to ten feet thick, the walls at Caballo had originally been built by the Americans and later improved by the Japs.

Various plans were offered and rejected.

A plan formulated by Lt. Col. Fred C. Dyer, G-4 of the 38th which had worked so well on Caballo, was finally accepted.

An LCM was fitted with a centrifugal pump and two tanks capable of holding more than 5,000 gallons. A special mixture of two parts diesel oil and one part gasoline was prepared and pumped into the tanks.

Brigadier General (then Colonel) Robert H. Soule, assistant division commander, selected this plan as the one most likely to reduce Drum.

Training and preparations for the landing were begun a week before D-Day. On Corregidor a reinforced platoon of riflemen from Company "F," 151st Infantry and a platoon of demolition men from Company "B," 113th Engineers, made repeated dry runs so that each man should know what he must do when he stepped atop Fort Drum.

On the parade ground at Corregidor the surface of the island was simulated. Dummy gun turrets and air vents were built. Each rifleman was assigned a specific opening in the surface of the fort to cover. Every gun turret, every air vent, every crack in the surface was to be covered with an M-1 or a BAR, so that no enemy would be able to come topside. The infantrymen practiced repeatedly so that each one was able to carry out his appointed task without a hitch.

The engineers were trained in planting explosives at strategic intervals on the rock, while others went through the motions of dragging a fire hose topside from the LCM which was scheduled to pull up alongside in the manner of the Caballo operation.

Under the direction of Major Robert E. Hisle, S-3 of the 113th Engineers, an especially designed wooden ramp was built from the conning tower of the LSM, much like a drawbridge. It was located on the starboard side and let down at right angles to the length of the ship. The ramp was necessary since the height of the island—40 feet—prevented the troops from landing in the usual manner.

Plans for effecting an entry through the sally ports were rejected because a Naval reconnaissance force landing from a PT boat at these points had received machine-gun fire from the tunnel.

April 13—a Friday—was selected by an unsuperstitious staff as D-Day; H-Hour was set at 1000. At 0830 the troops loaded from Corregidor's south dock walking over the narrow plank from the pier to the landing boat.

The engineers were burdened with 600 pounds of explosives, while the infantry carried rifles and bandoleers of ammunition. In the crow's nest towering above the landing ramp a BAR man was stationed, while below him on a precarious platform a light machine gun was set up, thus providing adequate protection for the troops who were to land.

Precisely at 1000 the LSM pulled up at Fort Drum. It was a ticklish operation to maneuver the squat bulky craft

so that it snuggled tightly against the island and held there steadily.

As the LSM moved up on the port side, three LCVP's manned by naval personnel came up alongside the larger ship, bows first, and with motors racing pushed against the LSM, shoving it against the rock.

As soon as the LSM was close enough, sailors standing in the well-deck let down the ramp by means of a block and fall. Immediately, other sailors rushed ashore across the ramp carrying lines which were fastened to the gun turrets or any other available projection to make the LSM more secure.

The infantrymen in single file moved up the circular ladder to the conning tower. Sailors helped them climb to the ramp and onto the rock, like so many charging knights.

Despite the strong lines and the LCVP's, the LSM pitched and rolled and the ramp scraped dangerously back and forth over the concrete top deck.

The LCM used in the Caballo invasion was brought in behind the larger vessel and a fire hose was passed up to the engineers on the LSM by means of a line. The line was thrown up to the deck of Fort Drum where other engineers grabbed it and brought up the hose.

The Infantry did its job well. Every vent was covered by a rifleman. A Jap could never have gotten his head above the surface without having it blown off. The engineers set about their task of planting the explosives with sureness and dexterity. Particular attention was given the powder magazine which was below the surface on the first level, and protected by an armor plate six inches thick under the layer of reinforced concrete.

In ten minutes the job was finished; thirty-minute fuses were lighted; and the men began to file back onto the ship.

Once at one point, the hose broke and while the break was being repaired, the first opposition developed. A Jap sniper hidden in one of the six-inch gun turrets on the port side opened up. His aim was bad on the first couple of shots. Although the sniper couldn't be seen, sailors manning the LSM's 20mm guns were anxious to spray the turret, but a redheaded ensign yelled from the bridge that oil was leaking through an aperture in the turret and that shells would undoubtedly ignite it, jeopardizing the success of the whole operation. Fuming, the sailors held their fire but remained at their positions exposed to the enemy rifleman.

The sniper opened up again with another volley and a bullet passed through the fatigue jacket of Sgt. Mack Thomson, the colonel's driver and radio operator. Thomson, unaware that the sniper had been firing, was standing some distance away toward amidship. The bullet made seven holes passing through the jacket, baggy pocket, and sleeve. Thomson was not even scratched.

Another bullet grazed Cpl. Vincent Glennon's left hand. At the first shot this aid man dropped behind a ventilator for protection. But a bullet passed through the light, thin metal of the ventilator, creasing his hand and drawing no more blood than a pin scratch.

A sailor was less fortunate. One shot split the fittings that connected the three air hoses to the gyroscopic sight

of a 20mm gun and several of the pieces embedded themselves in his throat. He had been manning the gun at the time. Army and Navy medical corpsmen teamed up to give him an immediate blood transfusion and dress his wounds. Those were the only casualties—a cheap price for Fort Drum.

After Colonel Lobit and his men returned safely, the lines were cut, the LCVP's backed off and the LSM pulled away, stopping about a thousand yards off to watch the show.

In thirty minutes there was a slight explosion. Nothing else happened. Disappointment was written in the faces of the men. They'd have to do it all over again now. But no.

Suddenly it seemed as though the whole island were blown out of the sea. First there was a huge cloud of smoke rising from the island, then seconds later, the GI's on the LSM heard the thunderous explosion. Blast after blast ripped the concrete battleship; debris was showered into the water, creating hundreds of small geysers; a huge flat object, later identified as the six-inch, 12 foot square slab of armorplate protecting the powder magazine, was blown hundreds of feet into the air to fall back into the sea with a large splash.

A satisfied cheer went up as the explosions rocked the air and there were the usual salty comments in unvarnished language.

As the LSM moved toward Corregidor more explosions were heard and dense black smoke continued to rise from the "impregnable" battleship.

Two days later—on a Sunday—the drama was partially reenacted. This time the object was to gain admittance to the lower levels. But wisps of smoke that curled up from the ventilators indicated the oil was still burning. Major Paul R. LeMasters, commander of the 2d Battalion, called the descent off and the disappointed troops returned to Corregidor.

The following day the troops again returned. Now they were able to make their way as far down as the second level but again smoke forced them to withdraw. Eight Japs—dead of suffocation—were found on the first two levels. Two days later another landing party returned and this time was able to explore the whole island. The bodies of sixty Japs—burned beyond recognition—were found on the third level in the boiler room.

The inside, of course, was a shambles. The walls were blackened with smoke and what installations there were had been blown to pieces or burned.

Someone had suggested that possibly Fort Drum was being used or had been used to detain American prisoners of war. No evidence was found to support this theory.

The souvenir hunting wasn't very good.

* * *

The Fall of Fort Frank

The Americans had systematically retaken first Fort Wint in Subic Bay, then Corregidor, that famed bastion of Manila, its near-by companion Caballo, then Drum. In off Cavite Province stood the last of the coastal defenses yet in the hands of the Japanese.

Like the other islands in the Manila Bay defenses, it was largely rock, but afforded only one landing place, a concreted ledge which long before the assault had been pounded to dust. For several days before the date decided for the assault the island had gone through the usual softening-up process by air and naval bombardment.

On 16th April, came the invasion of Carabao Island (Fort Frank), where the network of tunnels rivaled those at Fort Mills on Corregidor and Fort Hughes on Caballo.

On D-Day the preparation for the landing increased in intensity for one and a half hours, when a cruiser on the north, a destroyer on the west and another on the east trained their guns on the fortress. On the mainland 155's and 105's howitzers, a cannon company with its sawed-off 105's, plus 87mm, and a battery of 4.2-inch mortars boomed out their destruction.

Beside this barrage from the shore, .50-cal. machine guns kept drumming fire on the island, a unique note in the cacophony of sound, their stuttering voices continuing during the lulls in the bedlam. These guns were firing tracers into the tunnels and caves with visible accuracy.

During the preparation so many incendiary bombs and phosphorus had been used that no vegetation remained.

H-Hour was at 0930, the naval bombardment commencing at 0800, and LCM's used as assault boats. The assault boats had left Corregidor before dawn, about 0630, and had bounced about the bay with the assault troops nervously sweating it out during the bombardment. In view of what had occurred at Corregidor and Caballo, everyone thought this operation was going to be as one soldier put it, "a massacre for us," as there was no place except the landing platform to make the assault, and when the Americans set up the defenses of the island, one could be assured that they had designed them well to take care of this vulnerable spot.

Jap guns trained here could have held up the invasion for days as had occurred at Caballo.

As the assault waves made for the jutting rock—two LCM's to each of three assault waves—the island was almost a mass of white phosphorus, a beautiful pyrotechnical example of modern warfare.

The waves were to land at three minute intervals, followed by headquarters and reserve troops. In all, seven waves were to land on Carabao.

Troops ashore scrambled over a mass of wreckage—some of which had been tractors, trucks, field pieces—as they began their ascent over the broken and shattered rock.

Coast Artillerymen who at some time past in their careers had a stint of duty on this rock will remember the landing platform, which is on the side toward Manila, and the steep ledge-like pathway that leads to the top.

Previous to the assault, troops to be engaged in the operation had been thoroughly briefed. The island had been assaulted in exacting miniature scale by Master Sergeant Erwin Lederer and Technician Fourth Grade Peter R. Metz, of the 38th Division's G-3 Section.

The job was to be done by the 1st Battalion, 151st Infantry, by now veterans in this type of warfare. Brigadier General Robert H. Soule, a native of Wyoming, was in

command, with Major Morton K. Sitton, Battalion Commander, leading the assault. Major Sitton was later killed by a Jap sniper on Caballo, some weeks after its capture.

Immediately after the landing under a continuous rolling barrage of shell fire, one platoon of A Company rushed up the rock pathway bearing to the right. After reaching the top, they continued right, or eastwardly, holding the flank, and breaking out into a skirmish line.

When B Company came up, this platoon was relieved and the advance was continued, securing that end of the island. A Company's other three platoons made a turn at the top of the hill, advancing left just under the crest, and continuing this advance to the top of the second hill, maneuvering around the draw where the tunnels are connected with a causeway near the west end of the Island. Here one platoon detached itself, crossed the causeway and went to the top of the hill on the other side.

C Company landing as the third wave, repeated what A had done, advancing across the causeway, relieving the platoon there, and securing the rest of the island.

All during the operation the troops had kept up a stream of machine-gun, BAR and rifle fire into the tunnels and caves, while two out of three of the infantrymen carried 25-pound satchel charges which were tossed into every opening found. If a Jap had raised his head it would have been his finish.

Engineers, A Company of the 113th Battalion, following the infantry, closed the holes with more systematic demolition. The operation lasted between two and three hours after the landings.

Our intelligence reports held that the island was occupied by between 300 and 500 Japs. If they had elected to defend the rock with the determination they had displayed on Corregidor and Caballo it would have been a bloody operation.

However, Carabao was just another example of the unpredictable of the Japanese. There was no way of knowing beforehand whether the Japs were there or not. The operation had to be carried out just as if the Japs were in the tunnels.

It was believed they had decided to pull out three or four days before the landing, swimming ashore to the mainland in the night—a distance of only a few hundred yards. They could also from their CP's atop the island have viewed the earlier cremation ceremonies at Drum, and obtained radio communication of what had happened on Corregidor, even if they had not watched it through their glasses.

As it was we lost five men killed, and eighteen wounded. This occurred in an unusual explosion about one and a half hours after the initial landing, and its cause was never determined.

Some thought that an artillery shell fell short, others believed a demolition charge carried by the engineers had exploded prematurely, or that a land mine had been stepped on. Probably among those killed one might know the answer.

Two Japs were found dead. The only living thing found on the island after the bombardment and assault was a pig.

Drop on Corregidor^{*}

By Major Thomas C. Hardman

The lead bombardier spotted his target through a break in the clouds that hung over Manila Bay. Seconds later, a B-24 load of 500-pound bombs whistled down on "The Rock." The air blitz of Corregidor had begun.

One by one, Liberators of the 13th Air Force's 307th Bomb Group passed over cloud-obscured Cavite, made 180-degree turns over Manila's docks and came in for their bomb runs on the tiny island bastion that stands like a sentry at the entrance of the harbor.

The Libs dropped their 500-pounders from 17,000 feet, and 85 percent of them blanketed the target. Tremendous blasts tossed smoke and debris more than 3,000 feet into the air. One string of bombs found an underground dump, and the resulting explosions appeared to race along an L pattern as the earth erupted.

This strike was made shortly after noon on January 23. By the 17th of February, Corregidor was to become the most heavily bombed island per square foot of any invaded area in the Southwest Pacific.

The green light for the air blitz on "The Rock" had been flashed several days earlier in the form of an unqualified

compliment to airpower. General of the Army Douglas MacArthur, commander in chief of Allied Forces in the Southwest Pacific Area, and General George C. Kenney, commanding general of the Far East Air Forces, were discussing ways and means of capturing Corregidor, held as a blood symbol since its day of surrender back in May of 1942.

"General," remarked the FEAF commander, "Let me take Corregidor from the air."

General MacArthur hesitated but a moment and replied, "All right, George, go to it." And the discussion ended.

The 13th's Liberators, which had gashed the jugular vein of Jap supply arteries to the south with strikes on such "out-of-reach" targets as Truk, Yap and Balikpapan, were the first of the big parade of heavies, medium and fighters to be thrown against the three and three-quarter mile long island.

Next came three veteran groups of the 5th Air Force—the 90th's Jolly Rogers, the Ken's Men of the 43rd and the 22nd's Red Raiders. These were the boys who had pestered the Japs almost daily since the 1942 days at Port Moresby.

B-24s of the 7th Air Force joined in from their bases in the Central Pacific.

For two weeks, the heavies poured it on in rotation. Enemy antiaircraft batteries, feeble from the start, were knocked out in short order, and by the first week in February, B-24 photo-recons could circle unmolested 3,000 feet over the island.

The Japs had dug in. This called for the A-20s of the 3rd Attack Group. The Grim Reapers they are called. These low-level bombers and strafers rounded out General Kenney's team for the first half. 7th Air Libs in the morning, 13th Air Force B-24s at noon, 5th Air Force A-20s in the afternoon, and 5th Air Force Libs just before evening chow.

Ton by ton, the bombs rocked "The Rock." The heavies with their 500 and 1,000-pounders blew up gasoline dumps, neutralized artillery positions and dug deep into the underground labyrinth, while the A-20s skimmed in low with bombs and .50 caliber bullets to pound away at the cliffs and ridges where Jap troops were burrowing in for a stand against inevitable invasion.

Then came the fighters . . . P-38s, P-47s and the newly arrived P-51s . . . with 1,000-pound bombs shackled under each wing. Buzzing the island from every conceivable angle they made 134 sorties and dropped 133 tons of bombs. They dropped them into cave mouths, barracks building doorways, gun pits, and, just to make sure, they fired 3,000 rounds of .50 caliber ammunition into the targets.

In 25 days, Corregidor had been shaken by 3,128 tons of bombs in target areas totaling little more than one square mile . . . a record unmatched in the Southwest Pacific. In contrast, Lae, in the two months prior to its invasion, had



Signal Corps Photo

The Signal Station, Topside.

*Reprinted from *Air Force*, by permission.



Ruins of San Jose Barrio, looking from Malinta Hill toward Topside.

Signal Corps Photo

taken less than 1,000 tons. During the weeks preceding the Finschafen landing, Allied bombers had expended 134 tons over that target. Cape Gloucester had taken 5,000 tons of bombs, but they had fallen on an area of over nine square miles. Nearly 2,000 tons had blasted Hollandia, but here again the area covered at least ten square miles. Wakde Island, with its two square miles, probably had been Corregidor's closest statistical competitor, absorbing almost 2,000 tons of bombs during a relatively brief bombardment period.

Now, with Corregidor's surface defenses and much of its underground installations battered to a pulp, the time had come for one of the most difficult operations in airborne military history.

At 0830 on the morning of February 16, a C-47 appeared over the hazy horizon, flying at 1,000 feet. Lt. Col. John Lackey, CO of the 317th Troop Carrier Group, was at the controls and behind him sat 24 hardened veterans of the 503rd Parachute Infantry Regiment. The smoke of the final combined naval and air bombardments still billowed over Corregidor as the C-47 neared "Topside"—a rocky plateau with its two tiny "jump" areas, the largest of which was 700 by 700 feet and surrounded by 500-foot

cliffs. Eight paratroops tumbled from the big transport.

Other C-47s followed close behind, flying in two strung-out trains. They came in nosed slightly downward on a gentle glide at about 110 miles an hour, a thousand feet above sea level but less than 600 feet above the bomb-shattered terrain. Jumpmasters counted four seconds at the "go-points" before losing their eight-man "sticks." The areas were so small that to drop nine men at a time would have the last man falling into the bay.

The wind velocity increased and the jumpmasters' counts went up to 10 seconds as the two sky trains passed the dropping area and diverged north and south, swinging in two great counter-rotating circles for their second and third eight-man runs.

For one hour and 20 minutes, 50 C-47s sowed their human cargo on the plateau until the ground was literally blanketed with white parachutes.

All during the paratroop operation, A-20s had made strafing runs over the neck of the chop-shaped island, erecting an effective wall between the main portion of "The Rock," where our men had landed, and the tail of the chop



Signal Corps Photo

Post Hospital, Fort Mills.

Paratroops of the 503rd Regiment alone held Corregidor for 40 minutes, and at 1030 the first waves of landing craft hit the island's only beach. The men walked ashore with their rifles on their backs.

It took some hard, hand-to-hand fighting to dig the Japs out of the holes they had burrowed into, but on March 1,

General MacArthur announced that the destruction of the enemy garrison on Corregidor had been completed for all practical purposes. Four thousand, two hundred and fifteen enemy bodies already had been counted while hundreds of others had been sealed in the tunnels and caves of "The Rock." Our losses: 136 killed, 531 wounded, 8 missing.



Signal Corps Photo

Colonel George M. Jones, CO of the 503d Parachute Infantry Regiment, stands beside the original Fort Mills Plaque.

The Genesis of Fort Drum*

By Brigadier General John J. Kingman, United States Army

Recent newspaper accounts of our operations for recapture of the Philippines have included photographs of and brief references to the "concrete battleship" Fort Drum, which is located on the rock called El Fraile in the wide channel south of Corregidor. As Fort Drum is the only harbor or coast defense fortification in which we have made use of steel turrets, it is of special interest to learn how they performed while the Japs were attacking Corregidor and the other fortified islands (Forts Hughes, Drum, and Frank) at the entrance to Manila Bay.

During our defense of Bataan and Corregidor in 1942, the enemy concentrated fire on Fort Drum and Fort Frank, starting about February 15 with 105 and 150mm shells and in April with 240mm shells. It has been reported that in one day Fort Drum received over 1,000 direct hits on its deck; that its cage mast was hit several times rendering useless the depression position finder on top; that all anti-aircraft guns were destroyed; and that over 15 feet of the reinforced concrete deck was whittled away. Despite this terrific pounding Fort Drum suffered few casualties and the four 14-inch turret guns were never out of action and were still firing effectively 5 minutes before the surrender of Corregidor, although all other guns on the fortified islands, at one time or another, were rendered inoperative.

It may be interesting to note that the inception of Fort Drum was contained in a letter dated Corregidor Island, July 18, 1908, which I sent to Major G. P. Howell, District Engineer in Manila. The text of the letter follows:

"In connection with Mr. E. B. Thomson's report relative to the construction of an artificial island just south of El Fraile, I beg to submit the following plan as an alternative, which I believe would prove vastly cheaper and no less effective."

PROPOSED FORTIFICATIONS

El Fraile, Manila Bay

"From a glance at the print entitled 'Entrance to Manila Bay, approximate distances from El Fraile' the following facts are apparent:

"1st. That the channel north of Corregidor Island can be so well defended by open batteries on Corregidor as to force any attempt at entrance by a hostile fleet to be made through the wide channel to the south.

"2d. That a battleship passing between Corregidor and Carabao Islands will of necessity come within effective range of one or the other, but no ship would attempt to make the entrance by daylight.

"3d. That the distance between Corregidor and Carabao is too great for batteries on these islands to prevent the entrance of hostile ships at night.

"We may therefore conclude that it is necessary to mount heavy guns at some intermediate point. The problem is thus

reduced to one of two alternatives: to build an artificial island, or place guns upon El Fraile.

"I strongly recommend the latter course and submit here with three copies of a print entitled 'Proposed Fortifications, El Fraile Island, Manila Bay, P. I.'

"The plans and sections are drawn to a very small scale and no attempt is made to show details. It is merely desired to set forth something in tangible form, subject to such modifications as further study and investigation may indicate desirable.

"The features contemplated are briefly as follows:

"Armament:

"Four 12-inch guns on Navy carriages in two two-gun mushroom turrets of cast nickel-steel from 21 to 24 inches thick on the sides and tapering to a thickness of 8 to 10 inches on top; these two turrets to be mounted on a concrete structure containing rooms for personnel, ammunition power, etc.

"Protection of ammunition, etc.

"Horizontal, 30 feet of concrete.

"Vertical, 10 feet of concrete.

"Ammunition storage: 200 rounds per gun.

"Power:

"The power to be supplied by gasoline driven generators of total capacity about 350 K.W., sufficient for lighting, including searchlights and for driving the motors for traversing the turrets, elevating the guns, running ammunition hoists (Navy type), operating the telescopic rammers, air compressors, ventilating fans, pumps, and cooking stoves.

"Interior Economy:

"The structure is divided into two stories and each story



Signal Corps Photo

Fort Drum before the war.

*Reprinted from the *Military Engineer*, by permission.

quarters, mess room, and kitchen for a complement of 120 enlisted men. There is access to the turrets and to the lower floor by means of ladders and to the top of the fort by two stairways.

"During the times of peace the garrison would live on Corregidor and go to El Fraile only for drills, a guard being maintained at all times and living in a shack on top of the Fort. During war the island should be regularly garrisoned, the troops living in tents on top of the fort except during action or storm, when they should be quartered below.

"Water Supply:

"The main water storage is on the lower floor and from here water is pumped as needed into a small tank on top. It is probable that an artesian well could be drilled giving an ample supply for all needs. A small distilling plant should be provided.

"Ammunition Service:

"Projectiles are carried to the handling room beneath the turret by overhead trolley. The cartridges are shoved in through a small trap door to prevent any explosion in the turret or handling room from entering the cartridge rooms. From the handling room the charge is raised to the breech of the gun by means of the standard type of Navy ammunition hoists, and is rammed by the Navy telescopic rammer.

"Range Finding and Fire Control:

"An observing station of cast nickel steel is placed between the turrets with the observing slot at sufficient elevation to see over both turrets. The top or roof of the station is supported by steel plates radial to the axis of the observing instrument. This station should be made as small as possible so as to minimize the effect of the blast. This station might be made oblong in plan so as to accommodate two depression instruments and cover both channels at once.

"To prevent the gun captains from losing their targets it would be advisable to furnish them with both range and azimuth from the B. C. Station.

"Note: The present plan for torpedo defense may be carried out by placing observing stations on top between



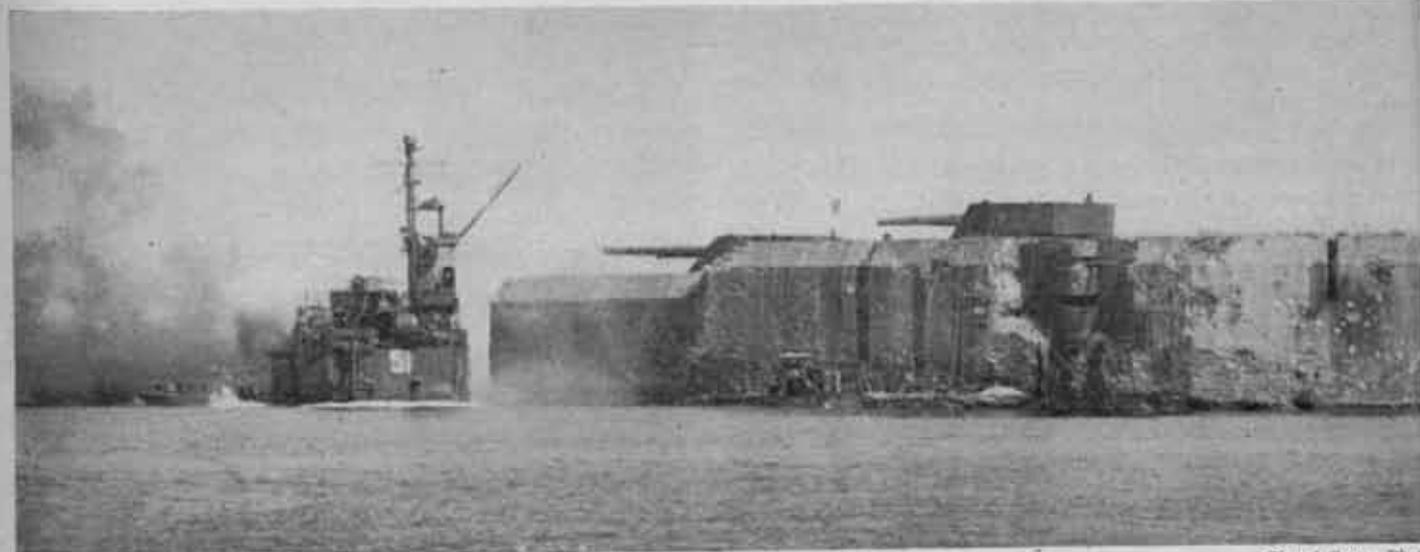
Signal Corps Photo

American Engineers, covered by Infantry riflemen, board the "battleship."

into several rooms and passages by reinforced concrete floors and partitions.

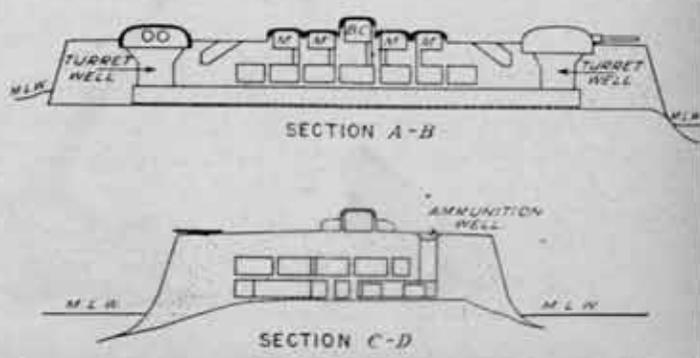
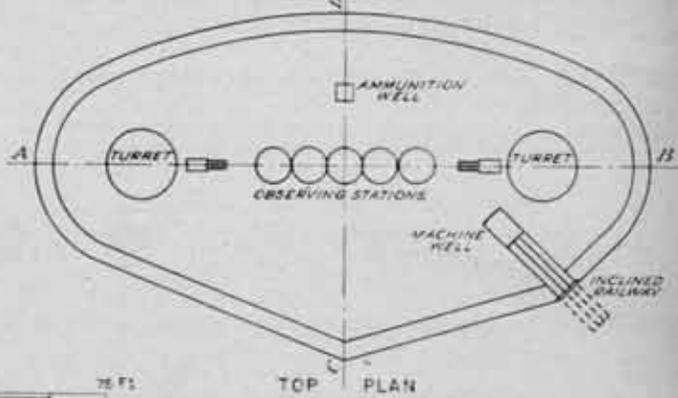
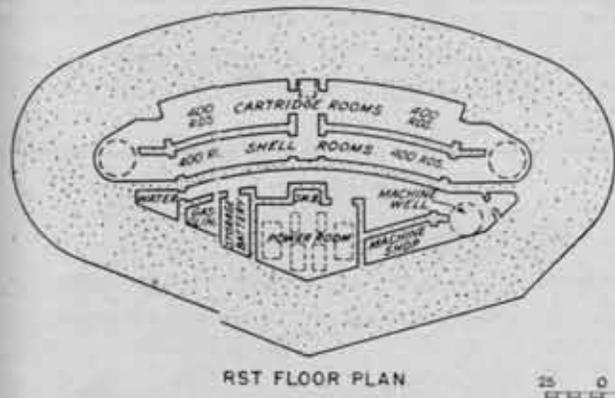
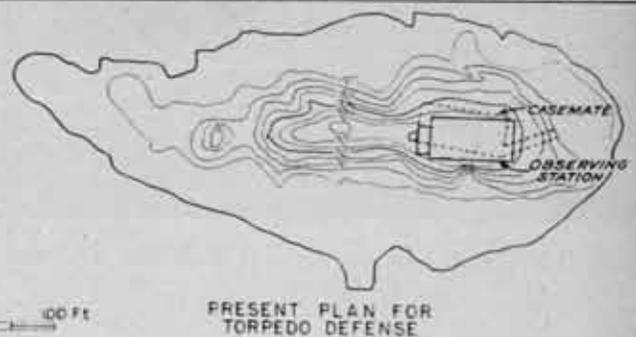
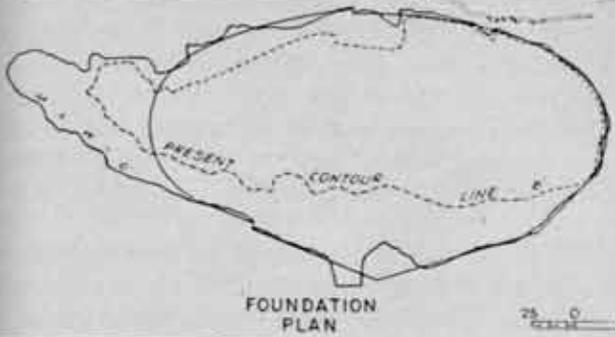
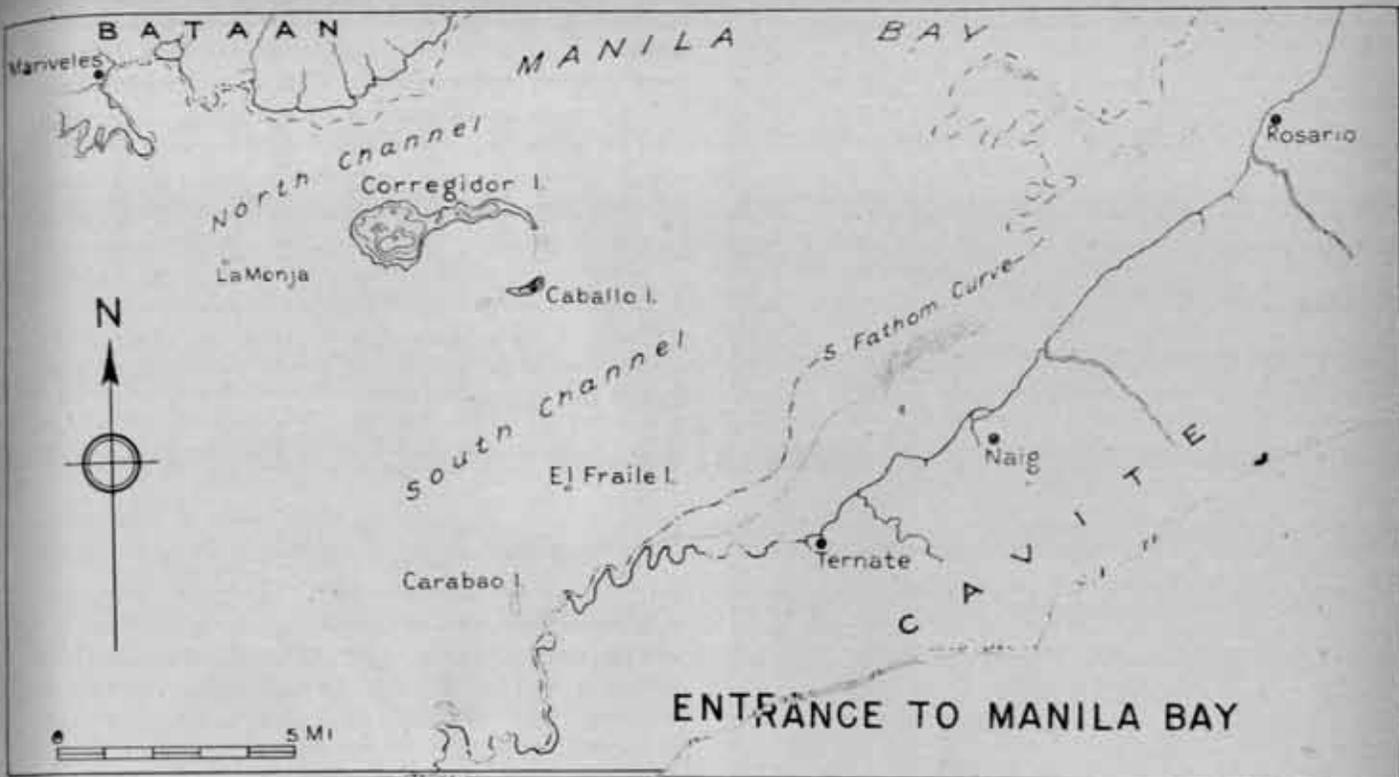
"The first floor contains the magazines, power rooms, machine shop, storage battery, and storage rooms for water and gasoline. To protect against accidents from gasoline fumes the magazines are completely cut off from the power rooms by a concrete wall. The magazines are accessible by ladder through the turret wells, the other rooms through the machinery well; ammunition is brought into the magazines by means of a chain hoist in the ammunition well.

"The second floor contains the plotting rooms, office, guard room, storerooms, lavatories, officers' quarters, and



Signal Corps Photo

The "boarding party" leaves the fort after pumping 3,600 gallons of oil and gasoline into it, and planting 600 pounds of TNT.



Map and Plans for Proposed Fortifications, El Fraile, Manila Bay.



Signal Corps Photo

Gasoline, TNT, and Japs go skyward after the Americans pull away.

the B. C. Station and the turrets and the casemate apparatus located on the 1st and 2d floors. This is in part shown.

"Cost:

"It is not possible without further data to make even an

approximate estimate of the total cost. The concrete would amount to about 1,000 cu. yds. more per gun than in our open batteries or in all about 26,000 cu. yds. which at cost of \$12 per yard would amount to \$312,000.

"The armor being cast nickel steel because economy of weight is not necessary would be much less expensive than the same protection on shipboard when steel forgings must be used.

"Roughly we might estimate the total cost at \$1,000,000 or \$250,000 per gun in all respects complete.

"Note: I deem it not only desirable but imperative that whatever plan be adopted it should contemplate both all around fire and protection.

"Very respectfully,

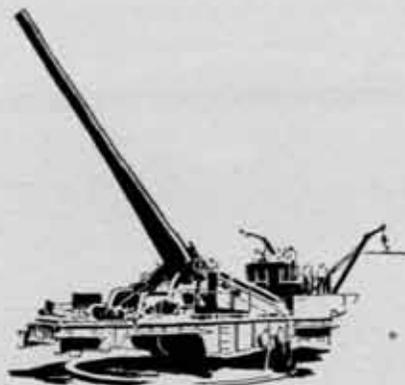
"JOHN J. KINGMAN,

"1st Lieut., Corps of Engineers."

The final design provided for 14-inch guns and armor plate in lieu of cast steel turrets. The turrets were placed at different elevations to permit the east turret guns to fire over the west turret. A cage mast was used for observation and fire control instead of steel cupolas between the turrets. While the basic conception remained unchanged, even to the caretakers' shack on top of the fort, the final design included numerous other improvements over my original sketch plans referred to in the above quoted letter and reproduced with this article. One important and fortunate change was the increase from 10 feet to 20 feet in the thickness of the reinforced concrete roof, as this enabled Fort Drum to weather the concentrated and long continued pounding it received from Japs from about February 15 to May 6, 1942.

Although the cost of Fort Drum did materially exceed my too modest estimate of \$1,000,000, still, as compared to the cost of the previously contemplated artificial island, the "concrete battleship" did assuredly prove vastly cheaper and no less effective."

In fact open batteries on an artificial island, located as had been proposed, would probably not have long remained in action under such shelling.



From the FIGHTING FRONTS

The 90 Millimeter Sniper*

Not long ago a story by a war correspondent of the *New York Times*, bearing a Luzon dateline, told of the great work being done by 90mm AA guns in helping to dig Japs out of caves in Balete Pass—or, equally efficacious, in merely sealing them in and letting them smother. This, he said, may be the answer to the "Japanese war from holes."

And this, we might add, has been going on for quite some time; for over a year, in fact. In the September-October (1944) issue of the *COAST ARTILLERY JOURNAL*, an article by Staff Sergeant Jac Bowman gave an account of what we believe to be first use of 90mm guns in this specialized rôle. Since that bloody battle on Bougainville, the 90's have been used in the same way on Saipan and Cebu, as well as Luzon. It has seemed to us it was about time somebody wrote up the whole story, so here it is.

As you know, we pulled a fast one on the Japs in the first place by establishing our Bougainville beachhead at Empress Augusta Bay. It was the most awkward spot they could possibly have had us, and though they gave the Marines a pretty stiff fight initially, it was four months before they could mount a full-scale offensive. By that time the 37th Infantry and Americal Divisions had largely replaced the Marines, we had a nice tight perimeter around all the ground we cared to use, and our planes based on the three fields constructed within the perimeter were raising plenty of heck with the Jap air force. If the Japs wanted to pry us loose they were going to have to pay for it—and they did, when they tried it.

Our Infantry paid, too. The flat area we occupied was ringed to the northeast by high ridges, and on these heights the enemy assembled much of his lighter artillery. He could look right down our throats, and shell our airfields and perimeter positions with ease. It would have been nice to have held those ridges ourselves, but that would have extended the perimeter too much to be practical. So, on 8 March 1944, as the second Battle of Bougainville started, we began catching it hot and heavy from the Jap guns.

The howitzers of our division artillery swept the face of those ridges with fire, but the Jap guns were dug deep into the hillsides in L-shaped caves and fortified positions protected from plunging fire. The caves, for instance, showed

only firing ports in the front of the hill, and when the guns drew answering fire the Japs would simply pull them back into the recesses of the caves and wait until the firing let up. Howitzers proving ineffective, we moved 75mm TD guns mounted on half-tracks up into the front line and blazed away with direct fire. They didn't work so well on the caves, either.

Then the S-3 of the AAA gun battalion which was set up down in the flat in a dual FA and AA rôle had an idea. Taking one 90mm gun out of each battery would not impair the efficiency of the battalion in the long range FA rôle to any extent. AA action was negligible; the Japs had promised their ground troops the support of 300 bombs but only one ever showed up. The high velocity and flat trajectory of the 90's might be just what the doctor ordered for those Jap caves.

In all, six 90mm guns (a couple of them from the Marine AAA battalion which was also on the island) were emplaced on hills and rises of ground that coincided roughly with the secondary line of defense behind the front, about 2,000 to 4,000 yards from the Jap positions. Some AAA air service troops, incidentally, were in this secondary line—provisional Infantry outfits. The 90mm gun positions were organized more or less as strong points amongst the Infantry pillbox and foxhole system.

It may sound as if it was a simple matter to get the guns in. It wasn't. The Engineers had to cut winding roads up the reverse slopes of the hills, away from Jap fire, and then it was a matter of hauling the guns up by main force, with a tractor pulling and a bulldozer pushing on the rear of the pedestal. Positions were dug in and revetted with earth-filled oil drums. In most cases natural growth was so luxuriant that camouflage presented no problem.

There was jungle all over the Jap-infested ridges also which made the pin-point location of targets which is necessary for "sniping" with a 90 a little difficult at times. The sharpest watch had to be maintained for gun flash or muzzle blast, or other signs of activity among the monkeys. Occasionally the division artillery would request time-fuzed area fire on certain locations. The Infantry would point out pillboxes or machine-gun nests for the 90's to shoot up. Indeed, Infantry morale went up sharply as a result of the swift, hard-hitting direct artillery support.

*Prepared at the AA Command.

they were given. It's a very satisfying thing to spot an enemy weapon that has been keeping you pinned down, report it, and see it blasted out of existence five minutes later.

From the first the mission was a success. A couple of episodes will illustrate.

After a few days of proving a thoroughgoing nuisance to the Japs, a 90 commanded by Lieutenant Eugene C. Camp began to receive counterbattery fire from an extremely well-hidden Jap field piece. An infantry OP finally located it for him, and Camp and his boys blasted back with thirty-round rounds, using PD ammunition. When the smoke of the last rounds cleared away it looked as if the position—a cave—was pretty well wrecked. But Camp decided to put four more rounds in it, "for luck." One of the rounds went smack into the firing port, and suddenly the whole cave erupted, spewing out the Jap gun, debris, and piece of Sons of Heaven. Camp had hit an ammunition pile inside.

