HEADQUARTERS
ARMY GROUND FORCES
OFFICE OF THE COMMANDING GENERAL
FORT MONROE, VIRGINIA

To all members of
The Coast Artillery Corps:

On the eve of this Christmas season, I extend my
sincere and hearty greetings to you all.

We regard the New Year with cheer and confidence,
dedicating ourselves to the high resolve of preserving our
priceless liberty, that "Peace on earth, goodwill to men" may
become a reality for all times.

Jacob L. Devers
General, USA
Commanding

WAR DEPARTMENT
WAR DEPARTMENT GENERAL STAFF
SERVICE, SUPPLY, AND PROCUREMENT DIVISION
WASHINGTON, D.C.

To all members of
The Coast Artillery Corps:

On behalf of the officers and members of the
Executive Council of the United States Coast Artillery
Association, may I extend to all Coast Artillerymen
throughout the world congratulations for their con-
siderable performance of duty and successful accom-
plishments during the trying days of reconversion to
peace. And my best wishes for a Merry Christmas and
Happy New Year.

Lee Luter
Lieutenant General, USA
President, Coast Artillery Association
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PUBLICATION DATE: December 1, 1946
A 90mm gun crew of Battery D, 401st, cleaning their gun in the deep snow and bitter cold of the Apennines in Tornelli, Italy.

From the time of the initial landings in North Africa in November 1942, until late in February 1943, available United States Army units were transferred to the Tunisian front for front-line service with the British and French forces in contact with German and Italian Armies. Early in 1943 these U. S. troops were assembled under II (U. S.) Corps and assigned to a sector on the extreme right flank of the front extending to Gafsa. There was only one U. S. antiaircraft artillery brigade in North Africa during this period and it was employed on an important mission at Oran. To meet the need of the situation, Allied Force Headquarters directed the formation of a provisional antiaircraft artillery brigade for duty with the U. S. forces under II Corps. Thus it was that Hq & Hq Btry 2626th AAA Brigade (Provisional) was activated on 22 February and organized on 1 March 1943 at Casablanca, French Morocco. Brigadier General (then Colonel) Raleigh R. Hendrix, previously with the AA & CD Section, Allied Force Headquarters, was placed in command, and the majority of the staff officers and enlisted personnel for the brigade headquarters were obtained from the 213th CA (AA) Regiment. The 2626th...
AA Brigade (Provisional) was established as a permanent unit on 11 December 1943, and designated as the 1st AAA Brigade.

Tunisia
Immediately following activation in March, Brigade headquarters started on the long overland trip to join II Corps near Thelepte, Tunisia. The following antiaircraft artillery units were then operating in the II Corps sector:

1st Battalion (90mm gun), 213th CA (AA) Regiment
Three British gun batteries (3.7"
Three British AW Batteries (40mm)
105th AAA (AW) Battalion
106th AAA (AW) Battalion
107th AAA (AW) Battalion
43rd AAA AW Battalion (SP)
Six AAA Batteries (AAMG) (Airborne)

The following additional units were assigned during the course of the Tunisian campaign:

431st AAA (AW) Battalion
434th AAA (AW) Battalion
436th AAA (AW) Battalion
67th (AA) Regiment (less 3d (SL) Battalion)
3d Battalion, 213th CA (AA) Regiment

Due to the deficiencies in its equipment and to the belief of division commanders that searchlights, if committed in the forward areas, would bring down enemy fire on themselves and other troops in the vicinity, the 3d Battalion of the 213th was not committed to action and remained in bivouac until employed in the defense of the Baretta and Ferryville areas following the surrender of the enemy forces.

Missions of the Brigade included the protection of forward airfields and lines of communication, then receiving frequent attacks from the German Air Force, supply dumps, troops and installations of the II Corps. The U.S. supply lines in Tunisia were long, the vehicular road net in poor condition, and the railroad deteriorated and inadequate. Loss of locomotives due to enemy air action was creating a serious problem in the building up of stock piles in the Tebessa area and the establishment of supply points for the front-line troops. To counteract this menace, two of the separate airborne antiaircraft artillery machine-gun batteries were organized into the Composite Railway Antiaircraft Protection Unit. Mounting their machine guns on flatcars, they rode the supply trains in 72-hour shifts, exposed to the ever-changing but always foul Tunisian weather. Theirs was truly a grueling, thankless job, but one magnificently performed. Their spirits always high, these separate units, with a T/BA that consisted mainly of antiaircraft artillery machine guns, ammunition, musette bags, and ingenuity, soon discouraged enemy air attacks against the supply trains and contributed thereby to a significant improvement in the flow of supplies from the ports to the battle area.

Considerable work was done at this time to establish an effective Antiaircraft Artillery Intelligence Service. Scarcity of communications was a serious handicap. The pioneer work done, however, produced much improvement in existing practices and later evolved the well-oiled machine that more than proved its worth in overcoming the difficulties encountered in the mountains of Italy. The Brigade's first month in combat saw the British Eighth Army push the Afrika Korps through the Mareth Line and the II Corps drive southeast to establish contact. The going was tough, enemy air action heavy, and some antiaircraft artillery units were overrun by enemy tanks in one temporary setback.

After contact was made with the British Eighth Army,
Men of the 532d AAA AW Battalion on duty at their 40mm gun during snowfall in the Apennines, Radicosa, Italy.

The Brigade moved north with II Corps on its secret withdrawal from the southern front. With little preparation, II Corps struck west of Beja on its new front, advanced and seized Mateur, Ferryville, and Bizerte, forcing surrender of the German and Italian forces thus ending the North African Campaign. The surrender found the antiaircraft artillery units generally concentrated around the ports of Bizerte and Ferryville where they remained until the end of May, 1943. Relieved from II Corps and assigned to Allied Force Headquarters on 31 May, the Brigade moved to Hammamet at the base of Cape Bon Peninsula and with the 22d British AAA Brigade, shared the responsibility for the protection of approximately sixty airfields in Tunisia then being occupied in preparation for the coming invasion of Sicily. Some units left the Brigade at this time but were replaced by others moving up from Algeria. Soon after the invasion of Sicily was launched, the Brigade, relieved of its airfield mission by the 31st Brigade, returned to Ferryville to stage antiaircraft artillery units for movement to Sicily. Coincidental with these staging activities, some weapons of the units in staging areas were employed to supplement the defenses of the ports and staging areas of Bizerte and Ferryville which were jammed with troops and shipping, and to protect the huge supply dumps in the Mateur area. The last desperate air effort of the Germans against installations in North Africa consisted of severe night attacks against the ports which, as a result of the strong antiaircraft defenses, caused only minor damage while costing the German Air Force heavy losses.

In early August, 1943, the 68th CA (AA) Regiment Colonel E. King, commanding, conducted training tests by firing at disabled German tanks and at long-range land targets with its 90mm guns. The remarkable results obtained were the forerunners of the extensively developed and refined use of 90mm guns in a ground role by this same unit a few months later in Italy.

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The last rushed predeparture weeks in Africa presented many problems, one of the most serious being supply. Antiaircraft artillery supplies were short and long-range efforts to obtain basic T/BA authorizations accomplished little. In a final, last resort attempt, Major Edgar A. Thompson, the Brigade S-4, condensed his unit requisition files into a brief case and took a plane to the base supply
ACTIVITIES OF THE 71ST AAA BRIGADE

SICILY

In early August, 1943, the Brigade Headquarters boarded an LST and sailed to Palermo, Sicily, whence it moved inland to the vicinity of Licata until more comfortable accommodations were found in historic Agrigenta. Here, the Brigade was assigned to Seventh Army from 13 August to 22 September, and to Allied Force Headquarters from 22 September to 18 October. The Brigade mission was the protection of ports and airfields in south Sicily. With the enemy air force inactive in this area, an A-20 airplane was obtained for tow-target missions and extensive target practice were conducted. These further sharpened the "shooting eyes" of units destined to participate in the coming encounters in Italy. The antiaircraft artillery units with the Brigade in Sicily were the 1st, 106th and 107th Groups, the 215th, 216th, 401st and 406th Gun Battalions; the 103d, 431st, 433d, and 400th AW Battalions; the 6th Barrage Balloon Battery; eight Separate Airborne AAA Machine Gun Batteries and the 261st Ordnance Maintenance Company (AA). Long distances, terrible roads, and occasional sabotage of communication lines featured this period.

ITALY

On 18 October 1943 the Brigade left Sicily via ferry across the Messina Straits and moved in convoy to the Italian front, staging in the vicinity of Qualiano on 23 October. The week 23-30 October was spent in grouping and planning, and the Brigade went into action 30 October again under attachment to II Corps. Moving with II Corps across the Volturno River and up Highway 6 toward Cassino, the Brigade's missions were the defense of Army supply dumps, road nets, bridges, Corps and Division artillery, troops and installations. The Brigade also established and operated the Corps AAAIS, and supervised the Corps' passive air defense program.

Mountainous terrain, combined with rain and mud made it almost impossible to move any heavy equipment more than a few hundred yards from the main highway which lay in a deep valley. This valley, from the Vairano Crossroads to the battered town of Mignano, contained a terrific concentration of men and materiel and most of the Brigade's fire power. This condensed the battle area into a relatively small strip of land dominated by towering mountains which provided excellent cover for the many surprise sorties made by enemy fighters and fighter bombers. Initially, during the reduction of the formidable defenses at San Pietro, and the surrounding mountains, which outposted the famous "Winter Line," almost the entire Corps' battlefield was easily viewed from the upper floor of the building which housed the Brigade CP in Vairano.