Another gun, commanded by Lieutenant Francis M. Bryan, performed as neat a bit of precision shooting as has ever come to our attention. A Jap pillbox had been built just outside the perimeter to ambush our patrols at night, and the Infantry wanted very badly to get rid of it. Due to jungle growth it was difficult to see the results of fire from the 90mm position, so an Infantry observer shot Bryan's gun in for him. He was on target in azimuth soon enough,

but the elevation adjustment seemed to be giving trouble. The pillbox was strongly built and the infantrymen wanted a round to go directly in a machine-gun firing port.

Finally the infantryman was bracketing the firing port in inches, and Bryan was laying his 90 for elevation with a gunner's quadrant in tenths of a mil! Between the two of them they got a round in the firing port, and in Bryan's words, "blew the damn pillbox all to hell."

This was 90mm sniping with a vengeance.

Methods of fire control were relatively simple. All guns used BC scopes for observation, and oriented the telescope and gun together at a convenient azimuth by boresighting on a distant point. Azimuths to targets were read off the BC scope azimuth scale and the gun laid on the same reading by the azimuth clock. The azimuth direct fire sight frequently helped in getting on target.

No maps were used. Usually the determination of ranges was by estimation—a fairly simple matter as ranges to most points in Jap territory were known, and in most cases it was easy to shoot in on a target with the flat trajectory of the 90. The elevation direct fire sight could be used to compensate for differences in height of site between gun and target. Super-elevation was taken from the firing table and placed on the gun either with the elevation clock or a gunner's quadrant, as were corrections.

Adjustment of fire was usually by BC scope, or by direct



A "90" at Bougainville, delivering ground fire.

ire sights in daytime and the BC scope at night. "Artificial moonlight" furnished by AAA searchlights was of great assistance in night firing.

Captain James B. King, who in addition to his other duties as S-3 of a provisional infantry battalion and BC of a 90mm battery, personally commanded one of the front-line guns, had an interesting innovation in his direct fire control setup. He took a height finder up on the hill with him, oriented it with the gun and BC scope by boresighting on a star, and used it to get accurate initial ranges to his targets. The observer would take ten readings on a target and strike an average. Entering his firing table, King would almost invariably hit the correct firing elevation within one mil.

The height finder also came in handy for picking up targets of opportunity. Captain King had a little more leeway in this respect than other commanders, and could devote more firing time to simon-pure sniping. He had plenty of volunteer observers for his height finder and BC scope, from field officers on down. Everybody wanted to hunt for Nips.

But perhaps the strangest observer he ever had on his HF was a Jap prisoner, a most obliging cuss. For half an hour this Nip swept the ridges where his erstwhile yellow bellied pals were holed up, pointing out spots in the jungle to be fired on. King gave the indicated targets a good blasting after the Nip had gone—with what result he could not tell definitely. He says it was the most peculiar experience he's had in the war, "that Nip sure was loyal to his God-Emperor."

Our boys had a few bad breaks, one in particular. Lieutenant Bryan's gun was in position up on Howitzer Hill, in a spot that had been cleared of trees to make a 40mm AA position. It was somewhat exposed, and could be seen all up and down the valley; Infantry patrols used it as an orienting and assembly point. However, the 90mm gun was well fortified. Though it drew fire, nothing drastic happened for almost a week.

Then, one night while the gun was firing, the Japs infiltrated with some heavy mortars, set up in the valley below and got off a twenty- or thirty-round barrage before the Infantry caught them. The mortars caused several casualties.

Some of the mortar fragments had broken the cartridge cases of several rounds of 90mm ammunition. The spilled powder burst into flame, threatening to send the whole position up. Then ensued one of the most outstanding instances of individual gallantry in the entire campaign.

Corporal Raymond A. Uttaro, wounded and bleeding profusely from a six-inch gash in his shoulder, scattered the burning powder *with his hands*, stamping it out and throwing dirt on it to smother the blaze. He put the fire out—but they dug half-burned bits of powder out of his face and hands for days afterward. Uttaro got the Silver Star for that.

However, decorations were not unusual on Bougainville by the time the Jap counterattack was smashed and the remnants of their 17th Army retreated back over the mountains to its own side of the island. Space forbids listing the many recipients of Silver and Bronze Stars.

In the Saipan operation, 90mm sniping took a slightly

different form. As the Jap forces fell back inland, Army AAA supported the 27th Infantry Division with ground fire as well as providing overhead protection. Most AA firing was at night; days were devoted to FA missions.

Both 90's and 40's were used to assist the Infantry to gain the rugged terrain on Nafutan Point, the 90's firing indirect battery concentrations. The 90's were also turned on Haguman Point and Tinian Island to knock out CP's and other installations at extreme ranges—up to 19,000 yards. Then about 1,500 Jap Marines or "Elite Guard" troops holed up with a batch of civilians in deep caves in Death Valley on Nafutan Point, and the 90's went into their sniping routine.

One battery was in position some five to six thousand yards from these cave targets, and so placed that direct fire was possible. For closer support, 40mm guns were moved up into the front lines at about five hundred yards range to pour hundreds of rounds directly into the cave mouths. The infantry needed artillery support badly. Only about half a battalion of doughboys were available to clean out this pocket.

It was a bit of a trick, using the 90's for direct fire at 5,000 yards. Laying for elevation was no problem—initial ranges were determined with a height finder and firing table elevations were put on the guns with a quadrant. But the vertical cross hair of the azimuth direct fire sight was a little thick for accurate lateral gun pointing. The azimuth setters caught on to the trick of laying on one edge of the cross hair and accuracy improved. Sometimes a forward observer would send sensings back for particularly tough targets, and then lateral corrections could be put on with the azimuth clocks.

A new wrinkle in the employment of M16's was discovered on Saipan—they became armored OP's for forward observers when the 90mm guns were firing ground support. Snipers' bullets rattled harmlessly off the sides of the half-track. And if they got too troublesome, the gunner in the M16 turret would just spray the trees around with a few bursts of caliber .50 slugs and make them quiet. Snipers soon learned respect for the Armored OP's.

The M16's and trailer-mounted M51 quad fifties did a wonderful job chopping up infiltrating Japs on the airstrips at night, too. But that's not a part of this story.

The cliffs where the caves were in Death Valley were practically bare rock, and very hard. Solid AP shot was used by the 90's in an effort to break up the mouths of the caves and close them with rock slides, but was only partially effective. M43A3 shell proved just as capable of putting the fear of God into the Japs. When those rounds went slap into the caves, the din must have been hellish. There were no duds. The rock was hard enough to detonate every round on impact.

Mingled with the roar of 90mm bursts was the cacophony of 40mm shell. Many of the caves were dug down into large rooms, and the 40mm rounds would ricochet off the roofs of the entrances, bursting farther along. So effective was the 40mm fire that infantrymen would hear the Japs at night, infiltrating from the caves, asking in English where the 40's were located, evidently in the hope the positions would be betrayed so they could destroy the guns.

At length, out of the 1,500 Jap troops in caves, only five

or six hundred were left. And one night they all marched out, leaving the civilians behind, to attempt a break-through. These were big Japs, shock troops. A dead one found by an AA officer measured six feet four inches. It took four days to clean them out once they were in the open. The Infantry counted 499 dead of the force which had broken out into the general area. AAA weapons were credited with killing 803 Japs in the Death Valley action.

This episode does not seem to speak so well for the practical advantages of the cave type of Jap defense—not when AAA weapons are present to blast them out.

As the *New York Times* reported, 90mm guns went along as support artillery with the 25th Infantry Division in the drive on the Cagayan Valley in Northern Luzon. The correspondent, Mr. Lindsay Parrott, spent a day and a night on 3,500-foot Banzai Ridge overlooking Balete Pass, watching Captain Welford A. Sherman work two of his 90's over Japanese positions defending the Cagayan Valley entrance.

The newspaperman seemed to be properly bug-eyed over 90mm performance. He writes:

"Figures piled up by Captain Sherman's guns show that their fire mission has given ample support. Firing more than 2,000 rounds between April 12 and April 24, the two guns alone closed more than 100 Japanese caves—either planting shells squarely in cave mouths or bringing down landslides over the apertures from which hidden guns were fired. They have hit directly twenty-three gun positions, silencing enemy pieces that had fired down the road along the valley of the Digidig River so effectively that the highway once was known as 'Tojo's bowling alley.'"

The hills where these caves were dug are much softer than the rocks of Saipan. The 90mm rounds can really get in their work in ground like that. It is so much simpler to seal up the caves and smother the defenders than to storm them expensively with infantry.

The Infantry likes the 90. In a report from the 68th AAA Brigade mention is made of terms the doughboy has applied to it, "the 90mm sniper" and the "90mm machine gun."

The Americal Division on Cebu had an equally interesting reaction when it ran into a series of prepared cave positions after driving the Japs out of Cebu City and into the hills on the north and east. The Americal had been in the line on Bougainville, and a message went up to Luzon: "Send us some 90's."

Captain Stanlis L. Milkowski, S-3 of the veteran gun battalion sent in answer to this request, tells the story.

"The battalion moved into the Americal Division area and set up most of the guns for immediate long range ground support. Then we went out to look for front-line positions for a few direct fire pieces.

"It's always a choosy job picking front-line gun positions. If the ground is good and you find a bit of defilade, the targets are scarce; in a spot where you can shoot to good effect your gun is usually right out in front of God and everybody. The colonel of the Infantry regiment where we went first thought the two-gun team which would support him should go in on the edge of a rice paddy. The position wasn't bad,

if a trifle soupy, but there were only two or three targets we could hit worth a nickel. So we went on.

"We found what we were looking for just a few hundred yards behind the infantry outpost line and right with their front. The ridges the Japs held opposite the line were lousy with caves and bunkers and pillboxes. It was target heaven.

"Just then the Japs let go with everything they had. We hit the dirt. When the racket quieted down the Old Man said, 'Isn't this a little exposed?' Lieutenant Hill, who was commanding the gun team, sat up in the brush and looked around. All those wonderful targets. 'Brother, this is for me—that is, if you don't mind, Sir.' So that's where the guns went in.

"Lieutenant Hill had an 'experience' for himself when he moved the guns up. He had just come over a rise in the road to the position with his first 90 when a 20mm Jap dual-purpose gun and some small arms cut loose from a concrete-faced pillbox set into a hillside across the way. Everybody dove for cover. The fire let up after about twenty minutes. Hill was sore as a boil. He yelled to the men, 'Come on—set 'er down!' The men unhooked the gun from the prime mover and got it down faster than they ever had on a drill field.

"The direct fire sights were in their box, but Hill didn't wait to get them out. He just took the firing pin assembly out of the breechblock and boresighted the gun on that pillbox. Sticking the assembly back in, he snapped, 'Fire three rounds!'

"And the boys let the pillbox have it. They wrecked the place. After two more rounds the concrete in front of it broke loose and slid down the face of the cliff. Two Japs tumbled out and ran for cover. There was just a hole in the dirt where the pillbox had been.

"Eventually four gun teams, eight 90's, went into the front lines opposite the Jap hillside positions. The gun positions were organized as strong points with the Infantry, the guns of each pair being about twenty yards apart. Fire control methods were the same we'd used before—height finders for observing, locating targets and getting initial ranges, BC scopes tied in to give azimuth readings. Guns were laid with the azimuth clocks and gunner's quadrant. We used the direct fire sights against moving personnel and vehicles.

"We shot up caves, pillboxes and targets of opportunity, destroyed the Japs' water supply by shelling their tanks and pipe lines, and supported Infantry attacks with overhead time fire. We found that APC ammunition (armor piercing cap) was the most effective stuff yet for closing caves with land and rockslides.

"Jap prisoners, captured when the main force pulled out of the fortifications and retreated inland, said that it was the artillery fire sealing up their caves and suffocating the men that forced them to withdraw.

"We had a peculiar result of one shoot. After slamming a few rounds into a cave, a big puff of smoke came out. We figured we had hit an ammunition dump. Then about ten minutes later smoke began pouring out of another cave several hundred yards down the line. The two caves smoked for the next twenty-four hours. Must have been quite a fire in there.

The Japs fought back hard. They infiltrated every night and kept the area full of snipers. One of their tricks was to lug in homemade demolition blocks of picric acid taken from bombs and torpedoes, and fuzed with two-second blasting caps. We'd find them all over the place each morning, set up as booby traps or just lying on the ground where they'd dropped them when fired on.

"One night a tent which our men were using was blown up with one of these charges. Pieces of personal belongings, bits of packs and clothing and tent were scattered for a couple of hundred yards around. You never heard such a blast nor saw such a flash in your life. Luckily, none of the men were in the tent at the time.

"We had a habit of bedding down each of the men not on duty with the guns in the foxhole of a battlewise infantryman. A lot of our men were green replacements, and the plan saved lives. We had only five men wounded, none of them from Jap infiltration.

"I sure take my hat off to the Infantry. Those boys in the Americal were the toughest, coolest, fightingest guys I've ever seen. The best soldiers in the world. They loved us. They'd yell like sixty when they saw Jap positions we fired on go up right before their eyes. They couldn't do enough for us.

"Morale in our outfit was plenty high, too. Men with the batteries back in the long-range ground support positions would beg me for a chance to go up with the front-line guns. Everybody wanted a crack at the Japs. We had a lot of fun on that mission.

"After a little less than two weeks the Japs had enough of us and pulled out. The front-line guns supported the

Infantry rush to clean out the last of them—then reverted to the battalion and fired long range with the rest of us, mostly harassing and interdiction fires on the retreating Japs. The battalion fired a night concentration with the division artillery in which 150 Japs were killed in a single bivouac area.

"All told, the Cebu campaign was a distinct success."

And that's the story to date of the 90mm gun in a sniping rôle. Instances of such shooting have occurred in other theaters than the Pacific, of course. We can never forget the tremendous part played by 90mm guns in stopping the German tank attacks during Rundstedt's break-through in the Ardennes salient. Another little episode on the Western Front deserves mention.

A gun of a battery in Germany was registering on a house last November. The fourth round was a direct hit. This was too close for about twenty Germans who were inside. They took off down a near-by road. As they ran, the observer shifted his fire to follow them. Out of four volleys fired he saw many Germans "winged" by near bursts, and one disintegrated by a direct hit. The fire was returned to the house which was practically demolished by succeeding salvos.

This was not direct fire, although it can be called "sniping." It certainly speaks for the flexibility and accuracy of the 90mm gun.

In the direct fire assault rôle, we believe the 90 has a great and immediate future in the war against Japan. Long may it blaze!

Antitank Mission

By Lieutenant Stanley A. Roicki, Coast Artillery Corps

EDITOR'S NOTE: Lieutenant Roicki wrote this article of action in Belgium at the request of the JOURNAL; mention of the action was found in a press release. The unit concerned was Battery B, 143d AAA Gun Battalion. The story that follows, "Battery B's Revenge," is the Battalion's story of the same action. It is interesting to compare the two stories.

We were relieved of our normal mission as AA 18 December, leaving our range equipment behind with a guard detail. Our Reconnaissance Party left before we could get any information about our destination. S-3 told us what he could about our new location.

We cleared the I.P. on schedule and left for Werbomont, Belgium. When we reached the R.C. we were informed about the big break-through, and instructed to meet the Recon Party at Werbomont; the Party would lead us to our position.

Leaving ahead of the convoy to meet the Recon Party,

I was stopped before reaching Werbomont by American officers who told me that some German tanks were coming toward us, and were about a mile down the road. I did not quite believe this because I could not hear any firing. We decided to find out for ourselves. The spot where we were to place our guns was already in enemy hands.

I did not find the Recon Party at Werbomont—I found the bodies of the Party two days later, killed in ambush. I was searching for the enemy at the time. In the front lines it is difficult to get information about the enemy unless you go out yourself and find them. Occasionally other units are able to offer some information.

The Infantry moved in and took over the area, with battles raging most of the night about 1,500 yards away.

During the third night I was ordered to move again so we picked up our guns and headed for Borgumont, Belgium. Here I had to place the guns in different towns: one at Cour, one at Ruy, one at Moulin DeRuy, and the fourth at Roane. There were a few problems connected with

making the men comfortable and getting warm food to them, but we solved them without too much trouble.

Our action really started on 23 December. I was at the CP when Lieutenant Gaskill called and reported action at Gun No. 4—two rounds were fired at the gun position from a Tiger tank about 1,500 yards away. Gun No. 4 put the tank out of action with 13 rounds, using the elbow sights. It was almost dark when a Tiger started a duel with three Shermans, but visibility was too poor for our sights to pick up the Tiger.

At dawn on 24 December Sergeant Volpp picked up the Tiger parked in the brush, about 1,400 yards away, and knocked off the tracks with nine rounds. I arrived just as they finished off the tank.

An artillery observer and some tank men came running over to the gun position and began to point out other targets, under the trees about 1,500 yards distant. The gun crew did not have much luck in picking up these targets, so I got off about twenty-five yards to the flank and with a pair of field glasses began to call lateral and vertical corrections.

When we opened fire there were two tanks. One tank took evasive action—the crew of the other bailed out and headed for safety. Our first round was high and to the left. The second round was too high. The third was a direct hit. I fired six more rounds, getting five direct hits out of the six. A large fire broke out and the tank exploded.

Picking up the second tank, we got our first hit on the

fourth round, although the target was exceptionally hard to see, screened as it was by the trees. We fired five more rounds—five hits. One man was caught in the tank and burned with it. The others escaped. The targets were a Tiger and a German-manned Sherman, which we inspected when the area was cleared of Germans. The tanks were at La Glieze; the gun at Roane.

I found that it was necessary to fire one round at a time, waiting to see the results before firing another round. Observation was best from about twenty-five yards to the flank.

For good measure we fired eleven rounds into the trees where some half-tracks were parked. We stopped this fire on the order of a TD captain whose outfit was moving into the area for an attack.

This ended our antitank experience, because the breakthrough was stopped about this time.

I believe that we would not have drawn enemy fire if the troops did less moving around, and used concealment measures when they did move. Digging was difficult in the frozen ground, so we solved the problem by carrying sandbags full of frozen dirt—this saved time and work. All movements were made during darkness. We set the guns up in pairs so that one would always have a flanking shot. Where possible we emplaced the guns in a triangle, so one gun could draw the tank's attention from the front, while the other two had flanking shots.

Battery B's Revenge

Many stories have already been told about the sudden, startling and intricately planned German counteroffensive that struck our lines in Belgium in December, 1944. The whole world suddenly centered its attention on that series of noted battles fought in all the bitterness of a Northern European winter. No one failed to see then, as now, that a completion of the plans of Field Marshal Gerd von Rundstedt, if successful, could have seriously endangered our entire position in Northern Europe and prolonged the war by many months.

This is a story of Battery "B" of the 143d AAA Gun Battalion. When the German break into the Ardennes came this AAA unit was employed in a ground rôle. None of the personnel had previously had direct contact with the enemy. They showed the effectiveness of the 90mm gun as an antitank weapon and provided an important contribution to the halting of the German armored thrusts northward toward Liege, Huy and Namur. It is a story of men untried in combat who fought, in a rôle unfamiliar to them, with ingenuity and intenseness in the face of grave danger. It is the story of a just revenge they meted out to the German armor for the loss of their captain and three of their enlisted men.

The 18th of December was a cold, gray winter day as routine to Battery "B" as any other had been in their job of AA defense of the city of Liege. Suddenly everything was

changed. At 1200 on that day orders were received from the battalion relieving the battery of its mission. A reconnaissance party was ordered to meet the C.O. of the AAA Group. There was no mistaking the urgency in the terse voice that brought the order over the field wire. The arranged spot for the meeting was on road N-15, north of Aywaille, Belgium, and the time was—"as soon as possible!"

The commanding officer of Battery "B," with the requested reconnaissance party left for the position assigned from a map reconnaissance made by the AAA Group. These were the men who unknowingly played into a meticulously contrived ambush of the Germans and paid with their lives—and these were the men who were avenged by their battery before their antimechanized mission was completed.

Orders had been received attaching the whole 143d AAA Battalion to the 49th AAA Brigade and in turn to the 11th AAA Group, with the assigned mission of establishing antimechanized defense for the road nets at Aywaille, Stoumont and Habiemont (east of Werbomont). The 90's were to be supported by units of the 563d AAA AW Battalion. From that moment until they were relieved of their antitank mission there was nothing dull or routine in the activities of Battery "B." Further orders specified that the chosen positions would be occupied only after ground reconnaissance had verified conditions and the emplacements organized for antimechanized defense. The orders stipulated

that it was vital that enemy tanks were to be stopped at any cost. As an officer in the battery put it, "it was our job to get our guns down, get them down quick, and not let the situation get so hot that we would have to pull out."

The emergency had developed so suddenly that no accurate information was available regarding the enemy deployment at that time. Two days before, German armor had launched their vicious thrust into the snow-covered Ardennes in such strength that they had broken through on a wide front. Enemy armor could be expected to be met on any road to the southeast. Battery "B" left Liege in high spirits. Here was a chance to get right up there and see what it was all about.

The Battery serials of the battalion checked through the battalion report center prior to 1700, and the officers were briefed on the situation, as then known. Alternative action was provided for in the event that any of the reconnaissance elements should fail to return to their individual battery R.C.s. In the case of Battery "B" this foresight was to prove itself of great value. The units of the battalion proceeded to move to their prearranged positions after all reconnaissance elements had departed from Liege. Battery "B" struck south on the road leading to their R.C., north of Werbomont. There they waited to contact their reconnaissance party, which, as they learned later, was never to return.

It was then discovered that the original map position was in enemy hands and consequently, as prearranged, they reconnoitered an alternate position and in the cold, pitch blackness of that same night emplaced their guns astride another road, facing south. At 2330 hours they were ready to fire. Here was a situation to try the ingenuity and resourcefulness of the most experienced combat troops.

The guns crews talked the situation over with impatience, "Nuts, there aren't any Jerries here!" It was the consensus then that the whole deal was just another dry run. One of the gunners put the whole thing very clearly.

"I didn't think there was really anything to get excited about. The way we had it figured was that AA troops never got right into the thick of it. You didn't have to worry too much because there was always the Infantry—good old Infantry! You can bet we felt a hell of a lot different when the time came for us to see the Infantry moving out and we sat right at our guns waiting!"

The men and officers of Battery "B" proved themselves thoroughly competent when their emergency arose, and acquitted themselves in a thoroughly enviable manner before their action was finished.

Their chance to prove themselves, however, didn't come that night, nor the next day, nor the next. They just waited and watched and waited some more. At daylight on the 19th the battalion C.O. of the 143d Gun Bn., Lt. Col. Myron T. Fleming, then Major, met the C.G. and the G-3 of the 82d Airborne Division and coordinated the disposition of Battery "B" and supporting AW fire units with the operational plans of the division. After daylight two of the guns of Battery "B" were moved to a better position, making two platoons of two guns each with each pair mutually self-supporting.

As the 82d Airborne advance developed, a search was made for the missing members of the Battery "B" recon-



A "90" covers the road at Malmedy, Belgium.

naissance. During the night of the 19-20th of December one enlisted man from the party, shaken and overwrought, stumbled into the Battery "B" C.P. and told his story. He reconstructed as best he could in his condition, how the captain and the other men had been killed outright by the enemy from concealed positions. Their jeep had been attacked by a tank as they had cautiously proceeded on their mission of reconnaissance and they had dispersed. He had escaped by throwing himself in a ditch, and while still under fire had hidden and crawled, and hidden again until out of range of the enemy MG and small-arms fire and miraculously worked his way out of territory over-run with the enemy. The next day, December 20, a search party was organized and the bodies of the captain and the enlisted men were found where they had fallen to the German bullets.

Now the men had something close and tangible and vital to fight for—a score to even with the Germans. The following day, December 21, the threat of the enemy armor had shifted its weight to the vicinity of Stavelot. Battery "B," still waiting for the chance to show what it could do, again changed positions. It was from these new locations that the AA men later stuck to their guns while Infantry units could be seen moving back. Reconnaissance parties discovered an enemy tank pocket in the vicinity of La Glise. This time the battery had its chance. After nightfall the guns were moved to covered positions commanding this area and completely camouflaged. Sgt. Richard A. Volpp, who figured largely when the time came for his gun crew to show their stuff recounted how they handled the situation.

"My biggest worry, then, was to get my gun in and cov-

ered. We had no time to worry about the Germans. Everyone was too tired and cold—and how cold! Besides, it was so foggy that the danger couldn't be seen. We didn't think much about how close the enemy might have been. You couldn't stand still or you'd freeze, and you couldn't sleep because of the cold. The gun was so cold it wouldn't traverse. I worried about the level. We were higher than the surrounding country and had to jack up the gun to fire lower than our position into the area where the tanks were supposed to be.

"There was the feeling that if only things would get going it would be all right. It was the waiting that got on our nerves. After the shooting started there was a great relief. It was like the tight nervous feeling before starting a football game against a tough opponent. Another thing we had to think about was mines. We knew the roads were cleared but the fields were full of mines and traps. No one did any unnecessary walking around."

All that long, cold night of December 22-23 the men worked in complete darkness disguising their positions. There was no time for thought of comfort and not a minute's time was lost which could make their position more secure. Warm food, heated on a blowtorch, was relayed from man to man until it reached the guns. It was impossible to dig into the frozen ground, so sandbags were filled with frozen dirt and carried to the position. This saved time and a lot of work. All during the night Infantry battles raged less than fifteen hundred yards away. The men lay in wait that night and the next day until gun No. 4 was fired upon by a Tiger tank from about 1,500 yards away. At last the waiting was over. Immediately No. 4 gun swung into action, fired 13 rounds and destroyed the tank. This was accomplished by using the elbow sights on the 90's. Later, as the short December day waned another Tiger tank approached and fought a battle with three Sherman tanks. An attempt to pick up this Tiger in the sights failed because visibility was too poor. It wasn't until first light on the 24th of December that their really big chance came. Just after

daybreak an undetermined number of tanks were discovered parked and camouflaged approximately 2,000 yards due west of the forward gun position. Everything was made ready to engage them. Sgt. Volpp, whose discerning eye had first spotted the nearest Tiger, about 1,400 yards away, opened fire and pounded 9 rounds into the tank before its crew had time to realize what had happened. The tracks were completely blown off and the heavy death-dealing menace rendered useless.

First Lieutenant Stanley A. Roicki, who had been placed in command of the battery upon the captain's death, reached the gun position just as the last round was fired. He realized that it was necessary to open fire as soon as possible on the other tanks hidden in the nest. If they could spot his gun and open fire first the battery's chance of a crippling blow and of their revenge on the German armor would be lost. The other tanks were well concealed and the gun crew in the faint morning light could not actually see their targets. Lt. Roicki immediately seized on the only alternative. He ordered the sergeant to keep the guns' nose into the thicket that hid the tanks. Stealthily, he worked his way through the growth until he flanked the gun at about twenty-five yards. Then, with his field glasses glued on the hiding place, the gun again opened fire. He signaled lateral and vertical corrections which were applied to the gun and the fight was on! The first round landed short, the second to the left. The third round was right on target with a direct hit and another German monster was knocked out. The tank burst into flame and ammunition began exploding. At this point the crew of the third tank had had enough, they scrambled out of their well-hidden refuge and took to the woods like greased lightning. It took four rounds to get a direct hit on this one, but after they had the range they pumped five more quick rounds into the burning mass and caught one German inside before he could clear the turret. The tank crews got away and no more armor could be seen but to finish the action the gun crew fired eleven more rounds into the wooded area just for good measure.



Ground fire in Belgium.

When the area was examined after the Germans had been cleared out it was found that one of the tanks was a captured Sherman. The others were found to be Mark VI's. The entire action had knocked out a total of four tanks without matériel loss and with no casualties to the personnel. The action was fought in very bad weather and it can be said that the AA men in this emergency ground rôle proved themselves more than adequate to the task.

That night, Christmas Eve, 1944, will be long remembered by these men. They spent that holiday in the rela-

tive comfort of an abandoned house in the area. They rehashed their very successful engagement over some hot food sent up from the battery kitchen, "Hell's fire," one of the gunners pointed out, "we didn't do so bad for green-horns, did we? But I sure never thought that those Heinies had got that close. You can take it from me that deal didn't turn out to be no dry run!"

It goes without saying that their comrades who had been killed in ambush would have been proud to see how their battery could fight.

The 863d AAA AW Battalion in the Battle of the Bulge

By Major William J. Krzton and Captain Warren G. Tyson, Jr.
Coast Artillery Corps

This had been a long move for the 863d Antiaircraft Artillery Automatic Weapons Battalion, commanded by Lieutenant Colonel William H. Warrick. But it all felt the same. Of course, it was December now and somewhat colder, and too, ever since the groaning 6 x 6's with the 40mm's and M-51's behind had pulled over the long hill in Eupen, Belgium, the atmosphere had been changing. The white patches in the blue sky had been settling closer together until now as the lead trucks crunched by the inevitable "Entering Germany" sign, the sky had turned grey-white and a fierce cold breeze stung across the clearings. It felt the same as the score of other moves the 863d had made from the time it hit "Easy Red" on Omaha beach until it slid in behind the Canadians at Rouen in France. But it wasn't exactly the same. The MP at the road crossing had told the leader of the "D" Battery convoy to be sure to spread out wider as they drove south off the main Eupen-Monchau Road toward Elsenborn, particularly in the open spots, because the enemy artillery liked to bounce in a few rounds whenever several trucks got together. And if you looked hard northeast, through the haze that hung above the snow, you could see the dragons' teeth of the Siegfried Line. The enemy was there.

Advance details met "D's" convoy at the junction of the Kalterherberg and Eupen-Monchau Roads, and guided it to Kalterherberg. Sections split off in pairs of trucks and dashed through the six inches of snow of the sites selected by the section chiefs. In a little while yellow clay scarred the fresh white of the snow but only for a short time until the revetments were completely dug, then snow was scooped upon the embankments for camouflage purposes. It was much the same for "B" and "C," except that Section 8 of "B" got a roaring welcome from German artillery fire just as they had finished building their revetment. Here the 863d suffered its first loss in Germany. The first German

shell exploded fifty feet short of the freshly dug revetment and killed the Range Setter. The remainder of the crew hit the snow inside their revetment and hugged the base of the embankment. A dozen additional rounds crashed all around, but there were no more casualties. As night settled the 2½-ton prime mover pushed through the snow to the position. The section piled on its power plant, director and other equipment, and moved out of enemy artillery observation. Four additional sections of "B" Battery and sections No. 6 and No. 7 of "C" were resited also because they, too, had drawn enemy artillery fire.

For several weeks buzz bombs had been bursting all over Liege. The 11th AAA Group, the 49th AAA Brigade and later the 18th AAA Group, all of the First Army, had charted the course of the buzzers from across the Siegfried Line to their destination. Thus they had discovered that the "PAC's" (Pilotless Aircraft) followed a grooved course and on this basis they had planned a belt of AA using both 40 and 90mm guns. Batteries "B," "C," and "D" ("A" was in Liege) occupied a sprawling line extending from Mutzenich, Germany, almost due south to within 4 miles of Elsenborn, Belgium, with "B" along the northern sector, "C" in the middle, and "D" on the southern flank. The enemy line varied from 1,000 to 3,000 yards from forward points established by some gun positions. Between the 40's and M-51's and the indeterminate German line, were, in the north around Monchau, elements of the 395th Infantry Regiment of the 99th Infantry Division and in the center and south, elements of the 99th Cavalry Reconnaissance of the 99th. The line was loosely held, particularly in the center and south. This was a quiet sector. Wooded areas and poor roads inhibited armored warfare. Opposing the U. S. line-up were at least two regiments of Volksgrenadiers, the 998th and 999th. (See map.) Battalion Headquarters moved to Kalterherberg, a deserted German



One of Battery C's M-51's at Kalterherberg.

town in the center of the 863d gun line. The 18th AAA Group of the First Army, next higher headquarters, was located at Elsenborn, Belgium.

From the 4th to the 16th of December, the 863d popped away at the PAC's as they scooted across the sky. Each succeeding day found the gunners more proficient at their task. New methods of fire control were devised and the old ones refurbished. One of two OP's would spot the PAC, transmit to a receiver at the Battery CP's. A battery "hot" loop tied in to the receiver would instantly blare the warning to the operator's headphones at the 40mm and M-51 positions. Night firing was particularly dramatic. An orange puff ball slid among the stars over the eastern horizon. It twinkled and filled. Observer, OP No. 2 pressed the "mike" button. Against the background of the whine of the dynamotor, Observer OP No. 2 reported: "1 PAC, low, traveling northwest." Through the night air, the report sped to the Battery Headquarters and then by field wire to eager air guards scanning the eastern sky. The orange puff ball bobbed brighter and a pattering rumble filled the air. "Fire," screamed the Section Chiefs. The air burst with fingers of liquid fire reaching for the single gob of orange. Orange-red 40mm tracer slid across the sky sandwiched between smaller yellow-white streaks of cal. .50 tracer. The rumble deepened into a staccato roar. The cone of tracer fell off to a few lines. The bobbing orange roared away into the night. Often one of the lines of tracer exploded in the body of the PAC. Then a blinding red-orange flash outlined the background of green pines for miles around, and a tremendous roar shook the earth. Pieces of PAC drifted to the ground. Seventeen per cent of all PAC engaged by the 863d were destroyed.

For days 105's and 155mm howitzers of our artillery had been pounding shells over the heads of our gun positions. But on the morning of the 16th, beginning at 0540, instead of hearing a bang and then the whistle, the sequence was reversed; it was whistle, then bang. The enemy was throwing them back! Some slammed into the gun positions, but the revetments were deeply dug; we suffered no casualties there. Some crashed idly into the fields near by, but most of them piled into Kalterherberg where "C" Battery and Battalion had their Headquarters.

The Charge of Quarters in the Personnel Office, located in a beer garden, crawled out of the rubble from behind the bar where he had been sleeping. A 105mm shell had torn the two-foot stone wall out not more than eight feet from his head. Papers, files, and typewriter parts littered the floor, but the bar had saved the Charge of Quarters, even though his M-1 standing in the corner at his fingertips lost its stock and trigger mechanism.

Across the road in the mess hall the cook complained bitterly because he'd have to whip up another batch of hot cakes. The windows had caved into the batter, because a shell had hit the woodshed leaning on the side of his kitchen. A couple of in-the-groove ones crashed through the roof of the Headquarters Battery Office. The Medics took their quota of two, dug out their tubes and bottles, and searched out a new Aid Station. At "C" Battery, about 500 yards down the road, and "D," still farther down the road, it was much the same. All around wire communications were cut to shreds: lines to batteries, lines to Group Headquarters and liaison wire with forward units of the 99th Infantry Division. Crew Chiefs marshaled their men and equipment and dodged along the roads repairing their lines. But through it all there were only a few minor casualties. The cellars of the homes in the town were thick and deep. The enemy shelled the town periodically throughout the day.

It was on the 17th that the various headquarters in Kalterherberg began to realize that there was a purpose to the continued enemy shelling. The broad picture unfolded slowly. From the north, from "B" Battery at Mutzenich, came reports of heavy fighting in Monchau. From the south the Battalion Executive and S-3, inspecting shell damage at Section No. 7 of "D" Battery, saw enemy AA puff out among flights of P-47's going in the direction of Butgenbach. A Field Artillery captain informed them that he was moving his 105's south around Camp Elsenborn to stop an enemy drive on Elsenborn. This wasn't just a local skirmish; the whole line was threatened. All afternoon, front-line reinforcement centers, combat engineers, signal units, and repair shops streamed out of Kalterherberg, headed back for Eupen and Verviers. The 105's and 155 Hows jerked their muzzles into the pine forests behind them and sped off. Group Headquarters imminently threatened at Elsenborn, notified the 863d that henceforth it would be attached to the 99th Infantry Division, and pulled out for Army Headquarters.

Wire crews tied into 99th Division lines and radio nets were set up; a liaison officer was dispatched to 99th Division Headquarters at Camp Elsenborn. First instructions from their new Headquarters ordered the 863d to destroy classified files, prepare all equipment that could not be removed for instant demolition—and to hold the line with the Infantry. The Intelligence Sergeant gleaned his files, hauled secret records behind the Operations Room and burned them. Platoon officers with their sergeants plodded around the gun positions with ½-pound blocks of T.N.T. and made last-minute check-ups on demolition instructions. The Battery Commander of "C" Battery sent his officers and platoon sergeants into the gun pits with the gun crews. All battery commanders checked their liaison with forward units immediately in front of the and organized

headquarters personnel into mobile reserves. Down in "D" Battery's area, the enemy plastered forward Infantry units with artillery and mortar fire. Under the hail of continued concentrated shelling, the 99th Reconnaissance Units withdrew from their forward positions to the Battery "D" gun line. Up in "B" Battery's sector in spite of artillery fire and imminent infantry action, the alert air guards spotted three ME 109's snooping in the vicinity. As the enemy planes swooped across in a low-level strafing attempt, M-51's and 40's caught them in a fierce cross fire. One piled up in flames near by, the other two tore through the valley with thick streams of black smoke trailing behind them.

Dawn of the 18th burst bright and clear. Hope swelled in the hearts of the boys in the gun revetments. Today our air force would come out and stop this. Radio reports were confusing. The Commanding Officer called Battery "B" on the telephone. "How are your men up in Mutzenich?" he wanted to know. "Fine, fine," the B.C. replied. "But," said the Colonel, "B.B.C. has just announced that Mutzenich has fallen to the Germans." "Can't be, Colonel," replied the B.C., "We're still here." Later the C.O. of the 47th Infantry disclosed that he had received instructions to detruck at Eupen, march through eight miles of snow and pine forest and recapture Mutzenich. Coming into Eupen he found the situation pretty quiet; so he hauled his regiment four miles along N-17 toward Mutzenich. The men quietly detrucked and cautiously crept across the snow toward Mutzenich. After three hours of painstaking cross-country travel, an advance patrol slid into the outskirts of the town. "Cripes," hissed the first scout to his corporal, "It's Ack Ack." The arrival of the 47th Infantry preceded a change-over from the 99th Infantry Division to the 9th Infantry Division. The 39th Infantry Regiment went into the line established by "C" and "D" Batteries and sent its OP's ahead. Now, the 863d was attached to the 9th Infantry Division. The line of doughboys filed into place like ghosts in the late dusk. The reddened, wind-whipped faces of the cannoneers on the "C" and "D" Battery lines brightened. At last the Infantry had arrived.

The events of the day were high lighted by an enemy aerial attempt. About twenty-one enemy FW 190's and ME 109's dropped out of a hazy sky and attempted to pounce on opportunity targets around Camp Elsenborn, Headquarters of the 99th and 2d Divisions, and supply trucks rumbling up and down the Eupen-Kalterherberg-Elsenborn Road. This was gravy. The section chiefs waited. They watched the enemy glide out of the haze and split into two sections, one section sliding out of range toward Camp Elsenborn and the other getting poised to dive on the supply road guarded by 863d guns. Swiftly and silently the funneled muzzles of the 40's and the thick, blunt mouths of the 50's whirled in the direction of the approaching planes. The section chiefs waited. The planes were in range and suddenly the guns burst out in sheets of tracer. Caught in a web of fire, the surprised enemy planes attacking separate objectives in groups of threes, scattered in all directions. Only two of the three that had swooped down to strafe a convoy on the Kalterherberg-Elsenborn Road remained. The leader had me a hail of caliber .50 bullets from the M-51 of Section No. 1 and spiraled down in flames. Of

the eleven planes attacking objectives in the range of the 863d guns, four were definitely destroyed, two by "C" Battery and two by "D" Battery.

The next four days were characterized by increased enemy artillery fire and patrol activities. It was evident to the battery commanders working in close liaison with the 47th Infantry Regiment in the northern "B" Battery Sector, and 39th Infantry Regiment in the "C" and "D" Sectors, that the enemy wanted desperately to cut the ammunition and supply route from Eupen to Elsenborn. Our artillery units, a few miles northwest of Elsenborn were pouring tons of shells into the German tank thrusts directed toward Elsenborn and Malmedy. Clashes between patrols were frequent; in addition, enemy paratroops were operating in the wooded area between the Eupen-Malmedy Road and the Mutzenich-Kalterherberg Road behind the "B" and "C" Battery gun line.

The Chief of Section of No. 4 Gun in "C" Battery shoved in the door in the barn part of the combination house-barn in which his section was living. The section itself occupied the house part. The machete that the Sergeant was carrying was to be used for cutting wood. One of his men, carrying a flashlight, accompanied him. The ray of light from the flashlight outlined two German paratroops crouching in the barn, ready to spring at the Chief of Section. A swift stroke of the machete slashed the wrist and forearm of the nearest German; the other dropped his weapon and raised his hands to the back of his head. At "D" Battery the air guard at Section No. 3 spotted German NCO and a private dodging through the brush not 100 feet away. Two shots from his M-1 from the hip plopped the NCO in his tracks with a bullet in the head and another in the breast. The private's arm strained in their sockets as he reached skyward. The procedure was a little different at "B." The security guard at Section No. 3 spotted a group of six paratroops skulking in the pines a few hundred feet away. The aroused section immediately opened fire with their M-1's. The Germans crashed through the pines headed northward. The telephone operator shouted a warning to Section No. 1 located due north. As the German paratroops burst into the clearing 400 feet from Section No. 1, M-1's went into action. Three paratroops fell, two dead before they hit the ground and the third writhing with a bullet hole in his stomach. Even



A 40mm gun at Mutzenich.



Terrain around Mutzenich.

though he was seriously and painfully wounded, when the men arrived to give him aid, the paratrooper held an armed grenade in his hand, ready for action. The 190-pound gunner coaxed him to release it by squeezing the German's wrist with his hobnailed combat shoe. The three remaining paratroops decided that they had had enough. The tally sheet on action against German paratroops by units of this organization reads like this:

Headquarter Battery	2 Captured
"B" Battery	15 Captured—2 Killed
"C" Battery	7 Captured
"D" Battery	1 Captured—1 Killed

By the 22d of December, the enemy armored attempts at Monchau had been completely halted at the northern end of the 863d line and seriously blunted at Krinkelt and Elsenborn, at the southern end of the line. Heavy artillery action by U. S. artillery units in the Elsenborn sector had been a great contributing factor. By the night of the 21st, the enemy had decided that the artillery bombardment had to be erased to permit his tanks to by-pass Malmedy, drive to the road center of Eupen, dissolve opposition in the Monchau sector and push for Liege. The main supply route for these artillery units was the Eupen-Kalterherberg-Elsenborn Road which roughly outlined the 863d gun line. If this road was taken, not only would the hellish artillery pounding cease, but in addition, the artillery units themselves would be flanked as would be the stubborn defense at Monchau. Night patrols operating behind enemy lines reported two infantry regiments and spearhead units massing in the wooded area before the Siegfried Line some 6,000 yards from our line.

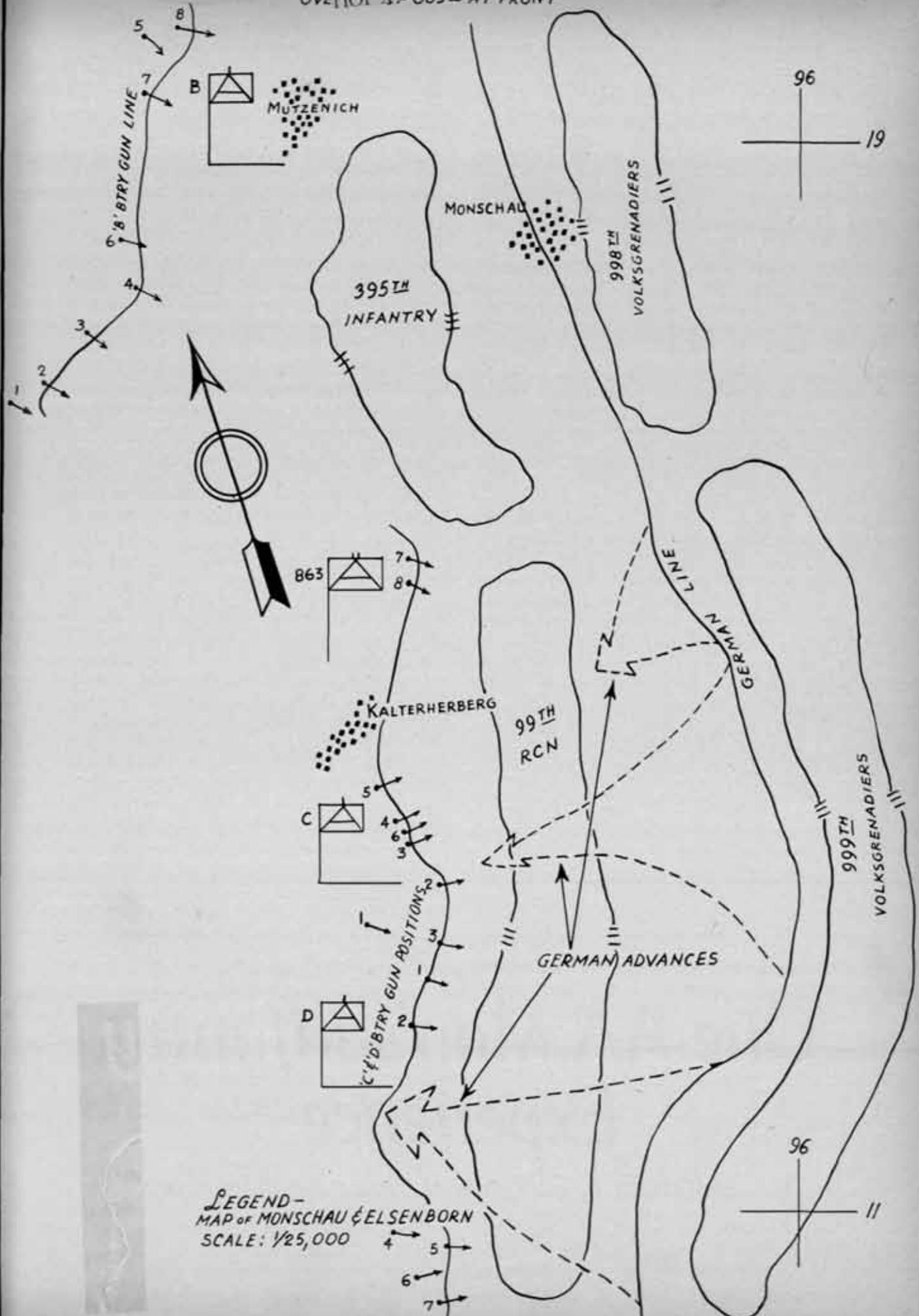
A heavy artillery bombardment began in the early morning of the 22d. Shells from 75's, 88's and 155's blasted Kalterherberg and the "C" Battery area. Forward elements of the 39th Infantry Regiment swayed to the rear and fell in line with the cannoneers of "C" Battery of the 863d. Here, declared their tall, competent platoon leader, they would hold. Heroic wire crews from Battalion, "C" and "D" Battery Headquarters dashed through the rain of shell-fire, patching up torn lines. The platoon commanders, platoon officers and platoon sergeants of "C" Battery, crouching in the most exposed gun positions, quietly advised the gun crews and prepared them for the crisis. Mortar shells

plopped around the gun revetments, spotting the snow with round holes four feet in diameter. Heavy enemy machine guns raked the line. Bullets spat against the armor of the M-51's.

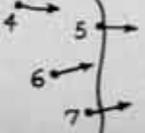
An irregular band of green shadows burst out of the woods along a narrow road leading to the larger lateral road which tied in to Kalterherberg at the ruined church at the road bend. The M-51 at Section No. 2 spattered out four streams of tracers. The 40mm sited on the gentle slope overlooking the wooded valley burst out in auto fire. The enemy was charging, 500 feet away. More guns joined in the battle. From behind the revetments, from trenches, M-1's banged their bullets into the battle. The enemy machine guns roared in increased fury. The charging line thinned, 400 feet from Section No. 2. The assistant platoon commander rallied the section, raised himself above the parapet and directed the fire of his 40mm. The loader and firer dropped his loaded clips into the auto loader which projected several feet above the revetment, amid the vicious singing of enemy bullets. At the foot of the slope, 400 feet away, green-clad forms plopped down and snuggled deeper into the snow. The line faltered, turned and broke for cover to the woods behind it. This round was ours. The gunners reloaded their guns and brought up more chests of ammunition. An aid man slipped into the gun pit at Section No. 2 and patched up three wounded members of the crew. Our casualties were no more than a dozen wounded: the enemy dead lay dark against the snow on both sides of the road at the edge of the forest. Sixty were killed and an uncounted number wounded. The whole battle had lasted from 1300 to 1500. At 1500, a heavy weapons company of the 39th Infantry crawled into the line. "C" Battery's rôle changed from holding the line to supporting the Infantry.

The enemy withdrew from "C" Battery's immediate area, but he was not through yet. At 1630, he launched an attack in battalion strength at the main supply road in the sector held by "D" Battery. A scanty line maintained by twenty-eight infantrymen bent back and finally anchored on "D" Battery's gun line. "D" Battery's C.P. nestled in a heavily wooded area in the center of the line was brought under heavy machine-gun, mortar and small-arms fire. As machine-gun bullets twanged off the pines the Battery Executive Officer rallied his Headquarters Section, loaded the few trucks available and ordered the destruction of the remaining equipment. An M-5 director and an M-5 power plant under repair at the C.P. were destroyed. German patrols pushed to the road, but the hail of lead from "D" Battery's M-51's and the M-1's of the Infantry drove them back into the woods. That night truckloads of Infantrymen of the 39th Infantry Regiment stole off the trucks onto the back road from Kalterherberg to Camp Elsenborn. They formed single file in the tall pines and quietly pushed off to reinforce "D" Battery's line.

That night too, the 40mm guns of the 863d were pulled out of the line and trundled off to Eupen to provide AA protection for defiles along the three main roads tied together in the town. Thus the Battalion was split, with the M-51's under the Battalion Commander on the line in Germany and the 40's under the Battalion Executive Officer performing an AA rôle in Eupen. That the Battalion per-



LEGEND -
 MAP OF MONSCHAU & EISENBORN
 SCALE: 1/25,000



formed equally as well in its two separate jobs under two AAA Groups (18th in Eupen and the 115th in Kalterherberg) is a tribute to the versatility and training of the basic units, the gun sections. Because of the rapidity of the move without prior warning, and the tense situation in the line requiring the presence of all officers, prior reconnaissance of positions to be occupied in Eupen was impossible. Therefore, the 40's were moved to fields near Eupen until a reconnaissance could be made and positions located. In accordance with standard practice in the 863d, the guns were set up for action as soon as the 6 x 6's stopped rolling.

The next morning three ME 109's swished out of a ravine toward the open patch where "D's" 40's were awaiting deployment. The alert air guards spotted them immediately, shouted their warnings and took their places for action. Again the 40's spat death. One ME 109 caught unawares, attempted to evade the tracers reaching for him by pulling up in a steep bank. That did it! A 40mm shell, the first of only three fired, blew off his tail. He rolled over on his back and splashed down in the hayfield that way. They found the pilot with his head torn off. The other two were also hit and crashed in the near-by woods. Both pilots were killed.

The primary mission of the M-51 quads had been changed on the 19th from anti-PAC rôle to Infantry support. In addition to supporting the Infantry by direct action, the M-51's also delivered indirect plunging fire at ranges from 3,000 to 6,200 yards on enemy troop concentrations. Although the enemy spotted the general location of the M-51's from the line of tracers or muzzle blast, his artillery fire failed to stop the effective fire of the quads. Regimental Headquarters, 47th Infantry Regiment, spotted the targets and specified the time of firing. Battalion S-3 designated the batteries for the firing. At "B" Battery, as at "C" and "D" Batteries, the platoon commanders with plotted azimuth and quadrant elevation determined from firing tables, supervised the M-51 setting made with compass and gunner's quadrant. Two guns at a time per mount fired in long bursts. Then the other two were fired. In this way at least two guns per mount were always fully loaded. A forward artillery observer spotted the fire and reported by phone through Regimental Headquarters to the individual gun sites. That the fire was highly effective was exemplified by a forward observer's running account

of a mission accomplished on the 21st of December. On this day, "B's" guns were set on Hofen a little south of Monchau. "They're running out of the houses and diving into foxholes. Whee, look at them go," shouted the lieutenant over his phone. Many houses were burned by the AP incendiary bullets used for the firing, and scores of the enemy were killed or injured. The Battalion expended a total of 240,455 rounds in this type of firing.

On the night of the 24th of December, the 39th Infantry Regiment pushed off on the 863d sector. The immediate threat to the objective guarded by the 863d was relieved. Until the 1st of January the M-51's continued to support the Infantry with indirect fire. The enemy poured in artillery fire but even though the C.P.'s were forced to move several times, the casualties were light. The Tec. 5 in charge of M-51 Section No. 4 was killed as he sat on top of the back of the seat in his gun. The MAC officer performed his paper duties standing for a few days. A heavy caliber shell had torn a hole in the rear of the dispensary and a flying stone caught the MAC in the rear. On 1 January 1945, when the *Luftwaffe* made its last large-scale aerial attempt, the M-51's at Kalterherberg destroyed three and the 40's at Eupen three. The total score of planes claimed for the period 16 December 1944 to 2 January 1945 is:

11	CAT	I
7	CAT	II

For gallantry in action three officers and one enlisted man of the 863d have been awarded the Silver Star. Five officers and twenty-one enlisted men have been awarded the Bronze Star for heroic action and meritorious achievement. For wounds received as the result of enemy action, thirty-one Orders of the Purple Heart have been awarded to officers and men of the Battalion, two posthumously. In recognition of the exemplary performance of the Battalion during the period 17 December 1944 to 1 January 1945, a summing excerpt from the commendation of the Commanding General of the 9th Infantry Division, First United States Army reads as follows:

"The spirit of cooperation and the skilled performance of an unfamiliar task exhibited by all members of the Battalion during this crucial period assisted materially in the successful defense of the Monchau-Hofen-Kalterherberg Sector and is worthy of high commendation."

One AA Man's Infantry Experience

By Lieutenant E. G. Vendetti, Coast Artillery Corps

Our AA had performed its mission in Italy so successfully that toward the end of 1944, my battalion had been scattered about the Mediterranean area with diversified assignments. After a brief period of guarding and conveying

prisoners of war, I returned again to the battle areas of Italy.

There was increasing activity at the front, and rumors were floating around among the AA men that some of the

organizations were in the thick of it. However, the front lines seemed so far away that as far as I was concerned, it was just one of those things soldiers talk about to pass the time.

A messenger interrupted my period of waiting for action with a dispatch ordering me to a new assignment, and within a few seconds, I was on my way to the front lines with five other junior officers and some forty soldiers. We were all originally from an AAA AW outfit and knew little about infantry combat work, but we were headed for the front lines.

That night we reached the front.

We were now in the vicinity of Viareggi, about thirty-five kilometers north of Pisa, and about a week previous, the Jerries made an attack on Forti de Marni near by.

When I reported to my BC, he rapidly sketched the tactical situation for us and it appeared serious indeed to those of us new to this type of activity.

"As you can see, our front lines run along these lowlands. Jerry is 700 yards to our front in those hills and mountains, and he holds that patch of woods to our front. Our battery is organized as a rifle company. As you probably know by now, we are an AAA AW battalion, and so are all the other troops in this vicinity. Our battery still keeps its platoon organization, but I'm forced to keep them all on the line as our strength is too reduced to hold out one as a reserve. What makes our situation interesting is that there is a large German mine field ahead of us, and doubly more interesting, there are the remains of one just behind our lines. So, take care how you move around." (The word "interesting," under these conditions, seemed to me a mild understatement!)

I agreed and answered that we certainly *would* look out for the mine fields, particularly those behind us!

After showing me some maps, and pointing out a few pertinent battle facts, our new BC left me with time to look over my platoon.

When I state that my platoon had only seventy-five yards of front to hold, I know that might sound like a small assignment. With just twenty-eight men and four Partisans, however, I felt that these seventy-five yards were more than a dot on the map; and as I looked over the terrain, the seventy-five yards seem to grow and grow!

This was particularly so as the drive the Nazis had started in this sector a short while before had not been wholly stopped, and no one had to tell my troops that the situation was dangerous. They were all AAA troops in this sector, and even if we had been organized as Infantry rifle companies, we knew there was no "divisional artillery" to back us up, such as the Infantry always has. We did, however, have some tanks in reserve, which encouraged us considerably.

My platoon was rather fortunate in finding the remains of two stone houses to the right of our sector, and these had been "fortified" by the platoon to some extent. (I had always pictured barbed wire being used along the front lines, but there was nothing like that where we were.) These two houses, or what was left of them, afforded us an excellent place to install our "twenty-man" kitchen unit. Our rations were either "5 in 1" or "10 in 1." This shelter made

excellent sleeping quarters, and spared us from having to curl up in the mud outside.

The tactical situation was a maze of attacks and counter-attacks. A week before our AA troops made a desperate counterdrive and made a gain of 1,000 yards, but eventually were driven back. Two days before my arrival, they made another attack and gained 400 yards, but they were stopped in their advance by a mine field.

The Tyrrhenian Sea lay shimmering off to our left flank. In peacetime, it would be a pleasant assignment to try to outdo the travel writers and gush forth with a flood of adjectives about the beauties of the sea, and the lovely countryside; but to us the sea was just a body of water guarding our left flank, and the adjectives we used to describe the mud and rain, and the dripping countryside are unprintable.

The second morning on the line, I was awakened by the crash of artillery fire. It increased in intensity as an hour crept by and it was not necessary for anyone in my platoon to tell me that something was up. As mortar fire started thickening up the artillery barrage, our platoon was "standing to" on the alert for the attack and so were the outfits on our flanks. Around 0700 hours and daylight, with increasing artillery fire, the attack started.

Our small-arms fire was heavy all up and down the line. Here and there we could see enemy troops advancing and I noticed that they were using the patch of woods to our front, so I called the CP to direct mortar fire on them.

We called upon our tanks, in reserve, to aid us with their fire. There was some confusion, as might be expected, especially since none of these units had ever worked together before and were not too well coordinated. The enemy attack slowed up, and soon the Germans retired to their former positions. In this action we were quite fortunate in suffering only two casualties in spite of all the artillery barrage and small-arms fire. The old admonition about digging in paid off in saving lives and matériel.

The balance of the three weeks we were in the front lines proved to be quiet and uneventful. Our main activities were night patrols and in our "company," personnel was selected for the job by roster. The party usually consisted of four men led by an officer.

Here is an example of the type of work we did, and what we looked for. One night I was assigned the mission of checking the condition of a small bridge that crossed an irrigation ditch in "no man's land," between us and the Jerry. Aerial photos had indicated that the bridge might have been damaged, and possibly destroyed. The prints were not perfect, however, and our BC wanted to know if it could be used. I was also instructed to check on the mine field, and to keep my eyes and ears open for anything of interest.

My first thought in writing of this patrol is to say that we went, we looked, and came back. I realize that troops do this type of work all the time, and probably take it in their stride; in spite of the simplicity of the mission, however, it was a new task for us, and we were eager to try this new experience of night patrol.

The night was clear enough, for the cloudless, starlit sky gave us some light, and the visibility was excellent throughout the patrol.

It was my decision to check on the condition of the bridge first; so, quite carelessly, I started on a fast walk with my men spread out close by. However, no sooner had I found myself briskly pacing along in front of my platoon, than caution seized me. I call it caution, although my fear and imagination had a lot to do with my suddenly crouching down and listening. Our approach thereafter was not all brisk walking, and we exercised proper caution!

We reached the bridge without much difficulty, and found it intact.

So far this was not bad, and then I motioned our patrol to start working to our right toward the mine field. I knew that we could check some of its destruction by noting the artillery fire and hits in the field, and listening to see if there were any Jerry working parties planting new mines, or doing some clearing. Then I asked myself, if I failed to discover any of this, how could I check on a mine field in the dark without any mine detecting equipment?

Nevertheless, we kept going. If we had been cautious before, we were doubly cautious now, for we were within speaking distance of the enemy lines.

As we moved forward we felt as if we were in a black, empty void. If any other patrols, enemy or friendly, were out that night, we did not see nor hear them. We slid

through a very few small craters, just bare depressions, and kept moving.

Making what observations we could, we started back. I had my compass, and there was the Big Dipper and the faint North Star to guide us back, and over to our flank we could sense the sea.

Did I say that my platoon position seemed large? As we started back to our position, it seemed to grow smaller and smaller! I was not worried about my platoon and the few men that were left on the alert, but I began to wonder if there were any "trigger happy" soldiers along the lines waiting to fire at us in the dark, as we were coming in from enemy territory.

After some minutes of steady progress I began thinking of hot coffee, a chance to scrape the mud off my equipment, and perhaps enough time to crawl into my blankets before dawn.

We were well past the time I knew we should have reached our lines, and I began to swear at the Dipper and my compass. One of my party nudged my elbow, and pointed. To our left something large and faintly lighter than the rest of the landscape loomed above our low and very close horizon. Could it be our stone houses, our own "home"? It was!!

Fifteen Days On the Griddle*

One raw day early last December the 95th Infantry Division blasted its way into Saarlautern on the Saar River, and much to everybody's surprise, including the Germans', captured intact a heavy stone bridge on the north side of town. Jerry had it all wired and mined and ready to blow, but before he could push the plungers the 95th's doughs and the combat engineers hot-footed it across, grabbed themselves a little bridgehead on the other side of the river, and dug in to hang onto it.

Jerry promptly began throwing everything he had at the bridge, because it was the only reliable means of crossing the Saar in the Corps zone. He tried to float mines downstream against the piers; he tried direct assaults and those little robot tanks filled with explosives. And of course he whaled the daylights out of it with artillery fire. But the bridge still remained intact.

Dive bombing was an obvious possibility, and AP bombs might work as nothing else could. It was with this idea in mind that the CO of the 547th AAA AW Battalion gave the bridge the once-over the day the town was taken. The ground around our end of it was sizzling with small-arms, machine-gun, and artillery fire. Defending the bridge was going to be an extremely tough proposition.

But the danger to the bridge was also great, and the next morning the 547th Battalion was relieved from attachment to the Division Artillery and attached to the 95th Division. Captain John J. O'Malley, commanding Battery "A," got

the job of manning the bridge defense. Battery "C" was to go into position on the south side of town, protecting the combat engineers while they tried to throw a ponton bridge across the river down that way.

Well, the engineers simply couldn't do it, as German observed artillery fire from across the river was too damnably intense. After six days of trying they pulled out, and "C" Battery pulled out with them. So it was all up to O'Malley and his boys. Sometimes it seemed as if it was all up with O'Malley and his boys.

As a matter of fact, though "A" Battery's 1st Platoon was in position around the near end of the bridge for fifteen days, and two sections of the 2d Platoon on the far side in our little bridgehead for twelve, never an enemy plane came within striking distance. Maybe this was just as well. While the battery was in position, the Jerries lobbed over better than 40,000 rounds of artillery ammunition in the bridge area—in addition to spells of intense small-arms and mortar fire!

But let's begin at the beginning and tell you a few details of things that happened.

The battalion CO and the headquarters staff gave O'Malley some help with his reconnaissance. He needed it. Buildings and other obstacles had to be blown out by the engineers to clear fields of fire. And the snipers and Jerry machine guns and artillery were busy all the time. In fact, the S-3 of the infantry battalion around the bridge suggested not bringing in the AAA at this particular time because of the uncertainty of a counterattack.

*Extracted from AAA Notes, Hq. ETOUSA, in Overseas Information Division, Hq. AA Command.

But the General wanted the 40mm sections in as soon as possible, and in they went. While the detailed reconnaissance and initial preparation of positions was going on with engineer help, Captain O'Malley sent T/5 Donald E. Rollins and T/5 Thomas Houston back from the recon party assembly point to the RJ where the 1st Platoon was waiting to pick up Section Number One. A truckload of filled sandbags had been readied by headquarters battery to go in with each gun section.

The afternoon was wearing on by this time. One by one the sections came in, all under fire from the Jerries across the river and snipers still holed up in the town. Dusk came early, adding to the concealment furnished by the clouds of smoke and dust raised by the enemy barrage. The men worked furiously under the direction of O'Malley and 1st Lieutenant Leicester Y. Ryan, the 1st Platoon leader, digging gun pits, building revetments, tugging their weapons into position.

Sections One, Two and Four were put in a hundred yards or so back from the riverbank, One and Four on the left side of the bridge, Two on the right. Number Three's initial position was back in the town about 300 yards to the rear. It was pestered to death by sniper fire.

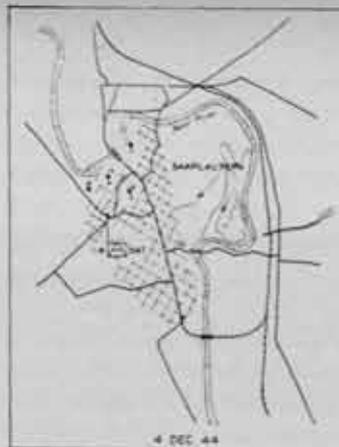
Number Two had somewhat of a time getting its M51 mount in. It was necessary to build the revetment first, and then back the quadruple machine-gun trailer into the position. T/5 Aldre E. Summers, assisted by T/5 Llaguno of headquarters battery, built three sides of the revetment under fire and lying on his side, then wrestled the mount into it with his truck, drove the truck off to shelter, and completed the revetment.

While the men of Section Four were building revetments, a heavy concentration of artillery fire forced them to take cover. Pvt. Floyd A. Warren, in the M51 turret, thought he might just as well stay behind that steel plate as go dashing for a foxhole. As a matter of fact, the artillery fire lifted in just a few minutes. Then, however, enemy machine-gun fire began sweeping the position. This was worse than the artillery for Warren. He looked hastily for the source of the hail of bullets, swung his turret a little, caught the machine-gun nest in his sight and let go with 200 rounds of caliber .50 ammunition. Those Jerries quieted down—permanently.

After the weapons were emplaced, the colonel, O'Malley and 2d Lieutenant Alexander E. Berger, the assistant platoon leader, went around to inspect the positions. They had to reorganize Number Three, as the sniper fire had driven the crew from this position. While they were at it, an enemy artillery shell started a blaze in the body of the gun truck, which contained 40mm ammunition. Sixteen rounds of the stuff went up, but the colonel and the battery officers, with Pvt. Jesse J. Schrofer, put the fire out. Only minor damage was inflicted on the truck.

Another shell killed one Infantryman, wounded two others, and made junk out of Captain O'Malley's jeep. Men from the section gave first aid to the injured Infantrymen and assisted the medics in evacuating them. The inspecting officers walked back to the platoon CP.

And the war went on. At approximately 2030 hours the M51 mount at Number Two position was hit by two shells and completely destroyed, with 3,100 rounds of caliber .50



ammunition. Fortunately, there were no casualties. During the first thirty-six hours that the platoon occupied the area, all gun sections were kept under extremely heavy artillery fire, averaging 200 rounds per hour.

The next morning, an M51 was received to replace the mount destroyed in the night. As the old position was evidently too near the long axis of the bridge, it was decided to put the new MG mount over to the right, closer to the 40mm gun. A casemate was blown out by the Engineers, and the mount rolled in the open end. Here it had a fair field of fire—and it was infinitely safer.

Number Three section was still having sniper trouble. Finally the pot-shooting Jerries were discovered—in a church steeple about 150 yards from the position. Captain O'Malley ordered bazooka fire on the steeple, and Pfc. Lonnie B. Minter, Jr., thought he would like to pay the enemy back for some of the near misses he had experienced. In order to fire, it was necessary for Minter to stand in the middle of the street, fully exposed and a perfect target for a sniper. He got nine rounds off, and the side of the steeple facing him began to look somewhat different. The sniping ceased.

It was resumed again after a while, though the Jerries still left up there took Minter's hint and did not aim their fire at the 40mm position. An Infantry lieutenant came over and asked T/4 William B. McKiernan, the section chief, for a little 40mm AP fire on the tower. McKiernan zipped twenty-four rounds into what was left of the structure. Sniping then ceased altogether.

The day after, Number Three section was moved nearer the bridge, to a position with a better field of fire. As usual,

the move was accomplished under small-arms, mortar and artillery fire.

And at noon that day, Captain O'Malley was directed to move two gun sections across the river. The bridgehead was deemed sufficiently well established over there. With 1st Lieutenant Gerald E. Clark, the 2d Platoon leader, O'Malley reconnoitered the area on foot and selected the two gun sites. Sections Seven and Eight moved across the bridge—under heavy artillery fire. This was getting monotonous.

Casualties were surprisingly light despite the continuous shelling. In fact, more men were hurt by an accident than anything else. The engineers blew another casemate near Number Two position, and the wall and roof of the crew's living quarters went in, injuring nine of them. In order to replace the injured men, O'Malley asked for volunteers from the other gun sections and organized a provisional section to man Number Two's equipment.

The reason for the low casualty rate was that all men not actually on duty were kept in basements, casemates or other well protected cover. Also, the gun pits were deep, small and had thick revetments. Foxholes had been dug near the gun pits for use during heavy concentrations, and these were well covered to protect against falling shrapnel. Here it was proved once again that men well dug in and protected can live through unbelievable amounts of artillery fire.

A few figures will illustrate:

During one day and night 7,000 rounds of enemy artillery fell in the bridge area—the M51 mount of Section Number Four was damaged.

The next day, 4,000 rounds came over—one man in Section Number One was hit by fragments.

Another day, 3,000 rounds—no casualties, no damage, though the day after that a mere 350 rounds falling in a two-hour period resulted in two men being slightly wounded in Section Eight, and two trucks damaged.

Then, for a four-day period some 13,500 shells pounded the area without causing damage or casualties to AAA.

The last full day in position scored 3,000 rounds, and Number One's range truck received a direct hit and was set on fire. The truck, one director, power plant, and 7,155 rounds of caliber .50 ammunition were completely destroyed.

The following morning Battery "A" was relieved of the mission by a platoon from another battalion. Sections Seven and Eight were pulled back from across the river. The remaining two sections of the 2d Platoon never had gotten over, due to unexpected resistance met by the Infantry.

All told, fourteen men of the battery received the Purple Heart for wounds incurred in this action. Awarded the Silver Star were Captain O'Malley, Lieutenant Ryan, Sgt. Robert E. Gibson, Sgt. Carl W. Mitchell, Sgt. Alvin K. Bates, T/5 Sumners, Pvt. Schrofer and Pvt. Warren. The Bronze Star was awarded to Major John E. Campbell, the battalion S-3, 1st Lieutenant Roland Kendell, Lieutenant Clark, Lieutenant Berger, S/Sgt. Hunter Hill, Sgt. McKiernan, T/4 Warren P. Reed, Cpl. Francis E. Vogler, Cpl. Clarence H. Hunter, Cpl. William R. Buchanan, Jr., T/5 Rollins, T/5 Clyde S. Alley, T/5 Houston, T/5 James M. McClure, T/5 Guillermo Llaguno, Pfc. Minter, Pfc. Frank Frith and Pvt. Walter E. Stefanski.

In his report on the operation, the battalion CO had some cogent remarks to make. We quote a few of them for the benefit of other officers who may find their outfits in a like situation.

"Before occupying these positions all men were thoroughly briefed as regards their mission and were given psychological preparation for a rough time. This was carried out by the battery officers; and without it I doubt that the mission could have been successfully accomplished."

"All sandbags available in the battalion were filled before the operation commenced so that there would be no delay in occupation of positions and construction of revetments."

"The day prior to the withdrawal of 'C' Battery, the battalion commander and the battery officers discussed all details. The section chiefs were then briefed and every move planned. The greatest difficulty was the necessity to run motors to winch out guns and M51's. This invariably drew artillery fire, but, due to prior planning, the time necessary to get the guns out was cut to a minimum."

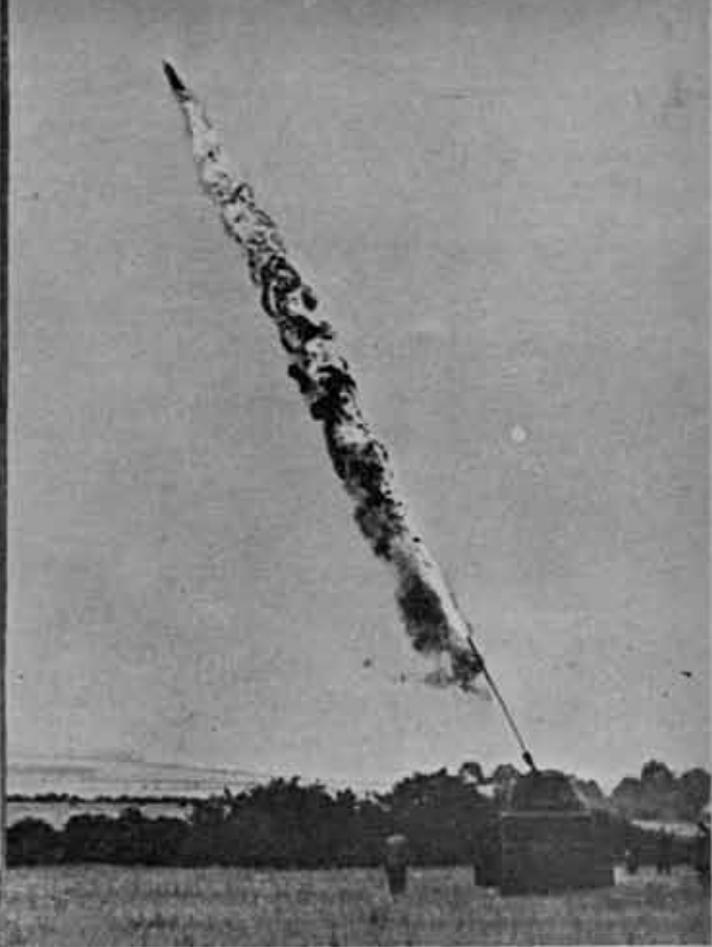
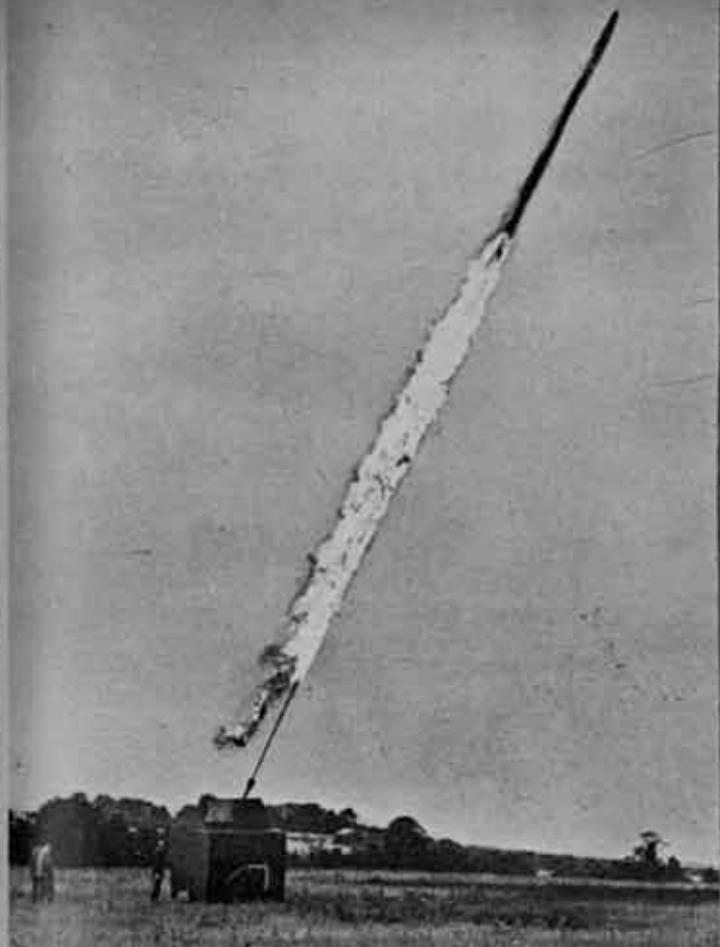
"Battalion officers *must* visit their positions daily when the men are under intense fire. The visits must be visits, not inspections. The men were particularly anxious to know how the Infantry was doing. No casualties resulted from these visits, although there were many close calls. I never allowed more than two staff officers in the area at one time and never permitted them to ride in the same vehicle."

"No fires by day when in an area under observation. One crew started a large smoking fire in their quarters and within five minutes had an artillery concentration on them."

"Sentries must have protected positions. A wall or doorway is not sufficient. One man was killed because he did not believe this."

It may be that the only way to learn how war should be fought is to fight in one. All we can say is that the 547th Battalion certainly had a taste of the real article.





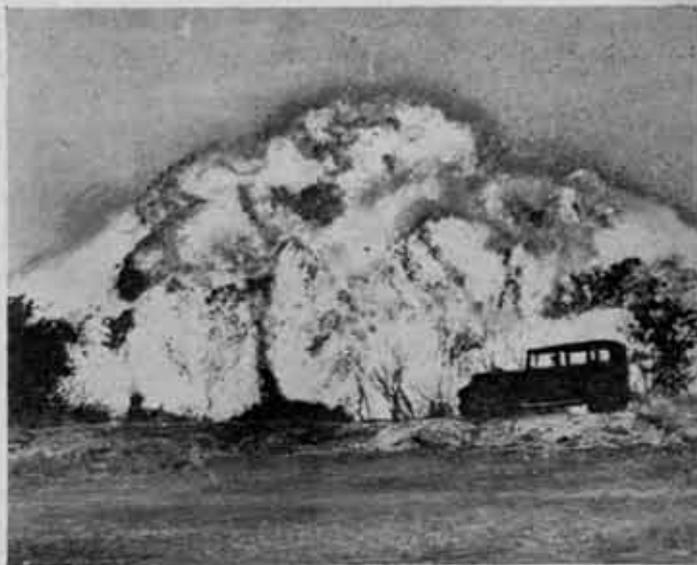
British Official

Armored car flame thrower, for use against low-flying aircraft or against airborne troops emerging from their aircraft.

Turning On the Heat^{*}

How Britain's scientists and oil experts protected her against invasion in 1940 by devices for setting the sea afire, turning the coastal roads into walls of flame and producing super Molotov Cocktails has been disclosed in London.

After Dunkirk when Britain was most vulnerable to attack and the B.E.F. had left most of its weapons in France, it was necessary to improvise stop-gap defenses. Geoffrey Lloyd, then Minister of Petroleum, consulted Lord Hankey who had experimented in the use of burning petroleum before the last war and in cooperation with Army authorities they carried out experiments on the Channel coast. Remembering the effectiveness of the Molotov Cocktail which is only a pint of gasoline in a beer bottle, Lloyd thought of projecting four-gallon tins of gasoline by means of a catapult. He suggested oil fires or flame traps on the roads leading through the low cliffs on the coast around Deal, operated by petrol lines run into defiles which would burn so fiercely that even the heaviest rain could not extinguish them. The first flame trap was working within three days;



British Official

The Fougasse, operated from an OP about 100 yards away, releases a ton of burning oil.

^{*}Prepared by British Information Service.



British Official

Heavy flame throwers, used for coast defense, were capable of several hours continual use.

within ten days oil tanks were being assembled in Kent; within three weeks twenty installations were operating. These flame traps have a burning capacity of from one to one and one-half hours but could be turned on for ten minutes or any time required. The tanks vary in length according to the gap they had to protect being sometimes 100, sometimes 300 hundred yards long. Eventually hundreds were installed in Kent, Sussex, Cornwall and even Scotland.

The handiest flame weapon proved to be the fougasse (named after the old military weapon which was a barrel filled with nails and stones which when exploded was like a whiff of grapeshot). The 1940 fougasse was a giant, static

Molotov Cocktail containing one ton instead of one pint of petroleum. It was a drum or barrel of oil ignited from a distance which could instantaneously project a flame of 100 to 150 feet from the starting point. It was used in units of four barrels operated from an observation post about 100 yards away. Thousands were installed in Britain and were mostly operated by the Home Guard except along the dangerous Channel coast when the Army took over. The fougasses were cleverly camouflaged, sometimes being hidden in gardens and painted to look like brick walls. They were only one-shot weapons, burning about ten minutes.

Lord Hankey devised a variant of the fougasse called the demigasse resembling a tar barrel which would explode like the fougasse with similar deterrent effect. There was even a fougasse hedge-hopper, a barrel hidden behind a hedge which, on pressing a button, would rise and leap over the hedge and ignite in the road.

To set the sea afire very large reservoirs of petroleum were connected with the sea by large pipes hidden in the shingle and running under the sea from 100 to 200 yards out. The petroleum was ignited by chemicals like calcium phosphide which ignites on contact with water. These were sent down the pipes in little balls which dissolved in the water and set the oil afire. This weapon was called the sea-flame barrage. It could not operate in rough seas and was established only along the critical stretch of the coast in the Dover-Folkestone area. It had a great psychological effect on the enemy. German planes frequently observed our experiments and we took steps to inform the German soldiers by leaflet and other means that they would meet literally the hottest reception if they tried to invade Britain. The enemy began carrying out their own experiments with troops to counteract our fire measures; 100,000 asbestos suits were ordered in Paris but the head pieces were wrong and the Germans were badly burned during practice.