Here the Brigade, from sheer necessity, had to assume almost complete tactical control of all the antiaircraft units, including those previously attached by Corps to various elements of the Corps artillery and to the divisions. This occurred after it became apparent that little or no coordination existed among the units not under Brigade control and that the means being employed were excessive for the size of the area. The Brigade thereupon divided the Corps...
buildings for observation posts and other military purposes, take it, and the enemy forces were making use of religious
which were duly reported as "Lessons Learned."

way some of the "Do's" and "Don'ts" about river crossings,
This attack failed
beachhead forces. Again the Brigade learned, the hard
forced the commitment of strong enemy reserves which
had to deploy as infantry along the bank of the river
the near bank of the river and twenty were actually occupied.
Casualties for all arms during this attack were very high
1943 and January 1944. The concentration of antiaircraft
artillery weapons took a heavy toll of the attacking aircraft;
kills out of 14 raiders.

The greatest and most determined air effort of the Ger-
man so in Italy was made during the months of December
1943 and January 1944. The concentration of antiaircraft
artillery weapons took a heavy toll of the attacking aircraft;
one sortie alone in December netting the Brigade's guns 11
killed out of 14 raiders.

Following establishment of contact with the famed
"Winter Line," an "all-out" attempt to cross it along the
Rapido River was made 20-22 January 1944, by the 36th
Infantry Division. Although a diversionary attack designed
to assist the Anzio landings began at that time, this was a
considerably prepared and vigorously conducted operation.

Under adverse conditions of intense enemy rifle, machine-
gun and mortar fire, thirty gun positions were prepared on
the near bank of the river and twenty were actually occupied.
Casualties for all arms during this attack were very high
and at one point elements of an antiaircraft artillery batta-
lion had to deploy as infantry along the bank of the river
when the infantry to their front withdrew to reorganize.
This attack failed to attain its objective across the river but
forced the commitment of strong enemy reserves which
might, otherwise, have been employed against the Anzio
beachhead forces. Again the Brigade learned, the hard
way some of the "Do's" and "Don'ts" about river crossings,
which were duly reported as "Lessons Learned."

Since Cassino continued to hold despite all efforts to
the Air Forces on the morning of 10 February 1944,
dropped 2,500 tons of bombs on the Abbey atop Mons
Hill and on fortifications within the city of Cassino at a
base. Under control of II Corps Artillery, pinpoint targets
such as machine-gun positions, mortar positions, and can-
openings were assigned to the 90mm guns of the Brigade
for fire during the preparatory phase of the infantry attack
scheduled to follow the aerial bombardment.

The Brigade was attached to the New Zealand Corps
upon relief from the II Corps in February, 1944. The
71st AAA Brigade at this time consisted of the 8th and
209th AAA Groups, the 403d Gun Battalion, the 532d,
534th, 630th and 900th AW Battalions. The 105th and
443d AW Self-Propelled Battalions were attached to other
units within the Corps.

On 9 March 1944, the Brigade with most of its units was
relieved by the NZ Corps, reassigned
II Corps, and sent to a rest area near San Agata. In this
rest area, extensive casualty drill was conducted, a Renish
Training Unit was employed to improve personnel in recog-
nition of aircraft, and a director trainer M8 was used by
the AW Battalions to train range setters. During this rest
period, the antiaircraft artillery regiments were reorganiz-
ed into separate groups and separate battalions.

On 27 March 1944, II Corps returned to the forward
area in a new sector relieving X Corps (British) along the
Gangiliano River on the Tyrrenian coast. The Brigade
followed and on 29 March assumed responsibility for ant-
aircraft artillery operations in II Corps area. The next few
weeks were spent in preparation for the big offensive which
was to begin in May. During this period experimentation
work was done with antiaircraft artillery radars in an effort
to pick up and track enemy artillery shells. By back-plott-
ing the trajectory on a map the enemy artillery position could
be approximately located. This experimentation had the
wholehearted support of Major General Geoffrey Keyes,
II Corps Commander, and of members of the Corps and
Division field artillery units. As results obtained were con-
sidered promising, the 15th Army Group later organized
a joint American-British Radar Unit to further study and
develop this practice.

At 2300 hours, 11 May 1944, the whole Italian front
exploded into action and the big drive for Rome was on.
The Brigade advanced with II Corps along the coast from
the Minutano River, through Fondi, around the bottlenecks
at Terracina toward Itri in the area where Fifth Arm-
troops from II Corps established contact with VI Corps;
from Anzio. Corps then moved on through Cisterna, in the area where Fifth Arm-
exploded into action and the big drive for Rome was on.

The M-15 shown is using the fire and movement principle:
firing from position shown and moving to position behind hill to
await further orders. This picture was taken during some
ignition by Brigade units in the vicinity of Tazzola, Italy.
Brigade, located two undamaged harbor defense searchlights on bogies taken from damaged German 88mm guns. Emergency searchlight crews were formed by Lt. Baker and cooks, clerks, and other personnel of Brigade headquarters. They were briefly indoctrinated into the use of searchlights and took battle stations along the highway north of Rome to become probably the first U. S. Mobile AA Searchlight Unit to see action at the front with enemy forces in World War II. Although later “deactivated” when the Brigade received a regular searchlight battery for such purposes, its pioneer work was of immediate instance and provided experience for future work in this field.

On 9 June 1944, the French Expeditionary Corps and British XIII Corps began replacing the II Corps on the east north of Rome and units of the Brigade withdrew to an area at Lido Di Roma a few miles south of Rome. During the last week in July the Brigade moved north with Corps to assemble in the area near Pescioli, southwest Florence. In a few days tactical positions were occupied along the Arno River in preparation for the next attack. Advances were begun the first week in August which carried the Brigade slowly into and through Florence, over the Sieve River and on to Futa Pass in the Gothic Line where our forces stopped in the mountains, mud, and ice another winter.

During this period, to meet the needs for increased infantry support and since enemy air power was definitely the wane, Fifth Army directed the establishment by the Brigade of an infantry school in the vicinity of Impruneta. Infantry weapons and ammunition, and combat experienced infantry officers were obtained to accomplish this training, which began about 25 September 1944. Later the 2nd and 900th AW Battalions, after long and exemplary service in their antiaircraft roles were used as elements of a separate Infantry Regiment.

A large portion of the heavy transportation of units of the Brigade was organized into two trucking companies and employed for a period of three months under Fifth Army control to transport food, ammunition, and other supplies to front-line troops and supply dumps over the one and half main supply routes-twisting, icy, and treacherous route 65.

On the night of 16-17 October 1944, the Brigade, on orders from II Corps, conducted a test with a battery of searchlights to determine the practicability of providing “artificial moonlight” over the battle area. After favorable ports were received from nearly all elements of the corps, the practice was continued nightly for the remainder of the war on every night when additional illumination was required. Although these searchlights were within range of enemy artillery only three were destroyed by enemy fire. Their use greatly facilitated all operation and movements in the battle area.

In December, 1944, AW (SP) battalions moved elements of their units to the vicinity of Barberino for ground support training. Range and azimuth scales were installed on the mounts and firing conducted at ground targets. Elements of these battalions, at the conclusion of the training phase, assumed this role in combat and by the end of March 1945, had fired 237 missions at ground targets under control of the infantry unit in the area where they were employed.

Enemy air activity during the winter months was confined to daylight reconnaissance flights and sporadic dusk raids on forward positions and lines of communication. As a consequence, units had few and irregular opportunities to fire at air targets.

Use of the 90mm in firing at ground targets had been developed in the winter of 1943, and throughout 1944, the 90mm gun battalions fired regular missions under control of the Corps Field Artillery fire direction centers. From November 1943 to March 1945, 90mm guns of the Brigade fired 4,913 missions at ground targets. A special event was staged at 1118 hours, 9 April 1945, when Major General Geoffrey Keyes, Commanding General, II Corps, pulled the lanyard to shoot the 200,000th round of 90mm guns at enemy ground targets engaged by units of the Brigade while serving with his Corps in Italy. An honorary gun section from all 90mm batteries fired twelve additional rounds while General Keyes viewed the impacts on an enemy strong point through the battery height finder. Prior to the firing of the historic round, short talks were delivered by General Keyes and Brigadier General Hendrix, Commanding General of the Brigade.

During the aerial bombardment preceding the jump-off in mid-April, the 90mm guns of the Brigade were employed to establish and maintain a line of bursts at a predetermined altitude to provide an orienting line for the waves of bombers attacking the German strong points in front of Bologna. The Air Force, conveying its thanks, pronounced the mission entirely successful and of considerable assistance. Several hours of such firing on successive days consumed many thousands of rounds of ammunition and produced considerable wear on the gun tubes. However the break-through into the Po Valley followed almost immediately and in a matter of days the German resistance collapsed and surrender followed.

In the closing days of the bitter struggle for Italy, the Brigade passed from II Corps to Fifth Army control and its
The M-16 gunner surveys the skies in the vicinity of Tazzola, Italy.

command passed to Brigadier General Aaron Bradshaw, Jr., previously Army AAA Commander. This resulted purely from organizational changes under which Army AAA Sections were abolished. To the retiring Brigade Commander, Brigadier General Raleigh R. Hendrix, went the heartfelt thanks and best wishes of the officers and men of the Brigade he had so ably led from its activation to the day when final victory had come at last within sight.

In the final preparation for victory, elements of the Brigade, reinforced by British units, were rushed to the Po River and to forward airfields in the valley to guard these vital installations. There they remained until the Army Commander decided they could safely be withdrawn some days after the actual surrender. Meanwhile divisional SP units had pushed deep into the Alps with the spearheads probing toward Austria.