More widespread than the sea-flame barrage was the land-



British Official

Oil lines, running 100 to 200 yards out to sea, release their cargo.



British Official

As the patches merge, they are fired chemically.

flame barrage which could operate in all weathers and was concealed in the base and superstructure of tubular scaffolding running along the beaches of the Channel coast.

To delay possible enemy paratroops mobile flame weapons were developed by converting fire pumps which sprayed gasoline instead of water. To protect the airfields armored-

car flame throwers were prepared which could project the flame into the air as well as along the ground.

Lloyd pointed out that all these devices would have been ineffective in themselves. Their essential strategic objective was to delay the enemy so that reinforcements might reach the threatened area in time.



British Official

The fire burns hotter.

time instead, is to introduce D_m/D_0 for $\sin \alpha$ and $D_m^2 + (St)^2$ for D_0^2 , as follows:

$$\omega = \frac{(57.3) SD_m}{D_0^2} = \frac{(57.3) SD_m}{D_m^2 + (St)^2} \dots \dots \text{Eq. (2)}$$

Now, the trouble with Eq. (2) is that ω is expressed as a function of three variables: S , D_m , t . To reduce the number of variables from three to two, divide numerator and denominator by SD_m , thus introducing the ratio, D_m/S . At the same time, define this ratio, D_m/S , by a new symbol " r ." We get

$$\omega = \frac{57.3}{r + t^2/r} \dots \dots \dots \text{Eq. (3)}$$

Eq. (3) makes it possible to work out the first problem. For the 200 mph case, $S = 100$ and $D_m = 15$, so that $D_m/S = r = .15$; and $t = .5$. We have

$$\omega = \frac{57.3}{.15 + .25/.15} = 31.4$$

Since the maximum available tracking rate with the M5 director is about 20° per second, tracking for a case requiring 31.4° per second would not be possible.

For the 600 mph case, $r = 15/300 = .05$ and hence

$$\omega = \frac{57.3}{.05 + .25/.05} = 11.4$$

This is the basis for the "yes" answer to the first problem.

For this curious case, we find that a threefold speed increase causes roughly a threefold decrease in tracking rate requirement.

This seeming paradox can be explained qualitatively, without benefit of mathematics, by consideration of two self-evident facts: (1) if D_m were zero, required tracking rate would be zero on the approaching leg, infinity at the instant the target passed the gun, and zero on the receding leg; (2) although, in the problem, both 200 and 600 mph targets were one-half second from midpoint, they were at different distances and presented different approach angles. Lest the reader feel that the problem was unfairly worded, it should be appreciated that *time*, rather than distance or approach angle, is the element of vital concern in delivering fire.

To develop a relation from which the second problem can be solved, consider again Eq. (3), which expresses the required slant plane tracking rate in terms of the ratio $r = D_m/S$ and time. If time be considered to be fixed, the required tracking rate, ω^R , can be considered to be a function of r only. Then by means of elementary calculus methods the value of r which would make ω^R a maximum, and the maximum value of ω^R for any given value of t , can be found as follows:

$$\omega^R = \frac{57.3}{r + t^2/r} = 57.3 \left[\frac{r}{r^2 + t^2} \right]$$

$$\frac{d\omega^R}{dr} = 57.3 \frac{[r^2 + t^2 - r(2r)]}{(r^2 + t^2)^2}$$

Evidently, $d\omega^R/dr = 0$ when $r = t$. Substituting $r = t$ in Eq. (3) we get

$$\omega^R \text{ max.} = 57.3/2t = 28.7/t \dots \dots \text{Eq. (4)}$$

which is a remarkably simple relationship.

Applying Eq. (4) to the second problem, in which $t = 2$, we find:

$$\omega^R \text{ max.} = 28.7/2 = 14.4$$

and this the basis for the "no" answer to the problem.

This completes the technical analysis relating to the two problems. The general considerations, suggested by the study, can now be undertaken.

Consider, to begin with, the significance of Eq. (4), which states that the maximum required tracking rate varies inversely as the time required for the target to fly from where it is to the point of least range. When plotted, Eq. (4) yields the hyperbolas shown in Figure 2. From Figure 2 it can be seen that if a slant plane tracking rate of 20 degrees per second is available, any target can be tracked until it is within about 1.5 seconds from midpoint; also that an increase of maximum available tracking rate, from 20 to 30 degrees per second, increases the available tracking time on approaching leg by only about one-half second.

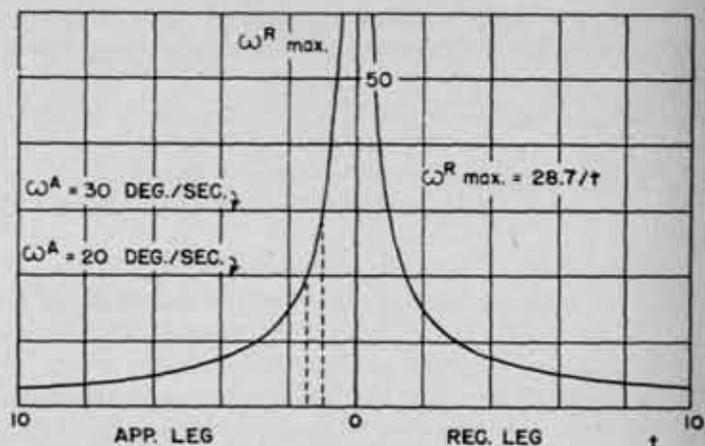


Figure 2—Relation between maximum required tracking rate in deg. per sec., and time, in sec., required for target to fly to point of least range (midpoint).

If all possible curves obtainable from Eq. (3) were plotted, using the axes of Figure 2, they would lie below the hyperbolas, regardless of value chosen for r . The limiting case would occur for $r = 0$, when the "curve" would coincide with the horizontal axis on the approaching leg, jump to infinity at time zero (midpoint), instantly jump back to the horizontal axis, and then coincide with the horizontal axis for the receding leg. This means that whenever r is very small, the available approaching leg tracking time, for a given available tracking rate, is greater than would be inferred from Figure 2.

There now arises the question as to what should be the definition of available effective firing time (t_f) and how such time may be affected by maximum available tracking rate, ω^A .

For those cases where r becomes small, and especially where r is less than unity, Eq. (3) indicates that high midpoint tracking, or slewing, rates will be required if aimed fire is to be delivered on the target on the receding leg. For such cases, fire, if achieved, is likely to be poorly aimed and, except for high explosive projectiles, relatively ineffective, even if hits are obtained.

If for such cases, we deliberately abandon the receding leg as a zone of effective fire, we can define t_e as the approaching leg time during which (a) adequate tracking is possible and (b) the range is short enough so that the cross course angle subtended by the target at the gun can absorb unavoidable errors in cross course aim. Let the largest range, at which this absorption of errors is likely to take place, be called D_E (effective hitting range, Par. 30, FM 44-51).

Then, for cases where all effective fire is delivered on the approaching leg, if no time were lost because of the ω^A limitation, t_e would be:

$$\sqrt{\frac{D_E^2 - D_m^2}{S}} = \frac{D_E}{S} \sqrt{1 - \left(\frac{D_m}{D_E}\right)^2} = r \sqrt{\left(\frac{D_E}{D_m}\right)^2 - 1}$$

Because of the ω^A limitation, the time lost would be, from Eq. (3)

$$t_L = \sqrt{\frac{57.3 r - \omega^A r^2}{\omega^A}} = r \sqrt{\frac{57.3}{\omega^A r} - 1}$$

Therefore, if ω^B were greater than ω^A near midpoint, so that effective fire became restricted to the approaching leg, we would have:

$$t_T = r \sqrt{\left(\frac{D_E}{D_m}\right)^2 - 1} - r \sqrt{\left(\frac{57.3}{\omega^A r}\right) - 1} \dots \text{Eq. (5)}$$

For given values of S and r , Eq. (5) shows that t_e , as defined above, can be increased only by increasing D_E or ω^A .

Now, Figure 2 shows plainly that increasing ω^A beyond 30 degrees per second reduces t_L , and hence increases t_e , very little. The "law of diminishing returns" has set in. Increase in D_E could be accomplished by using a fuze to provide greater aim tolerance, by developing an improved system of fire control, or by increasing care and skill in the use of available systems of fire control. The last named expedient is the only one available to the using arm. Increase in ω^A can be brought about only by redesign of equipment.

But Eq. (5) is, after all, a restricted equation. It assumes that ω^A is less than the value of ω^B for midpoint conditions. What is ω^B for $t = 0$? Eq. (3) shows it to be $57.3/r$. If ω^A were greater than $57.3/r$, what would t_e then become? A little reflection will show that, for such case, t_e would become

$$t_T = 2r \sqrt{\left(\frac{D_E}{D_m}\right)^2 - 1}$$

which is, of course, more than double the t_e defined by Eq. (5).

This appears to give a green light to efforts to increase ω^A . But let's see what we are up against.

Suppose we compute ω^B for $S = 100$ and $D_m = 10$ yards. Then $r = D_m/S = 0.1$ and $\omega^B = 57.3/0.1 = 573$ degrees per second—a fantastic value, even though the target speed is not high. We are up against the cold fact that, regardless of target speed, as D_m approaches zero, r approaches zero, and midpoint ω^B approaches infinity.

But suppose we did provide an ω^A equal to 573 degrees per second. We could then "track" for all cases when $r = 0.1$. That is, if $S = 250$ (500 mph) we could "track" if D_m were greater than 25 yards, and so on.

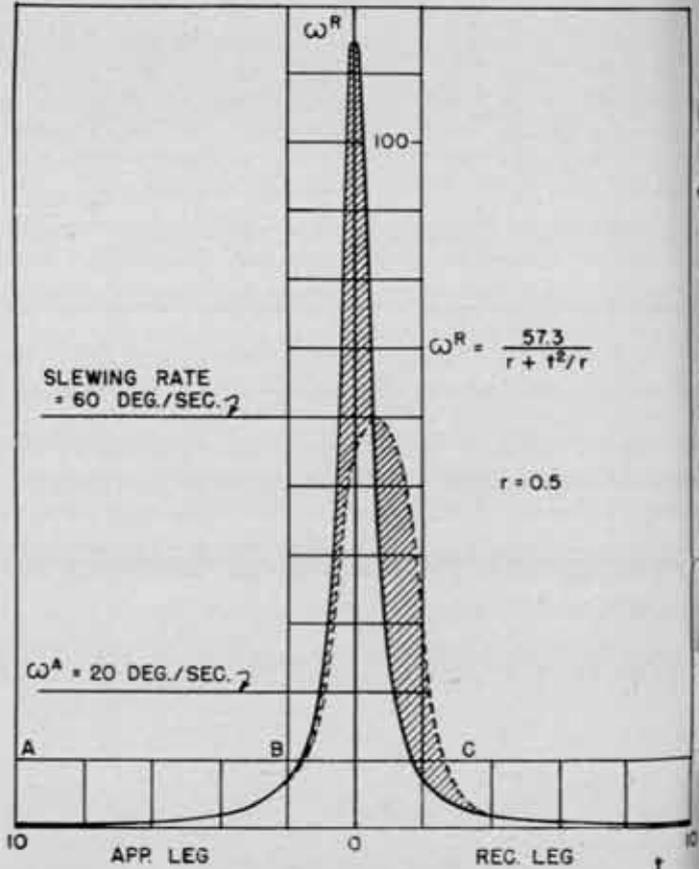
But could we really "track"? The true tracking operation

requires that the sight axis be made to coincide with the moving line of sight within a mil or two. Consider Figure 3. The shape of the $\omega^B - t$ curve shown is typical for cases where $r = D_m/S$ is less than unity. From A to B, tracking would be easy. At B, the high angular acceleration of the line of sight begins and is followed, almost at once, by an equally great deceleration. From B to C, the required tracking rate changes violently, so that tracking, in the proper sense of the word, is impracticable.

It is, however, feasible to perform the slewing operation indicated by the dotted curve. If the two shaded areas are equal, the angular displacement of the gun barrel, from B to C, is the same. This slewing operation can be performed manually when using automatic cannon, and by power control when using turrets.

The operation of slewing should not be confused with the operation of tracking. In slewing, the mission is to produce a large angular displacement of the gun barrel in a short time, without the use of too great accelerations. In tracking, the mission is to provide such exquisite control over the angular motion of the sight axis that its position can be made to coincide with the line of sight (line GT_s) within a mil or two. For unless the sight axis is so positioned, hits become impossible except at short ranges. A little reflection shows that the two missions are incompatible. One either slews, or he tracks; not both.

Now there are two situations under which the operation of slewing is necessary. In the first situation, the gun is pointed in a given direction at an instant when a target is approaching from a radically different direction. The gun must be displaced as quickly as possible, consistent



AA7522 ARTICLE for CA Journal Figure 3.

with reasonable accelerations, so that it can be pointed in the direction of the target, pickup achieved, and tracking begun. In the second situation, the target has been engaged on the approaching leg, has not been hit, and no other target appears, or is expected soon to appear, from the direction in which fire has just been delivered. Further, the required tracking acceleration has become so great that either accurate tracking has become impossible or the required tracking velocity (rate) has exceeded that which can be produced by the tracking mechanism. In this second situation, slewing to permit controlled fire on the receding leg may be warranted.

In weighing the technical factors which influence the decision as to whether or not engagement on the receding leg is warranted, two items should be appreciated. First, by the time accurate tracking is achieved, aim tolerance will be small, and will be diminishing instead of increasing as it does on the approaching leg. Second, if lucky hits are obtained with nonexplosive ammunition (the kind of ammunition used by machine-gun turrets), the lethal effect is likely to be disappointing. Not only are vulnerable areas less exposed, but the relative velocity of projectile and target is low, so that the lethal energy, which is proportional to the square of relative velocity, is a small fraction of what it would be on the approaching leg. The familiar

analogy of two automobiles which crash head-on, as compared with the case where they collide when going in the same direction, illustrates the point.

Now that the distinction between the operations of tracking and slewing has been made, pertinent questions arise. To what extent is it possible to combine both tracking and slewing control in the same device? If a device can make available slewing rates of, say, 60 degrees per second, can it also provide delicate control when tracking rates are in the neighborhood of one degree per second? Is it feasible to provide a lag between sight axis and gun barrel, so that earlier pickup on receding leg, following slewing, might be had? With any given system of control, under what maximum combinations of angular velocity and angular accelerations of the line of sight is tracking (matching the sight axis with the line of sight within a mil or two) possible? In most cases where slewing is necessary to swing the gun past midpoint, is shooting on the receding leg worth while?

Such questions are food for thought, and, in thinking about them, the "little-known facts" which have been discussed can be brought to bear. Until such questions are answered, it is reassuring to reflect that the "tracking rate" limitations in devices which are in current use are by no means as severe as they are commonly supposed to be.



Manpower Plus Materiel

Two major wars have shown that, starting from a state of unpreparedness, very large armies can be raised by about the second year, but that the production of modern weapons takes longer. Until they are supplied the Army cannot be fully trained, still less used effectively. If operations are ventured upon they are likely to prove unsuccessful owing to inadequate preparation and equipment. It follows that preparations in planning, personnel, and plant must be kept in a sufficiently advanced state to ensure that up-to-date weapons are supplied as men become available to use them.

The second lesson is that in total war most issues can be judged by their ultimate effect on the expenditure of manpower, whether in the services or in the factories, and that *there is no surer way of squandering manpower than by skimping development and supply organizations.* This results in the first place in slow transfer from peace to war production, and in the second place in low output per man employed in industries where plant and methods are old-fashioned. The cost may be anything from a few men to whole armies. These are the lessons of two world wars.—*London Times.*

Tracking with the M5 Director

By Lieutenant Frank B. Aycock, Jr., Coast Artillery Corps

In a previous article ("Ten Per Cent Hits With the Director"), emplacement, leveling and orientation of the 40mm fire unit were discussed. Certain suggestions as to range setting were also given. However, at the time that article was written, certain tracking principles concerned with the variable tracking point had not been completely verified. For that reason it was necessary to leave out the subject of tracking until tests were completed.

Tracking with the M5 Director and its modifications will be covered under the following heads:

- a. The mechanics of tracking
- b. The pick-up
- c. Correction of error
- d. Variable tracking point and track-off

THE MECHANICS OF TRACKING

If a man with average reflexes and normal eyesight will interest himself in tracking with a high degree of fidelity; if he is given a fair amount of practice; and if he will hold his handwheel correctly, he can become an excellent tracker. A great deal of emphasis has been placed on tracking and justly so. Because of this emphasis there has grown up a belief that there is something extremely difficult about tracking, so that only a favored few can become experts. All kinds of advice have been given as to selection of trackers in order to find those few individuals who can track well enough to be trackers. There is nothing difficult about tracking if one goes about it right. It is very probable that the majority of errors attributed to trackers should have been charged to improper emplacement, leveling and orientation.

How should a man prepare and position himself for tracking a target?

The first thing he should do is to adjust the diopter setting on his telescope. If this is stuck so that it cannot be adjusted, the telescope should be turned over to qualified personnel for repair. If the lenses are clouded the same thing should be done. One can't track if he cannot see clearly.

When the command "Target" is given, the handwheel should be raised to the 12 o'clock position. The handle was put on that tracking handwheel to be used. The tracker should hold it lightly but firmly between the thumb and first two fingers of the right hand. *He should not insert the fingers through the holes in the wheel.* The latter position is deceptively steady for target practice but it will not work on most combat targets. When rates get high and the wrist is twisted, tracking will become unsteady and at times the tracker will actually have to release the wheel to take a new position. He should take the right position to start with.

(Any officer having doubts on this score can remove them quickly by tracking fifteen or twenty difficult rocket courses. More about this later.)

When tracking, the left hand should be turned slightly,

with the left wrist placed against the director and with the fingers of the left hand steadying the tracking handwheel. If this is done, steadiness on slow targets will be equal to that obtained by inserting the fingers in the cutout holes of the handwheel, and will be immensely superior on fast targets.

In training trackers, emphasis should be placed on the foregoing because of the tendency of many, if not most, trackers to be careless in their methods of holding the wheel.

THE PICK-UP

There is only one way to make a fast pick-up.

The range setter takes the slewing clutch in his right hand and grasps the fingers of the right hand of the elevation tracker with his left, so that the elevation tracker's fingers are compressed against the tracking handle. In this way the range setter has perfect control of the director. He does not hold the tracker's wrist and he does not take the bottom rim of the handwheel and give it a series of pushes or pulls to get on target. To do this is fatal on fast targets. The range setter must have perfect control and the method described appears to be the only one that will give it.

Range sections must be constrained to do all pick-ups properly regardless of whether the target is fast or slow. Range sections who do an indifferent job on slow targets will find themselves with a set of bad habits impossible to overcome on fast targets.

From time to time one hears facetious remarks relating to the use of rockets by A.W. This is prompted by the practical impossibility of hitting a rocket. Such an attitude is very shortsighted. Plenty of rockets should be used. The pick-up should be made after the rocket is in the air just as with a real target. One should not try to track the rocket from the instant it leaves the launcher (this can be done but is of no value for pick-up practice). The difficulty of the courses should be gradually increased. Finally several launchers should be emplaced for various courses and no warning given as to when the rocket is coming or when it's coming from. When sections can pick up a "right" rocket without warning, fire on it creditably and then pick up either a "right" or "left" rocket, without warning, that was fired before the first hit the ground, and fire on it creditably, then they are getting somewhere.

Many crews from battalions assigned to the AAA School have been able to do this. One crew fired seven exhibitions, in July, 1944, using about 100 rounds in each demonstration, and missed only two rockets on pick-up and firing. They were given no warning other than by Nos. 8 and 9 and did not know from where the rockets were coming. On one occasion they picked up a "right" rocket and fired 26 rounds and then while this rocket was still in the air, picked up a "left" rocket. Since the time of flight of the "right" rocket was only about 18-20 seconds, a little computation involving the cyclic rate of fire of the 40mm gun shows that they must have been on, steady, and firing

within about 5 seconds. This compares well with the time on-carriage fire control and actual tests have shown that the well-trained director crew can get on target practically as quickly as the Computing Sight M7 crew when the latter is using telescopes. When the Computing Sight M7 is equipped with reflex sights, the director crew loses by only one second. It can more than make up for this by rate of fire since smoke and shock does not affect rate of fire with the director.

Such results cannot be obtained, however, unless the director trackers and range setter use proper methods such as are outlined above.

CORRECTION OF ERROR

Trackers will make errors on every course regardless of whether it is an easy course or a difficult one. Analysis indicates, and tests confirm, the fact that the errors made by trackers are by no means as important as what they do about them.

Two types of errors are made by trackers. Take the approaching leg of a crossing course as an example and consider the azimuth tracker first. When the azimuth tracker first picks up the target he tracks the center of mass. In the case of a towed flag, he generally takes the nose of the target since the flag does not have a specific point at center of mass. Since rates are slow, his handwheel is steady in one position for several seconds. Then he sees the target has pulled out in front of his cross hair. He has no signal to add rate until he sees this condition. He must see he is behind before moving, so he has made an error. He is off target momentarily, however small the error may be. There is only one thing to do, get back on target by adding rate through movement of the handwheel.

Quite often, in attempting to make this correction, the tracker will find himself slightly ahead of the target. He may be only a yard or two ahead as measured on the course line but he will make small mistakes quite often and be ahead. Now if the tracker will keep his tracking steady for a short time interval the target will provide its own correction. It will come right back to the cross hair because of its increasing angular rate. Analysis has shown that the along-course shooting error is of the same order of magnitude as the along course tracking error *unless one reverses the handwheel to correct*, in which case the shooting error may be as much as seven times the tracking error. Thus if the tracking error were 2 yards, the shooting error might be as much as 14 yards. It is probable that the oil gears might dampen out the error to some extent but nevertheless a large error would remain. Let the target make its own corrections.

On the receding leg we have the reverse situation. Rate is being decreased and errors are made in the opposite direction. If the tracker finds himself behind the tracking point, increasing the rate momentarily will bring the target back to the cross hair.

In elevation the same principles hold true. On the first part of the approaching leg, the tracker may find the cross hair slightly above the target. Hold the rate and the target will rise. Before midpoint the handwheel is reversed. The opposite condition now prevails and the crosshair is below. Increasing the rate will correct. After midpoint there is an-

other change as the tracker begins again to move his handwheel clockwise.

It can be seen that there will be one difficult place to track in azimuth and two in elevation. In azimuth the handwheel reverses its direction at midpoint but momentarily it is practically motionless with a fast rate set in. Trackers may be a little unsteady at this point. In elevation, just before midpoint and just after midpoint tracking will be a little shaky. Whenever a tracker reverses the direction of his handwheel at these points he will not be as steady as on other parts of the course.

Watch the tracker's handwheels. They should always move steadily in the same direction until these crossover points occur. Do not allow them to move clockwise one inch and back up a half inch, and again clockwise one inch and so on until they reach the point of maximum rate. Watch their handwheels and coach them and in a surprisingly short time they will catch on. After they have learned this, check from time to time to see that they haven't relapsed into their old habits.

VARIABLE TRACKING POINT AND TRACK-OFF

Early efforts at fire control with the M5 director were confused by the doctrine of track-off. It was not realized that, if the gun and director were leveled and oriented as perfectly as possible, track-off, 99% of the time, was not justified. Most of the track-off attempted was an endeavor to counteract a multitude of interacting errors, a thing impossible to do.

Then came the second phase. Both British and American light AA discovered almost simultaneously that percentage of line shots, and therefore hits, increased when the trackers picked one tracking point and stuck to it. Obviously if the shots were considerably off in direction of lead (non-line) for any particular target, sticking to one point would never produce a line shot; so doctrine was modified so that no track-off was attempted for normal conditions but where it was obvious that the gun was not oriented, track-off was allowed until the condition could be corrected.

With refinement of emplacement, leveling, and orientation, particularly elevation orientation, the number of line shots was increased. However, when all other errors which previously had cropped up were eliminated, one slight error still remained, the well known climb of the shots as the target approached midpoint. On service targets it is probable that the size of the target would more or less absorb this error, which is comparatively small, if the plane is flying a course perpendicular to the gun-director line or close to it. The slight tendency to climb is offset to a great extent on the normal target course by the increasing elevation parallax distance as the target approaches midpoint. On service targets however, if an enemy plane flies parallel to the gun-director line there will be no elevation parallax distance and even the extra size of the target will not absorb the error. You can test this for yourself by emplacing a director and gun so that the director-gun line points up and down the firing line instead of having the director behind the gun. Fire a couple of courses, tracking a single point on the target with no track-off. You will see some quite extraordinary results but you will not feel particularly delighted with them.

Eventually it was noted that this climb of the shot pattern as viewed from the gun and director occurred just as the elevation tracker reversed his handwheel on the approaching leg and the shots came to line again when he reversed on the receding leg. In other words, when the elevation tracker first sees the target, and insufficient up-rate is applied the target drifts upward along the vertical cross hair. He corrects by increasing the rate, turning the handwheel clockwise. At the cross-over point ("cross-over point" is defined as that point, in azimuth or elevation where rate becomes a maximum, causing a reversal of the handwheel) the target appears to reverse direction and goes down the cross hair. The tracker reverses his handwheel and moves counterclockwise. Out on the receding leg, the target starts up the cross hair and the elevation tracker reverses the wheel and moves clockwise.

Here is a chance to do something about the climb of the tracer. Previous track-off attempts were based on stale tracer information concerning conditions that might no longer exist and were unsuccessful for that reason. But the director tells you in unmistakable terms when shots are going to tend toward a non-line condition and tells you before it happens. From this we get a simple rule, namely, when the target tries to go up the vertical cross hair, the elevation tracker will track the top edge, when its apparent motion is down, he will track the bottom edge.

After tracking a few courses, many elevation trackers have stated that this is easier to do than tracking one single point. To the elevation tracker on a crossing course, first the top edge, then the bottom, and finally the top edge again are the leading edges. There must be a natural human tendency to track the leading edge since so many elevation trackers agree that the variable tracking point method is so easy to follow.

On target courses, using narrow flags, the variable tracking point gives a very high percentage of line shots all through the course. On service targets, where first the top of the fuselage and then the bottom becomes the tracker's leading edge it will give line when the target is passing through the principal field of fire. On those enemy planes flying parallel to the gun-director line, the method plus the increased size of the target will give much better results than can be obtained by track-off and should result in very good line shot performance.

The method has been tested at many varying ranges and angular heights and on speeds from 107 miles per hour to better than 300. It seems to be required for any course. On exceptionally fast targets at very high angular heights it does not give quite enough correction but on those courses correction is needed for only an extremely short time. The higher the slant plane angular height the closer the elevation cross-over points are to midpoint.

With a properly leveled and oriented gun no track-off is

necessary on crossing courses but with an incomer we have a different condition. Track-off will be necessary but use those orientation methods described in "Ten Per Cent Hits With the Director" and the parallelism methods given in FM 44-60, the amount of track-off necessary is known before the first round is fired. Those methods are One-Pole Parallelism with a string along the rear extension of the gun-director line, One-Pole Parallelism along the front extension using an additional pole for check and Scribe Mark Alignment. The amount of track-off will be equal to the parallax distance between the gun and director. If the target is coming straight over the gun-director line the parallax distance will be zero and will vary on different targets between zero and four to five yards at maximum when the target is flying perpendicular to the vertical plane containing the gun-director line. The azimuth tracker can judge this distance or if the pick-up is too hurried the range setter can judge it and tell him before firing starts.

In one test made by the AAA School, a gun section was able to orient by Scribe Mark Alignment within 60 seconds elapsed time and then proved the perfection of orientation and track-off procedure by firing at a PQ at 2,000 yards range on an incoming course. The azimuth tracker estimated the parallax distance and tracked off that amount on each course. Firing four shots per course simply to test the orientation procedure and track-off method, the azimuth tracker never got less than 3 out of 4 line shots. If he had been tracking on, all shots would have been wasted since all four shots were away before he could see the first in his telescope. Remember, however, that you must use a method giving perfect parallelism and the method must be followed with fidelity.

If the methods outlined above are followed, they will greatly increase the efficiency of the M5 Director and 40mm gun. The time from "Target" to "Fire" will be shortened, tracking will improve, more line shots will be gotten and the hit percentage will go up. Since the article "Ten Per Cent Hits With the Director" was written, ten per cent has been exceeded several times by individual crews. Using the methods described therein and tracking methods as outlined above always gives good hitting performance.

One final suggestion in conclusion. Officers training men to track, to set range, to load and fire, generally content themselves with telling the men how it is done. In your spare time, if you are an officer training gun sections, it is suggested that you learn to track expertly yourself. You will find it an invaluable aid in training the elevation tracker if you are a good azimuth tracker and can track with him. If you can track in elevation and watch the azimuth tracker you will be a better instructor. Even a good check sight leaves something to be desired. The officer who is a good tracker and range setter will turn out the best crews, all other things being equal.



AAA Notes No. 20, ETO

EDITOR'S NOTE: This extract from *Antiaircraft Notes Number 20, Headquarters, European Theater of Operations*, was written in March, 1945. More extracts from *AAA Notes, ETO*, will be published in the *JOURNAL* in as complete a form as possible, consistent with the dictates of military security, space requirements in the *JOURNAL*, and timeliness.

* * *

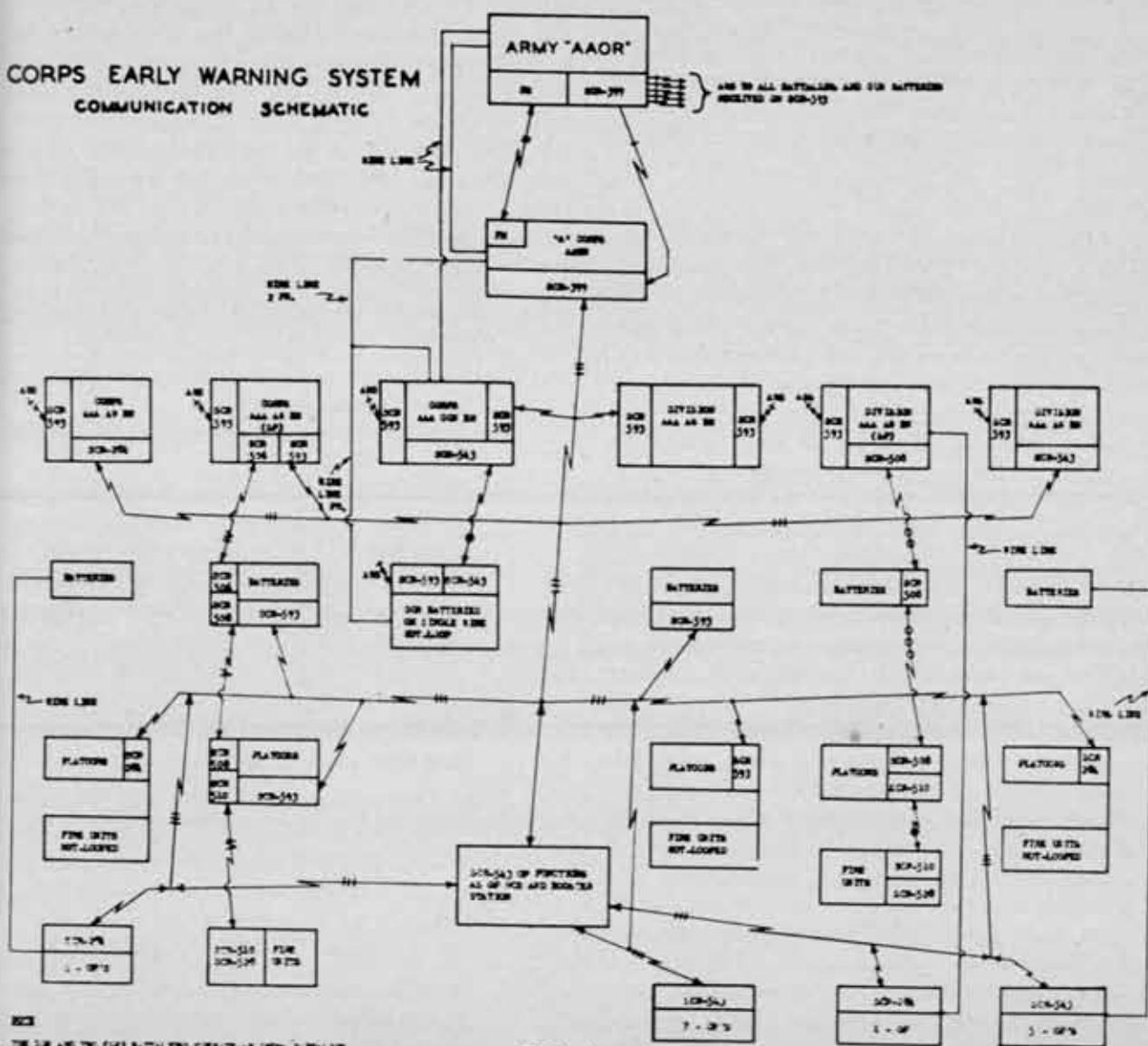
Subject: Early Warning within Corps Areas of Twelfth Army Group.

Source: AA Section, Headquarters Twelfth Army Group.

A general discussion of early warning to AAA units of Twelfth Army Group was presented in ETOUSA AAA Notes No. 2, paragraph 7. A more detailed discussion, presenting the early warning picture as it existed in Ninth U.S.

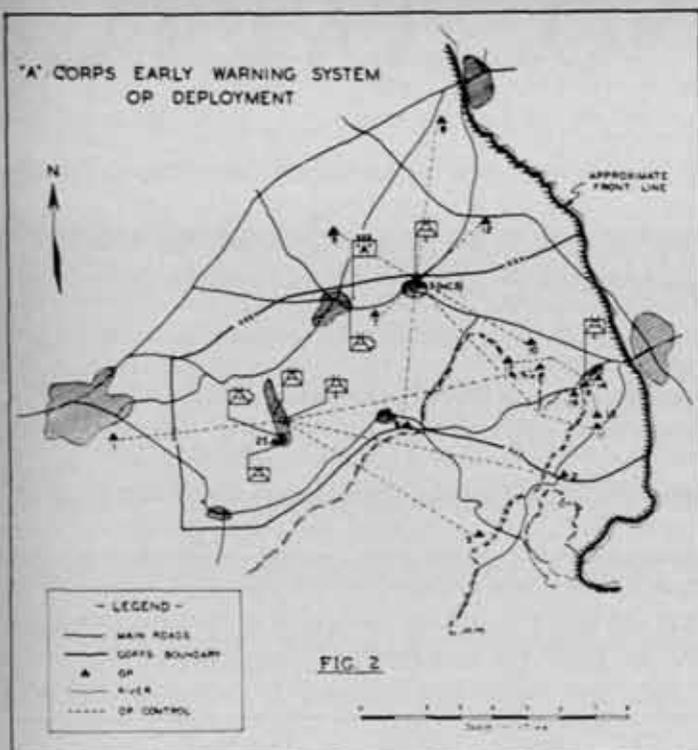
Army, was given in ETOUSA AAA Notes No. 14, paragraph 6. Early warning systems employed by corps are discussed in this article. A representative corps early warning system of each of the three operational armies in Twelfth Army Group is presented, evaluating the good and the bad features of each system, and combining the good features to arrive at the best possible solution. The increasing number of attacks by German jet planes, and the expected increased *Luftwaffe* effort to prevent an Allied crossing of the Rhine make this study all the more timely. The addition of the eight OP's to each AAA automatic weapons battalion has raised a number of questions as to the best method of employment: how they should be administered and supplied; whether or not the teams should consist of more than two men, and if so, where the extra personnel can be obtained; whether or not the disposition of the OP's should be coordinated at battalion level or group level.

X CORPS EARLY WARNING SYSTEM COMMUNICATION SCHEMATIC



THE 1st AND 2nd (OP) BATTALIONS OPERATE BY OPEN CIRCUIT AND ARE NOT LOADED THROUGH AAA G. NET.

FIG. 1



The three corps systems to be discussed are designated as "A" Corps, "B" Corps, and "C" Corps early warning systems, with an overlay showing actual OP dispositions, and a communication schematic showing the flow of intelligence data for each system.

(1) "A" Corps.

(a) "A" Corps has one AAA AW Bn (M), one AAA AW Bn (SP), and one AAA Gun Bn (M) attached as corps AAA and two AAA AW Bns (M) and one AAA AW Bn (SP) as divisional AAA. Of the equipment used in their early warning system, only two items are non-T/E; a FM radio set obtained by the Army from Air Corps sources for two-way communication to the Army AAOR, and a SCR-399 procured by the Army for all AAA groups because of insufficient coverage afforded by the normal AAA T/E radios. The SCR-399 is operated on reduced power strength but still gives excellent coverage of the corps area.

(b) The flow of intelligence data can be readily seen by reference to Figure 1. The AWS from the Army AAOR is received direct by the gun batteries and the gun and AW battalions. Filtered AWS information is rebroadcast by the AAA group on the corps AAIS frequency. A common AAIS frequency is in effect throughout the corps including all divisional OP's and fire units. Information from the OP's goes direct to near-by fire units, which are within radio range, and to the group operations room, where it is filtered and pertinent plots rebroadcast over the SCR-399 to all AAA units in the corps area. A centrally located OP acts as NCS and booster station for OP information. (See Figure 1.) Information from the gun battalion goes by telephone hot loop to all gun batteries and to group operations room, where it is filtered and rebroadcast. The gun battalion also has a direct wire line to the Army AAOR. Corps gun battalions are usually in unrestricted areas, and the direct communication with the Army AAOR often enables the battalion to secure permission to fire on enemy planes

that would normally pass as "unidentified." The AAA group has direct wire communication with the Army AAOR in addition to the two-way FM radio communication. The SP battalion, because of its different type radio equipment, does not contribute to the system to any great extent. Frequent radio silence within the armored units also prohibits the attached SP AAA unit from contributing information. The SP platoon headquarters monitors the corps AAA net with the SCR-593 and passes information to its units.

(c) The disposition of the OP's is made by each AAA battalion individually. (See Figure 2.) The corps AAA group coordinates the disposition of the OP's between battalions. The OP's are manned by three-man crews and each battalion is responsible for the administration and supply of its own personnel. OP's operate during daylight hours only. The extra man for the OP detail is obtained by the AAA battalion in two different ways; one divisional AW battalion attaches the intelligence observer (SSN 676) from each AW platoon to an OP team; other battalions pool the available OP personnel and establish fewer three-man teams. The battalion mentioned above as attaching the platoon observer to the OP team also keeps a different unit at the battalion CP each day for the maintenance of equipment and rest of personnel. Other battalions which are only partially equipped cannot afford to do this. The method of feeding the OP's varies; one battalion has two men from each team come in to battalion headquarters for each meal and these men carry a hot meal back to the third man; each OP in this battalion also has four days of C rations on hand; other battalions merely attach the OP's to their nearest element of the battalion, which is given the responsibility of feeding the OP's.

(d) The good features of "A" Corps early warning system are:

1. Two-way communication with the Army AAOR by both radio and wire.
2. Wire communication between gun battalion and Army AAOR.
3. Use of SCR-399 in the AAIS net, insuring coverage of entire corps area.
4. Common AAIS frequency between group, AAOR, fire units, and OP's, to include divisional AAA battalions, insuring rapid transmission of information and minimum relays.
5. Use of a centrally located OP as NCS.
6. Gun batteries receive AWS information direct.
7. Three men are used for each OP station, insuring more efficient operation.

(e) The limiting features of "A" Corps system are:

1. The AAA Group does not coordinate the disposition of all OP's; this results in too great a density of OP's in some sectors and too thin a density in others. (See Figure 2.)
2. In the event wire communication between the gun batteries and the AAA group operations room failed, information from the gun batteries would have to be relayed through the battalion headquarters rather than going direct.