The Brigade was not to rest, however, merely because the Italian campaign was over, and the end of the gigantic battle for Europe was in sight. Japan was still in the fight and already the plans were ready for implementation to transfer many of Fifth Army's veteran units to the Pacific Theater. Off to Montecatini, south of the Apennines went the Brigade to take charge of Fifth Army's redeployment training center then in the process of being set up. After five hectic days of delving into the situation and just when it was beginning to show signs of "shaping up," lo! the Brigade did a quick about-face and raced right back over the Apennines to a hot and bleak-looking airfield near Ghedi in the northern part of the Po Valley. The airport buildings were windowless and filled with rubble from demolition bombs, hurriedly detonated inside them by the departing Germans. The famed 442d Nisei Combat Team, bivouacked nearby, was at the Brigade's disposal for processing and guarding German prisoners then en route. A few Army supply men were on hand as fuel and ration dumps had been started. Only a thousand or two prisoners had arrived but the big influx of 10 to thousand a day would begin to arrive within 48 hr.

Thus began the Brigade's last and perhaps biggest. The hordes of prisoners began to arrive as scheduled and thereafter the Brigade Staff was constantly expanded, the need dictated, by officers drawn from the 442d Combat Team, Fifth Army, and IV Corps headquarters. Problems too innumerable to mention were solved by this hastily assembled, hard-working staff with the results that in an amazingly short period a large and well organized city had sprung up, populated by more than 100,000 German prisoners and their guards. Many acres of ground were occupied by the thousands of impounded vehicles taken from the Germans as they arrived. The roster of German units in this city contained most of the famed divisions that had provided the Allies with such long and bitter opposition since the Salerno landing some 20 months before.

Ultimately, under the administrations of the Brigade, the city rapidly grew smaller as its inmates were screened, processed, and returned to Germany.

In mid-June General Bradshaw left the Brigade. Colonel Sullivan succeeded him and retained command until he too, departed for home on about 8 August 1945. The Brigade closed its long and distinguished war service with inactivation in September 1945.

In its travels the Brigade left in its wake a trail of some 185 enemy aircraft definitely destroyed plus another 8 probably destroyed. The number driven off and damaged by its busy guns or deterred from attacks by their presence will never be known. As a casualty-producing agency the number of enemy ground troops killed and wounded by heavy and light antiaircraft guns must have been far greater than was suffered by the enemy air forces, but those figures too must remain forever unknown. Some of its troops with but little training assumed the role of infantry, and battled the veteran Germans valiantly. In services to its own troops the Brigade produced military police and trucking battalion which turned in performances equal to those of the more experienced contemporaries. In the closing months of the campaign, it lighted the battlefield and facilitated the night operations of both the combat and service troops.

For distinctive individual service personnel of the Brigade received: 14 Legions of Merit, 36 Silver Stars, 208 Bronze Stars, 75 Soldier's Medals, and 137 Purple Hearts.

In the final analysis this is the story of the gun section, the smallest antiaircraft artillery unit and only a "dot on the situation map," but a little group of highly trained men, manning complex equipment with deadly precision, always at the vital point when the enemy raider struck. Theirs was the effort that brought smiles of pride to the faces of our troops as the enemy faltered and crashed, or turned back in defeat and, theirs the glory—if such there was.
RUSSIAN GEOGRAPHY

An Asset or Liability?

By Colonel Carl F. Tischbein, G.S.C.

The average American knows no more about the geography of Russia than he does about the ingredients of right.

As much as a Gallup poll showed only 12% of our people to be well informed concerning Russia, this imperfect observation is probably not too wide of the mark. Either it be the difficult language or the Russian's profli- use of consonants and their penchant for strewing x's throughout their place names—whatever the cause, names and locations of Russian centers of industry as as Denver, St. Louis, Atlanta, and Dallas are but dim- recognized by the average citizen. He usually associates a long and unpronounceable jawbreakers with the heavy arrows which adorned the news maps during the war. consders the Ural mountains as a sort of Chinese wall aing Europe and Asia. Siberia? That conjures up in mind's eye the grammar school print of the bearded re in fur cap and greatcoat madly beating his frothing ces as they pull his heavy sleigh through the deep snows, while being pursued by wild-eyed, savage wolves. It recalls visions of chain gangs, salt mines, and impressed

before the war we could afford the luxury of ignoring big slice of the good earth inhabited by the Russians. could rest secure in a fatuous belief that every Russian a beard, and that caviar was one of the staples of diet the Polish frontier to the Maritime Provinces. We saw a "Made in Russia" trademark on the shelf in local store, and our contacts with Russian citizens were dry and wholly second hand via the news print. Be Russia was so far away!

The war changed all that. The enormous successes of Allied Army after a series of disastrous reverses which ort the Nazis almost to the shores of the Caspian Sea; indomitable courage of the Russian worker who labored other Russia under almost inhuman conditions; and unconquerable courage which kept the Russians in war struck responsive chords in the American psych.

With typical American enthusiasm we approached a new test. What manner of people are these Russians and where do they hail? Newspapers and magazines, col-
s and commentators, all tried to give what the news-calls "The Russian picture." Russian experts blo-
overnight, and before the war was a month old were ating events and letting us in on future developments of which never transpired.

still presents an enigma. Whether it be the ideologies of her people, the political philosophies of her leaders, or an appreciation of her international position—whatever might be the aspect of Russian life under consideration—our approach to an understanding is seemingly shrouded by an intangible cloak which, for want of a better term, might be called an intransigent lack of understanding. And to the categories enumerated above we may, with assurance, add her geography.

It was no historical accident which led the early Phoenicians to the sea; neither was it a natural phenomenon which brought them to the shores of Britain. Likewise it was no accidental design which led the stout men of England to the far reaches of the globe. In both instances the urge toward the sea was a vital, vibrant, living force in the lives of the people of Phoenicia and the British Isles. The geographic implications of their natural surroundings were a dynamic force which unwittingly helped shape their destinies and those of their world.

Geography has always played an important although unostentatious role in the historical evolution of nations. It is the stage upon which each nation plays its part. It is the principal factor which determines whether a nation will be a major or a secondary power. The climate, the vegetation, the relief, the size and the shape of a nation help determine the part it is to play in the family of nations. Mountain ranges, for example, have as effectively as ocean barriers sealed off one nation state from its neighbor. They have as effectively prevented cultural, social, and economic intercourse between nations as great distances. In similar fashion, large land masses with their systems of confluent rivers have forced neighbor nations to merge their economic and cultural societies as effectively as though one were the political vassal of the other. In both the long-range plotting of a potential aggressor state and in the brief terrain study of a platoon commander, geography plays a vital role. Cesar and Hannibal both understood its implications though it is to be doubted whether their deliberations were as exact as those of the disciples of Haushofer.

Geography is thus an important element in the consideration of any nation's potential. The interdependence of nations both in peace and in war due in part to their physical surroundings needs not be labored further.

It is precisely the interdependence of modern states which leads to the conclusion to examine Russia's geographic position, for her rapid rise to the van of nations bids us inquire into all aspects for her world position. It is thus in order to inquire into the advantages and disadvantages to be found in the Russian geographic position.
Stretching for endless miles, her forest constitutes a valuable defensive weapon.

American states, and hot, arid deserts. Except for the gently sloping Urals rising occasionally to 3,000 feet and extending 1,500 miles north to south, this tremendous area is almost as flat as the proverbial pool table. To the east the Urals and extending about 1,200 miles to the Yenisei lies one of the largest level areas in the world. This extends to the south from 1,000 to 1,600 miles until it meets the mountainous southern frontier. Across this expanse of hundreds of monotonous miles, the Trans-Siberian road runs in a straight line. Very few elevations of 1,000 feet are recorded in the remainder of this Plain. In European Russia were it not for a few feet of elevation, the majestic rivers of the Soviets would flow toward the north instead of toward the south.

The Russian Plain—some 9½ million square miles of real estate—is the world's largest uninterrupted plain. For practical purposes this is Russia. About its borders lie the forbidding ice to the north and the lofty mountains and desert wastes to the south. Within its confines stretching from Poland to the broad and mighty Yenisei in Siberia, it contains thousands of miles of trackless, primeval land. This land is food-producing doughnut-shaped areas, the sparsely populated backwoods of British Columbia or the fruitful valleys of New England.

The Russian Plain—some 9½ million square miles of real estate—is the world's largest uninterrupted plain. For all practical purposes this is Russia. About its borders lie the forbidding ice to the north and the lofty mountains and desert wastes to the south. Within its confines stretching from Poland to the broad and mighty Yenisei in Siberia, it contains thousands of miles of trackless, primeval land. This land is food-producing doughnut-shaped areas, the sparsely populated backwoods of British Columbia or the fruitful valleys of New England.
RUSSIAN GEOGRAPHY - AN ASSET OR A LIABILITY? 11

understandable why Tolstoi wrote, "Wares could not be taken abroad—there was no seaport. All foreign trade was in the hands of foreigners. It was maddening to learn how people traded in other lands." This observation in his novel laid during the times of Peter the Great, might still have application.

The great Russian Plain covers over 4½ million square miles of Russian Asia. Within this vast area much of the terrain is wasteland—the frozen tundra of the north. Here the winter temperature drops to a recorded -92° Fahrenheit in the interior of Siberia. This intense cold adversely affects all forms of human activities out of doors. Here, too, the summer temperature rises to a recorded 100 degrees Fahrenheit along the Arctic coast. In this region the spring thaws render large areas impassable, and restrict the movement of commerce mainly to waterways. Here the road net runs essentially north and south while rail lines are virtually nonexistent. Some commerce is carried by air, but even the few airlines follow the river courses. Communications and commerce in this vast northland depend during a large portion of the year upon Siberia's great river arteries, the Ob, Yenisei, and Lena. Except during the months of frigid weather, east-west communications over vast stretches of Siberia's northern reaches are practically nonexistent.

To the south of the tundra region and running in a general east-west direction is the tremendous forested area of the Russian Plain. From Eastern Siberia to the Pripet Marshes near Russia's western boundary stand the deep mysterious forests of the Soviets. The Dukes of Moscow depended upon their friendly strength; Napoleon's Grand Army recognized them as an able adversary; and Hitler's legions were continuously subjected to guerrilla warfare emanating in the trackless depths of Russia's forests. Stretch-
The Russians plan on adverse climatic conditions. Russian Sentry photographed at 40° below.

that there is a lot of fresh air in Russia—but none of it in Russian homes. This is perhaps the best clue to finding an answer to the average Russian climate. Leningrad has an average yearly temperature of less than 40 degrees Fahrenheit while Moscow, farther south, has an average only slightly higher. During the winter, the Muscovites accept the bitter cold with an apathetic calm and do not become unduly exercised about the weather until the temperature drops below -30 degrees. July is the warm season when the temperature averages about 65 degrees—but not for long. Nights are very cool and snow falls before the first of October. Ice skating is in vogue by mid-October.

All throughout the Russian Plain, summers are comparatively short. South of the tundra and throughout the coniferous forest area, the winters are long and severe, the relative severity becoming more pronounced in the east. In the west, the dead of winter temperature averages close to 20 degrees. Due principally to the climatic effect of the Atlantic Ocean. In the east, the effect of the Arctic Ocean is very pronounced and midwinter temperatures in eastern Siberia will average as low as -50 degrees. As a consequence, Siberia's great rivers are frozen over for more than 200 days of the year. The snowfall is heavy, and snow lies like a heavy blanket on the forests to prevent the cold from penetrating the ground deeply.

Except along the southern fringes of the great Russian Plain the climate is not inviting. It is subject to extremely low temperatures, cold, gloomy, raw days throughout long, snowy winters; rainy spring thaws with accompanying floods—the so-called “rasputitsa” periods—short, rainy transition periods before the summers set in for their brief stay—very long fall periods with noticeably lower day-to-day temperatures; and then a return to the long, unforgiving winter cycle again. Yet even this latter season has its compensations. The inadequate roads which, during the spring, summer, and fall were impassable quagmires are now frozen once more and again provide the means of access and egret to the adjoining villages and to the nearest town. This season, therefore, of Russian festivals and fairs when the country folks can get to town. The snow and ice provide a magic carpet for the Muzhik and his family.

It would appear that the Russian Plain is a rigorous region. It is indeed a land of startling contrasts as this paper has endeavored to point out. In writing of Soviet geography, Cressey has stated the case with admirable restraint. He writes, “Too much of the land is too cold, or too dry, too wet, or too infertile, or too inaccessible, or too something else.”

This brief account of Russian geography has attempted to suggest the vast proportions of the Soviet Union; to portray its gargantuan size; its major physical features, the general aspects of its terrain and climate and by inference the defensive strength of the Russian state as it has expanded eastward almost daily since the days of Peter the Great. No consideration has been given herein to the treasure trove of natural resources which places the Soviet Union in leading position among the world's Great Powers. In this connection, for instance, reference was made to the frozen wastelands of northern Siberia. Nothing therein indicated...
the intense interest being displayed in this region by Moscow's economic planners. Nothing was mentioned of the enthusiasm being displayed by the field parties of the Geological Society of the USSR whose members in recent years reputedly have found several thousand fields of new sources of raw materials in Siberia. A consideration of Russia's mineral wealth and the implications arising therefrom are outside the purview of this discussion.

Russia's geographical position is favorable in many aspects. In the first place, she is the world's largest land power and occupies the heartland of Eurasia. Facing east and west in a position similar to that of the United States, she is relatively secure in her frontiers from ground attack. The 4,000 miles of her northern Arctic coast line present an effective barrier against all forms of invasion except airborne. The mountainous frontiers to the south are without benefit of railroads, modern highways and other essential communications systems. Travelers in many places still follow the ancient caravan trails. In addition, her southern neighbors are economically and militarily weak. Only in the event that one of them were to become a possible base of operations for a major military power would they become potential liabilities. In the meantime, their natural resources are immediately available to bolster any requirements in Soviet strategic needs.

In central Siberia, the Lake Baikal region will continue to remain the geographic Achilles heel of the eastern Siberian hinterland. The rich maritime provinces are almost wholly dependent for their continued existence during any emergency upon the thin skin of communications running east and west of Lake Baikal. The relative vulnerability of her eastern frontier hinges upon her ability to maintain supplies over the vast distances from the Ural industrial centers, and beyond. Great efforts have been exerted in the recent past to make her eastern frontier an effective military bastion, but today this area is not industrially, economically, or agriculturally self-sustaining. Time, however, is a valuable ally.

Russia's most vulnerable frontier faces west. Here Mother Nature has provided no ready-made bulwark against invasion, and here, unhappily, live her most dynamic neighbors. From this direction have come all attacks in modern times. Napoleon's Grand Army en route to Moscow followed the east-west route to the north of the Pripyt Marshes, Hitler's troops, on the other hand, followed the southern route through the Ukraine. At present there is no first-class military power to her west. Yet if and when a worthy western foe emerges to challenge her, the same routes which lured Napoleon and Hitler will again be a temptation.

Soviet sea frontiers are limited and are readily defendable. Her 1,200 miles of Black Sea coast line are easily protected so long as an inferior naval power controls the Dardanelles. Her Baltic shore line is short and easily defended. Her Arctic frontier is closed to traffic over most of the year and when open is readily controlled.

In naval affairs, however, the Soviet position is uninviting. Her four short openings to the world's sea lanes are barred off by foreign powers. In addition, her sea frontiers are widely separated and are not mutually supporting. As a consequence, her naval forces would face the alternative of either being contained or engaged in detail with probable unfavorable results. Russia's geographical position definitely bars her from becoming a leading naval power regardless of her ability to provide herself with the necessary fleet.

The Russian climate has always proven an asset. The Soviets have succeeded in adapting themselves to the climate much in a vein similar to that of the politician who follows the maxim "If you can't lick 'em—join 'em." The Russians plan on adverse climatic conditions and condition themselves accordingly. History is replete with instances wherein her foes either neglected or were unwilling to give the necessary consideration to the disabling effect of the Russian winter on man, beast, and machine.

For years the Soviets have shown a marked interest in the mysteries of the Arctic. Movements of the ice pack, exploration for new lands to the north of Siberia, studies of Arctic Ocean currents, and investigations into meteorological phenomena have engaged the attention of some of her best scientists. The Russians without doubt possess comprehensive information in these respects. They no doubt have the most complete data available regarding Arctic winds, their directions and velocities, and of Arctic storms, their incidence and probable directions, thanks largely to the pioneer research work of Professor Otto Schmidt and his colleagues. Dependable forecasts for transpolar flights of piloted or pilotless aircraft will depend largely upon acceptable weather information. Soviet geography permits the Russians to establish and maintain the necessary weather stations in appropriate high latitudes.

Russia's river systems as already indicated are effective military obstacles. Her principal streams are broad and subject to seasonal flooding and freezing. They inundate large areas and tend to render the terrain unsuitable for military operations. In addition, their tributaries overflow and create bogs and marshes. It has been estimated that fully 20% of Russian terrain is marshland and consequently unsuitable for habitation. Great marshes such as the Pripyt Marshes and those immediately east of the Urals and extending toward the Ob river are important military obstacles.
AARTC Moves to Fort Ord

The Antiaircraft Replacement Training Center, largest single headquarters at Fort Bliss, will be transferred to Fort Ord, California, Colonel Evan C. Seaman, AARTC commanding, has revealed in an official announcement.

The first body of troops were scheduled to move to the new post on Friday, 22 November. This will consist of the 3rd Group headquarters and the Officers and cadre of the 51st Training Battalion, which has recently finished a training cycle. Other Battalions will follow as their training cycle ends and the trainees are put on orders to other organizations. Nine training Battalions will be affected by the movement of the Training Center. The entire movement is expected to extend up to or possibly into January, 1947.

At the present time, the AARTC has about 300 officers and a permanent cadre of approximately 1,600 enlisted men. The center at Fort Bliss has facilities for the training of some 7,200 recruits.

Available information indicates that the original AARTC consisted of the 51st, 52d, 53d, 54th, 55th, 56th, 57th, and 58th Training Battalions. Present organizations of the Center include, in addition to the AARTC headquarters units, the 11th and 12th Groups, and the 51st, 52d, 53d, 54th, 55th, 56th, 57th, 58th, and 59th Training Battalions.

The Antiaircraft Artillery Replacement Center was moved to Fort Bliss in April, 1944, from Camp Callan, California and at that time was under the temporary command of Colonel William R. Stewart, CAC. It arrived at Fort Bliss to join the Antiaircraft Artillery Training Center, set up at Fort Bliss in September, 1940.

Both units functioned to train soldiers. AARTC trained men, fresh from induction centers, in the basic essentials of military life. The AAATC trained complete units to take their place in the Armed Forces fighting in Europe and the Pacific.

It is contemplated that the main body of officers and cadre will be moved from Fort Bliss by the 15th of January, although a few will remain to close out the Training Center prior to its complete deactivation on the 31st of January.