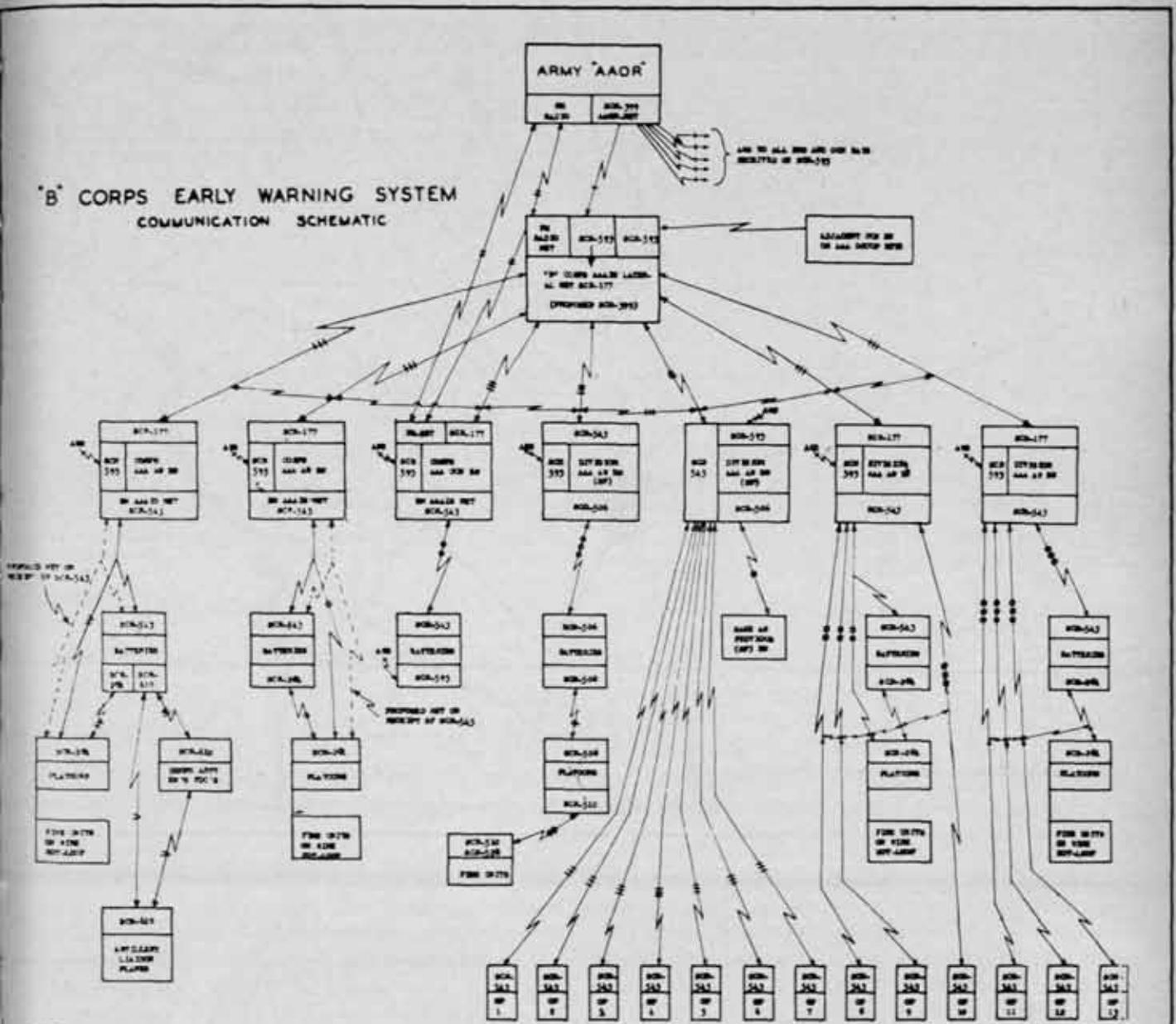
(2) "B" Corps.

(a) "B" Corps has two AAA AW Bns (M) and one AAA gun battalion attached as corps AAA, and two AAA AW Bns (M) and two AAA AW Bns (SP) as divisional AAA. A FM set procured by Army through Air Force sources for two-way communication with the Army AAOR, SCR-399 procured by Army for use in the corps, AAAIS net, and a SCR-610 (FM) procured from the corps artillery for use with the corps Arty FDC's and artillery observation planes comprise the non-T/E equipment used by "B" Corps AAA group. The flow of intelligence data in the AAAIS net is featured by the corps "lateral net." (See Figure 3.) Throughout their operational experience, "B" Corps has always covered a large area. The areas covered have been characterized by terrain and ground conductivity

that is unfavorable for good radio transmission and reception. In order to overcome these communication difficulties, the corps AAA officer has established a corps lateral AAAIS net in which all of the AAA battalions, except the SP battalions, use their SCR-177 to rebroadcast all AAAIS information in their sectors. The SP battalions tie into the net through their SCR-543's.

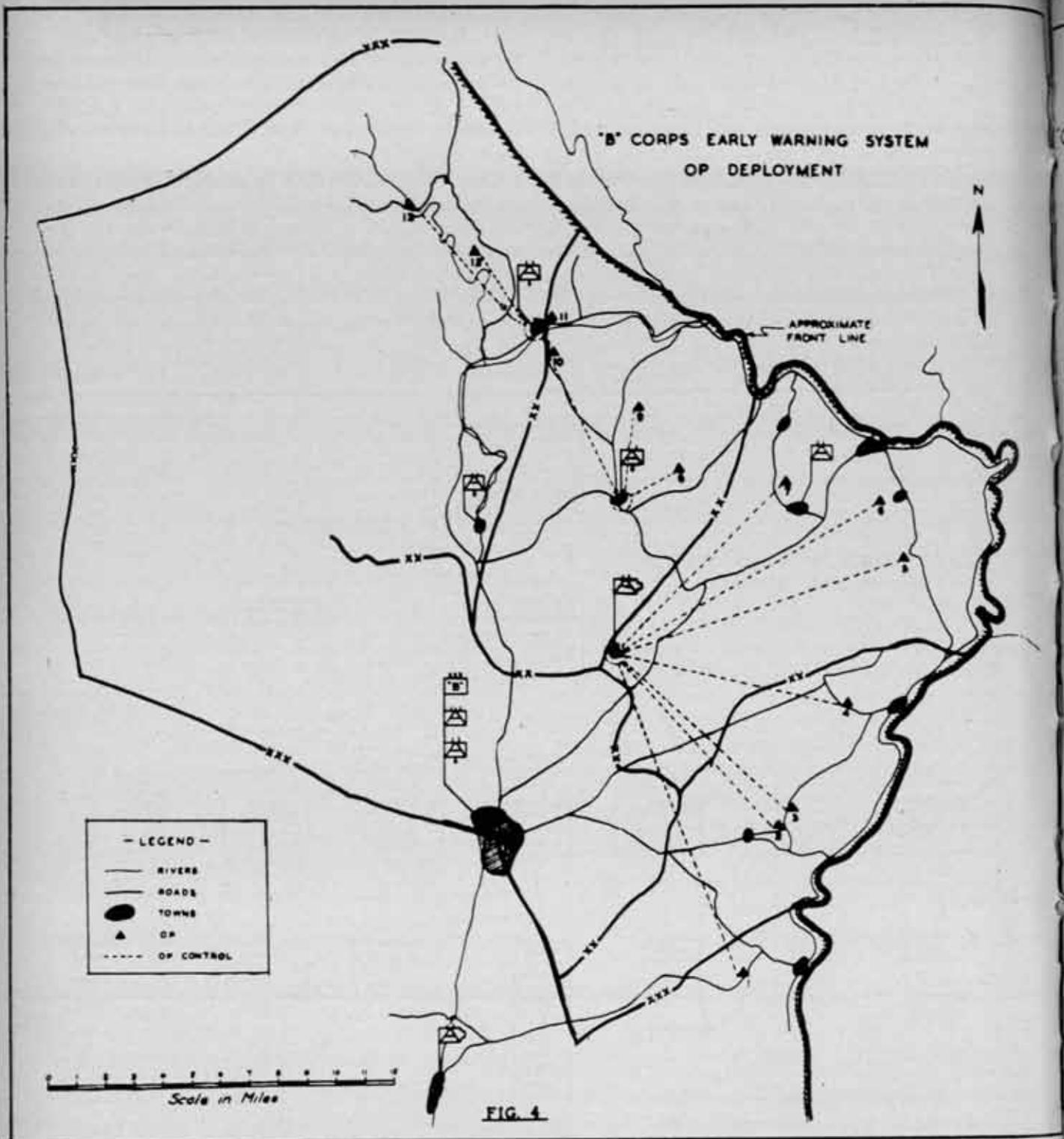
(b) The complete flow of intelligence data is shown schematically in Figure 3. The AWS information from the Army AAOR is received directly by the gun batteries and each AAA battalion. Pertinent AWS plots are rebroadcast by the group over the corps lateral net on the SCR-177. (A SCR-399 has later been obtained to replace the SCR-177 for the group AAAIS broadcast.) The corps does not have a common AAAIS frequency down to fire

"B" CORPS EARLY WARNING SYSTEM COMMUNICATION SCHEMATIC



- 1. SCR-177 BATTALION OPERATES THE CORP AAAIS NET
- 2. ALL BATTALIONS AAAIS NETS ARE ON A COMMON FREQUENCY FROM THE CORP LATERAL NET EXCEPT THE SP (SP) BATTALION AS SHOWN ABOVE.
- 3. DIVISIONAL BATTALIONS OPERATE COMMON AAAIS - CHANNEL NET.
- 4. SOME OF PLATOONS USE SCR-543 FOR REBROADCAST IN LOTS OF SCR-177.
- 5. SCR-399 OPERATES DIFFERENT FREQUENCY.

FIG. 3



units. Each battalion has a separate AAAIS frequency and in most cases the battalion nets are used as combined AAAIS-command nets. The OP's belonging to the divisional SP AAA unit (Nos. 1 to 7), are on the corps AAAIS frequency but OP numbers 8-10 and 11-13 are on separate battalion AAAIS frequencies. (See Figure 3.) (The divisional battalions maintain that their radio equipment must be available for a combined AAAIS and command net, and the corps AAA group has consequently allowed them to establish a battalion AAAIS net on a separate frequency from that of the corps system.) One of the division AW battalions is tied in with the division intelligence net, over

which is received direct information of the location of booby traps, mines, etc., which aid the battalion officers of reconnaissance; information concerning hostile aircraft detected throughout the division area is also received over this net. One corps AAA AW Bns maintains liaison with the artillery FDC's and observation planes, transmitting the pertinent information obtained to other AAA units over the corps lateral net. Information from the OP's goes direct to the fire units of the battalion which controls them, but this information must be rebroadcast by the battalion group and the other AAA battalions. Group filters and rebroadcasts pertinent information to the remainder of the

CORPS EARLY WARNING SYSTEM COMMUNICATION SCHEMATIC

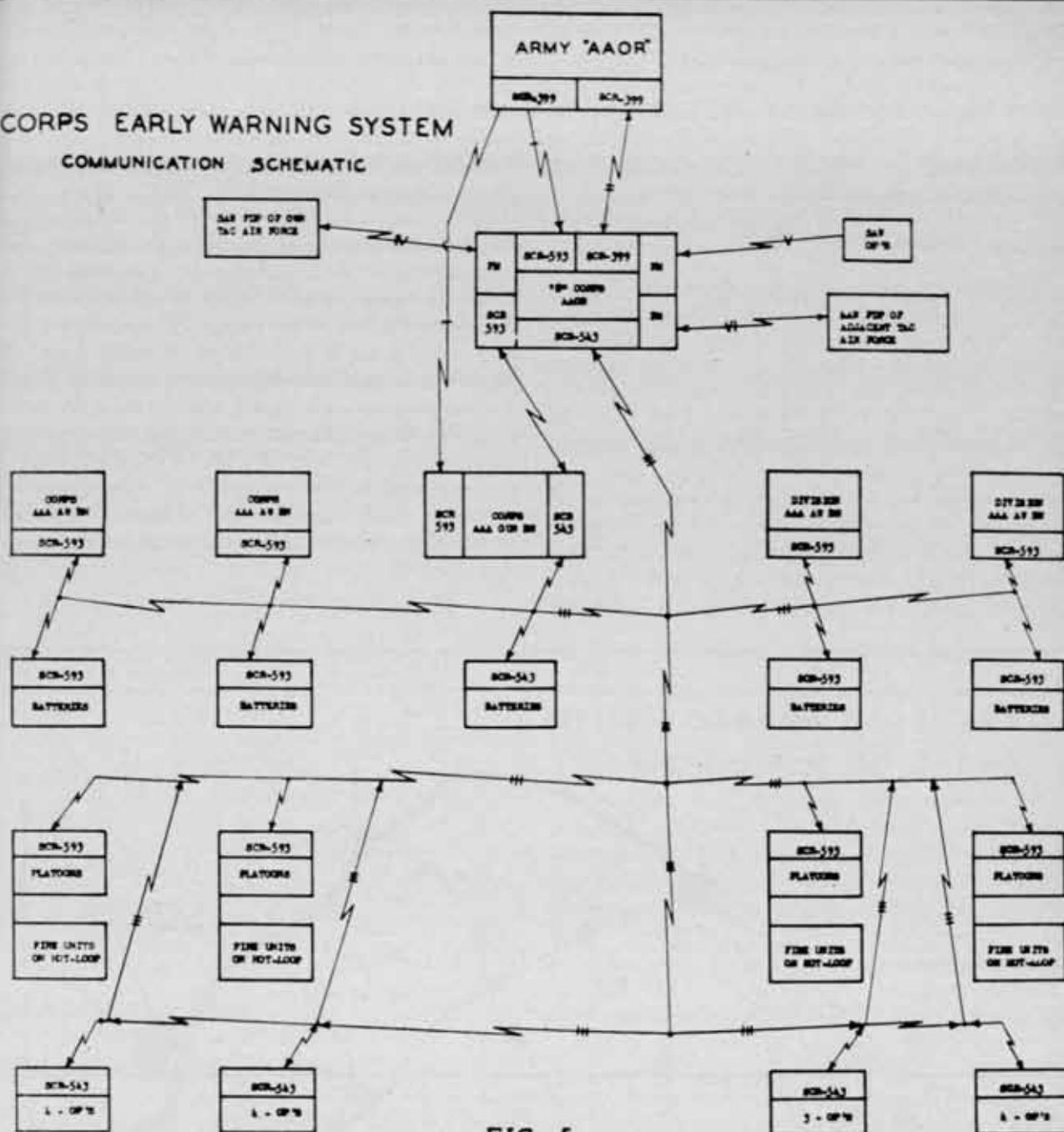


FIG. 5

NOTE:

SOME PLATOONS USE FINE HOT-LOOP WITH SCR-399.

Information from the gun battalion is transmitted by the battalion over corps lateral nets, using a SCR-177. The gun batteries are on a battalion AAAS frequency that is different from the corps AAAS frequency, thereby necessitating a relay through the battalion headquarters for information picked up by the batteries.

(c) The disposition of all OP's is coordinated by group, but their administration and supply is accomplished by the parent battalion. The OP's are sited generally in an arc covering front-line approaches. (See Figure 4.) They operate during daylight hours only, and are manned by teams varying from two to four men. The extra man in the OP's manned by more than two men is obtained by pooling all available OP's and establishing fewer teams. The method

of feeding and supplying the OP's varies with the battalions concerned; some make arrangements for OP's to eat with the nearest unit whether it be AAA, infantry, or artillery; others make the nearest component of the AAA battalion responsible, while still others attach the OP's to batteries; in some cases the OP's prepare their meals.

(d) The good features of "B" Corps early warning system are:

1. The corps group coordinates the disposition of all OP's.
2. Two-way communication direct with artillery AAOR for both AAA group and AAA gun battalion by means of FM radio.
3. Gun batteries receive AWS information direct.

4. Use is made of information available at artillery FDC's and observation planes.

(e) The limiting features of the system are:

1. A common AAAIS frequency does not exist throughout the corps area. Too many relays are necessary in order to get information to adjacent fire units.
2. Some OP's are manned by only two men.
3. OP's are not sited so as to give all around coverage.

(3) "C" Corps.

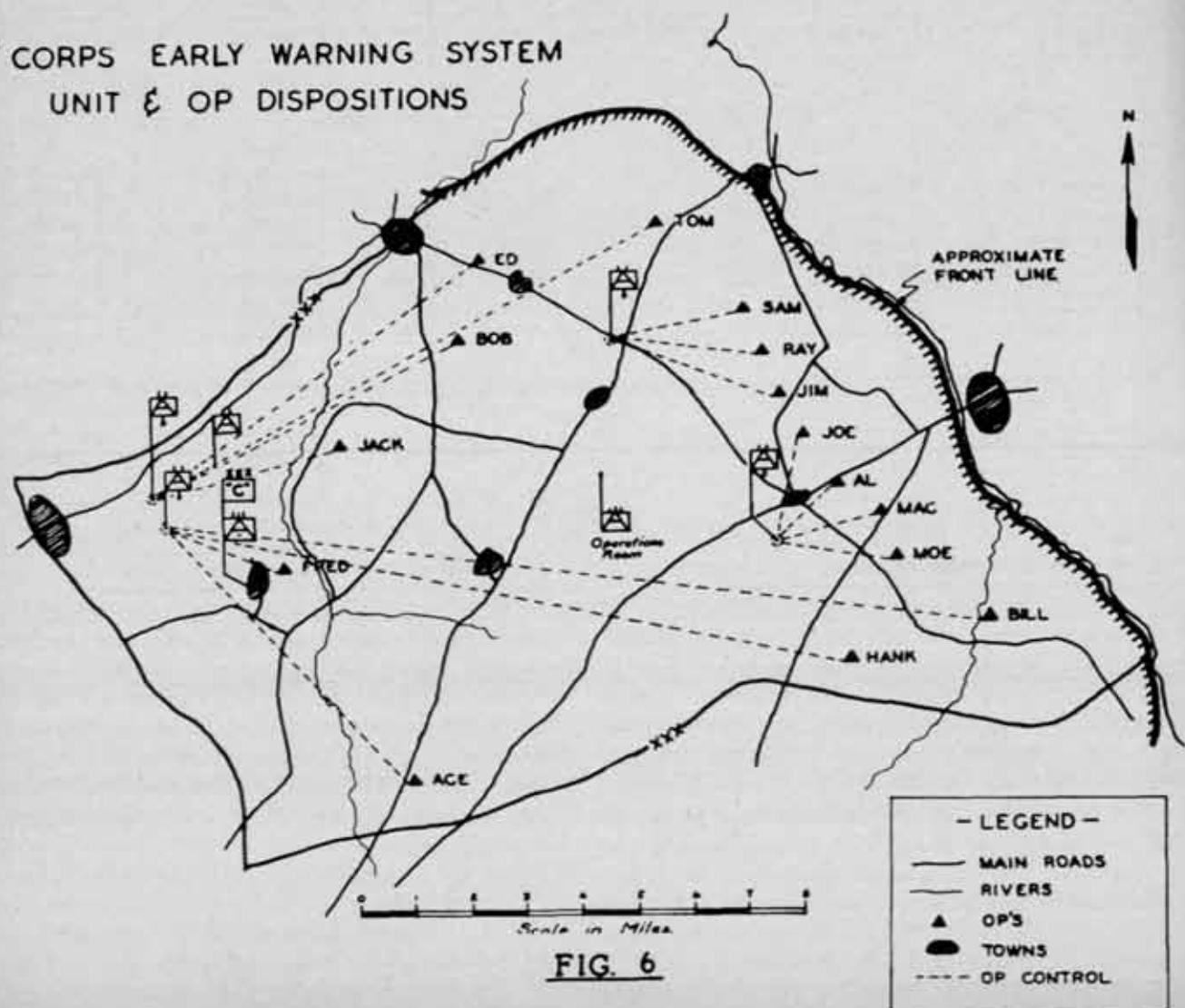
(a) "C" Corps has two AAA AW Bns (M) and one AAA Gun Bn as corps AAA, and two AAA AW Bns (M) as divisional AAA units. One FM set obtained by Army from Air Corps sources for monitoring signal air warning (SAW) OP's, and one SCR-399 obtained by Army for two-way communication with the Army AAOR comprise the non-T/E equipment used by "C" Corps. The main characteristic of "C" Corps early warning system is that the AAA group operations room is separated from the group headquarters, and set up in the signal air warning battalion CP, which is centrally located with respect to the AAA in the corps area. The SAW battalion informally has agreed

to move each time the AAA group moves its operations room.

(b) The flow of intelligence data is as shown in Figure 5. The SCR-399 is used for two-way communication with the Army AAOR. The Army AWS information goes direct to the group and gun battalion only. Neither the gun batteries nor the AW battalions monitor the Army AAOR direct. The signal air warning (SAW) EDP of "C" Corps own tactical air force and that of the adjacent tactical air force have both placed a man with two-way radio communication at the AAA group operations room. This sometimes allows a more rapid identification of aircraft to be made. Two SCR-593's are used at the operations room, one of which was borrowed from an attached AW Bn. One SCR-593 is used for monitoring the Army AAOR, and filtered information is passed down to the fire units over the corps AAAIS net. The other SCR-593 monitors the gun battalion. A common corps AAAIS frequency is used throughout, and a SCR-543 is used by the group for broadcasting the corps AAAIS information. The SCR-543 has so far given adequate coverage to the corps area, due chiefly to three factors:

1. The corps area is small.

"C" CORPS EARLY WARNING SYSTEM UNIT & OP DISPOSITIONS



- 2. The terrain is flat and the ground conductivity is good.
- 3. The group operations room is centrally located.

Information from the OP's goes directly to all near-by fire units within radio receiving range, and to the corps group where it is rebroadcast to insure coverage throughout the area. Information originating within the corps area is also rebroadcast to the Army AAOR over the SCR-399.

(c) Disposition of all OP's is coordinated by the corps AAA group. OP's are sited generally in a ring about the corps area, thickened toward the front. (See Figure 6.) In moving situations the AAA battalions may initially spot their own OP's, but they are later resited by group when the situation so warrants. The OP's normally operate during daylight hours only. "C" Corps assigns names rather than numbers to the OP's. The manning personnel of the OP's varies from two to four men. The additional personnel are obtained by doubling up on the normally authorized two-man teams. The OP's are administered in various ways by the different battalions. Some cook individually, some eat 10-in-1 rations and are periodically rotated with others who are getting hot meals. Other OP teams eat in shifts at the nearest AAA unit.

(d) The good features of "C" Corps early warning system are:

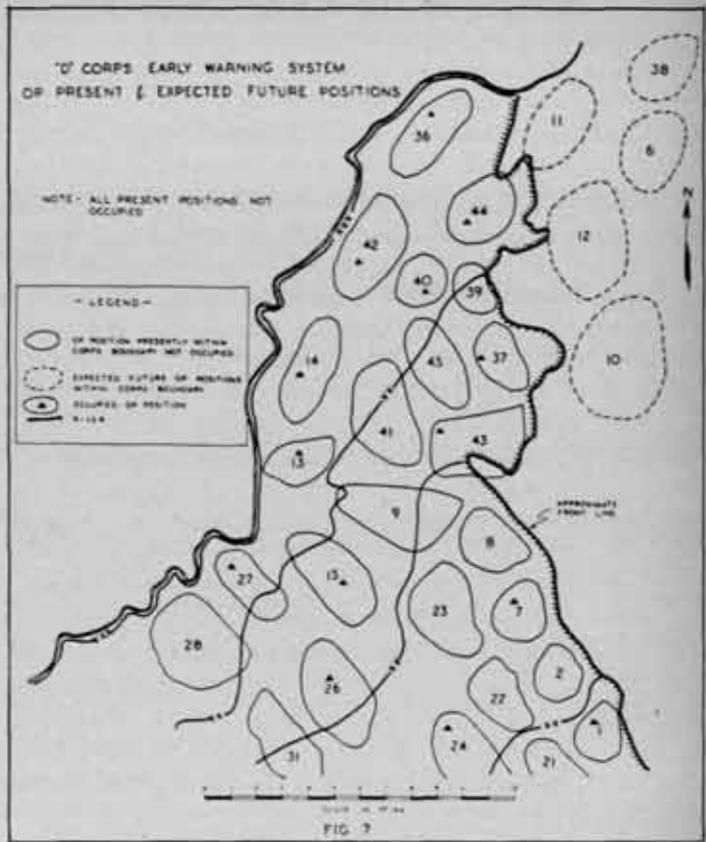
- 1. The AAA group coordinates the disposition of individual OP's insuring all-round coverage.
- 2. The group operations room is centrally located.
- 3. Maximum use is made of adjacent sources of early warning information.
- 4. Corps AAAIS information is transmitted up to the Army AAOR.
- 5. The two-way communication is maintained with the Army AAOR.
- 6. A common AAAIS frequency is used between OP's, fire units and group.
- 7. Obtaining early identification of planes by means of the SAW FDP is possible.

(e) The limiting factors are:

- 1. Gun batteries and AW battalions do not receive the Army AAOR broadcast direct.
- 2. There is no direct two-way communication between gun battalion and Army AAOR.
- 3. The movement of the operations room is dependent upon the SAW unit over which the group has no control.
- 4. Some OP's are manned by only two men.
- 5. The SCR-543 will not normally give adequate coverage of the corps area in a mobile situation.

From the foregoing description it is apparent that combining the good features existing in each system and minimizing the limitations of each would produce a more effective system than any of present ones as they now exist.

It is believed that "A" Corps could materially improve its system by coordinating the individual dispositions of the OP's. As can be seen from Figure 2, many of the OP's are less than 600 yards apart. It is recognized that terrain features play a major role in their siting and that adjacent OP's may sometimes, of necessity, be sited closer together than is normally desirable. However, battalion control of the dispositions will quite often lead to a "bunching" of



teams that could be more advantageously disposed elsewhere in the corps area. The flow of intelligence data in "A" Corps is excellent. The only suggested improvement would be to have the gun battalion AAAIS frequency the same as that of the corps AAAIS frequency, which would enable gun batteries, when on search, to transmit intelligence data direct in case the existing wire communication failed.

Although "B" Corps coordinates the siting of the OP's, it is believed that by thinning the perimeter dispositions and siting some of the OP's so as to give coverage in depth, a better over-all coverage could be obtained. It is desired to point out, however, that "B" Corps is operating over very difficult terrain and some of the OP siting as appears in Figure 4, is misleading. For instance, OP's numbers 2 and 3 are only about 2,500 yards apart, but they command opposite fields of view covering a large area. It is felt also that there are too many relays in the dissemination of intelligence data. If all OP's, fire units, and group operations rooms were on one AAAIS frequency, increased efficiency could be obtained.

"C" Corps has taken maximum advantage of the warning services available. However, the system could be improved by having AWS information go direct to the gun batteries and all AAA battalions. Also, it is undesirable to have fire restrictions relayed, except to insure receipt of the fire restrictions. The central location of the operations room is a desirable feature, but the continued efficient operation of an AAA group operations room separate from the group headquarters has yet to be proved in mobile warfare. It is believed that the use of a more powerful radio set at the AAA group operations rooms together with establishment of a centrally located OP team for a net control and booster

station, as is used in "A" Corps, eliminates the necessity for central location of the AAA group operations room. Even though the present system in "C" Corps is giving very satisfactory results in their present situation, it is believed that the communication system in effect in "A" Corps is a more satisfactory answer in the average situation. The desirability of passing information from the corps area up to the Army AAOR is readily recognized, but it is not thought that the advantages gained by so doing equal the advantages of using the more powerful radio set for dissemination of intelligence data to units within the corps area.

The above discussion has covered most of the desirable features of an efficient corps early warning system. However, one important point has been neglected—the selection of future OP positions so as to insure maintenance of an all-round coverage in depth in moving situations. A good solution to this problem is now in effect in one of the army corps other than the three that have been mentioned. For purpose of discussion this corps will be referred to as "D" Corps. "D" Corps system maintains a continual map study of the terrain offering desirable OP positions in areas of the expected advance of the corps. Figure 7 shows an actual overlay of occupied OP positions within the corps area, unoccupied but favorable positions within the corps area, and favorable positions located in territory in the direction of the expected advance of the corps.

To summarize, the solution of the corps early warning problem involves two basic factors:

- (a) Communications involving the flow of intelligence data.
- (b) Proper use of visual OP teams, to include:
 1. Control of OP dispositions, including expected future dispositions.
 2. Administration and supply of the OP teams.
 3. Manning personnel required for each OP team.

As regards factor (a) above, it is believed that the communication schematic as used by "A" Corps as modified so as to have the individual gun batteries on the corps AAAIS frequency for transmitting as well as receiving and the division AAA AW Bn (SP) monitoring corps AAAIS with SCR-593 at each platoon, offers the best solution for the average situation. Maximum use of all outside sources of

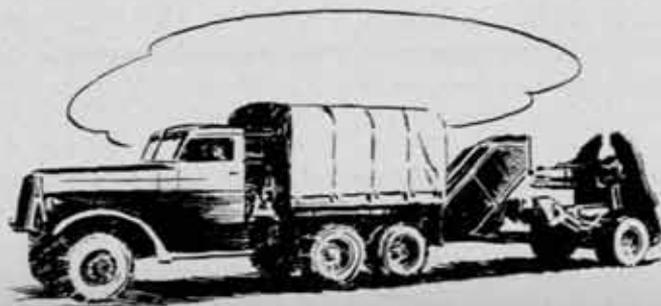
information, as exemplified by "C" Corps, should be made whenever possible.

As regards factor (b), 1., it is emphatically recommended that the corps AAA group *must* coordinate the disposition of each individual OP position in order to insure a complete corps area coverage *in depth* with the selection of future expected positions as shown in Figure 7 is essential to obtain maximum effectiveness.

Regarding factor (b), 2., administration and supply of the OP's must of necessity be a flexible system. The method employed by the divisional AAA AW battalion in "A" Corps, in which elements of each OP come into battalion headquarters for meals is a good solution that has proved practical for at least one battalion. It is recognized, however, that with the corps AAA group controlling the individual OP dispositions, the factor of distance may sometimes make this system impractical. Having the men coming in to the nearest element of their parent battalion, or a near-by element of another AAA battalion, would appear to offer a good solution. The system of rotating the OP teams so that one is always at battalion headquarters for maintenance of equipment is also considered an excellent idea.

As regards factor (b), 3., manning personnel required for each OP, the opinion was practically unanimous throughout all armies that two men were insufficient. Again it is felt that the solution of this problem by the "A" Corps divisional AW battalion above is excellent. While admittedly the taking of the intelligence observer (SSN 636) from each automatic weapons platoon aggravates an already acute manning problem, nevertheless, it is felt that it is the best practical approach to the problem. The doubling up of OP teams is satisfactory only so long as the corps occupies a narrow and confined sector, and the reduced number of teams is sufficient to provide all-round coverage.

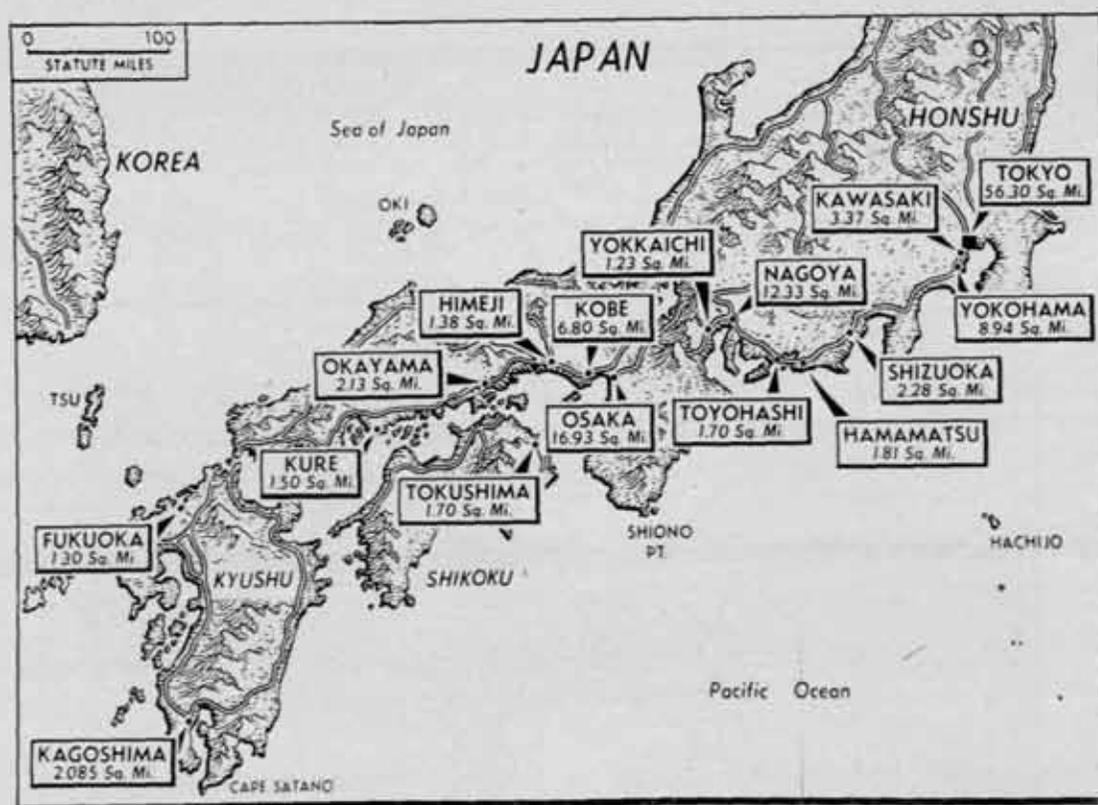
In conclusion, it is desired to reemphasize the purpose of this article: chiefly, to present an interchange of ideas between Armies from which the best possible solution to corps early warning may be obtained. Specific details as regards each corps system, such as the method of calling plots, the sector divisions of the corps areas, etc., have been purposely omitted. Satisfactory solutions to these problems have been worked out by all corps, and the difference between any two systems is not great enough to warrant presentation.



Pacific Theater



Comparative losses in the Pacific Amphibious campaigns indicate some of the cost of the present favorable situation. The U. S. figures include all services and all killed, wounded, and missing. Jap figures include only those known killed or taken prisoner. The figures do not include the early defensive actions such as Bataan, Guam, and Wake, nor those of the early campaigns in the Solomons or southeastern New Guinea. The black areas were Jap-held 20 May.

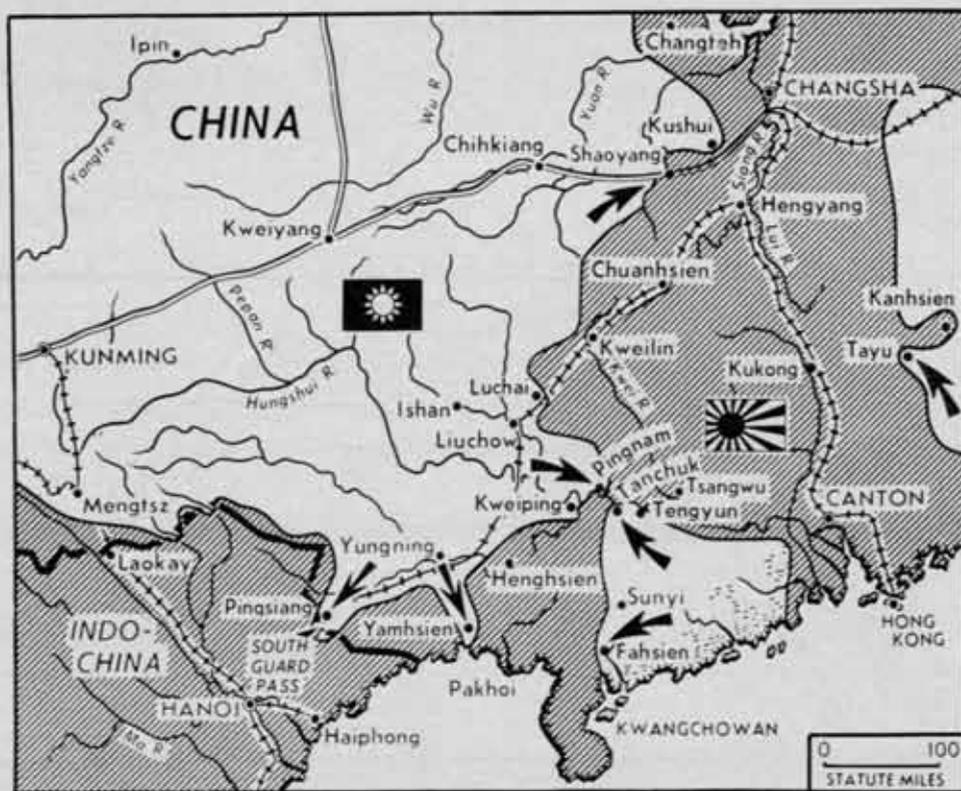


As of 8 July, these Jap cities had one square mile or more burned out by air strikes. Nine other cities had damage of less than a square mile. Five other cities, attacked up to that date, had damage that was not released for publication. Between 8 July and press time, the American raids had been stepped up. On 28 July General Le May named eleven additional Jap cities which would be wiped out; six of the eleven were hit the next day.

China

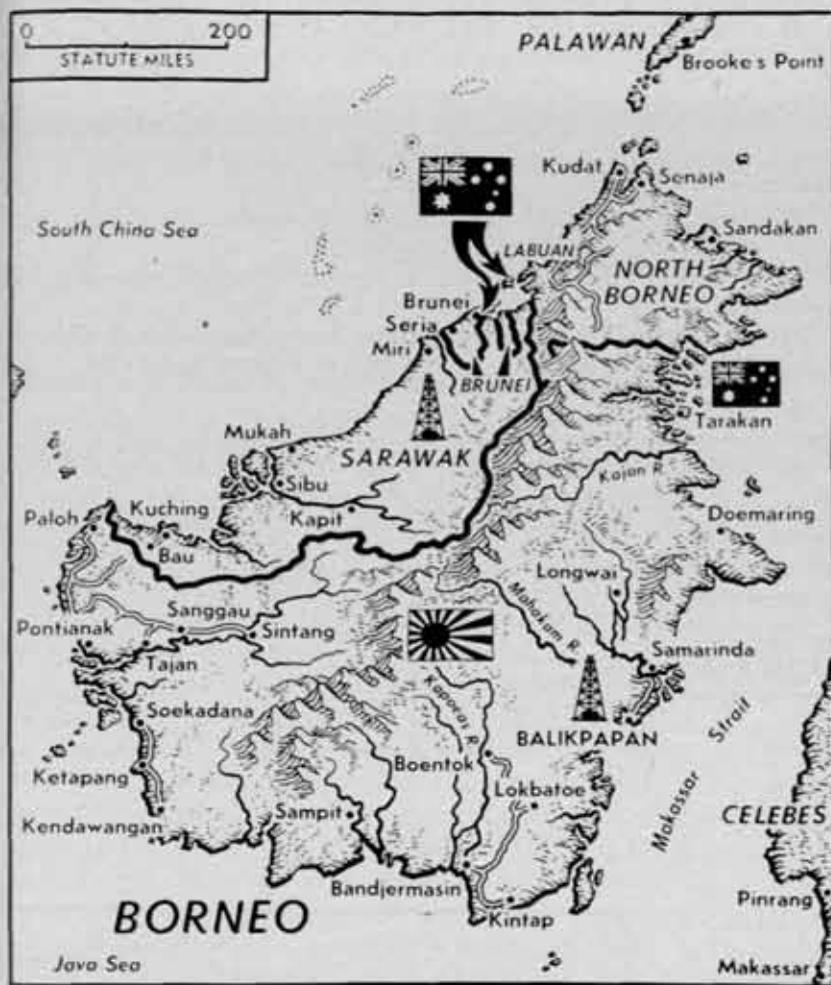


On 16 June, Chinese troops were reported at the gates of Wenchow (1), were (2) following up the withdrawing Japanese after occupying Ishan on Liuchow in three columns. North of Hong Kong (3) the Japs were trying to strengthen the Hankow-Canton corridor. Shaded area is Jap-held.

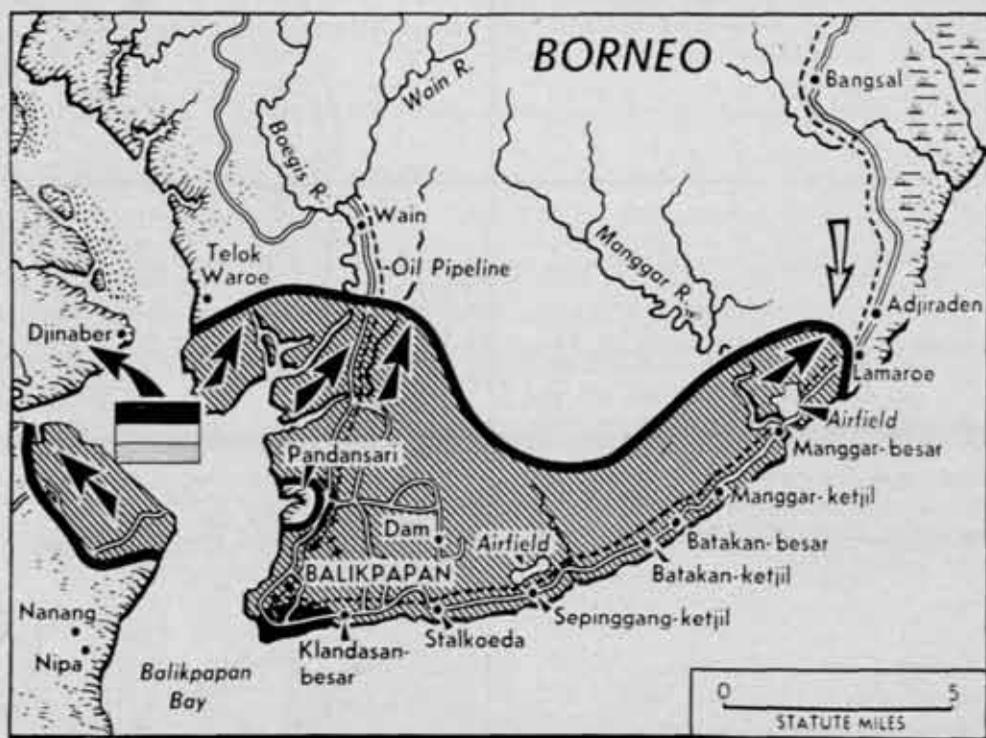


By 11 July, the center of interest in the China fighting had shifted to the south. Arrows locate the Chinese drives. Yamhsien was reported captured, cutting off the Japs in Indo-China from land contact with those in the North.