In addition to the two group headquarters, nine battalions and 36 battery cadres scheduled by the Army Ground Forces directive to set up the new Training Center at Fort Ord, four battalion headquarters, one of them colored, and four colored companies are slated to move to the Training Center from Fort Knox, Kentucky.
Jet Propulsion Devices

By Captain G. H. Drewry, Jr., G.S.C., and Dr. Ancel St. John

INTRODUCTION AND HISTORY

Jet propulsion has, in recent years, caught the public's fancy as a novel way of pushing things around. But the principles of jet propulsion are not new and many examples of their use exist in nature and in the annals of history. Thus, the cuttlefish known as the Squid, propels itself through the sea apparently without effort by sucking in and expelling water, the Chinese, centuries ago developed the forerunner of our Fourth of July skyrocket and Isaac Newton proposed driving a vessel by a steam jet. Before World War II, jet propulsion enthusiasts had developed powerful rockets and jet engines. Goddard shot his meteorological rockets thousands of feet into the air in New Mexico, Opel drove his automobile at high speed across the salt flats of Utah, Campini in Italy flew the first aircraft powered only by jet propulsion and Whittle in England developed the forerunner of the turbojet which powers the American P-80 "Shooting Star" jet fighter.

The long-range bombardment of England by the Germans during World War II, first with the FZG-76 pilotless aircraft or "V-1" popularly known as the "Buzz-Bomb" because driven by an intermittent jet, and later with the A-4 Rocket or "V-2" focused public attention on jet propulsion devices. These are devices from which matter is expelled to produce momentum, in accordance with Isaac Newton's well known law that "to every action there is an equal and opposite reaction." For our present purposes, we will classify as "rockets" those devices which obtain all this matter from within themselves and as "jets" those which obtain some of this matter, principally oxygen, from outside.

THE ROCKET

A rocket is thus a device which produces thrust by a jet and contains within itself all the matter to be expelled in the jet. To produce the thrust, the rocket generates a gas under high pressure and ejects it as a high velocity stream through a nozzle. Rockets are classified into two general groups depending upon the means by which the high pressure is generated. Those which burn a solid fuel are known as "solid propellant rockets" and those consuming a liquid fuel are called "liquid propellant rockets."

The solid propellant rocket is comparatively simple in construction. As shown in Figure 1 it consists of a "head" which carries the payload; a "motor" or body which contains the propellant and acts as the combustion chamber; a "nozzle unit" comprising a convergent portion which restricts the flow of gases and builds up the pressure to give the desired thrust, a divergent portion which directs the jet and utilizes the expansion of the gases to increase thrust; and a set of fins to stabilize the motion of the rocket. The single large nozzle may be replaced by a set of smaller nozzles arranged symmetrically in a tail plate. If these are canted somewhat so as to give a tangential component of the thrust they can produce enough rotation to stabilize the rocket without the use of fins.

The liquid rocket is more complicated. In its simplest form, shown in Figure 2, it may appear to be like the solid propellant rocket of Figure 1, but, except for the head, the internal structure is entirely different. Part of the motor is replaced by a "tank section" usually housing two tanks, one containing a liquid "fuel" such as alcohol, the other an "oxidizer" such as liquid oxygen; the rest of the motor is replaced by a "thrust unit." The thrust unit contains a combustion chamber; means for controlling the flow of fuel and oxidizer to maintain a uniform thrust; and means for forcing the liquids into the combustion chamber against the chamber pressure, such as pressure from an inert gas applied to the liquids in their tanks.

The V-2 is probably the most complicated liquid rocket yet used. A control compartment houses equipment for regulating the fuel supply and stabilizing flight while the fuel is burning. The thrust unit includes two centrifugal pumps for forcing the liquids into the combustion chamber. These are driven by a 580-horsepower turbine operated by steam generated by the reaction of hydrogen peroxide with a catalyst, sodium permanganate. Two pairs of small rudder flaps at the rear outer corners of the fins are controlled by stabilizing gyroscopes through servo motors so as to maintain a predetermined trajectory. These motors also control graphite rudders in the jet itself which divert the jet and so maintain the trajectory during flight.
as compressed air and atomized fuel, to produce a high momentary pressure in the combustion chamber. The rush of compressed hot gases out through the tail-pipe induces a partial vacuum in the chamber which causes in turn a new supply of air to be sucked in through the flap valves. When this air forms an explosive mixture with the fuel, it detonates, starting another cycle. The power thus generated is slight, and the aeropulse engine is not efficient unless it is moving with considerable speed through the air, when higher intake of air permits feeding more fuel without getting too rich a mixture. The action is accompanied and assisted by resonance such as causes the note in an organ pipe. In fact, the characteristic note of the V-1, about 46 cycles a second, led to its nickname, "Buzz-Bomb."

Missiles or aircraft driven by ramjets or intermittent jets require the assistance of a booster rocket, a catapult or another powered launching device to attain operating speed.

**THE TURBOJET**

The turbojet actually sucks in the air required for operation by means of a compressor driven by a gas turbine, as shown in Figure 6. The compressor may be of the centrifugal or the axial type. In either case a few turns by a starting motor as in the action of an automobile starter, produces a combustible mixture in a combustion chamber. When this mixture is ignited the resulting high pressure gas drives a gas turbine directly connected to the compressor and then exhausts through a nozzle as the high velocity gas stream which propels the device forward. Since the turbojet does not depend upon forward motion to get the air for combustion, turbojet devices can start from rest under their own power. Hence they are suitable for jet-propelled aircraft.

**CONCLUSION**

The fundamental principles of jet propulsion are common to all the devices described. In some manner a gas must be compressed to an appropriate high pressure and this pressurized gas must then be converted into a high velocity gas stream which is expelled from the device into the atmosphere. The reaction from this ejection creates the thrust or impulse necessary to move the jet propulsion device. The Ramjet, Intermittent Jet, and Turbojet depend on the atmosphere for oxygen to support combustion and therefore cannot operate much above the ceiling of conventional aircraft. Rockets, however, carry their oxygen and therefore operate efficiently at any altitude; in fact, rocket propulsion is the only type that can be used above the earth's atmosphere.
Guidance for Missiles

By Gifford E. White

INTRODUCTION

Making a clean-cut distinction between the stabilization instrumentation and the guidance equipment on a guided missile is a difficult one, and frequently leads to inconsistencies in nomenclature. For a missile to fit into the guided category, it must of course possess wings, fins, jets, or other devices to allow it to change its course away from that of a free body, and inferentially it carries only inanimate intelligence in the mechanism which gives the commands to the course changing elements. We will define stabilization as the actions of the control damping out all transient disturbances and preventing all spurious movements. In an airplane, for example, the automatic pilot will compensate for any tendency of the ship to become aerodynamically unstable and spiral rapidly off course, it will correct for the transient disturbances of air pockets and will otherwise maintain the plane in level flight on a straight heading. Guidance, on the other hand, even though it acts through the same servos and external control elements as the stabilization instrumentation, is that portion of the intelligence system which shapes the whole course to bring the missile to the intended goal. An automatic radio homing system for a conventional plane might be thought of as a guidance system.

Some of the possible guidance systems for missiles carrying warheads will be considered here from the viewpoint of the unusually interesting fire control problems involved in their design, although many of the aspects of the fire control application are common with the problem of automatic navigation for other purposes. The problems of the basic missile design and launching are of equal importance with those of control, but so far as possible, guidance alone will be discussed.

One important aspect of the fact that the payload is a warhead is that the whole missile is expendable, and economic advantage may be taken of the consequent short life expectancy. Also, only one-way operation is needed, and the problem of safe landing may be discarded. In general, the stress in uninhabited aircraft design is laid on attaining that of a free body, and inferentially it carries only inanimate intelligence in the mechanism which gives the commands to the course changing elements. One solution which would be adequate, but one which seems hopeless of attainment, is to make the time-of-flight of a shell quite small. However, this concept of the decreasing time-of-flight is useful when applied to the guided missile problem. If the missile can be given altered course instructions after its launching on the basis of more recent and consequently more accurate data on the behavior of the target, an advantage equivalent to continuous second-guessing can be maintained.

HOMING METHOD OF CONTROL

One important and well-known class of guided missiles is that which possesses a source of intelligence in the missile which perceives the intended target, and guides the missile toward it, regardless of the target maneuvers. This type of weapon gives a decided psychological advantage in that it may appear inescapable to its victim, since it follows through all evasive actions. Further, the missile must be capable of much higher accelerations than its target in order to insure success. These points are worthy of elaboration.

Let us assume that a missile is available which can be launched in the approximate direction of the target, the missile may be launched from ground-to-air, air-to-air, or other, and further assume that the missile is properly stabilized and capable of reacting to course-changing signals. Some physical property of the target is selected which makes it distinguishable from its background, such as its radiated heat, its visible light contrast against the sky or surface, or its ability to reflect radio waves better than its environment. A measuring element can then be placed in the nose of the missile to utilize one or more of these properties. For example, a heat sensitive bolometer might be placed in an optical system to measure the temperature of the area being viewed. If this sensing element can also be made direction sensitive, the means is at hand for deriving control signals to keep the missile pointed in the desired direction to home on the target.

In Figure 1 is an elementary sketch showing how directional signals are commonly derived from the scanner, which is the usual name for the sensing part of the homing head of a missile. This sketch refers to a radar scanner, but the essentials for any other type of energy or field measuring equipment could be illustrated in a similar fashion.
are much the same. First of all, the sensing element must be sharply directional so that it can perceive small angular misalignments. The optical or radio sensing element is then rotated so that its axis of highest sensitivity is sharply eccentric with respect to the direction in which it is looking. As shown in Figure 1, if the target is slightly off the principal axis, the signal is stronger on one side than the other, and the amount and direction of this deviation can then be measured and converted to electrical signals to actuate the internal controls.