Borneo



On 12 June, after landing on Labuan Island and the northwestern Borneo mainland, troops of the Australian 9th Division were pushing toward Brunei and the oil districts of Seria and Miri.



The landing in southwestern Borneo was made 2 July. By 10 July the Dutch had made a new amphibious landing in the Balikpapan area (arrow extreme left). Other solid arrows locate the Allied drives. Open arrow indicates a Jap offensive move. The shaded area is Allied-held.



Okinawa

The map indicates the American position on Okinawa on 23 May. The island was declared secured on 21 June.

Luzon



The map shows the situation on Northern Luzon 23 June. The shaded area was Jap-held. Arrows show American drives; Tuguegarao was held by guerrillas. By 31 July the 6th and 36th Divisions, with elements of the Philippine Army, were closing in on 10,700 (estimated) Japs 32 miles north of Baguio. The 37th Division was eliminating remnants of 7,500 Japs in the mountains east of the Cagayan Valley. The 38th Division was reducing about 2,200 Japs in the Wawa dam area east of Manila.

COAST ARTILLERY

Citations and Commendations

Distinguished Service Medal

TO: HAROLD F. LOOMIS, Brigadier General, U. S. Army.

FOR: As Chairman of the Joint Rearmament Committee, from October 11, 1943, to October 4, 1944, in North Africa, he was charged with the coordination of all rearmament matters with the French authorities, the Lend-Lease Administration, and other agencies concerned with the rearmament of the French Air, Navy and Ground Forces. He was further responsible for furnishing advisory and instructive services for the operation; instruction in the use and maintenance of United States equipment; and, finally, to advise and make recommendations to the theater commander in rearmament matters. His successful solution of the unusual administrative problems involved in controlling equipment and supplies furnished under the rearmament program was a major contribution to the successful participation of the French Forces in the Allied war effort. By untiring efforts and great diplomacy he earned the respect and admiration of all his associates, and contributed in a large degree to the furtherance of friendly relations between the Allied Forces.

Legion of Merit

TO: WILLARD W. IRVINE, Brigadier General, U. S. Army, 3133 Connecticut Ave., N.W., Washington, D. C.

FOR: Services from August, 1942, to February, 1944. Charged with the protection of the vital naval and industrial installations in the Hampton Roads area, he, as Commanding General, Norfolk Antiaircraft Artillery Region, Eastern Defense Command, through his sound military judgment and knowledge of anti-air defense brilliantly planned the disposition of his forces. Co-operating closely with the Army Air Forces and maintaining harmonious relations with local naval commanders, he instituted a training program that was successfully carried out, even though the units were on a twenty-four-hour alert; he organized an efficient sound defense system; he attained complete coordination in the use of searchlights and by his ingenious disposition of equipment, perfected an anti-aircraft artillery information service to such a high degree of efficiency that test bombing raids were unable to penetrate the system without detection.

TO: CLARENCE E. COTTER, Colonel, IGD (CAC), 11 Abingdon Road, Washington, D. C.

FOR: He was chief of the Coast Artillery Advisory Committee, later to become the Seacoast Defense Projects

Branch, Headquarters Army Service Forces, from March, 1942, to October, 1943. In this capacity he organized and directed the coordination between the technical services and the using arm with the result that the construction and equipping of the modern defenses of important continental harbors and overseas bases were efficiently and expeditiously performed. He recommended the elimination of one complete harbor defense and the reduction in the number of major caliber batteries in several others, resulting in saving many millions of dollars. He prepared a directive that simplified the records of harbor defense projects and provided the War Department with a valuable technical and factual record of each harbor defense installation.

TO: KENNETH W. BILBY, Major, CAC, Colonia Solona, Box 569, Tucson, Arizona.

FOR: As battery commander and staff officer, 48th Antiaircraft Brigade, and Acting Executive, Antiaircraft Artillery Replacement Training Center at Camp Stewart, Georgia, he performed outstanding service from July, 1942, to April, 1944. He contributed to the establishment of an effective anti-aircraft artillery defense of the Hampton Roads Area and the training of troops, in widespread battle positions in region, which were later employed overseas. By his initiative, ingenuity and continued application and his thorough knowledge of anti-aircraft artillery matériel and gunnery, he made improvements in fire control equipment and procedures and accomplished field tests of new equipment that were of great value to the service. He materially aided in the tactical and technical training of many units and thousands of replacements.

TO: VICTOR G. HINES, Major, CAC, 2214 Yale Avenue, N., Seattle, Washington.

FOR: He performed outstanding service in the field of terrestrial fire by anti-aircraft artillery from September, 1944, to February, 1945. In addition to his normal assignment as instructor in the Gun Department of the Antiaircraft Artillery School, he developed and raised to a high standard the technique of employing 90mm guns in the terrestrial rôle and determined a simple method of calibrating for long-range ground firing. Through personal observation and study he modified considerably the prevailing concept of the burst pattern. His diligent and thorough endeavors in this field made it possible for the Antiaircraft Artillery School to qualify better many officers in the multiple use of gun matériel.

TO: LLOYD A. WHITE, Tec. 3, CAC, 225 Ridgeland Avenue, Waukegan, Illinois.

FOR: From May to December, 1944, he materially assisted development engineers in the preparation of certain equipment for shipment overseas. By diligent study and application he became thoroughly familiar with gun data computer equipment and applied this knowledge to great advantage in connection with demonstrations conducted in the Hawaiian Islands. He assisted in and supervised the assembly, testing and putting into operations of equipment of the most advanced type which, after extensive revision, had never been fully operative. He continued to apply his technical knowledge in the preparation of the equipment for issue to combat units and in the training of personnel for its operation and maintenance

Silver Star

TO: EUGENE P. PALMER, Captain, CAC, Rochester, N. Y.

FOR: Heroic achievement in action on 18 March 1945, near Klarenthal, Germany. His unit given the assignment of supporting Infantry troops when they attempted a crossing of the Saar River, Captain Palmer, commanding officer, personally conducted a hazardous daylight reconnaissance, exposed to enemy observation, to site several direct-fire automatic weapons. Although subjected to hostile mortar and small-arms fire, he persisted in his self-assigned task until he was seriously wounded as a result of hostile mortar fire. His dauntless devotion to duty was an inspiration to his men, who later aided materially in the successful crossing of the river.

TO: THEODORE J. DU BOIS, Lieutenant, CAC, 157 Spruce Street, Watertown, Massachusetts. (Posthumous.)

FOR: Gallantry in action of 17 February 1945. While on reconnaissance near Oetingen, France, Lieutenant Du Bois was pinned down on a slope approximately 400 yards from the enemy by heavy fire from an 88mm self-propelled gun. At the height of the shelling, Lieutenant Du Bois left cover to give aid to a wounded soldier twenty-five yards away in sight of the enemy. Disregarding his own safety, he administered first aid and greatly eased the pain of the wounded infantryman. As he prepared to carry the wounded man to safety, Lieutenant Du Bois was killed by a shell fragment. His sacrifice above and beyond the call of duty exemplifies the finest traditions of the Armed Forces of the United States.

Soldier's Medal

TO: JOHN F. McDONALD, Lieutenant, CAC, 18 Edisonia Terrace, West Orange, New Jersey.

FOR: On September 5, 1944, at Hueco, New Mexico, he voluntarily entered the pit of a 40mm gun where an explosion had occurred, seized a loose high-explosive projectile and carried it to a place of safety. He had been assisting the battery commander in practice firing at the time of the explosion, and, ignoring the fact that loose powder was on fire in the gun chamber which might have detonated several rounds of high-explosive ammunition, he unhesitatingly risked his life in order to prevent further explosions.

TO: PAUL N. SMITH, Lieutenant, CAC, 2817 Portage Kalamazoo, Michigan.

FOR: On September 5, 1944, at Hueco, New Mexico, he voluntarily entered the pit of a 40mm gun where an explosion had occurred, jumped on the gun platform and extinguished the flames, using his hands and sand from the gun parapet. He had been acting as "line of metal" safety officer at the time of the explosion, and notwithstanding the fact that a loose high-explosive projectile as well as several cartridges lay in the flames subject to immediate detonation he unhesitatingly risked his life in order to smother the fire.

Bronze Star

TO: HAROLD F. HARDING, Colonel, GSC (CAC).

FOR: Meritorious service in connection with military operations against the enemy from 7 January 1942 to 25 September 1944. First as an adjutant and later as a regimental commander in the Hawaiian Seacoast Artillery Command, Colonel Harding administered and trained his organization and maintained it at a high degree of efficiency and morale. Later acting as executive officer of a Harbor Defense Headquarters, he coordinated the staff in an unusually efficient manner. From 4 May 1944 to 25 September 1944, as Assistant to the Assistant Chief of Staff, G-1, United States Army Forces, Pacific Ocean Areas, Colonel Harding demonstrated outstanding administrative ability, tact, and judgment during a period of great expansion and combat successes of our forces in the Pacific.

TO: LEON A. WHITE, Colonel, CAC, Charlottesville, Virginia.

FOR: Outstanding and meritorious service in the New Hebrides Islands from August 1942 to June 1944. During this time Colonel White was at first executive officer of an AA regiment supporting offensive operations against the Japanese, and later he commended all AA on a key island in the New Hebrides group.

TO: HAZEN C. SCHOUMAN, Lieutenant Colonel, CAC.

FOR: Meritorious service in connection with military operations against the enemy during the period 1 March to 30 June 1945.

TO: WILLARD G. ROOT, Lieutenant Colonel, CAC.

FOR: Meritorious service in connection with military operations against the enemy from 18 November 1944 to 31 March 1945. As commanding officer of an antiaircraft searchlight battalion, Lieutenant Colonel Root, experimented with, perfected and inaugurated methods of searchlight homing for aircraft by which 2,503 safe landings were credited to the assistance rendered by his unit. His attention to duty and his firm and enthusiastic leadership built an organization with an outstanding *esprit de corps*, and reflect great credit upon himself and the armed forces of the United States.

TO: ORMOND K. WILLIAMS, Lieutenant Colonel, CAC, 4 Allendale Road, Montgomery 6, Alabama.

FOR: Meritorious service in connection with military operations against an enemy of the United States in France

the period of 1 November 1944 to 27 November 1944. Lieutenant Colonel Williams through long hours of detailed planning, expert supervision, execution and unflinching devotion to duty, all under adverse conditions, contributed immeasurably to the successful cutting of enemy supply lines to the north and east of Metz by the 10th Airborne Division in its participation in the capture of the Mors fortress.

JOHN O. HERSTAD, Major, CAC, Salt Lake City, Utah.

FOR: Heroic achievement in action on 18 March 1945 near Oetingen, France. In the afternoon of 18 March, Major Herstad conducted a forward reconnaissance on the banks of the Saar River to site automatic weapons for direct fire on the enemy. Under continual mortar and small-arms fire in clear view of the enemy, he was wounded by a shell but continued to reconnoiter the exposed terrain until he had accomplished his mission. The information furnished by Major Herstad's courageous perseverance greatly aided in the river crossing and successful assault which followed.

HARRY G. LEVENDUSKY, Captain, CAC.

FOR: Meritorious service in connection with military operations against the enemy from 25 September 1944 to 9 April 1945. As commanding officer of an antiaircraft artillery searchlight battery engaged in widespread and diverse tactical operations in France, Captain Levendusky organized a highly efficient battery, capably administered despite difficulties of communications, widespread deployment of manpower and supply shortages, frequent movements and adverse weather. He developed and improved field living conditions, displaying great ingenuity in housing and sanitation measures which added to the comfort and welfare of his men and won for him their respect, confidence, and full support as an outstanding officer. The initiative, efficiency and devotion to duty displayed by Captain Levendusky reflects the highest credit upon himself and the armed forces of the United States.

NELSON O. PRICE, Captain, CAC, General Delivery, Blacksburg, Virginia.

FOR: Meritorious service in connection with military operations against an enemy of the United States in France during the period 18 December 1944 to 23 December 1944.

ROBERT K. HARRIS, First Lieutenant, CAC, New York City.

FOR: Meritorious service in connection with military operations against an enemy of the United States during the period 15 October 1944 to 31 December 1944, in France. Lieutenant Harris, on his own initiative, organized a patrol from his platoon and captured thirty-two enemy soldiers who were retreating northward. His driving spirit and devotion to duty, even under the most severe conditions of weather and terrain, have been an inspiration to his men.

CHARLES P. PALMACCIO, First Lieutenant, CAC, 10 West Street, Brooklyn, New York.

FOR: Meritorious achievement in connection with military

operations against an enemy of the United States in France and Belgium during the period 14 November 1944 to 17 January 1945.

TO: JOHN H. BRAYMAN, Sergeant, CAC, 4422 State Road, Ashtabula, Ohio.

FOR: Meritorious achievement in connection with military operations against an enemy of the United States in France, Germany, and Belgium during the period 14 November 1944 to 17 January 1945.

TO: JAMES MCCARTHY, Sergeant, CAC, 7294 Evergreen, Detroit, Michigan.

FOR: Meritorious achievement in connection with military operations against an enemy of the United States in France, Germany, and Belgium during the period 14 November 1944 to 17 January 1945.

TO: WILBURN S. SEXTON, Corporal, CAC, Castar, Louisiana.

FOR: Meritorious service in connection with military operations against an enemy of the United States during the period 8 November 1944, to 17 January 1945, in France. During a rapidly moving situation, Corporal Sexton, in the absence of the regularly assigned Chief of Section, assumed command of his antiaircraft gun and independently carried out a difficult tactical assignment. His quick thinking aided in destroying two enemy planes that were strafing the area.

TO: VESTER SMITH, Tech. 5, CAC, Star Route, Northport, Alabama.

FOR: Heroic achievement in action in the vicinity of Senonchamps, Belgium, on 20 December 1944. In defense of a road block he personally accounted for five members of an enemy patrol and supported infantry troops in the capture of one prisoner. On 21 December 1944 he was pinned under debris with another member of his crew in a house subjected to a heavy enemy artillery fire. After freeing his comrade he was ordered to withdraw and leave his damaged half-track. Realizing that the vehicle would fall into the hands of the enemy, Technician Fifth Grade Smith drove it back to a rear area under heavy enemy fire. Although suffering from injuries received in this action, he repaired the damages to his vehicle so that it could be further used for tactical operations. On other occasions, Technician Fifth Grade Smith drove half-tracks through perilous enemy fire and carried ammunition to his own vehicle under enemy small-arms and artillery fire. His actions were in accordance with the highest standards of military service.

Commendation

Hq., 70th Inf. Div.

I wish to commend the officers and men of the 433d AAA AW Battalion for outstanding service in action against the enemy from 18 to 20 March 1945 inclusive, near Saarbrücken, Germany, while attached to the 70th Infantry Division. This battalion carefully planned and furnished close antiaircraft machine-gun support for infantry making a river crossing. Accurately placed fire power on enemy pillboxes was so effective that the entire Third Battalion, 274th Infantry, was able to cross the Saar River with light casualties. The willingness of the battalion to brave ob-

served enemy mortar and small-arms fire, and the exemplary manner in which the battalion accomplished its mission reflect the highest credit upon this organization.

A. J. BARNETT,
Major General, U.S.A.,
Commanding.

Certificates of Merit

TO: EDGAR W. NELL, First Lieutenant, CAC, 215 Broadman Avenue, Traverse City, Michigan.

FOR: During the defense of Bastogne, Belgium, he displayed outstanding courage and devotion to duty as a Platoon Leader.

TO: ALVIS E. VASSEUR, Sergeant, CAC, RR No. 6, Benton, Kentucky.

FOR: During the defense of Bastogne, Belgium, he displayed outstanding courage and devotion to duty as a Gunner.

TO: RAYMOND F. DEILY, Tech. 4, CAC, 2031 Hanover Avenue, Allentown, Pennsylvania.

FOR: During the defense of Bastogne, Belgium, he displayed outstanding courage and devotion to duty in risking his life to obtain vitally needed ammunition for his unit.

TO: HOYT ROSS, Corporal, CAC, General Delivery, Clyde, Texas.

FOR: During the defense of Bastogne, Belgium, he displayed outstanding courage and devotion to duty as a squad leader.

TO: RAYMOND K. ATKINSON, Tech. 5, CAC, RR No. 1, Titusville, Pennsylvania.

FOR: During the defense of Bastogne, Belgium, he played outstanding courage and devotion to duty as a Driver.

TO: JOHN H. CROYLE, Tech. 5, CAC, RD No. 1, Rainsburg, Pennsylvania.

FOR: During the defense of Bastogne, Belgium, he played outstanding courage and devotion to duty in risking his life to obtain vitally needed ammunition for his unit.

TO: CHARLES B. SCOTT, Tech. 5, CAC, Route 3, Union, South Carolina.

FOR: During the defense of Bastogne, Belgium, he played outstanding courage and devotion to duty as a Gunner.

TO: JOHN W. ASHLEY, Private First Class, CAC, Route 1, Belton, South Carolina.

FOR: During the defense of Bastogne, Belgium, he played outstanding courage and devotion to duty in risking his life to obtain vitally needed ammunition for his unit.

TO: PAUL KULASA, Private First Class, CAC, Box 1, Route 1, Rolling Prairie, Indiana.

FOR: During the defense of Bastogne, Belgium, he played outstanding courage and devotion to duty as a Gunner.

TO: ROBERT C. STEWART, Private First Class, CAC, Route 1, Eden, Alabama.

FOR: During the defense of Bastogne, Belgium, he played outstanding courage and devotion to duty as a Cannoneer.



American Soldiers

Of the military traffic it is unnecessary to say much. The long convoys of motorized equipment are familiar enough to all the world at war. But, viewing an American sector with a critical eye, a British observer need seek no diplomatic phrases in his praise for the efficiency of the traffic or for the soldierly bearing of the troops. This great civilian army has achieved a sure professional touch which is a blend of pride in achievement and modesty in expression. At no point can any touch of the arrogance of a conqueror be seen. Saluting is exemplary, treatment of civilians correct but not harsh. Fraternalization is rare. The severest tests are from the small children, who seem to haunt every American sentry post, and the warm-hearted Americans must find it hard not to respond to their innocent advances. The few girls who can be seen attempting the same thing are probably not so innocent in their approaches. They seem to make little impression, and there is none of the "walking-out" which we have come to accept as a normal pastime of the American soldier in an allied land.—*London Times*.



Every 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, Fort Bliss, Texas.

THE COAST ARTILLERY BOARD

COLONEL LEON C. DENNIS, C.A.C., *President*

COLONEL R. E. DINGEMAN

LIEUTENANT COLONEL JAMES T. BARBER

LIEUTENANT COLONEL ANDREW W. CLEMENT

LIEUTENANT COLONEL O. K. MARSHALL

LIEUTENANT COLONEL W. L. CLAY

MAJOR AUSTIN E. FRIBANCE

MAJOR Z. L. STRICKLAND

CAPTAIN FOSTER A. HINSHAW, S.C.

CAPTAIN W. P. G. HALL

CAPTAIN C. W. ZIEGLER, O. D.

Sponge Rammer T17 for 155mm Gun M1, M1A1 and

The Board recently completed tests on the Sponge Rammer T17, Figure 1, which consisted of a magnesium body which were mounted two synthetic rubber and two dense sponge disks for sponging the chamber walls as a projectile is rammed.

The Board found that:

1. The Sponge Rammer T17 as received and as modified introduces too much moisture into the chamber of the gun during ramming.

2. It offers excessive resistance to rapid withdrawal.

3. It does not have adequate wear resistant qualities to withstand satisfactorily the wear of ramming for any appreciable number of rounds.

Fork Lift Trucks. The Harbor Defenses of San Francisco recently tested a fork lift truck to determine its utility to the mine command. The results indicate that mine equipment can be handled efficiently with this sort of equipment. Subsequently, military characteristics were written and they have been sent to higher authority for the necessary action, and procurement of a pilot model for test.

High Speed Visual Target. The Ordnance Department is now developing a high speed target suitable for visual tracking at medium ranges.

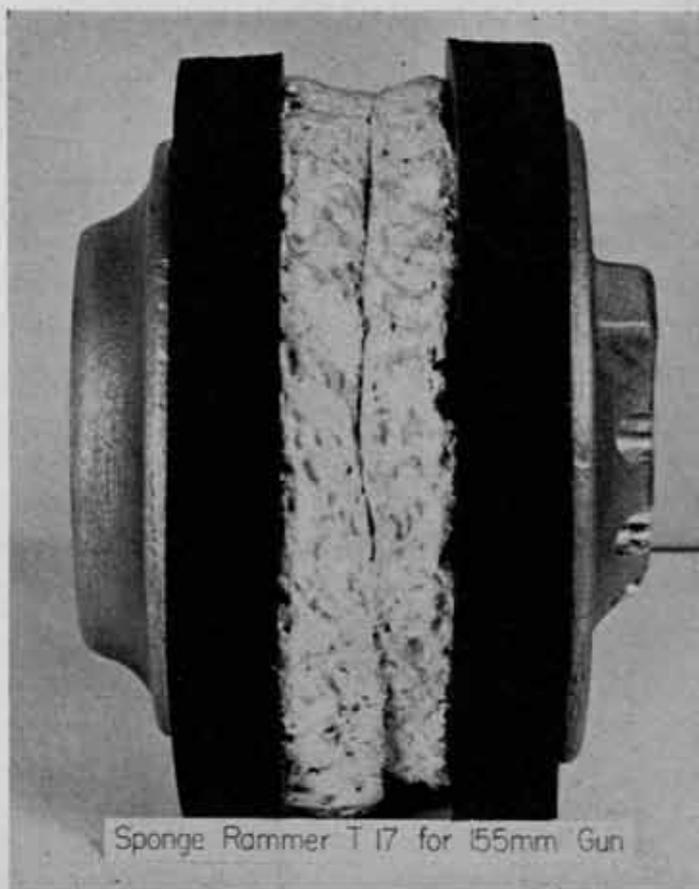
Curves for Rotation of Earth Effects on Deflection Charts

and Range Correction Charts. The curves for rotation of earth effects on deflection charts and range correction charts issued by the Coast Artillery Board are calculated for 30° N. latitude. The question frequently arises as to why these charts also are forwarded to seacoast artillery batteries located at other latitudes such as, for example, 10° N. or 40° N. where different values hold for the effect of earth rotation.

In general, charts are issued for 30° N. latitude only for the following reasons:

1. Analysis indicates that charts constructed with rotation of earth effects for 30° N. latitude can be used at, for example, 40° N. or 50° N. latitude without incurring ap-

preciable errors. The magnitude of these errors is dependent on the field of fire of the battery, the range to the target, and the armament being fired, but in all cases is sufficiently small in size as to be capable of being eliminated conveniently through fire adjustment. Where errors exceed .02° in azimuth and 10 yards in range, organizations in the field should modify rotation of earth curves on fire control charts to conform to the latitude at which the battery is located.



Sponge Rammer T 17 for 155mm Gun

Figure 1



Figure 2

b. Although it might be argued that charts should be forwarded for the exact latitude of each battery, this procedure has not proved possible during the current war and, hence, would have no application during a period of peace. Requests for charts and scales have been received from organizations all over the world. The greater number of these requests have not specified the latitude of the requesting organization either for security reasons or owing to the movement contemplated. In some cases, as many as 150 sets of charts have been forwarded for issue to units moving to overseas theaters the exact location of which was not known. The practice of supplying one standard chart for 30°N. latitude, it is believed, has expedited the delivery of charts and scales to using organizations to a degree far surpassing consideration of the small errors originating in rotation of earth values.

The relative importance of the question under discussion above is expected to decrease with the passage of time. With the advent of electrical data computers, charts and scales probably will be relegated to the function of an alternate means of fire control. The new electrical data computers will compute rotation of earth effects for the nearest ten degrees of latitude, which should fall well within the present standards of desired accuracy for seacoast artillery fire control.

Electrolyte for Storage Batteries. Attention is invited to War Department Supply Bulletin 11-55, February, 1945, stating that owing to the nature of its ingredients, electrolyte for storage batteries will be procured locally when possible. Certain new seacoast artillery equipment, for example, the Power Unit PU-26/U and Power Unit PE-197, is equipped with storage batteries. Under the provision of the supply bulletin cited above, these batteries must be shipped in a dry-charged state and electrolyte must be requisitioned by the using arms from the nearest supply

depot. To insure an adequate supply, units expecting to receive equipment requiring storage batteries, should submit requisitions in ample time to assure that electrolyte will be available when the equipment is received. Signal Corps stock numbers for electrolyte are given in SB 11-55. For the storage battery of the PU-26/U, electrolyte of specific gravity 1.280 is required. Stock numbers are 3B1514-1 for electrolyte in 1-gallon containers, and 3B1514-10 for electrolyte in 10-gallon carboys.

Navy Lock Primer Mk 34. The Board recently completed the test of the Mk 34 primer for use with the 6-inch Gun M1 (T2). The Navy Primer Mk 34 is identical to the Navy Primer Mk XV, Mod. 1, except that the entire percussion element has been removed and a solid brass plug substituted therefor. The exterior dimensions and appearance of the two primers are identical. The Mk 34 primer permits the insertion of the primer into the Navy Lock Primer Mk VIII, Mod. 2, on the 6-inch Gun M1 (T2) when the breechblock is open without any possibility of the primer being discharged when the breechblock is closed. The Board recommended that:

a. The Navy Primer Mk 34, Mod. O, electric, be standardized for the 6-inch Gun M1 (T2) only and classified as Required type, Adopted type, Standard article.

b. The Primer Percussion Electric Mk XV, Mod. 1, be retained as an emergency primer for use with the 6-inch Gun M1 (T2).

c. The issue of Primer Mk XV, Mod. 1, to firing units be in the ratio of 1 to 5 and be over and above the standard allotment to these units of the Primer Mk 34, Mod. O.

75mm Subcaliber Gun T19 for 155mm Gun M1, M1A1, or M2. The Board recently completed the test of the 75mm Subcaliber Gun T19 which was briefly described in the May-June 1945 issue of the COAST ARTILLERY JOURNAL.

the general characteristics of the T19 subcaliber gun ammunition are as follows:

Characteristics. The 75mm Subcaliber Gun T19 is internally mounted subcaliber gun for use with the 155mm Gun M1, M1A1, or M2. It consists of a monobloc weighing approximately 540 pounds which is centered in the parent gun by means of a front adapter and three adjustable wedges at the rear of the tube. The breechblock and firing mechanism of the parent gun are used as the breechblock and firing mechanism for the subcaliber gun; however, a special obturator spindle is furnished for use with the subcaliber gun. The component parts of the subcaliber gun are shown in Figure 2 and the gun installed in Figure 3. The installation of the subcaliber gun in the parent gun has no appreciable effect on the elevating or depressing handwheel efforts. The ballistics of the subcaliber gun are similar to the 75mm Gun M1916, M1917 and M2 and are covered by that section of Firing Tables AF-1 relating to the High Explosive Shell M48 with 70 f/s muzzle velocity (normal charge).

Ammunition. The ammunition for the 75mm subcaliber guns has been standardized, but is not in production yet. The standard ammunition for the subject gun is the same as that for 75mm Subcaliber Guns M7, M8 and M9 for the 12-inch Gun M1895A4 and M1895M1A4, 14-inch Gun Mk VI, M3A2, and 16-inch Howitzer M1920, respectively. The standard ammunition is fixed and consists of the components as listed in TM +205, Changes to 2.

In addition to the primer for the subcaliber ammunition which is fixed in the cartridge case, the standard primer for the parent gun is needed to ignite the primer of the subcaliber ammunition. The standard primer for the 155mm Gun M1, M1A1 or M2 is the Mk IIA4 percussion primer. The service tests indicate that the 75mm Subcaliber Gun T19 is generally satisfactory for a subcaliber gun for the 155mm Guns M1, M1A1, and M2. There are minor modifications necessary to the mounting fixtures and to the tools and accessories before the T19 subcaliber gun will be completely satisfactory. The Board recommended that:

a. The 75mm Subcaliber Gun T19 for the 155mm Gun M1, M1A1, and M2, modified as requested in the report, be standardized and classified as: Required type, Adopted type, Standard article.

b. The basis of issue for the T19 subcaliber gun be one per parent gun used by 155mm Gun M1 seacoast artillery units.

Remote Tuning Unit for Radio Set SCR-543. The standardization of remote antenna tuning kits for Radio Set SCR-543 has recently been recommended. The kit for the mobile seacoast artillery units will make it possible to locate the antenna up to 150 feet away from the radio set. The kits for the fixed defenses will provide for installation in various locations, etc., where the separation may be somewhat greater. It was also recommended that Antenna AN-44A be issued as a separate item. The remote tuning kits are designed to provide a means of satisfactorily employing a remote radio frequency transmission line between a Radio Set SCR-543 and an Antenna AN-44A. It provides for proper coupling between the output of the radio transmitter and the coaxial RF transmission line, and between the

transmission line and the antenna, and for remotely tuning the antenna to any one of six frequencies. The kits consist of Tuning Units TU-76-() with accessory equipment such as remote selector switches, control and RF cables, appropriate connectors, and incidental hardware.

Tuning Unit TU-76-(), which is designed for mounting at the base of the antenna, is contained in a weather-proof steel box 18"x12"x7", weighing approximately 33 pounds. It contains the antenna coupling and tuning coils, together with relays which select the particular tuning required in accordance with the setting of the remote selector switch. With Radio Sets SCR-543-A, -B and -C, it is necessary to use a separate remote selector switch and adapters for the RF cable. In Radio Set SCR-543-D, the switch for operating the remote tuning relays has been incorporated in the channel selector switch in the set and a connection provided on the radio set for the controls and RF cables.

Antenna AN-44A is a self-supporting insulated tubular telescopic mast type antenna designed for permanent installation on a concrete base. The over-all extended length of this antenna is approximately 34 feet. It is contemplated that mobile units employing this antenna will fasten it to a suitable post which has been set in the ground. Antenna kits are included in the accessory equipment.

Tests with this tuning unit indicate that better transmission is realized with the Antenna AN-44A located 150 feet away from the set than with the whip antenna normally supplied with the set. It was also determined that this remote tuning unit could be used to advantage with the standard whip antenna as well as with Antenna AN-44A.

The following tabulation shows the number of projects and subjects which were handled by the Board during May and June:

Number on hand 1 May	65
Received during May and June	90
TOTAL	155
Completed during May and June	104
Number on hand 1 July	51

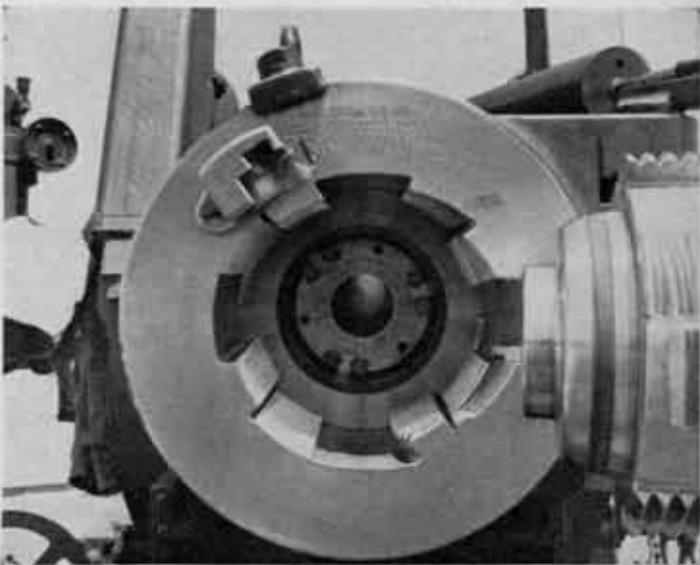


Figure 3

Coast Artillery Journal

Fifty-fourth Year of Publication

COLONEL E. B. WALKER, Editor

LT. COL. ARTHUR SYMONS, Associate Editor

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

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

The United States Coast Artillery Association

OFFICERS

LIEUTENANT GENERAL LEROY LUTES

PRESIDENT

MAJOR GENERAL JOHN T. LEWIS

VICE PRESIDENT

COLONEL E. B. WALKER

SECRETARY-TREASURER

ADDITIONAL MEMBERS OF THE EXECUTIVE COUNCIL

BRIG. GENERAL EDWARD A. EVANS

BRIG. GENERAL BRYAN L. MILBURN

BRIG. GENERAL RUPERT E. STARR

BRIG. GENERAL EDWARD A. STOCKTON, JR.

BRIG. GENERAL LAWRENCE B. WEEKS

COLONEL FRANKLIN E. EDGEComb

COLONEL E. B. WALKER



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 cooperation among all arms, branches and components of the Regular Army, National Guard, Organized Reserves, and Reserve Officers' Training Corps.

News and Comment

Group Subscriptions

Between press time for the last issue and deadline for this one, the 14th AA Command has submitted 147 new subscriptions to the JOURNAL—and still they come. It is hard to believe that other AA Commands are any busier than the 14th, but the 14th has run up quite a record.

Captain Herbert B. Warburton, of the AAA School, submitted thirteen new subscriptions; also from Fort Bliss Captain John E. Carr, Adjutant of the 11th AA Replacement Training Group, sent in ten renewals and six new subscriptions.

Major Willis T. Lyman, of the 582d AAA AW Bn sent in five subscriptions.

Six subscriptions came in one envelope from the AAA—the person who collected the cards and mailed them evidently desired to remain anonymous.

No JOURNAL?

Because of unsettled conditions, redeployment, and the failure of subscribers to keep us up to date on addresses, the JOURNAL has found it necessary to suspend the mailing of JOURNALS to:

- (1) Subscribers having temporary APO addresses.
- (2) Subscribers who have been mailed two issues of the JOURNAL but have failed to pay for the subscription.
- (3) Subscribers from whom mail has been returned undeliverable, probably due to a change of address.

It is requested that subscribers cooperate and immediately send in any changes of address. Most failures to receive the JOURNAL are due to the lack of proper address.

Subscribers whose addresses are changing so rapidly that they feel they cannot give us a permanent address are advised to have their JOURNALS sent to their home to be kept for them.

Unit History

The JOURNAL has just received the first published history of a World War II Coast Artillery unit. It is titled *Missions Accomplished* and is the story of the 547th AAA Battalion from its basic training period to the end of the fighting in Germany.

It is hoped every Coast Artillery unit will make a record of its history in this war. A list of its personnel by small units would add to its value.

Triple-Threat Artillery

After reading General Meyer's article on Page 2, and the *Fighting Fronts* stories of Coast Artillery action, do any of our readers doubt that Coast Artillerymen can handle any type of artillery? Field Artillerymen, too, can learn to fire AA and Seacoast matériel. The present division of duties and missions begins to appear artificial.

Pacific Typhoons

Typhoons in the Pacific war area, due during the summer and fall months, will be something new to many American soldiers and sailors, but not to those who know the hurricanes of the Atlantic and Gulf coasts. They are similar in origin, nature, violence, velocity and the amount of rain-accompanying them. They constitute real hazards for sea and aircraft. Some 20 severe typhoons occur each year in the Philippine-Okinawa-Japan region.

The usual path of the Pacific typhoon is northerly, along the 1000-mile eastern coast of the Philippine Islands, sweeping across Formosa, and Okinawa and the other Ryukyu islands, passing northeastward along the coasts of the Japanese mainland. Some pass through the Philippines into the South China sea and the coasts of Indo-China and southern Japan. Others pass through the Ryukyu islands into the East China sea.

The season for these typhoons extends from early August to late October but many of the most severe of them have occurred in July and in November. Typhoons and hurricanes form when the doldrums have moved away from the equator, where the deflective force of the rotation of the earth is sufficient to set up the whirl. In most cases the storms move westward as carried by the trade winds, then turn toward the poles of the earth. When they reach the higher latitudes, or over land, they lose some of their intensity and spread out, becoming less destructive.—*Scientific News Letter*.

* * *

Overseas Income Tax Extension

The Treasury Department has announced that an additional extension has been granted to overseas members of the armed forces on their income tax obligations which were postponed because of overseas service.

The action is intended particularly to help servicemen who stop in the United States for a few months while en route from the European to the Pacific theater of war.

The extension is embodied in an amendment to the income tax regulations.

Specifically, the new regulation provides that the postponement granted an overseas serviceman will continue if he has been back in the United States for a continuous period of five and one-half calendar months (not counting the month in which he returns). In other words, an overseas serviceman will not lose his tax postponement if he returns in this country for a short period while en route to another overseas assignment.

The new time allowance was decided upon after consultation with the War Department regarding the approximate time which may be spent in this country on furloughs and in retraining camps by servicemen being transferred from Europe to the Pacific. Formerly, the regulations allowed the tax postponement of an overseas serviceman only if he had been back three and one-half calendar months.

The tax laws exempt the first \$1,500 of active service pay for each member of the armed forces, and therefore most enlisted men and women owe no taxes.

Quotes from Letters

Am now detailed in the Infantry, but still want the JOURNAL.

LIEUT. JULIUS R. POLLATSCHEK

* * *

The JOURNAL has reached me overseas fairly regularly and I have enjoyed reading it. You are to be congratulated on maintaining the standards of the JOURNAL during such a difficult period.

BRIG. GEN. BRYAN L. MILBURN, GSC.

* * *

Your magazine helps out in a lot of spots.

LIEUT. P. F. WELLS.

* * *

The articles on the Philippines have been thoroughly enjoyed by all of us in the ETO. A fine coverage job has been done.

CAPT. NORMAN J. KAUTZ.

* * *

The JOURNAL is a great aid to me as a platoon commander in keeping my men orientated on developments in other theaters and also has lots of helpful hints in teaching the latest development in AA.

LIEUT. ROBERT H. LEGARD, JR.

* * *

Keep up the good work with the JOURNAL. Believe me, out here in these parts the JOURNAL is read thoroughly, more than once.

LIEUT. WALTER W. BRIGHT.

* * *

Having been absorbed by the Service Forces for almost a year, I find the JOURNAL a happy reminder of the days when I was a part of a real outfit. I look forward to reading every article you publish.

(OFFICER'S NAME WITHHELD)

* * *

Individual Equipment More Expensive

Equipping and maintaining a soldier in continental United States for his first year in the Army, now costs the Quartermaster Corps \$533.88, or nearly 15 per cent over the cost of \$465.06 in 1944, a report from the War Department reveals. These figures are arrived at by records of materials expended the year previous, but based on the current year's prices. In 1943, the aggregate cost was \$501.06.

These costs are averages, and represent the costs for a composite soldier equipped for all climates in all the various arms and services of the Army, and computed for the entire Army strength.

This year, the soldier's food will cost \$226.30, his clothing, \$128.19 at the outset, but \$83.82 is added to that for a year's maintenance. His individual equipment has an initial cost of \$47.72 plus \$16.21 for maintenance, and his barrack equipment comes to \$28.15 with \$3.50 added to maintain it for a year.

The following table shows the increase in costs in each category of supply, including maintenance, as compared with 1944:

	1944	1945	Per Cent Increase
Food	\$215.35	\$226.30	4.9
Clothing	173.70	212.00	22.0
Individual Equipment	44.70	63.93	43.0
Barrack Equipment	31.31	31.65	1.0
TOTALS	\$465.26	\$538.88	14.8

The above represents items issued by the Quartermaster Corps only, and does not include the cost of weapons, ammunition, transportation, shelter, pay, and similar expenses.

Rigors of warfare raise the maintenance costs on clothing from \$83.82 in the United States to \$145.10 in theaters of war, and on individual equipment from \$16.22 to \$33.88. The overseas maintenance on barrack equipment, due to the infrequent use of barracks, drops from \$3.50 to \$1.37.

Increased costs of equipping and maintaining the composite soldier in 1945 is partly due to higher costs of materials and manpower, but largely because of improved equipment. In some cases, items are cheaper.