Having obtained signals from a homing head which can inform the missile whether or not its scanner is pointed at the target, there are several ways in which the information can be used. The simplest of these is that which requires the missile to travel directly toward the target at all times. The scanner is pointed directly ahead in the missile, and the controls are actuated so that the axis is always in line with the target. In this way, a pursuit course is described, which is a classical problem in differential calculus. This is illustrated in Figure 2. In the simplicity of the system its undoing. If the accelerations required of the missile such a course are computed, it will inevitably be found that they become increasingly large on the last portion of the trajectory, which is the most critical in obtaining a hit, unless the target is either quite large or fixed in position. Hence the antiaircraft application is one of the most important of all the fire control cases, the use of direct homing against fast targets appears of little use.

There are other methods open, however, which alleviate its difficulty. Assume that the homing head, in addition to determining the direction of the target, is able to measure the angular rate of change of its course direction as it pursues the target. If the missile can be set on a course which makes the rate of change of this angle zero, we have established the condition under which the missile travels directly toward the collision point. The diagram of Figure 3 shows approximate characteristics of such a course. The missile completes the final and critical portion of its trajectory as a straight line, and the accelerations required of the missile are small, and a very efficient flight path is traveled. Of course, the increased intelligence of the homing head is obtained only at the cost of more complex equipment, and consequently a more difficult design problem is encountered in retaining good dynamic behavior of the missile system as a whole.

One important problem to be overcome by the homing head is that of target acquisition. High directional sensitivity is also necessary in order that the homing head will have less tendency to be confused by multiple targets. These factors taken together mean that the missile must be brought into the vicinity of the target, and must also be pointed accurately toward it in order to home properly. Hence, the use of homing may require the initial part of the course to be under control from an outside source, such as the launching station.

The peculiar physical shape of supersonic missiles, and the important factor of weight reduction will pose very interesting difficulties for the designer.

In addition to the use of homing heads in airborne missiles, there is also the application of target-seeking elements to marine torpedoes which is of much interest. Homing heads based upon acoustic radiation and magnetic fields might well be applied to the marine analogues of these air missiles.

**Line-of-Sight Control.**

Another basic class of missile guidance system falls under the category of line-of-sight control. In one of the German antiaircraft missile systems, a stabilized rocket was launched from the ground, carrying electronic signal receiving equipment with it. Signals could be transmitted from the ground through this command link to alter its direction of flight. The operator observed the intended target through an optical system of some complexity, the details of which are not relevant to the general problem. In order that the operator might follow the missile, it was provided with a flare in its tail. By sending signals through the command link, the operator attempted to keep the image of the missile in coincidence with the target. That is, the missile and the target were kept in a straight line from the observer's position.
Changes in a very important manner. Here it is interesting to note that no longer will erratic motions of the wind and changes in target course affect the accuracy.

In Figure 5 is displayed an elementary schematic of collision course antiaircraft system. Initially, target position data is assimilated in a computer. On the basis of the target position and motion, the missile is launched in a direction such that with its normal flight behavior it will reach a point on the target's future course which will bring it into contact with the target. Under this system, the uncertainty in the coordinates of the impact point becomes smaller and smaller, and the probability of a hit may be made far above that of the uncontrolled missiles or projectiles. It will be noted that the path of the missile is shown as a straight line. If the proper estimate has been made at the time of firing, the angular heading of the missile with respect to the target is thus constant (assuming constant missile velocity).

There is another class of guided missile systems of equal or greater importance than the moving target type; namely, those applied to long-range bombardment. It is obvious that navigation of guided missiles over long distances to military targets poses very serious problems. The difficulties experienced by pilots and navigators in arriving at their destinations, in spite of the multitude of complex navigational aids currently available, only serve to more sharply bring out the magnitude of the problem of navigating a pilotless aircraft over long distances. Regardless of the type of missile employed, it must be able to maintain an accurate knowledge of its course with reference to the earth, and have the ability to alter its course as required to terminate its path at the target point. Any scheme which measures position is potentially the prime element of a guidance system. Any system which would suffice for the determination of the position of pilotless air craft and rockets would also be applicable to inhabited aircraft. Likewise the converse this principle is possible.

**Figure 4**—Line of sight guidance system.

**Figure 5**—Collision course command system.
Loran

The system of radio navigation called “Loran” has been widely publicized since the end of the war. The details of its operation are too complex to be covered here, but its basic principles are simple. Two fixed and geographically separated radio transmitters send out signal pulses at the same instant under carefully maintained synchronization. A receiver in the ship or airplane picks up these two pulse signals and measures the apparent time separation between the signals; the amount of time separation gives the difference in the distance from the receiver to each station. This means that the receiver is located along a particular hyperbola passing between the station pair, and is determined by the measured time difference. Now if a second station pair at another physical point also emits a pair of synchronized pulse signals, a second time difference may be measured, and a second hyperbola is determined through the receiver which passes between the second transmitter pair. The intersection of the two hyperbolae is the position of the receiver. The importance of the system lies in its unlimited traffic handling ability, and the relative simplicity of the receiver equipment. Further, the ship desiring the position information emits no signals and privacy is maintained.

Other Navigational Systems

Several other radio navigation systems, such as Decca and Gee have been disclosed as having performed a vital function during the war, but the same basic limitations apply to them as a family. All of them must operate on a long wavelength to send signals around the curve of the earth, and the use of long wavelengths has so far led to accuracies which are low from the fire control viewpoint. Microwave guidance beams, and microwave tracking radar sets, were mentioned in connection with short-range guided missiles, such as the antiaircraft types. These microwave beams also operate on the optical line-of-sight principle, and hence are of little primary usefulness in connection with truly long-range navigation.

The German V-1, a short-range pilotless aircraft, relied solely upon measurements made by instruments carried in the control mechanism. It depended upon a gyro slaved to the earth’s magnetic field to maintain it upon a preset azimuth heading. The gyro insured short-time stability during any transient disturbances, and the magnetic compass element prevented slow drift of the azimuth reference. A pendulous element maintained the gyro in a stable vertical position. A pressure-altimeter element controlled altitude, and with these measuring devices, the missile would fly after takeoff in a straight course at a preset altitude. Previous to launching, the effect of wind would be estimated, and the azimuth value set into the compass-gyro combination would be that which would cause the V-1 to fly over the target. In order to control range, an air-log mechanism would accumulate the total distance traveled, and at the previous value of range which had been estimated to put it at the target, a steep glide would be started. These instruments were simple, and just adequate to give a useful accuracy at the available range of 200 to 300 miles. They were completely jam-proof, and the only countermeasure which was successful was that of destruction by fighter or artillery fire.

The basic ideas employed to navigate the V-1 appear very attractive for longer-range flights. Given a sufficiently accurate instrument to indicate the azimuth heading and to measure the direction of the vertical, a highly accurate continuous indication of the position might be obtained. Present airplanes fly in regions where the effect of winds cannot be easily computed, but the plans for guided missiles visualize flight in the very high altitudes where the air is so rare as to have little effect. Certain other measurements to give position must be added to the measurement of the azimuth and the vertical, such as velocity and time, but the first two appear the most difficult at present. The V-2 rocket is controlled in a very interesting manner. As is well known, its takeoff is in a vertical direction, but very soon afterward it turns over gradually in the azimuth direction which was set into its free azimuth gyro before takeoff. The pitch angle varies as a previously calculated function of time, which is determined from trajectory calculations. During the time of upward acceleration from the rocket motor, a computer takes into account the accelerations and the pitch angle of the missile and keeps a running account of the progress along the trajectory. It is possible to compute in advance the relation between velocity and direction of flight which must be attained to allow the rocket to proceed afterward as a free projectile to hit the target. When the proper combination of velocity and direction of flight has been attained, as measured by the computer, the motor is shut off by a preflight adjustment and the rocket hence travels as a free projectile. This is a complex problem in the mechanics of a moving body, but in spite of the complexity the accuracy is limited only by the errors in the measurement of acceleration, time, and the direction of flight. In principle, this method could be extended to truly long-range rockets for bombardment use. The stumbling block is a technological one, in that accuracies demanded of the equipment increase rapidly with the desired range, and it is difficult at this time to estimate the potentialities of this method of guidance.

Celestial Navigation

In the navigation of aircraft, the ancient art of stellar position-finding has found considerable modern use. The twentieth century position-finding methods differ from the old ones in many refinements of instrumentation, but the basic techniques are the same. If the observer has an accurate clock, a system for finding the vertical, and a sextant or other angular measuring instrument for taking the elevations of astronomical bodies, he can determine his position with fair accuracy. The problem of keeping time may be considered solved. In finding the vertical or its 90 degree equivalent (the horizontal), in a fast-moving aircraft, difficulty immediately arises. On a surface ship, the vertical may be taken as a perpendicular to the plane of the horizon, which on water is a well defined line. On an aircraft, the horizon may either be obscured over water, or indefinite over land.

Some conception of the problem to be solved in the long-range navigation problem may be gained by considering our present ability to navigate modern airplanes. On a long
range flight, the pilot makes the best possible estimate of
the wind conditions to be encountered en route, and allow-
ances are made for drift. Continuous estimates are made
of ground speed, and plots are kept of position. Astral shots
are made if possible. After taking all possible precautions,
the pilot considers himself fortunate if he finishes a long
ocean flight in sight of recognizable landmarks near the air-
port at which he plans to land. Consider then the range of
development problems ahead if the mechanical pilot must
arrive on a target no larger than a modern airport.

CONCLUSION

The blue sky should always be the boundary for research.
However, the time arrives in any research program when
a careful differentiation must be made between what can
be done now, and what must wait for tomorrow. The status
of design technique often represents the sole difference
between success and failure of a basically sound idea. A
healthy skepticism, mingled with the encouragement of
research, will see a tremendous unfolding of the field of
aerial navigation in the next few years.