/ / /

Ship-Mounted Mortars

Mortars mounted on Infantry landing craft are now supporting landing operations and generally lobbing explosives into Jap-held areas that were proof against weapons with flatter trajectories. This new development was suggested by the Chemical Warfare Service, POA.—*Science News Letter*.

/ / /



U. S. Navy

A Jap burial shrine on Okinawa makes an effective background for a pile of American shell cases.

Army Publications Combined

Commencing with the May edition, the Army combined its two major indexes of publications to provide a more complete and efficient listing service for the field. The new field manual, known as FM 21-6, is entitled "List of Index of War Department Publications." As heretofore, it will be published monthly and distributed down to companies.

The consolidated list and index of publications contains all the listings that formerly appeared in War Department Pamphlet 12-6 and Field Manual 21-6. Of special interest to maintenance personnel is the fact that they can now get complete listings of manuals, circulars, bulletins, orders, forms and the like between the covers of a single, up-to-date monthly manual. Among the many publications listed in the new FM 21-6 are Field Manuals, Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, Modification Work Orders and maintenance forms.

An important feature of FM 21-6 is that new publications are indicated by an asterisk (*). This makes it easy for an organization to make a quick check once a month to assure that it has on hand, or receives, the latest authorized publications.

/ / /

Goop Bomb

A new incendiary bomb which spouts pyrotechnic gel is the latest contribution of the Chemical Warfare Service to the aerial war against Japan, the War Department announced today.

Officially known as the M74, this 10-pound tubular bomb regurgitates its complex insides almost instantaneously after landing on an enemy target. A blend of violet inflammable chemicals oozes over the target like natural lava erupting from a volcano. One of the ingredients is "goop"—magnesium powder coated with asphalt material which is an intermediate product in making high-grade magnesium.

The resultant synthetic lava is a strong, rubbery material. Burning with an intensely hot flame, it produces a white glow and is difficult to extinguish. The mixture combines the good features of thickened gasoline, which can be thrown into hard-to-reach corners by means of tail-ejector bombs, and of magnesium, which concentrates a white-hot flame on a target area.

The "lava bomb" resembles a 19-inch length of hexagonal pipe. At one end is a collapsible metal tail which springs open when the bomb is released from its cluster. Designated after ballistic tests had been made in the wind tunnel at Harvard University, this tail tends to hold the bomb on its course. At the nose is a sensitive fuze which ignites the incendiary upon impact at any angle.

Inside the bomb is a plastic cup which holds a small quantity of white phosphorus, a few pounds of the synthetic lava filling and a dome-shaped ejection diaphragm. Broken open by a burster charge, the diaphragm works like a piston, expelling itself, the cup of phosphorus, the lava and the collapsible tail out of the bomb in a miniature eruption. Gobs of the lava fly for 25 yards, land under the eaves and against the walls of the target, cling, and burn.



Marines Corps

Marines on Okinawa inspect a Jap "Bubble-Wubble" rocket and its launcher.

The ROA

The Office of the Executive for Reserve and ROTC Affairs has been constituted a Special Staff activity of the War Department, thus restoring it to the 1942 level. Brigadier General Edward W. Smith is the Executive.

The Reserve Officers Association has been reactivated and the publication *The Reserve Officer* makes its appearance with the June (1945) issue. Brigadier General Edward A. Evans is the new Executive Secretary of the Association, with offices at 1726 Pennsylvania Ave., N.W., Washington 6, D. C.



Bridge-Laying Tanks

British tanks which carry and lay their own bridges have been removed from the secret list by the British War Office and revealed as having played an important part in invading France and Germany and in the British advance in Burma.

The bridge-spans are so mounted that when tanks are held up by wide ditches or cratered roads, the bridge-laying tank can immediately lay across the obstacle a bridge which all other tanks and vehicles can cross—without a single man having to leave the bridge-tank or be exposed to enemy fire.

The bridge-tanks, of which there are several types, span ditches and craters up to 30 feet wide or climb walls more than 10 feet high. Their greatest advantage is that there is no delay in an advance while extra bridging material is called up.

In the assault on the Normandy beaches, these new

tanks, some called ramp tanks, surmounted sea-front walls and various antitank walls. In subsequent operations they were used over craters, flooded streams and ditches. In some cases a combination of several tanks was used to span much wider gaps.

Designed by a team of army officers, civilian scientists, and technical experts of the British Ministry of Supply, the various types include the "Scissors" bridge, a folding span carried on top of a Valentine tank. The bridge is laid by being automatically unfolded and lowered by a mechanism operated from inside the tank. Another, the Churchill bridge-layer, consists of a 30-foot span of steel trackway, raised by an arm on the tank hull, carried forward and lowered across the gap in front of the tank.



3,000 mph

Two wind tunnels costing a total of \$2,000,000, that will produce speeds up to four times the speed of sound, about 3,000 miles an hour, have been dedicated at Aberdeen, Md. The supersonic wind tunnels, one for bombs, the other for ballistics, are a part of the Army Ordnance Research and Development Center of the Aberdeen Proving Ground. Research work sneaked in before calibration of the bomb tunnel was completed saved the Army more than the cost of the entire installation by showing that a new 10,000-pound bomb, soon to go into production, was unstable. Other research at the wind tunnel has added 3,000 yards to the range of the 155-millimeter gun by changing the shape of the projectile.—*Science News Letter*.



Signal Corps

A "90" on Iwo Jima, moving to a new location.

Airplane Rocket Bombs

New British rocket-propelled bombs that travel at a speed of 1,100 feet a second, greater than the speed of sound, have recently been developed, reports the British Information Service. The new bomb, dropped from a B-17 Flying Fortress, will tear through six thick layers of concrete before exploding.

Scientists of the British Admiralty, working in cooperation with the British Ministry of Supply, developed the powerful new bombs which ripped open Nazi E-boat shelters at Ijmuiden, Holland, as if they had been made of paper. The job of testing the rocket-propelled bombs was carried out by the U. S. Eighth Air Force. No further details on the design or construction of the bomb are released.

Under reverse lend-lease, details of the design of the bomb have been made available to the U. S. Army Air Forces for possible use in their operations.—*Science News Letter*.

Dissolving Airplanes

Recovering valuable aluminum for re-use from crushed war-weary, crashed, or obsolete planes has been speeded up by a new process that literally dissolves the aluminum from whole sections of these planes. This new method, developed by the Aluminum Company of America in cooperation with the Air Technical Service Command, eliminates all need for sorting metals before the aluminum is melted down and gives an end product of pure, high-grade aluminum ready for reprocessing. The aluminum obtained from alloys and other metals coated with aluminum is for all

intents and purposes the same as aluminum manufactured from bauxite.

Whole sections of wings and fuselage are placed in a bath of caustic soda. This caustic soda dissolves the aluminum in the plane, while any steel nuts and bolts, rivets, copper piping, bronze bushings, rubber or other non-aluminum parts are not attacked by the caustic and remain in solid form. Aluminum alloying elements are not attacked by the caustic, and as is the case with other non-aluminum parts they can be removed readily from the sludge. Thus scrapped planes are taken apart quickly by chemicals, instead of by tedious hand labor.

After filtering out the solid impurities from the sludge, the aluminum bearing liquor is transformed into pure aluminum oxide by the Bayer process. This is accomplished by pumping the liquor into precipitating towers as high as six-story buildings and allowing it to stand and cool. In time, crystals of aluminum hydroxide begin to settle out. These crystals are removed and washed to free them of caustic soda. Then they are heated white hot in large rotating kilns to drive off any moisture and leave commercially pure aluminum oxide, or alumina. The caustic soda recovered can be re-used.—*Science Service*.

✓ ✓ ✓

Motor Fuels

Antiknock motor fuels of high octane value can now be produced through the addition of compounds of heavy metals other than lead.

One compound which is regarded as especially successful is built around the relatively little known element rhodium; the molecule also contains the carbon monoxide and ammonium groups and either iodine or chlorine. For the rhodium, any of the following elements may be substituted: copper, thorium, lead, chromium, manganese, iron, nickel or cobalt.

* * *

A new fuel substitute for gasoline that gives one-fourth more power in a properly designed internal-combustion engine is reported by Donald B. Brooks of the National Bureau of Standards. A blend of certain nonhydrocarbons, the fuel, if used in an ordinary gasoline engine may give up to 5% more power than gasoline, he stated.

The components of the new blend are ethyl alcohol, diethyl ether, acetone and butanol. These can also be used "straight" in some cases, Mr. Brooks stated. His conclusions are based upon tests of substitute motor fuels conducted in a precision single-cylinder variable compression engine in the Bureau's automotive laboratory at the request of the Foreign Economic Administration of the Office for Emergency Management.

* * *

Improving the ignition qualities of Diesel fuels by the addition of what might be called mild-mannered cousins of TNT is the at first slightly startling proposal that won patent 2,378,466 for Dr. George O. Curme, Jr., chemist in the laboratories of the Carbide and Carbon Chemicals Corporation.

TNT, nitroglycerin and other high explosives are trinitrates of carbon-containing compounds. To pep up the often sluggish ignition of Diesel oils, Dr. Curme adds small percentages of the dinitrates of either polyethylene glycol or polypropylene glycol. These dinitrates are chemically somewhat similar to trinitrates, but are less temperamental in their behavior.—*Science News Letter*.

Hope for Dengue Vaccine

Hope that vaccination against dengue, or "break-bone fever," may be achieved appears in a report by Lt. Col. Albert B. Sabin and Capt. R. Walter Schlesinger, of the Army Epidemiological Board and the Children's Hospital Research Foundation. (*Science*, June 22.)

Dengue, though not fatal, is a painful, very weakening disease spread by the same mosquitoes that carry yellow fever. It has occurred in the southern part of the United States and there have been outbreaks in New Guinea and

Hawaii. Because of the disability it causes through its weakening effect, it could be a problem to an army fighting in regions where it is prevalent.

Inmates of the New Jersey State Prison, who volunteered for the studies, have been given immunity to this disease by injections of dengue virus which had been propagated in



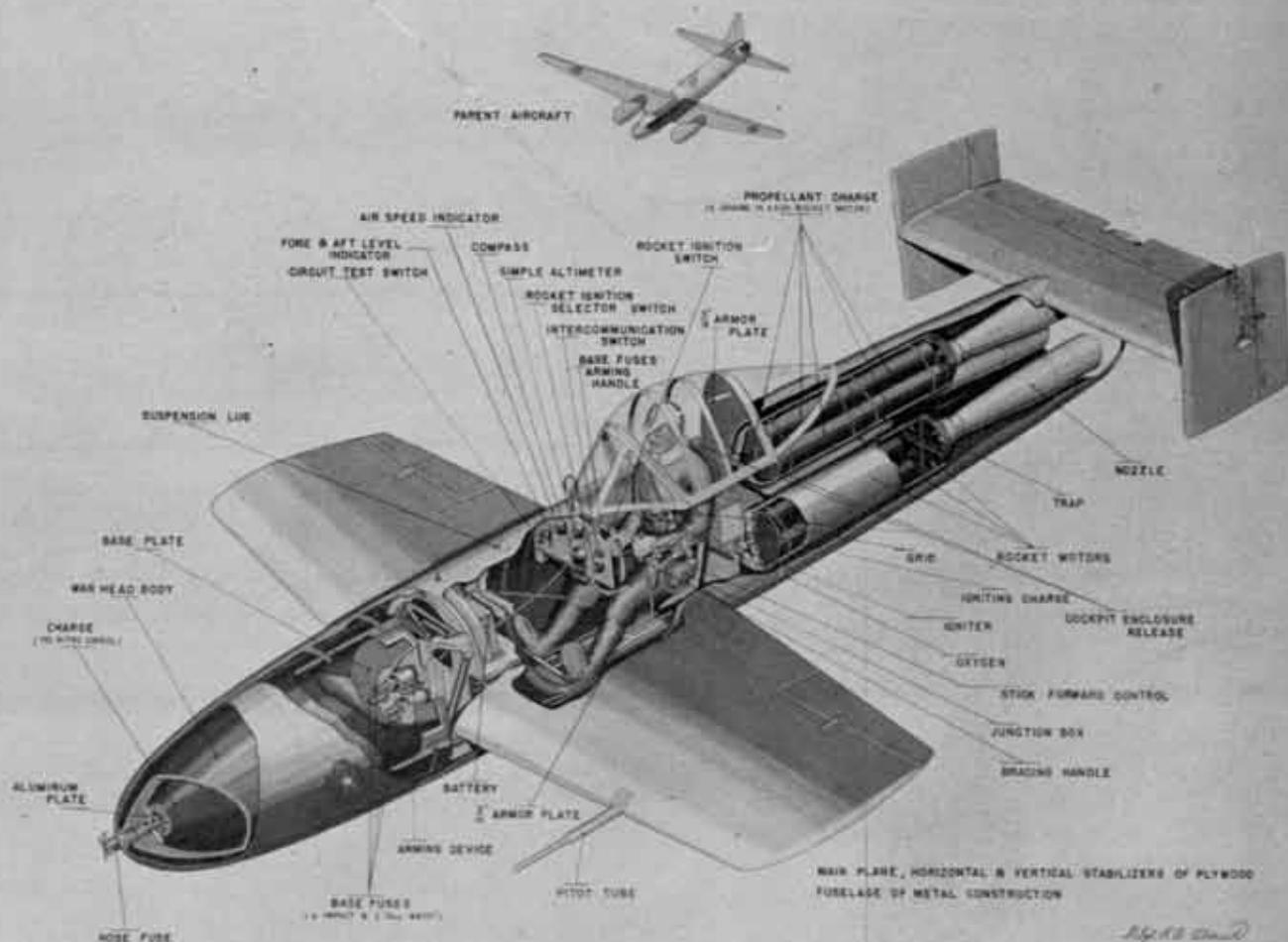
BAKA

ROCKET PROPELLED PILOTED AIRCRAFT BOMB

SPAN - 16' 5"

LENGTH - 19' 10"

TECHNICAL AIR INTELLIGENCE CENTER
NAVAL AIR STATION, ANACOSTIA D.C.



U. S. NAVY

The Jap Baka Bomb—Tokyo's foolish answer to the growing American power in the Pacific. The pilot steers the "bomb" into his target—if he gets that far. There is little future in this sort of thing for the pilot, and little more for Japan.

mice. The feat of establishing the virus in mice has never before been accomplished although a number of attempts have been made.

The virus becomes modified by transmission from one mouse to another, so that it causes a progressively less severe disease. The volunteers from the state prison actually got, along with their immunity to dengue, a mild attack of it. It was no more severe, the scientists report, than the reaction following typhoid vaccination and consisted of fever with or without headache and sickness for 24 hours or less. A marked, extensive rash, which is one of the symptoms of dengue, also followed the immunizing dose of the virus.—*Science News Letter*.



Giant Troop Carrier

A new six-engine cargo plane, the XC-99, readily adaptable as a hospital plane or as a troop carrier with a capacity of several hundred soldiers, has been developed for the Army Air Forces by Consolidated Vultee Aircraft Corporation of San Diego.

The giant XC-99 has a wing span of 230 feet, a length of 183 feet, and is powered by six pusher-type power plants. It is the military version of Consolidated Vultee's Model 37, the 204-passenger airliner contracted for by Pan-American World Airways for postwar transoceanic service.

The XC-99 is being built at Consolidated Vultee's experimental department. It has a tricycle landing gear, pressurized cabins, and will have a service ceiling of 30,000 feet.



Largest British Plane

The largest British airplane yet to take to the air is the 58-ton four-engined Shetland Flying Boat that could fly from London to Bombay, about 4,650 miles, nonstop at 184 miles an hour. It is larger and has a longer range than the American-built Martin "Mars," largest U. S. flying boat. The airplane is a double-deck ship with accommodations for 70 passengers and a crew of 11, and is fully air-conditioned. There are three main compartments as well as a promenade on the after upper deck, a fully equipped kitchen, and rest rooms.

The new giant of the sky, built by Short Brothers, is powered by four 2,500 horsepower Bristol Centaurus air-cooled, 18-cylinder engines. These powerful engines turn four-bladed propellers which have blades measuring 15 feet, 9 inches in length.

The wingspan of the Shetland is 150 feet, greater than that of a B-29 Superfortress, and it has an over-all length of 110 feet. Fuel tanks carry more than 6,000 gallons of gasoline and 320 gallons of oil.—*Science News Letter*.



Extra Copies

Single copies of the JOURNAL will be sold as long as they last for any particular issue, but if you want to be sure of getting the issue with your unit's action story, we suggest that you subscribe for the full year.

Germany's Secret Weapons

(*London Times*)

The more that is learnt of German preparations and progress with new weapons, the more apparent is it that the allies ended the war with Germany only just in time. It may, of course, be said that this was not all luck, because Germany's feverish research for new aggressive inventions starved the forces which had to fight her battles, notably the air and artillery arms, and thus contributed to the allied victory in the field, the only kind of victory to which there is no reply. Nevertheless the dangers faced, above all by Britain, were many and terrible. I am now learning a great deal about them from men willing to talk, partly from professional pride and partly, let us hope, to prevent further wars.

DESTRUCTION PREVENTED

The British entered Germany with machinery organized to prevent the destruction or concealment of research works or plants of special kinds, and they were more successful than they had dared to hope. First there was an arrangement with the air forces to avoid bombing them. Then special teams went forward on the heels of the fighting troops to take them over. Much was in fact taken intact. In other cases vital objects which had been hastily buried or hidden were quickly found. One managing director of a great company was actually found addressing a board meeting on the disposal of dangerous secrets.

It is convenient to summarize results under seven headings, representing the seven groups of the organization which did the work. The first of these concerns radio and optical equipment. Here, apart from the general high quality of output, there was only one surprise. That was in the Germans' infra-red photography. Photographs were taken at remarkable distances. Also in this category come a fabulous ray which was to deal with tanks. This proved to be only infra-red searchlights to blind tank crews and was used in conjunction with the 88mm gun. It was more humdrum than the fable, but it was deadly against tanks moving at night, as ours did. The second category embraces guns. So much has already been written about long-range guns that no emphasis is required to the enemy's inventive capacity. But there were other unpleasant novelties, such as rocket-assisted shells. At a certain point in the shell progress the rocket took over and provided further propulsion. Then there was at least a scheme in the predevelopment stage to provide the V 2 rocket with wings, which had great possibilities.

A NEW GAS

The third category is chemical warfare. The German had a new gas in great quantity with certain qualities more deadly than any yet used. It could have been mastered, but would have given trouble and caused much loss, especially as antigas discipline in England was naturally not as good as at the outset of the war. It is known that Hitler was the man who prevented its use, in spite of continual urging from the party bosses, not through altruism, but because he did not believe it would pay. Another invention in this field

is a very light and noninflammable synthetic rubber of a sponge-like consistency, admirable for motor tires because it is nearly indestructible by bullets.

In the fourth category, that of air warfare, in addition to their various jet planes the Germans were experimenting with a piloted V 1 flying bomb with a retarded take-off and an obvious increase of accuracy. They had also made considerable progress with controlled projectiles directed either from an aircraft to a ground target or from aircraft to aircraft. The fifth category covers vehicles. The British did not find much heavy tank industry in their area, but there were a number of half-track models with fantastically low fuel consumption. Amphibious vehicles of types not dissimilar from those used by the allies were in production.

The sixth category concerns naval construction. Here all the most notable work was on torpedoes and submarines. There was a torpedo with a range of 80 miles and an acoustic head which "listened" for its target. There were controlled torpedoes which would follow a zigzag course with deadly possibilities against zigzagging ships. There was a glider released from an aircraft and in turn releasing a torpedo, so that the aircraft could avoid the full blast of ships' anti-aircraft fire. There was a jet-propelled submarine going into production with an underwater speed of 25 knots—a nightmare to deal with—and one in production with a submerged speed of 15 knots. These were made possible by a

new fuel, also employed to propel the Me 163, and to be utilized either as a propellant or an explosive fuel. The seventh category, which can be labelled documentary, includes the records of the *Gestapo* and the Nazi Party. Some illuminating information has been unearthed here. The *Gestapo* would run a firm, supply it with slave labor, and then dodge income tax on the profits, which were sometimes enormous.

SINISTER SWITCH-OVER

The British organization built up to trace all these inventions was aided by the Germans refraining from laying booby traps or carrying out sabotage in their own country. In fact the principal damage was done by "displaced persons" in a state of inebriation after the German collapse. The Germans either ran away or, if they could not, gave all the information in their power. The "blind" in Hanover was probably the greatest Europe has seen and lasted for three days. Nevertheless a magnificent intelligence target which was the headquarters of the *Wehrkries* (Defense District No. 11) was secured in almost complete working order. In another case the head of a world-famous firm had completed the burning of all his documents on the afternoon before the British arrived, but when he was convinced that the Nazi Party was a thing of the past he admitted that he had first microfilmed all the most important of them.



The Pentagon, the Army's "home office." In spite of those winding drives it is possible to get in and out of the building.



The Coast Artillery School

BRIGADIER GENERAL L. B. WEEKS, *Commandant*

In line with the aim of making the Department of Artillery instruction as practical and realistic as possible, the use of a Firing Terrain Board has been incorporated in the Officers' Refresher Course. This board, constructed under the supervision of Capt. Henry A. Penchoen, C.A.S. Training Aids Officer, permits the students to have a realistic viewpoint of the land firing problem prior to the actual firing of such problems at Fort Eustis, Va. The Terrain Board, combined with instruction on the Smoke Puff Range and the Field Artillery Trainer M-3—all climaxed by the firing of landward problems at Fort Eustis with live ammunition—provide the students with a beneficial realization of the problems involved in land firing missions.

The Department is, at present, busily engaged in building up the curriculum for the Gunnery Officers' Course. The initial class is scheduled to start 5 August 1945. It is the intent of the Department in this course to give the students a comprehensive picture of seacoast artillery (ma-

tériel, gunnery, and tactical employment) such as to enable them efficiently to perform the duties of Harbor Defenses Gunnery Officers.

The Department of Engineering announces the graduation of Group 45 of the Enlisted Communication Course on 30 June 1945. During the last two weeks of this course the students were given training in the field, setting up and operating field radio stations. This field work was conducted under simulated combat conditions. Emphasis was placed on correct radio procedure, communication security, preventive maintenance, and military courtesy and discipline.

Speed in traffic handling was not stressed, but accuracy and faultless procedure were at all times required. Traffic was handled through interference and jamming. On one day a station operated near a firing 155mm battery, which gave the operators a "feel" of battle conditions.

Graduates of the Enlisted Communication Course receive the MOS 776. They are as well qualified as any twelve-week course can make them. Sixty per cent of the members of this class have been given the advanced course for radio repairmen. The course started on 1 July 1945.

Master Gunner students are now being trained in Meteorology in accordance with TM 20-240. This training will enable them to obtain meteorological messages for all types of Artillery based on data obtained from their own field observations or from liaison with Air Force Weather Station data.

In Orientation, stress is being laid on obtaining orientation data from the beginning to the end with sun and star observations, with the establishment of a temporary grid system in the beginning and the final conversion to a



Naval planes strafe the beachhead at Fort Monroe.

standard grid system in the end. This procedure is designed to fit the students for the type of orientation problems they will be meeting in the Pacific theaters of War.

The Department of Submarine Mining is most interested in hearing from the field on the results of the series of three Mine Property Officers' conferences which were completed on 11 May 1945. Correspondence indicates that most of the methods decided upon during that conference have proven successful but there have been a few exceptions. The School is interested in hearing more about the exceptions and any solutions that have proven successful.

New changes to T/O&E 4-260-1 have been forwarded for approval of higher authority. Some of these recommendations are a result of the MPO conference and others are a result of local experience or requests from the field. They are designed to bring present T/O's for the mine battery and the mine planter battery into conformity with the functional organization of these units.

Due to the brief but concentrated course of instruction in controlled Submarine Mines in the Officers' Refresher course (16 hours), a new method of instruction was tried and found satisfactory. During the last course, a complete set of notes, written by the instructor in the subject taught, was furnished to each student. This did not prevent the student from taking notes, but encouraged the student to follow the lecture more closely without worrying about not having a complete set of notes which he could study for his written review. The written review is based on information recorded in the instructor's notes.

A complete study has been made of MOS for officers and enlisted men in the Mine Service and corrections and new MOS have been forwarded for approval.

The plans and design for the new 125-foot diesel powered, harbor defense mine planter have progressed to the tank towing test stage. This design is being prepared by a civilian shipbuilding concern to meet the requirements established by the coordinated efforts of the Transportation and Coast Artillery Boards, the Submarine Mine Depot, and the Department of Submarine Mining.

Proficiency tests for Submarine Mine organizations have been prepared by the Department of Submarine Mining. These tests represent the first attempt to measure and compare the status of training required in a mine organization. Class No. 12 of the Mine Maintenance Course graduated on 19 May 1945 and class No. 13 is now in progress.

The Department of Tactics, for the last Refresher course, was able to add a great deal of realism, through the cooperation of the Navy, to the amphibious problem "Seacoast Artillery in Joint Army-Navy Operations." In this problem elements of a 155mm Battalion (one battery 155mm M1's) are loaded aboard LSM's the night prior to "D-day." This loading, conducted not without difficulties due to the condition of the loading beach, gives the students an excellent picture of the problem of loading all T/O&E equipment aboard this type of naval vessel. During the loading, a number of methods of loading this equipment were demonstrated so that the students may see all the advantages and disadvantages of the various methods. The best method of loading was found to be securing an M1 tractor to the center of the deck of an LSM, then using the tractor winch to pull the equipment up the ramp onto the

deck. For this amphibious move, several new pieces of equipment were added for the first time. The AN/MPG-1 and the M8 Data Computer were sent along for the purpose of tests conducted by the Coast Artillery Board. The problem of loading this equipment was no greater than was encountered in loading the SCR-584. The M1 tractors had little difficulty loading the equipment from the loading beach, up the ramp onto the LSM.

The day following the loading, "D-day," was almost completely a Navy show. The Navy furnished 2 LSM's, 2 LCC's, 1 LCM, and 2 Flights of Carrier Based F7F's. Naval Air furnished friendly air support for the movement of the convoy to the rendezvous area and to the landing beach, and later simulated enemy planes attacking the newly established beachhead. The plan of operation called for the landing of one battery 155mm's after the beachhead had been secured to protect the beachhead and to support an Infantry RCT as Field Artillery.

The students of the Refresher Course went ashore in the LCM as an advanced party of the battery. After landing it was necessary for the students to mark and clear mine fields found on the beach, and select tentative positions for various elements of the battery. As the LSM's started their run for the beach, 2 LCC's on previously arranged signal from the flagship laid down a smoke screen to protect the landing. The effectiveness of this screen was such that it was not until the bows of the LSM's appeared through the screen, as they nosed on the beach, that the ships could be seen. About the time the equipment of the battery was being unloaded, the Navy planes appeared as enemy planes and made five very spectacular strafing runs over the landing area. These attacks were so effective that all personnel were forced to take cover for self-protection, which added a great deal of realism to the problem. The strafing runs were so well coordinated that the attack, always from four different directions, kept the beachhead in a state of disorganization for fifteen minutes. The Navy pilots, being no respecters of rank, took delight in making all personnel dive for cover on each sweep of the beach. It was later learned that the superior coordination of these air attacks was a result of combat experience of these carrier fighter squadrons, recently returned from the Central Pacific Area.

Despite the almost continuous air action, the equipment of the battery was unloaded without difficulty, as the beach in this area is ideal for this type of operation. The AN/MPG-1 did bog down in the sand momentarily, but was pulled out and set up in position ready for operation in two hours.

For the final phase of the problem, after all the equipment was unloaded the battery elements were emplaced and a service practice was fired that afternoon.

A new War Games problem has been added to the present Refresher Course. Following the completion of the Harbor Defenses of Manila Bay problem, a CPX (War Game) involving the use of a large scale relief map of the Harbor Defenses of Chesapeake Bay, renamed Subic Bay for the problem, is used. This problem gives the students an excellent review of the tactical principles learned during the course. Major Martin J. Orbeck constructed this model which is 32 feet by 36 feet, with a scale of 1 inch equals

84 THE COAST ARTILLERY JOURNAL
250 yards. The ships models used are constructed to the scale 1/2,000.

The Department of Training Publications has been charged with preparing a series of Coast Artillery Training Bulletins under the title of *Notes on Coast Artillery*. The second bulletin in this series was distributed in July.

The purpose of *Notes on Coast Artillery* is to provide a means for mutual interchange of information on Coast Artillery matters of operational, training, or technical interest between the different Coast Artillery commanders and the Commandant, Coast Artillery School, and to furnish the field with pertinent Coast Artillery information of all classifications which otherwise might not find a suitable source of publication.

In order that the issues of *Notes on Coast Artillery* may accomplish their purpose, it is requested that seacoast artillery commanders submit to the Commandant, Coast Artillery School, information along the lines outlined above, including new methods of utilizing standard matériel or deviations from standard procedure, suggestions to improve the efficiency of Coast Artillery units or to overcome deficiencies encountered in training, suitability of matériel both as a basis of issue and type, suggestions as to new de-

velopments in matériel and technique, and narratives concerning Coast Artillery operations, training, tactics, techniques, procedure, and combat lessons believed to be of interest and practical value to Coast Artillery units in training or in combat. Wherever possible, material submitted should include photographs or sketches and, in every case, should include enough factual data for an understanding of the problem and the solution.

The Department of Training Publications has completed C1 to FM 4-10 and C2 to FM 4-15. Changes 1 to FM 4-10 includes a discussion of the standard and stand-by control systems for 90mm guns and a group of firing table problems in which the new meteorological message is utilized. Changes 2 to FM 4-15 contain material on air plane observation, an explanation of the new meteorological message, and a detailed discussion of the employment of the time-elevation plot in conducting fire under gun commander's control or central control.

The Department recently distributed CATB Vol. 4, No. 7, *Diesel-Electric Plants for 6-, 12-, and 16-inch Gun Emplacements*. *Notes on Coast Artillery No. 1* and *Notes on Coast Artillery No. 2* appear in CATB Vol. 4, No. 4 and Vol. 4, No. 8 respectively.



The swimming pool at the Beach Club, Fort Monroe.



Harbor Defenses of Chesapeake Bay

BRIGADIER GENERAL ROLLIN L. TILTON, *Commanding*
By Captain Alonza F. Colonna

The summer season at the Officers' Beach Club at Fort Monroe was started on schedule on Memorial Day, May 30, in a fine, new, brick clubhouse. The new permanent building was built on the site of the Colonial type brick clubhouse which was destroyed by fire during the early morning hours of June 15, 1944.

The new building is virtually fireproof and is so well constructed that it should withstand easily winds of hurricane proportions. The club was built originally in 1931 on the same spot, but the first building was destroyed by the same hurricane that swept the Virginia Peninsula in 1933, when a large part of the beach on the Fort Monroe side of the bay was washed away, including the concrete sea wall. The Colonial clubhouse was built after the wind disaster, only to go up in flames about ten years later.

The new club building has a large dining room where

luncheons and club dinner parties are held. There is a big outside dance floor of concrete between the front porch and the sea wall. The swimming pool was not hurt by the fire last summer, and the club carried on with a large canvas tent for a "clubhouse." The club now has new locker rooms in a separate bathhouse. There are facilities for games such as tennis, volleyball and the like, and barbecue pits and outdoor ovens. It would be nice for steak fries—if there were any steaks.

Both the historic Casemate Club and the Beach Club are in operation now, though most of the Officers' Club activities will center around the Beach Club until September, when the weather moderates to a point where the Casemate Club again will be a pleasant place. The Beach Club will be closed during the fall, winter and spring months, as it is strictly a summer clubhouse.

The same personnel, including secretary, steward and the like, function for both clubs.

The new Beach Club has a beautiful set of hand-wrought andirons for the big open fireplace in the dining room, which is the main room of the building. Dan A. Anthony, civilian civil engineer for the post engineers at Fort Monroe, presented the andirons to the club.

Seventy-eight years ago, a man fell off a ferry into Long Island Sound. Mr. Anthony's father, a passenger on the ferry, leaped into the water and rescued the man, who turned out to be an Italian who was a skilled artisan. The grateful Italian made Mr. Anthony a beautiful set of andirons. They are a prized possession of the younger Mr. Anthony. He had a set made, identical except a third larger to fit the big club fireplace, and presented them to the club. They were made in the spare time of J. Frank Sauer, post blacksmith, and his helper, Abraham Thomas, Negro, veteran of forty years' employment at Fort Monroe.



The new Beach Club at Fort Monroe, showing outside dance pavillion.



Northern California Sector

BRIGADIER GENERAL RALPH E. HAINES, *Commanding*

Battery B, 173d CA Bn (HD) recently completed one of the Harbor Defenses' most successful night firing practices. While searchlights of Battery A, HDSF, under the direction of Captain Don Smith, illuminated the target nearly four miles at sea, Battery B's armament scored physical hits on the S-40 Navy Target. Watching the shoot from an HDSF Mine Planter were the Commanding Officer HDSF, the Post Executive, and the Assistant Executive Officer HDSF.

The sixty-round practice shoot of Battery B, 6th CA Bn (HD) also gave satisfying results. An official review showed several direct hits on the upper half of an AMTB Target at a range of 6,300 yards. A total of fifteen hits were scored in the entire practice.

Thirty lucky HDSF soldiers were among the 1,000 Bay Area Service men and women who saw the signing of the United Nations Charter in the Veterans Building on 26 June.

One of the many duties assigned to two HDSF medical officers and five technicians was complete physical check-ups for 250 conference chauffeurs. This detachment was on duty the entire conference term as a part of the Army Hospitalization Program.

Harbor Defense and Postwar Bond Buyers topped all previous records as the 7th War Loan quota was met to the sum of \$65,000.

The Fort Barry medical detachment carried on the Army's tradition of quick work in an emergency recently. A giant Catalina Navy plane crashed near the HDSF area killing nine of a crew of eleven. Within five minutes after the crash the Fort Barry medics were on the job. In the brief space of fifteen minutes Captain Charles Blaugrund, Surgeon, 172d CA Bn (HD), S/Sgt. Herbert Heet, and Cpl. Burton Payne gave first aid to the survivors, and had taken the two men to the Fort Baker Hospital.

Air defense against carrier planes was the basis of several problems with a group of the Naval Air Arm. This carrier group was particularly anxious to test tactical plans over an area comparable to that of HDSF and Sub-Posts. Qualified observers from the Harbor Defenses assisted the Navy in operations and the analysis of results. HDSF units and the 122d Reconnaissance Troop (Mecz) participated in the problem from a defense standpoint. Particular emphasis was placed on reconnaissance, selection of terrain, movement into position, and camouflage. Vehicles of the 122d Reconnaissance Troop No. 1 took up advantageous positions prior to each problem. Observation posts were set up, and a radio warning net established. Every attempt was made to simulate realistic conditions except for actual firing. Excellent training was afforded to the HDSF and cavalry units, since the Carrier Group used dive bombers and fighter groups in executing its phase of the problem. The air units simulated the conditions of an actual mission. Reconnaissance

photographic missions were flown by the Navy. These accurate intelligence determinations. These photographs were very helpful to the HDSF units in checking the effectiveness of camouflage of positions used in the problems.

The Harbor Defenses of San Francisco had the honor of firing the salute and supplying the security guard for President Truman when he visited San Francisco to witness the signing of the United Nations Charter, and to address the closing session of the Conference. Assigned by Northern California Sector to some eighteen miles of densely populated area on the route from Hamilton Field to the Golden Gate Bridge every precaution was taken by this Special Security Detachment. Many of the men chosen were veterans of war theaters. Their service ribbons and stripes gave this detail a most impressive appearance.

The President arrived and departed without untoward incidents. Brigadier General Ralph E. Haines, Commanding General Northern California Sector, commended the personnel involved for the excellent performance of their duty.



2273d AAA Command

Brigadier General W. W. Irvine has been assigned to this Command after duty with the War Department General Staff. When notified of his change of assignment he was on temporary duty as an observer in the Ruhr pocket. Brigadier General Irvine has been assigned to command the AAA Brigade. Also recently welcomed into this command were Colonels Donald C. Tredennick, Glenn Newmeyer, Carl W. Holcomb and Harry S. Tubbs.

Victory in Europe found many soldiers in the Pacific area anxiously awaiting replacements and looking forward to release from the Army. AAA troops were among the first to arrive in the Hawaiian Islands after the declaration of war. As a result, throughout the Pacific Ocean Areas, a relatively large percentage of these men are among the high-point soldiers to be released. In this AAA Command alone, there were 2,335 men with the required minimum of 85 points or more. Men with 116 points or above were rapidly selected for the Pacific Ocean Areas Redistribution Center for transportation to the mainland Separation Stations for final processing before reentering civilian life. Other men with 85 points will be similarly processed as rapidly as replacements can be furnished.

A determined effort is being made to give special training to aircraft recognition instructors. A special school, conducted by the Command Recognition Officer at the AAA Command, has thoroughly trained recognition instructors in the methods and techniques of teaching recognition. With available training aids, these men are now applying professional educational methods. By the use of lesson plans, variety of training aids, games, and contests, and complete progress records, the instructors have had increasing success in teaching this important subject. Periodic tests are given in the field by this headquarters to determine the state of training in this and other intelligence subjects.

The AAA Gun Instruction Team has completed its tour of the Command. This tour was culminated by a Gun

and Matériel School for Officers. The instruction has been of great value to the officers of the Gun Brigade. Other AAA Instructional Teams have arrived from the mainland to aid similarly in training automatic weapons and searchlight personnel.

There have been 1,200 showings of armed forces released recreational films within the Command during the last month. This is a Pacific Ocean Areas record and serves to emphasize the steps being taken to provide suitable entertainment for the widely separated and isolated field personnel of the AAA Command.

Two pieces of captured Japanese matériel are now on display in this Command. A Type 2 Japanese AA Director making a tour of the Command mounted on a searchlight trailer. The G-3 office and the Ordnance office collaborated with an American-Japanese Nisei interpreter in studying the equipment and the different charts, drums, and operating handwheels were tagged to give the troops a more complete understanding of this enemy equipment. The second piece of Japanese matériel, a Baka plane (piloted suicide bomb), has been placed on display in an area adjacent to the Command Headquarters.



Northwestern Sector

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

Intensive artillery training has been going on in both harbor defenses of the Northwestern Sector to train newly arrived replacements, the majority of whom have had no previous Coast Artillery training or experience. Special schools in basic Coast Artillery subjects have been conducted in each harbor defense to give these men the necessary background and preliminary instructions for gunnery instruction and examination. Every effort is being made to avoid any let-down in Coast Artillery training and to develop well-trained batteries to carry out target practices during the coming quarter.

As another means of improving Coast Artillery training, Sector inspection of all Coast Artillery batteries was made during May and June by a Sector team, consisting of an officer from each harbor defense. This inspection lasted a week, and it will result in better Coast Artillery training and better target practices during the coming quarter.

Target practices for the second quarter have been completed with satisfactory results. An AMTB night practice was conducted in the Harbor Defenses of Puget Sound using the 63-foot aircraft rescue boat as a towing vessel for high-speed target. The target, being towed at nineteen miles per hour, was completely destroyed.

Infantry training, command post exercises and tactical exercises have been emphasized in both harbor defenses, including a surprise command post exercise in each harbor defense conducted by staff officers from Headquarters, Northwestern Sector. As is usual in such cases, the Harbor Defenses of Esquimalt took part in the Sector command post exercise held in the Harbor Defenses of Puget Sound.

Wild game and deer abound in the vicinity of both harbor defenses, and a pheasant farm has been operated for several years in the Harbor Defenses of Puget Sound from which all posts in the harbor defenses, and Fort Stevens as well, have been stocked with pheasants. The pet deer in the Harbor Defenses of the Columbia have increased to such a number that the Harbor Defense Commander is confronted with a choice between gardeners and deer lovers, and this has arisen in a less degree in the Harbor Defenses of Puget Sound, where the one pet deer is claimed as being better trained in the fact that he has gone through the Infiltration Course with the men in his battery, with the bullets whistling overhead. This is one for the Harbor Defenses of the Columbia to match if they can.

On 25 June, the Sector Commander, Major General Robert H. Lewis, accompanied by Brigadier General James H. Cunningham, Assistant Sector Commander for HD Matters, visited the Harbor Defenses of the Columbia and witnessed a target practice.

On 9 June, General Lewis and Major General Frederick F. Worthington, CB, MC, MM, General Officer Commanding in Chief, Pacific Command, Vancouver, B. C., accompanied by Colonel Harrington, U. S. Liaison Officer, visited the Harbor Defenses of Puget Sound and witnessed a target practice at Striped Peak.

A three-week school in the operation, maintenance and repair of airplane targets was held last month at Fort Casey for Canadian Army personnel. This school was completed 21 June by a demonstration which included firing .50 caliber machine guns and the demonstration of handling and firing at these planes. Brigadier W. C. Hyde, Chief of Staff, Pacific Command, Vancouver, B. C., attended this demonstration and took part in a ceremony at which he and General Cunningham presented certificates to the Canadian officer and ten Canadian enlisted men who had taken part in this school.



Major General Worthington, Major General Lewis, Brigadier General Cunningham, and Colonel Harrington witness target practice at Striped Peak, 9 June 1945.



BOOK REVIEWS

The JOURNAL can supply any book in print,
at the usual Association discount.

Filling a Gap

PSYCHOLOGY FOR THE ARMED SERVICES. By the National Research Council. Washington: The Infantry Journal, 1945. 519 Pages; Index; Illustrated. \$3.00.

Psychology for the Fighting Man, written in 1943, succeeded in explaining to the soldier and his officers the psychological and physical factors that made him the kind of soldier he was, and assisted him in becoming not only a better soldier, but a more complete man. This new book is the logical successor of the first one—written at the college level, it contains more technical explanations, covers a broader field, and fills a gap in the presentation of psychology in its military aspects.

The book, in broad aspect, covers seven fields: observation, performance, selection, training, personal adjustment, social relations, and opinion and propaganda. Officers whose duties are concerned with training, teaching, selection of personnel, upholding morale, leadership, and disseminating or combatting propaganda will find this volume particularly useful—and what officer is not concerned with at least a few of these problems?

Camouflage, for instance, is as much a matter of psychology as it is of form or color. If you don't believe this, look at the diagram of the flowerpots on page 78. Recognition of war gases, lost-time accidents, CW practice, venereal disease rates, large numbers of men on the sick book, and finding your way 'cross country at night are all manifestations of psychology, and a proper understanding of their psychological bases can be of great help in solving their problems.

We predict that this will be one of the really important military books of 1945.

Our New Neighbor

THE PATTERN OF SOVIET POWER. By Edgar Snow. New York: Random House, 1945. 212 Pages; Index; Illustrated. \$2.75.

Mr. Snow has written a well-informed and temperate estimate of Russia's present situation, her aims, and her methods, that should succeed in enraging both our more rabid haters of Russian and those who believe the Soviets can do no wrong. He covers Russian policy from Poland to China, as well as her internal politics and economy.

One quotation from the book stands out . . . "one must note that Soviet policy in the East, like Soviet policy in Europe, has long been a synthesis of two considerations: a combination

of supposed broad strategic needs for maximum security, on the one hand, and the skillful active promotion of political forces friendly to the Soviet Union, and likely to help improve the security, on the other. The only contradiction between the two aims lies, as we can now see, in the factor of time. In the long view the main policy and the alternative policies work together; they synthesize." This is as good an explanation as any for a condition that has been causing doubt in many American minds.

On the whole, Snow's judgment is that Russia is more interested in her own security than she is in world domination; that Stalin is, neither by inclination nor in fact, a dictator; that in spite of certain ineptitudes the country is moving forward in the fields that concern her own prosperity and her amicable relationships with other leading nations; and that although she is neither as black as she is painted nor as pure as she would have the world believe, she is neither a menace to world peace nor the future mistress of the world.

A little more understanding of Russia, its people, its problems, and its aspirations would do more good for America than all the suspicions that have been set alight in many quarters.

Background For Time

HISTORY IN THE WRITING. By the Foreign Correspondents of *Time*, *Life*, and *Fortune*. Edited by Gordon Carnahan. New York: Duell, Sloan & Pearce, 1945. 387 Pages; Index. \$3.00.

The Luce publications, *Time*, *Life* and *Fortune*, spend much time, effort, and money to insure that capable correspondents are present when big things happen, anywhere in the world. Much of what these people write never appears in print because of space or time requirements, or because it is meant as background material to assist the editors in evaluating news stories. Some of the material is more interesting than the stories that appear in the magazines.

This book is made up of much of this unprinted material along with some that has appeared in the three magazines mentioned. Items such as expense accounts, personal notes from the office, and other miscellaneous communications were combined with the background stories to form a book that brings the war into more than a day-to-day perspective. The period covered is from 17 May 1940 (France's death throes), to D-Day. Forgotten names and incidents are brought to mind: Klakring

pedo S. Kwajalein, Tarawa, Tobruk, and hundreds more have been crowded out by Balete Pass and Malmedy and the rest of the newer names.

This is good reading—and it will be better ten years from now.

Chaplain Courageous

WALKIN' EASTWARD. By Captain Thomas H. Clare. New York: The MacMillan Company, 1945. 321 Pages; \$2.50.

Chaplain Clare writes of India from the point of view of the American soldier, and he writes of the American soldier from the viewpoint of a chaplain who is human, humorous, and an efficient soldier. Blended in with the descriptions of the poverty, the filth, and the enervating heat of the country are the stories of American soldiers, Alsatian nuns, British civil servants. There is not a dull page in the book.

The author skips blithely from tales of drunken binges to the story of a Finnish-American enlisted man who couldn't get along with the "wet-nosed kits" who were his officers, to teaming with the nuns who operated an orphanage (the author is a Protestant), to numerous incidents that illustrate why (as far as the author is concerned) the British can have India, to a beautiful and reverent Christmas pageant put on by our soldiers as a substitute for a party for some Polish girls. There is little continuity to the book, but it will never be missed. Amusement and serious thought appear side by side, even in the same sentences.

Chaplain Clare was reported missing on a flight in May, 1944.

Casey Hits Twice

BATTLE BELOW. By Robert J. Casey. New York: The Bobbs-Merrill Co., 1945. 380 Pages; \$3.50.

THIS IS WHERE I CAME IN. By Robert J. Casey. New York: The Bobbs-Merrill Co., 1945. 307 Pages; \$3.00.

The combination of circumstances that brings us two books at once by one of America's top war correspondents is interesting in itself. *Battle Below* has been in the hands of the publishers since 1943; it was suddenly released after plans were made to publish *This is Where I Came In*. The publishers, rather than hold the first book any longer, or hold the second book past the time when it was still fresh news, decided to release them simultaneously. The combination makes a lot of sense, and it is well worth-while.

We have all read the timid Navy releases about the exploits of our submarines, and except for a few feature stories on the adventures of Morton and Klakring, very little has been said. Casey's means of interviews and good reporting. Casey is able to present a vivid running account, made up of hundreds of individual stories of submarine life and adventure, that makes one wonder what breed of men these are who do their fighting from the bottom of the sea. Then Casey tells us what sort they are, and the answer seems to be that they are normal Americans with a hatred of Japs and a will to do the job assigned. They have to be normal—the abnormal men can't stand the job. They are technically perfect in their work, proud of themselves and each other, and they don't like depth-bombing better than the next man.

Casey wastes no time telling us this, he tells us their stories, and their character appears framed in their adventures. It's a good book about a superlative fighting force.

In the second book, the story of the invasion of Europe is told once more, but told this time by a master. Casey writes of what he sees, and little of what he thinks. He points no fingers, and criticizes no tactics or strategy. He is content to tell how battles are fought, how men die, how civilians live in a war zone, and how the participants endure hell. He takes war off the map and puts it into words that make the reader feel that at last, he is beginning to know something of what is behind the communiques and the headlines.

Water Routes

INTERNATIONAL RIVER AND CANAL TRANSPORT. By Sir Osborne Mance. New York: Oxford University Press, 1945. 103 Pages; \$1.00.

Following the studies by General Mance and Mr. Wheeler in the fields of International Air Transport and International Telecommunications, this new book is part of an integrated series. The history of international cooperation concerning inland waterways is presented logically and clearly, and the conclusions concerning present and future cooperation are reasonable and well supported. Americans, whose interest in international inland waterways is touched only by the Great Lakes, the St. Lawrence, the Rio Grande, and the Colorado, have never met the thorny problems of the Europeans, some of whose rivers run through as many as four and five countries. The present discussions concerning the Colorado River, and the Chicago diversion project, have been relatively simple in comparison to the problems brought on by the Rhine, the Danube, etc. The Final Act of the Congress of Vienna, signed 9 June 1815, devoted Articles 108 to 116 to the settlement of some of the problems presented by navigation on the rivers and canals of Europe, and many other treaties and conventions have dealt with the problem since.

Name in the News

BURMA. By Ma Mya Sein. London: Oxford University Press, 1944. 39 Pages; 1s.

History, administration, resources and trade, communications, education and religion, etc., of Burma, written by a noted Burmese woman educator.

From Drawing Board to Tokyo

THE SUPERFORTRESS IS BORN. By Thomas Collison. New York: Duell, Sloan and Pearce, 1945. 215 Pages; Illustrated; Index. \$3.00.

The story of the B-29 seems more than usually wonderful to the general public because they never heard of this huge craft until it had already proved to the Japanese that Pearl Harbor was indeed a mistake. Even those who read about the crash near Seattle that killed some civilians in a packing house had no inkling that the biggest thing in aviation (in more than one sense) had been created. The B-19 had been a failure, and the uninformed (and some of the informed) believed that a plane much bigger than the B-17 was plain impracticable.

The Boeing engineers and Army technical men who were responsible for the new bomber did not begin their work after Pearl Harbor—1938 could be used as a date for the beginning, or some date before that, or some date afterward. The Army outlined the characteristics that were needed; Boeing engineers, in competition with the engineers of other aircraft companies,

had been engaged in a continuous marathon of design for years. Pearl Harbor accelerated the work and removed some of the financial obstacles. In peacetime neither the Army nor Boeing would have dared to tool up for production even before an experimental model had flown, but this happened in the case of the B-29. The plane had to be right, and it had to be right in a hurry. That it was both fortunate and the result of good engineering.

A review cannot even hint of the obstacles that were overcome, of the faith, the enthusiasm, and the hard work that went into the silvery fleets that now cruise over Japan almost at will. The book tells the story well, in a manner that rivals fiction. The heroine is a mighty pretty girl. She can cook, too. Ask any Japanese mayor.

* * *

Background of the RAF

PER ARDUA: THE RISE OF BRITISH AIR POWER, 1911-1939.
By Hilary St. George Saunders. New York: Oxford University Press, 1945. 326 Pages; Appendices; Illustrated. \$3.75.

In comparing the advances of British air power with our own (the author does *not* compare them, but concentrates on his subject) we are struck with the fact that in both countries it was the military which forced the development against the inertia and active opposition of certain of its own highly placed personages. Younger officers, already committed to a life of adventure, were the leading spirits in the early days.

Mr. Saunders, author of several official British histories of the present war, seems to have had a bit more latitude in writing this unofficial history, and makes the best of his opportunities. There was bumbling, and there were mistakes, and there were obstructionists who delayed the rise of British air power, but the author tells of them with humor and tolerance.

The development of the Royal Flying Corps and the Royal Naval Air Service in World War I (which the author calls the Four Years War) is as great an epic in its way as any tale of Dunkirk in this war. With equipment that was risky to take off the ground in any case, the British flyers of both services performed in a manner that would be creditable to any well-established and tradition-marked Corps. The field commanders soon learned that airplanes were most valuable for recon work, and overcame their prejudices against the new-fangled weapon in short order. Planes were scarce and unreliable; the loss in pilots was so great that practically untrained airmen had to meet the best the Germans had—but the British fought on.

The book tells of the individual airmen on both sides who advanced military aviation through great strides in four years, and it does it with admiration, not even grudging admiration, for certain of the enemy flyers who contributed. The Germans always had a few tricks up their sleeves, which the British learned the hard way.

... despite the gloomy prediction of Lord Curzon, who took the gloomy view that every country including Britain would be so exhausted by the end of 1917 that the war would have petered out in which case 'to be left with a large number of airplanes would be highly inconvenient.' Even with this sort of obstructionism, the British air services were able to match the effort of the German. Our own General Somervell's reply to a related criticism, that "it would be ideal, but hardly practical, to kill the last Jap with the last bullet," had not yet been made, by about twenty-five years.

The weakness of the book is the fact that the years between 1918 and 1939 are glossed over too fast and too skimpily. The Lancaster, the Wellington, the Hurricane and the Spitfire were

not fortuitous accidents—their development was worth a more pages. This part of the story would not have the book quality of the war years, but it should have been developed more fully.

* * *

Stages of Progress

THE AUTOBIOGRAPHY OF SCIENCE. Edited by Frank Ray Moulton and Justus J. Schiffers. New York: Doubleday, Doran & Co., 1945. 640 Pages; Selected Reading Index. \$4.00.

The preface says, "There are six ways to read this book—a storybook, a history book, a textbook, a reference book, a source book, or a chronicle. Taste and previous interests may guide the reader to those authors and passages which he will first savor, but it is our hope that in their proper order every passage will prove both interesting and illuminating."

Here is the history of science, largely in the words of those who made the history. Beginning with the Book of Genesis, Chapter I, and following on through the writings of Hippocrates, Pliny, Galen, Agricola, Galileo, Descartes, Pascal, Newton, Jenner, T. H. Huxley, H. F. Osborn, Harvey Cushing, Donald Culross Peattie, and hosts of others, the last item is a plea by Peattie to suspend judgment on the "first great cause of all natural phenomena," to "observe without the will to believe some particular thing or the intention of proving some preconceived belief."

As we read, we are impressed on the one hand by the depth and thorough studies of some of the ancients and the truth of their conclusions ("truth" as related that what we believe to be "truth" today), and on the other hand, by the "wild speculation" that were the stumbling blocks of science for centuries.

The age-long struggle of scientists to explain and catalogue the wonders of the world we live in cannot be described in any book, or any series of books. A work of the sort under review can serve merely to remind us that the things scientists know, and suspects that it knows, today are based on the work of the shepherds who watched the stars in ancient Babylon, on the studies of the wise men of Greece, and on the moral courage of those who were beacons of light in the dark Middle Ages.

If in reading this book to get an inkling of the background of science we learn a few of the basic ideas of science, that is clear profit.

* * *

Scientific Broth

SCIENCE TODAY AND TOMORROW: SECOND SERIES.
By Waldemar Kaempffert. New York: Viking Press, 1945. 273 Pages; Index. \$2.75.

In this peculiar (but interesting!) hodgepodge of scientific fact and fancy, Mr. Kaempffert mixes scientific history, prophecy, and explanation into a broth that is perfectly intelligible to the layman, flattering to the scientist, and inspiring to the student. Remembering that Fulton, the Wrights, and Bell were laughed at by their contemporaries, we hesitate to smile at the author's fancies of devices that add the senses of feeling, smelling, and tasting to the seeing and hearing of television; or of devices that will control the seasons; or of the home of the future. We can, however, agree with him that when these advances come to pass, man will require much adjustment to them. We can feel, also, the implied doubt that man might not be able to adjust—with dire consequences.

It is when he deals with science in the present that the author is at his best. Simple explanations about electronics, synthetics

chemistry, the sun, the attempts at laboratory creation of life, and many other subjects require no scientific background for understanding, and inform us of what is happening to our lives in the laboratories of the world. We are affected when new processes, new devices, or new conceptions are developed anywhere in the world; the least we can do is to understand the general principles behind them.

The book covers a broad field; science itself covers practically every human activity. There is both challenge and knowledge in the volume.

✓ ✓ ✓

How They Work

PRINCIPLES OF FIREARMS. By Charles E. Balleisen. New York: John Wiley and Sons, 1945. 140 Pages; Illustrated; Index. \$2.50.

Major Balleisen says in his preface, "The purpose of this book is to expound the concept that an automatic firearm is a piece of machinery operating in accordance with well-known laws of physics and hence capable of being analyzed and designed in accordance with common engineering practice. . . . The object . . . has been to select a limited number of familiar weapons and to analyze their operation from the viewpoint of a mechanical engineer."

This is a new approach in this country to books on firearms. Major Balleisen's text and illustrations are both clear and capable of being understood by any mechanical engineer or almost anyone familiar with physics. Gun cranks will find much they know in the book, as well as much they don't. The gun enthusiast who prides himself on knowing more than lining up the sights and squeezing will probably want this one to complete his library, even though he never intends to design a weapon.

✓ ✓ ✓

Handgun Lore

Pistol and Revolver Shooting. By Walter F. Roper. New York: The Macmillan Company, 1945. 251 Pages; Index; Illustrated. \$2.49.

There are really two types of handgun shooting—target competition, and field and military shooting. Mr. Roper's book emphasizes the target-shooting in this book, not necessarily because he believes that it is the more important, but because that is his field and has been for many years. The tricks and the details that add a few critical points to a competition score very often decrease the usefulness of a handgun that is meant for protection or field shooting, either by slowing the draw, by providing more things to go wrong when a quick shot is needed, or by misadjusting the sights when error can be fatal.

Roper describes many of the more common weapons, their sights, the ammunition available for them, the ballistics of pistol and revolver shooting, and many other points that will be of interest to the handgun fan. He labels his facts and his opinions for what they are, and doesn't try to force his ideas on the reader.

Only a very small portion of the book is devoted to marksmanship, but what there is is pure gold. What he writes about sighting, sighting, and squeezing is based on the sound old advice, with a few added tricks about how to do all three at once. His advice on how to cure slumps should be of value to the man who never had a good score as well as to the man whose score has gone down.

TWO NEW BOOKS

*By one of America's top
War Reporters*

This Is Where I Came In

By **ROBERT J. CASEY**

The wheel has made full turn, from Longwy 1940, to Longwy, 1945. Defeat has turned to victory. How it was done is told by a man who knows how to tell it; it's good reporting and excellent personal experience narration.

307 Pages **\$3.00**

Battle Below:

The War of the Submarines

By **ROBERT J. CASEY**

This book has been held up by censorship since 1943; it was released suddenly, and has come out at the same time as *This Is Where I Came In*. Literally hundreds of tales about submarines—the ships, the men, the actions, and the tactics. Probably the most complete book about submarine action ever written; you will be proud of the men who fight under the sea.

380 Pages **\$3.50**

SEACOAST ARTILLERY

Basic Tactics and Technique

Here is the long awaited basic volume on the tactics and technique of Seacoast Artillery—a volume complete enough to take the place of innumerable field and technical manuals and yet handy enough to carry with you.

The whole authoritative story is here, profusely illustrated and presented in logical, clear and easily understood language.

\$3.00

SCARNE ON DICE

Do You Know . . .

- that only one or two Crap players out of a hundred know the correct odds and percentages on dice?
- that even Hoyle and the other gambling "authorities" give wrong odds?
- that unless you know and use the correct odds you are sure to lose?
- that if you take wrong odds you lose because you cheat yourself?
- that center and flat bets are not even-money bets although everyone plays them that way?
- that there are thousands of pairs of crooked dice in the pockets of honest players who don't know they have them? That the pair you own may be crooked?
- how to detect crooked dice?
- that fair dice can be controlled and how it is done?
- that throwing the dice against a board is not a hundred per cent guarantee against cheating methods?
- that dice can be made crooked in many ways beside loading? Did you ever hear of Bricks, Shapes, Edgework, Bevels, Slick dice, Trips, Heavy Paint Work, Capped dice, Bust-outs?
- what percentage you are bucking when you play Chuck-a-Luck, Hazard, Klondike, Crown and Anchor?
- that a fast action, double-dealer, Open Crap table can earn \$2,829.16 and more per night?
- what the difference is between the expert dice player and the dub, and why there are so few experts?

\$2.50

Postgrad Shooting

PRACTICAL MARKSMANSHIP: THE TECHNIQUE OF FIELD FIRING. By M. M. Johnson, Jr. 183 Pages; Illustrated. \$2.50.

Captain Johnson's list of books on weapons and marksmanship is growing impressively large, but the quality does not seem to suffer from the quantity of his output, even disregarding the fact that writing is his avocation. The president of Johnson Automatics, and the inventor of the Johnson Light Machine Gun and Johnson Semiautomatic Rifle, Captain Johnson knows his subject.

This book which was meant to begin where *How to Shoot the U. S. Army Rifle* and other basic books and courses usually stop, will be of little value to the beginner. The man who knows how to shoot on the range, and knows what makes his ammunition move toward the target, will find it a valuable post-grad course.

Johnson lays particular stress on nontarget practice conditions when no target marker is present to assist, and when the target might shoot back. He goes into such things as Kentucky windage, zeroing rifles, weather windage, holding and positioning gun rests (*never rest the barrel on anything*), the fallacies of hip shooting, snap shooting, moving targets (very well explained), fact and fancy about effective range, and a host of other subjects, including care of the piece and malfunctions and stoppages. The writing is down-to-earth, and there is more theory than necessary to assist in understanding the fact

✓ ✓ ✓

Bitter Humor

UP FRONT. Text and Pictures by Bill Mauldin. New York: Henry Holt and Company, 1945. 228 Pages; Illustrated. \$3.00.

All the things that can be said about Sergeant Mauldin's cartoons have been said, in hundreds of thousands of words. Whether or not they are harmful to morale or morale-building is still a point of argument. The reviewer wouldn't have a cartoon changed by so much as a line. The drawings in the book are the ones that have appeared in the *Stars and Stripes* and the daily papers in the States.

The text is the surprising thing about this book. Mauldin is as good a writer as he is a cartoonist. He writes about the same situations that are covered by the cartoons—and he does it with a forthright clarity that makes every sentence important. He is much more bitter, and less facile with words, than is Ernie Pyle but he is every bit as good at putting down on paper the fighting man's thoughts, ideas, and reactions. The liberateness of his conclusions and the obvious thought behind his words belie his twenty-three years.

He is frank to admit that there are things he does not understand, due either to his youth or his limited perspective, but at the same time he is merciless in castigating the people in the situations that make life unnecessarily complicated for the fighting man. One quote will give a touch of the flavor of the book:

"Recently I've changed some of my opinions. After a certain length of time overseas, you stop bitching at the guy who is doing something. (*Air Corps rotation is under discussion.*) You may wish you had it yourself, but you begin to realize that taking the warm coat off his back isn't going to make you any warmer. So the more seasoned doggie just sort of wonders why he does get home after a certain number of 'missions.' He laughs about the youthfulness of the Air Corps officers and he wishes somebody looked after him as well as somebody looks after the

Corps. But he doesn't bitch when he sees a formation of planes going through heavy flak and he feels pretty awful when he sees one go down and thinks of the guys in it." Mauldin doesn't do anything as insulting in this book, as to try to explain his drawings. He merely tells of the background that makes the drawings possible—and he does it powerfully.

Small Bites

HALF-A-HUNDRED TALES BY GREAT AMERICAN WRITERS. Edited by Charles Grayson. New York: The Blakiston Company, 1945. 527 Pages; \$3.00.

This book, the outgrowth of a bull session among some captains at Caserta, is a compilation of fifty short stories by our best living American writers. One of the goals set by the editor was to include the lesser-known works of the better-known writers.

In a compilation of this type, any over-the-shoulder critic has something on his side when he argues about any or all of the editor's choices. This particular reviewer doubts the propriety of including Ernie Pyle's touching little piece about Captain Waskow, not because it is not a piece of writing that is one of the best that came out of the war, but because it seems out of place in a book that is otherwise all fiction. Our grandchildren and their children will read about the death of Captain Waskow, but not, we hope, as fiction.

The book contains humor, adventure, excitement, love stories—something to suit every taste. It was one of the more pleasant hours of a reviewer's usually boring labors. Perelman, Hergesheimer, McFee, Komroff, Hemingway, Nunnally Johnson, and forty-four others guarantee many a pleasant hour.

British Paragon

COMMODORE HORNBLOWER. By C. S. Forester. Boston: Little, Brown & Company, 1945. 384 Pages; \$2.50.

The true test of any fiction is the feeling, when the last page is turned, that the book should have been longer. *Commodore Hornblower*, like *Captain Hornblower*, merely whets the appetite for more. This time the redoubtable Hornblower commands a flotilla in the Baltic, and manages to aid in the creditable activity of preventing Napoleon from winning his Russian venture. As usual, the diplomatic angles of his assignment cause the Commodore much more trouble than the naval and military aspects, and as usual a combination of good luck and good management provide the perfect solution. In this book Hornblower teaches Clausewitz a few things about siege operations, runs afoul of the Russian custom of *hors d'oeuvres* before a huge meal, has a bout with the plague, and spends some time aboard a horse.

The faithful Bush commands Hornblower's flagship; the faithful Brown is still his servant. Hornblower, with his larger command, is still the hero as in previous stories—and excellent entertainment.

No Doctors, No Deans

"DUNG MAN, YOU ARE NORMAL." By Earnest Hooton. New York: G. P. Putnam's Sons, 1945.

With a title like the above, and Earnest Hooton's name as author, we may be excused if we expect a book that is both

COAST ARTILLERY RINGS

Ladies' Miniatures Now Available!!



Due to difficulties in the supply of gold, the JOURNAL in the past has been forced to disappoint many who ordered Coast Artillery rings. GOLD IS NOW AVAILABLE—we don't know how long this will be true. If you want a Coast Artillery ring, ORDER NOW! These rings are made to order, they are of heavy construction, and are made by one of America's leading manufacturing jewelers. Your name is engraved free.

Order your rings NOW because:

- We do not know how long gold will be available.
- Shipments overseas are at purchaser's risk.
- Six to eight weeks are required for manufacture.

A Coast Artillery Ring with Your Name Engraved is a Ready Means of Identification

ONYX SETTING

PRICE	TAX	TOTAL
\$27.00	\$5.40	\$32.40

PLAIN GOLD (CA Insignia Signet)

PRICE	TAX	TOTAL
\$27.00	\$5.40	\$32.40

Although the supply of stones for men's rings is almost exhausted, miniature Coast Artillery Rings for ladies are available in a wide variety of stones: ruby, alexandrite, amethyst, white sapphire, golden sapphire, garnet, aquamarine, zircon, and spinel. These stones are available in the miniature rings only. The price: \$20.00, tax \$4.00; total \$24.00.

Since these rings are made to order, it is necessary to require check or money order before work is begun.

Measure from this point Take 1/8 inch strip of paper and wind around desired finger. Size may then be determined by measuring in original size.



Military Classics

- Roots of Strategy** **\$3.00**
 Edited by Brigadier General T. R. Phillips
 Five military classics in one volume—Sun Tzu, Vegetius, Marshal Saxe, Frederick, and Napoleon.
- The Instructions of Frederick the Great to His Generals** **\$1.00**
 Edited by Brigadier General T. R. Phillips
 The principles of Frederick the Great still influence the German Army. (From *Roots of Strategy*.)
- My Reveries On the Art of War** **\$1.00**
 By Marshal Maurice de Saxe
 Edited by Brigadier General T. R. Phillips
 The innovations in tactics made by Marshal de Saxe led the way to Napoleon and Frederick the Great. (From *Roots of Strategy*.)
- Makers of Modern Strategy** **\$3.75**
 Edited by Dr. Edward Mead Earle
 The great military thinkers of four hundred years.
- Armored Warfare** **\$1.00**
 By Major General J. F. C. Fuller
 General Fuller has brought up to date his famous *Lectures on FSR III* by annotating it from this war.
- Principles of War** **\$1.00**
 By General Carl von Clausewitz
 A brief summary of the art of warfare.
- Defense** **\$1.00**
 By Field Marshal Ritter von Leeb
 A German study of defensive warfare by the general who perfected the "hedgehog" defense.
- Surprise in War** **\$1.00**
 By Gen. Waldemar Erfurth
 The essence of German thought on surprise.
- Amphibious Warfare and Combined Operations** **\$1.50**
 By Admiral of the Fleet Lord Keyes
 A veteran of amphibious operations discusses them.
- Combined Operations** **\$2.00**
 Commando training and fighting—all sides of it.
- Decisive Battles of the World** **\$3.00**
 By Edward S. Creasy and Robert Hammond Murray
 A new edition of this famous book brought up to 1905.
- Masters of Mobile Warfare** **\$2.00**
 By Colonel Elbridge Colby
 Studies of Frederick, Marlborough, and Napoleon.
- Napoleon and Modern War** **\$1.00**
 By Colonel Conrad H. Lanza
 Napoleon's famous maxims applied to modern war.
- Warfare** **\$3.00**
 By Brig. Gen. Oliver L. Spaulding, Col. John W. Wright, and Maj. Hoffman Nickerson
 The story of war from the days of tribal squabbles to the end of the eighteenth century.

entertaining and instructive. In this case we would be correct—the usually bubbling Hooton has been snowed out by a fall of statistics. However valuable the book may be from a scientific standpoint, it will not be read by those who desire their instruction in a light form.

Physicians, psychologists, and others whose interest is in the abnormal human were financed by William T. Grant in a project to study the normal human—a laudable purpose. The study was begun at Harvard, and the standard of normality seemed to be that the subjects (students) were chosen from those who did not have too much trouble with their studies, their personal problems, or their physical well-being—in other words, those who were able to stay away from the doctors and the deans. A group of scientists began their tests, to find out in what ways the "normal" group differed from the group of students as a whole, and how they differed from each other.

The methods of study, and the results, are presented in this book. The connection between the results found and the study of the "whole man" (as differentiated from the sick man) are ably explained by the author. Although the book justly and proudly boasts of the absence of statistical tables, some mechanical device may have made parts of the book easier to understand.

/ / /

Miss Lace

MALE CALL. By Milton Caniff. New York: Simon and Schuster, 1945. \$1.00.

One hundred and twenty of the popular *Male Call* strip in book form should be worth a dollar to soldiers who have loved the feature in Army papers from the Persian Gulf to Rio Hato. The strips in this book have all appeared in Army papers. Those who have read military publications for the past few years and don't know what *Male Call* is or who Miss Lace is won't be interested; but the great majority of soldiers won't need any introduction to Caniff's luscious creation for soldiers only.

Cheap paper and less than superb printing makes some of the strips fuzzy—but doncha know there's a war on?

/ / /

In Business for Yourself

A SMALL STORE AND INDEPENDENCE. By David Greenberg and Henry Schindall. New York: Greenberg, 1945. 223 Pages; Appendices. \$2.00.

The person, veteran or just plain civilian, who intends to start a small retail business can learn much from this book. The least of what he learns will be a summary of how little he knows. There is much in the book about the rudiments of figuring costs, probable turnover, selling methods, advertising, how to choose a location, mark-ups, and the rest of the things that cause retail merchants lost sleep and gray hairs.

It would be hard to quarrel with what the authors have to say about such things as stock control, choosing a business, signing leases, budgeting, buying, selling, managing, keeping records, or of what people in the various fields have written about the operation of certain specialized types of stores. The point of disagreement, of this reviewer at least, occurs at the front of the book where the difficulties of making a small business are glossed over. Little mention is made of the high mortality of small business, of the fact that hundreds of thousands of veterans will soon be discharged with the prospect of going into their own retail stores, and that a large proportion of these men are going to lose their capital, their time, and

self-confidence in bucking a field for which they are ill-equipped in capital and talent.

Opening a small retail business is a gamble beyond the capabilities of many—but if you are willing to take the risk and refuse to fall back because others have failed, this is a good book to own.

✓ ✓ ✓

Advice to Veterans

GOOD-BY TO G.I. By Maxwell Droke. New York: Abingdon-Cokesbury Press, 1945. 124 Pages; \$1.00.

Mr. Droke, a veteran of the last war, is editor of a church paper for servicemen and head of a publishing house, as well as being a merchandise counselor. The book, although it is a bit preachy in spots and although it emphasizes an inspirational rather than a practical plane, contains some good information and advice on the readjustment to civilian life. The point is brought out that both the soldier and civilian life will have changed to some extent, and that the discharged soldier cannot hope to pick up exactly where he left off—that readjustments will be necessary. He brings out a little-known fact—that the soldier who had the most difficult adjustment to the military life will also have the most difficult adjustment back to civil life, because a man who is not particularly adaptable will remain that way.

But we'd still like to know what that sergeant was doing on the bridge of a PT boat.

✓ ✓ ✓

Back to His Wife

HALF-PAST YESTERDAY. By Robert Sturgis. New York: M. S. Mill and Co., 1945. 253 Pages; \$2.50.

The military setting of this novel is merely incidental—it provides the background for the change that stiffens the subtly henpecked husband to the point where he has an understanding with his wife. The feminine contingent will like the tale, even if it isn't great literature.

✓ ✓ ✓

Cartoons

ALL IN LINE. By Saul Steinberg. New York: Duell, Sloan and Pearce, 1945. \$2.50.

Steinberg's drawing looks like a cross between the doodling we are likely to find in a telephone booth and the drawings of a mentally retarded 13-year-old—until you look at them more closely. The longer you look the more you see; humor and satire, as well as some queer psychological quirks, finally emerge from the jumble of figures, objects, and seemingly unrelated lines. The reviewer admits, however, that a very few of the drawings never did look like more than a first-grade art lesson. Our favorites are the new version of a centaur, the Nazi "victory" hen, and the PX scene in North Africa.

What it boils down to is that if you like Steinberg, here it is. If you don't like his drawings, you won't like the book.

✓ ✓ ✓

The Hero Returns

THE JOURNEY HOME. By Zelda Popkin. Philadelphia: J. B. Lippincott Co., 1945. 224 Pages; \$2.50.

Lieutenant Don Corbett, an AAF bombardier, comes home

VETERAN'S RIGHTS AND BENEFITS

By COLONEL MARIANO A. ERANA and
LT. COLONEL ARTHUR SYMONS

▼

Every veteran and every serviceman should know at least as much about his rights as a veteran as he does for instance, about income tax. In addition to describing and explaining your rights to financial aid, education, hospitalization, and other benefits, this book is helpful while you are still in the service because it covers insurance, dependent's benefits, Civil Relief Act, and many other subjects.

297 Pages

\$1.00

Full text of the G.I. Bill of Rights

Blitz French

75¢

By Georges Nicot

A useful book of "action" French.

Easy Malay Words and Phrases \$1.00

A handbook of the language common to the East Indies and Malaya.

Elementary Japanese

By Colonel E. J. Sullivan

To members of the Armed Forces \$1.00

To all others \$2.50

Dictionaries for the Soldier

By Frank Henius

Mr. Henius's foreign language dictionaries for soldiers—sailors and marines, too—are simple, understandable, and clearly sound-written.

GERMAN DICTIONARY FOR THE SOLDIER
ITALIAN DICTIONARY FOR THE SOLDIER
SPANISH DICTIONARY FOR THE SOLDIER
FRENCH DICTIONARY FOR THE SOLDIER

1 to 10 copies: 50¢ each

11 to 50 copies: 40¢ each

51 or more copies: 34¢ each

The Complete Set of LEE'S LIEUTENANTS

Vol. I: Manassas to Malvern Hill . . . \$5.00

Vol. II: Cedar Mountain to Chancellorsville . . . \$5.00

Vol. III: Gettysburg to Appomattox . . . \$5.00

All volumes fully illustrated with portrait photographs and military maps. The 3 volumes, boxed,

\$15.00

from the ETO and brushes up against a lot of people who take the war and its dislocations as a personal affront, as well as an opportunity to line their pockets. That this occurs on a Miami to New York train makes it quite reasonable, even though it shuts out the view of the millions who do look upon it as their war. But aside from the social angle, the tale is a good one, with all the elements of danger, suspense, love,

and the rest of the things that make a good story. A thief, a few rich and powerful men, innumerable women of varying virtue, a couple of children, a tough young Marine, and a host of other characters packed aboard a speeding train in times like these is almost sure-fire fiction, and Mrs. Popkin knows how to use her material. Oh yes, the lieutenant begins to understand the people, and the people the lieutenant, at the end.

BINDERS

AT A NEW LOW PRICE

Field Manual Size 5 1/4" x 8 1/4"

Technical Manual Size 6 1/4" x 10 1/4"



In order to reduce our inventory we are offering a substantial reduction in the price—FIELD AND TECHNICAL MANUAL BINDERS are now \$1.00. Individuals and organizations should order NOW, because this offer will not be continued after our stock is reduced.

\$1.00

FOR A LIMITED TIME ONLY

Glamor in O.D.

A STAR DANCED. By Gertrude Lawrence. New York: Doubleday, Doran and Co., 1945. 238 Pages; \$2.50.

Gertrude Lawrence weaves her autobiography into an account of her experiences on an ENSA (British USO) tour of Britain and France.

Basic Manual of Small Arms

\$2.00

By W. H. B. SMITH

This book tells how to load, operate, disassemble and assemble American, German, Italian, Japanese, Russian, British, and other military small arms. Completely illustrated. 213 pages.

The Officer's Guide

\$2.50

A best seller since the beginning of the war. The tenth edition is up to date and ready for delivery. Always the *Officer's Guide* contains everything the officer needs to know. It will keep you up to the minute.

The standard edition of any book will be sent unless the paper-bound Fighting Forces edition is specifically requested.

THE COAST ARTILLERY JOURNAL,
631 Pennsylvania Avenue, N.W.,
Washington 4, D. C.

Please send the following books:

REMARKS, OTHER ITEMS

- I inclose remittance in the amount of \$ _____
- Send bill to Battery Fund.
(For unit orders only.)
- Please charge to my account.

Name (Please Print)

(Street address or box number)

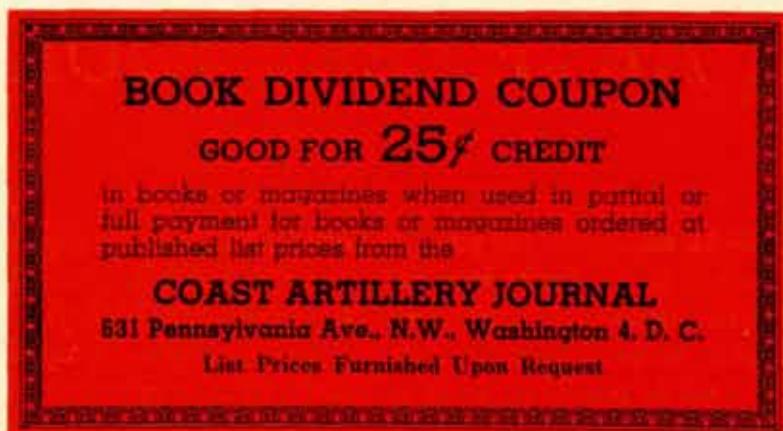
(Town — Post)

(City and State)

(CA445)

Book Dividend Coupons

Good for 5¢, 10¢, 25¢ Credit



COAST ARTILLERY JOURNAL Dividend Coupons represent a bonus for individual members of the Association *who send cash with their order.*

Because of the difficulties in keeping informed of changes in addresses with consequent increased correspondence and financial loss, these coupons are to be used to encourage cash transactions. To that end discounts to be returned to members will be the maximum that the JOURNAL can afford.

Send in your orders accompanied by cash in an amount equal to list prices and it will be of mutual benefit.

Dividend Coupons are not issued on orders for official publications nor on orders for organizations. Organizations are given cash discount when cash accompanies the order.

THE COAST ARTILLERY JOURNAL

631 Pennsylvania Avenue, N.W.

Washington 4, D. C.

The OOZLEFINCH

PATRON BIRD OF THE
COAST ARTILLERY CORPS

You'll want a pair for your desk both in camp and at home—and they make unusual gifts, in the authentic Coast Artillery Corps tradition.



Single Figure\$1.00

Pair (Facing Opposite)\$1.75

(POSTAGE PREPAID)

Services Offered by the **COAST ARTILLERY JOURNAL**

BOOKS

The JOURNAL can obtain for you any unclassified book, on any subject, that is in print, subject to the limitations due to wartime restrictions. Military books, technical books, fiction, biography, history—any type of book you desire. Send cash with your order and receive discounts paid in dividend coupons, which may be used for full or partial payment of other books or magazines.

MAGAZINES

The JOURNAL will handle your subscriptions to all magazines, subject at present to various wartime restrictions. Write us for quotations, or to learn the availability of any particular publication. If cash accompanies your order you will receive discounts in book dividend coupons, which may be used to pay for books or other magazines. Binders with name inscribed are available for all popular publications.

ENGRAVING

Calling cards, wedding invitations and announcements, informals, place cards, and other forms of engraving are needed sooner or later by everyone. The JOURNAL can do the job for you more reasonably than most other sources—with the added advantages of (1) keeping your plate on file, and (2) a complete knowledge of military and social forms. A style and price sheet will be sent upon request.

COAST ARTILLERY RINGS

Available both in men's style and in ladies' miniature style. Send for a descriptive price list. Men's 10k Gold Ring, \$32.40; Ladies' Miniature Ring, \$24.00. These prices include tax.

THE OOZLEFINCH

The patron bird of the Coast Artillery Corps. Good desk ornaments; something unusual for the whatnot shelf at home. A fine inexpensive gift. Single birds, \$1.00; pair, facing opposite, \$1.75. A history of the Oozlefinch is sent with each purchase.

TAKE ADVANTAGE OF YOUR JOURNAL'S SERVICES