The "Bat" Guided Bomb*

A RADAR-GUIDED "suicide" bomb, that glides like an
airplane and blows itself up when it almost unerringly finds
its target got its first public showing at Chincoteague, Va.
The bat, latest Naval guided missile, is no longer an ex-
periment. It is ready for active combat use. It is now stan-
dard equipment. Navy officials are confident that it will give
a good account of itself, if another war is fought.
Like the little flying animal after which it is named, the
bat emits invisible waves and uses them in navigation. But
the Navy's bat uses the high-frequency radio waves of radar
instead of the high-pitched sound waves of the animal bat.

With a ten-foot wingspread and a body length of about
12 feet, the bat looks like a small airplane without engine
or propeller. Radar equipment in its nose keeps the missile,
after its release from its mother-plane, headed directly on
the target, which may be an enemy ship or a land installa-
tion.

Its target can be attacked day or night, in clear or foggy
weather. The bat's radar equipment is focussed on the
target before its release. An operator aboard the mother-

plane is able to spot the enemy radar if this is necessary.
The mother-plane carries the bat under its belly or under
its wings. The release is made from four to eight miles away,
and preferably from an altitude of from several thousand to
12,000 feet. The bat sweeps downward and forward, when
freed, in a long glide to approach its prey at a low angle.
Once the bat is launched, the mother-plane flies off to safety.
The radar device is somewhat like the kind used with
anti-aircraft guns to keep them accurately aimed on moving
aircraft. It sends out radar pulsations which originate in the
bat's own battery. Reflected pulses are received on its own
receiving antenna. If the target is out of the radar field
center, delicate mechanisms elevate or lower the bat, or turn
it to right or left, until it is in exact attacking position.

In experiments, the bat hit its target some 50% of the
trials made. When it hits, its bomb load explodes. It is a
"suicide" craft, except that no human lives are involved as
the craft is not manned.

If a big and powerful vessel is the target, two bats are re-
leased from a single plane at the same time, and they will
hit at almost the same instant. The double blow would be
effective upon most ships.

The Future of Radar in Artillery

By Louis N. Ridenour

During World War II, radar was a device of great and growing usefulness in the Coast Artillery. The famous SCR-584 radar used for antiaircraft position-finding was an important member of the team that also included the M9 director and the power-driven 90mm guns. In the hands of the Antiaircraft Artillery, this combination of weapons served through the latter years of the war with outstanding success. The AN/MPG-1, a seacoast artillery fire-control radar of great flexibility and precision, similarly teamed with an electrical director, gave promise of being equally successful. It had no opportunity to show its possibilities in combat, because of the decline of enemy fleet potential toward the end of the war. Its performance in trials, however, was astonishingly good.

What of the future? In a war of pilotless missiles of increasing speed and range, the problems of radar meant for use with defensive artillery, multiply rapidly. What can be said about the future requirements on such radar, and the ability of techniques now in hand or in sight to meet these requirements? It will be useful to consider separately the problems peculiar to the Seacoast Artillery, the Antiaircraft Artillery, and the control of guided missiles used for offense.

One general remark can be made. At least as important as the technical design of the radar equipment and the ordnance is the functional design of the using organization. It was proved over and over again in the past war that a well-planned and competently trained organization could make highly effective use of inferior equipment, while an incompetent crew, or one forced to follow cumbersome, poorly planned operating procedures, would always fail to get good results even with superior technical equipment. The principal concern of this article is with the technical details of radar equipment, but so important are the many organizational problems bearing on its effective use that they must be mentioned. Very little study was given such problems during the past war, on any sort of systematic basis, simply because of the lack of time to carry out the work. Now that we are at peace, the preparedness of the Coast Artillery will hinge at least as much on the ability to devise sound and workable operating procedures as it will on the design and manufacture of new and better types of radar and ordnance.

Radar for Seacoast Artillery

The requirements on radar used for accurate position finding in connection with seacoast artillery fire control are likely to change little in the next few years. The targets of such fire will continue to be surface ships and surfaced submarines, and their speeds and maneuverability will not greatly exceed those common to such vessels in the war just past. The range at which such targets can be engaged by coastal guns will not change substantially; and the range at which such targets can be seen by radar will continue to depend on the heights at which the radar is sited, because of the curvature of the earth. By a fortuitous numerical coincidence, the radar horizon distance that corresponds to a given antenna height can be found from the following simple formula: Horizon range (statute miles) = \( \sqrt{\frac{2 \times \text{antenna height (feet)}}{2}} \). Thus, radar ranges available from antennas sited on towers of practicable height are adequate to fill the requirements of conventional coast artillery.

If surface targets are to be engaged at greater ranges, for example by rockets or other self-propelled missiles, the problem of getting the radar antenna to a height sufficient to give the range needed will be a formidable one. A simple calculation from the formula above shows that a range of 100 miles against surface targets (which modern radar is perfectly capable of giving, if its coverage is not limited by the horizon) demands an antenna height of 5,000 feet. It is usually not possible to obtain such an elevation of the antenna by siting the radar on a coastal mountain, and a tower of the necessary height is clearly out of the question.

Under such circumstances, the solution seems to be to mount the radar in an aircraft of some sort, and transmit the radar data to the battery that is to make use of them. Means for transmitting radar displays on radio links were quite satisfactorily worked out during the last war, though they came too late to achieve any operation use. Figure 1 shows two PPI photographs taken simultaneously at two different indicators that were both displaying radar signals produced by a long-range 10-cm ground equipment. One indicator (left photo) was located at the radar site, and received its radar signals through direct connection with the radar. The other (right photo) was more than 10 miles away, and received its signals by a radio link. There is no difference either in quality or in accuracy of the display between the radar picture at the set itself and that sent by radio to the remote indicator.

If such radar relay, as it is called, is used to extend the search and fire-control coverage of seacoast artillery radar, the position of the radar antenna with respect to the battery must be known with great accuracy at all times. This can be insured by the use of radar beacons located on the ground. Such beacons respond with a reply pulse (or a series of coded reply pulses) to an interrogating pulse they receive from a radar. When the reply pulse is shown on
Two PPI photographs taken simultaneously at two different 10 cm set. The one indicator (left photo) was located at the radar site and received direct signals from the radar. The other (right photo) was more than 10 miles away and received its signals by a radio link.

the indicator of the interrogating radar, the range to the beacon can be found very accurately. This gives a circular line of position (or a rough fix, since the bearing of the beacon from the radar can be found if the radar, as is usual, has a directional antenna). A precise fix can be obtained by making range readings on two or more beacons.

There is no danger of confusion between the reply of a radar beacon and radar echoes from the ground, for the beacon reply can be made on a frequency slightly different from that of the radar sending the interrogation pulse. Thus, if the radar receiver is tuned to receive the beacon reply, it will be detuned for radar echoes.

Beacon systems of this sort are able to determine the positions of an aircraft with a precision of a few yards, out to ranges determined by the horizon-distance formula given above. Such systems were very effectively used during the last war for accurate blind bombing; the British Oboe system and the American Shoran are examples of the type.

Here we have an example of the importance of the using organization. To extend the range of seacoast fire-control radar, the antenna must be put at a great height. The technical means for accomplishing this, and for making the radar data available at the battery as soon as collected, are in hand. So is a means for taking into account the "parallax" between the radar picture collected at the radar site and the scene as viewed from the position of the battery. The technical problem of obtaining the desired long-range coverage is thus a perfectly straightforward extension of what we already know how to do. The addition of several new elements to the seacoast fire-control problem, however, will demand that considerable thought be given to the way in which operational procedures are to be organized. And the operational decisions arrived at as a result of thought, test, and experience, will doubtless dictate changes in the technical design of the radar equipment.

Radar For Antiaircraft Artillery

While the problem of extending the range of seacoast artillery radar seems to be technically straightforward, the antiaircraft problem of the future is many times more difficult than that faced in the past. The combination of atomic explosives with supersonic long-range projectiles derived from the German V-2 leads to a problem of defense that seems almost insoluble. The great speed of long-range rocket missiles makes it necessary to detect, track, and engage them within a matter of seconds; whilst the immense radius of destruction characterizing an atomic explosive makes it necessary, if defense is to be effective instead of suicidal, to destroy a missile at a very considerable range.

However difficult the defense problem seems, it is the mission of the Antiaircraft Artillery to solve it. The most important part of the solution is doubtless a defensive missile adequate to counter supersonic rockets. It is not the purpose of this article to discuss this part of the problem.

Although the detailed design of the search and fire-control radar will depend to a great extent on the nature of the defensive ordnance, the over-all requirements placed on the radar will hinge on the properties of the vehicle being intercepted.

Search radar used for antiaircraft of the future must have hemispheric coverage. The design of search radar used in the past war was greatly simplified by the fact that aircraft seldom flew much above 30,000 feet, and almost never above 40,000 feet. Antennas were therefore designed to beam most of the radar energy which would have gone upward into low elevation angles, thus increasing the range performance of the radar at no expense in transmitted power. We can expect the new rockets, however, to go to altitudes of a hundred miles or more, and to come in toward their targets at rather steep angles.

In order to detect such missiles, search radar must cover...
the entire upper hemisphere. Possibly longer wavelengths
than the 3-cm and 10-cm microwaves so useful in wartime
radar will be advantageous for such hemispheric search
sets. The broader radar beams obtained at such longer wave-
lengt hes simplify somewhat the problem of coverage of a
large solid angle. Among the most successful radar sets in
the detection and plotting of V-2 rockets during the war
were the old British CH stations. These sets, the first radar
to be used in combat, work on wavelengths in the neigh-
borhood of 10 meters, or 1,000 cm. Broad search beams
have the disadvantage that they make it more difficult to
perceive the strength and composition of a raid involving
several or many missiles, and thus complicate the problem
of designating targets to defensive batteries.

In any case, the requirement of hemispheric coverage
greatly increases the difficulty of providing future radar
equipment with a search range adequate to give target
pickup at the necessary great distances. Worse, the supersonic
streamlining of rocket missiles makes them very poor
targets when viewed from directions near the front;
that is, when viewed from a position near the target. The
hurricane leading edges of conventional subsonic streamlin-
ing give far bigger radar reflections than the sharp noses
on supersonic vehicles.

Further, it is likely that missiles of the future will make
use of the now well-developed techniques of radar camouflage.
During World War II, both the Allies and the Ger-
man s developed sheet material capable of absorbing radio
waves with very small reflection. This material is simi-
lar in many respects to the antireflection coatings used on glass
surfaces in high-quality optical instruments. It can be ap-
plied over the surface of any object whose radar detecta-
ibility it is desired to reduce, such as the exposed upper hull
and superstructure of a U-boat. Quite possibly, similar coat-
ings will be used on the long-range offensive airborne mis-
Ssiles of the future, and the problem of radar detection will
thus be greatly increased.

The rapid wartime progress in radar development sug-
gests that technical improvement in radar will soon pro-
vide the search ranges necessary, despite the difficulty of
the problem. This may or may not turn out to be the case;
but it is worth noticing that increases in range purchased
by increasing the power output of the radar transmitter are
very costly. Doubling the transmitter power gives a range
increase of only 19%; radar range depends on the fourth
root of the transmitter power, other things being equal.
Similarly, we cannot hope for any spectacular change in
radar performance as a consequence of improvement in
radar receivers. The minimum detectable signal in a radar
receiver is set by the level of unavoidable electrical noise
generated even in a perfect receiver. Radar receivers of 1946
are so near this ultimate goal that a perfect receiver would
increase the range performance of the over-all set only by
some 80%. The great technical difficulty of designing a
search radar that is capable of searching an entire hemi-
sphere at least once every 20 or 30 seconds, and infallibly
detecting and locating every missile within, say, 300 miles
of the radar, even though such missiles have been treated
to reduce radar reflections, is apparent to anyone with war-
time radar experience.

So far, only the problem of radar detection has been
mentioned. Two other problems have at least equal im-
portance. One is the problem of identification. When do-
cers of targets return radar signals within the field of view
of a given radar set, it is necessary to have a means of de-
termining, within seconds, which signals come from nor-
mal air traffic and which are returned from possible hos-
tile vehicles. The electronic identification equipment (IFF)*
of the past war was unsatisfactory under conditions of high traffic density. Until supersonic rockets are
used for peaceful commerce between countries, of course,
one is justified in assuming that every such missile de-
tected is hostile. But the enormous densities of conven-
tional, peaceful, air traffic between countries of the world
will put an enormous burden on identification means.

The technical solution of the identification problem is
not yet in hand. It is of the utmost importance to have
some way of determining, within a few seconds of the first
moment at which a radar echo is detected, whether the ve-
cicle causing the echo is friendly or dubious. At the close
of World War II, this problem had not been solved.

The final part of the antiaircraft problem, and a vital
one, is that of fire control. Even with guided missiles as
defensive ordnance, it is still important to launch them in
the right direction to make an interception of the incoming
missile possible. And it is quite possible that some types
of defensive guided missiles will be controlled from the
ground, on the basis of radar information, in the course of
their interception of the target.

Wartime position-finding radar, despite its very great
success, has a serious deficiency when considered in terms
of future warfare. The SCR-584 obtains accuracy and con-
tinuity in the tracking of its target by neglecting all other
targets in the field of view. In a high-density air attack, or
under conditions in which the radar must track both tar-
get and interceptor. This scheme puts the design
burden on the organizational side exclusively; radar much
like that we now have is adequate for such use.

In order to deal with more than one target at a time,
either of two things can be done. First, several sets like the
SCR-584 can be provided, and a target-designation system
organized to make sure that each set deals with a different
important target. If an interception problem is to be solved,
means must be provided to combine the position informa-
tion flowing from the separate radars tracking the hostile
missile and the interceptor. This scheme puts the design
burden on the organizational side exclusively; radar much
like that we now have is adequate for such use.

Alternatively, antiaircraft radar can be designed to give
precise information on the position of any target in its
field of view while continuing to scan a substantial field
and continuing to display the position of all targets in that
field. The GCA (Ground-controlled Approach) radar used
during the war and since for tracking aircraft in order to
give them approach and landing instructions did essen-
tially this, by having two separate radar sets scanning re-
spectively in azimuth and elevation. No attempt has yet
been made to design a similar radar for antiaircraft fire con-
trol. Serious problems would have to be faced, for the GCA
has neither the range performance nor the positional ac-

*See article "Identification of Friend or Foe" (page 37), this issue.
accuracy that would be necessary in a similar set to be used for antiaircraft position finding. However, in the opinion of many men who were engaged in the wartime design of fire-control radar, this type of set is destined to supersede sets like the SCR-584. This approach to the mass-raid problem (and the controlled-interception problem) puts a smaller burden on organizational design by complicating somewhat the radar design.

**CONTROL OF OFFENSIVE GUIDED MISSILES**

The problem of controlling the flight of guided missiles used for offense is quite different from that of controlling guided antiaircraft interceptor missiles, principally because of the enormously greater range required in the offensive case. One is interested in the accuracy of offensive missiles at the target, and the target is usually over the horizon from the place at which the missile is launched.

Under these circumstances, the missile may be guided in any of the following ways, or by a combination of two or more of those ways:

1. While the driving power is being applied, the missile can be tracked very accurately and made to follow such a path, during the early part of its trajectory, that its free flight after power has been cut off will take it to the target. The Germans used a relatively simple scheme of this sort to control V-2.

2. By means of airborne radar equipment or otherwise, the path of the projectile can be followed over substantially its entire course, and flight corrections applied to make the actual course agree with that necessary to hit the target. For long missile ranges, this scheme becomes very complicated from the organizational point of view.

3. Sufficient navigational equipment can be put into the vehicle to permit the missile itself to perform the required navigation on the basis of coordinates of the path chosen and set into the mechanism before launching. Such electronic navigational schemes as Loran would probably be very useful in this connection. Good accuracy at the target would require navigational equipment of a precision now uncommon; the problem of finding the vertical direction accurately in such a vehicle during flight may be mentioned as one of the difficult ones.

4. The vehicle, having been brought to the vicinity of its target by any of the above schemes, may be caused to home in on the target by means of a mechanism carried in the vehicle. Any of several properties of the target can be used to actuate the homing mechanism; the radar homing device used to a limited extent by the Navy in the past was an example of such an equipment. Signals from a direction-finding radar in the nose of a controllable bomb were used to fly the bomb on a collision course with any object giving a strong radar echo, such as a ship on the sea.

Until more development has occurred in the field of such long-range offensive guided missiles, it is not appropriate to discuss here in detail the radar problems presented contingent to controlling them. It is clear from the above partial catalogue of schemes for guiding such missiles that the control radar will play a very important role in the final control set-up. It is equally clear that the attainment of accuracy at the ranges discussed for such missiles will put a whole new set of requirements on the performance of the radar equipment used. An extremely substantial development, design, and testing effort must precede the production of radar equipment adequate to these new and exacting needs. Somebody has remarked that, while we have the push button, we are far from being ready for a push-button war. One of the things we must still connect to the push button is radar, whose range performance, position-finding accuracy, and convenience of use are far ahead of those displayed by the radar that helped us win World War II.

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**Crichlow Slide Rules**

The Book Department of the Seacoast Branch, The Artillery School, Fort Scott, California, desires to dispose of 7,100 Crichlow Slide Rules. The reduced price of this rule is $1.10 postpaid, but on orders of five or more, a discount of 15% will be allowed.
Previous articles in this series have discussed radar and have shown that radar is quite capable of locating enemy targets and determining their location. No discussion of radar would be complete which omitted its most necessary adjunct, IFF, Identification of Friend or Foe.

Radar sets alone are not capable of identifying whether or not the detected target is friendly or hostile. Hence, the need for identification equipment to work in conjunction with radar sets, especially those in a surveillance role, is apparent.

Consider for a moment how ineffective a sentry patrolling an outpost in a war zone would be if he were unable to distinguish between the men of his own unit and the enemy trespassers. There would be two courses of action open to him: he could either sound a general alarm for each person who approached his post, or he could allow everyone to pass unchallenged into the camp, assuming that they could be identified later. Such practice would inevitably lead to disaster. However, we are confronted with much the same problem in radar operation. Radar is a long-range sentry that reports the presence of all trespassers and is constantly on the alert for enemy ships, planes, and other objects.

Of course, the ordinary means of challenging are available. But these are much too slow in modern warfare and present the added disadvantage that whether blinker light or radio be used they reveal the challenger's position. Both methods have the added disadvantage of range limitations.

In the accounts of the earliest tactical use of radar, all the evidence points to a lack of suitable means of target identification as the most serious limitation of radar.

History of the Development of IFF.

We are indebted to the British for initial development of the equipment that we so sorely needed. They had their own system of radar and its use helped in no small measure to save England in her gravest hour of peril. Still at the outset, one serious limitation threatened to destroy radar's effectiveness, and that was this problem of identification.

While the Luftwaffe was striking and the RAF was strictly on the defensive, the British radar operator had no identification problem, for his own fighters rarely ventured far from home. Thus, it could be taken for granted that all planes approaching from across the Channel or flying in from the North Sea were enemy.

It was the RAF's switch from the defensive to the offensive that really brought the need for an infallible system of identification to the forefront. Realizing that defense will not win a war, the RAF launched its own offensive. Soon British raiders were making the trip back and forth across the Channel.

The Nazis started dispatching their bombers close on the heels of the returning British squadrons. Unaware that German planes were trailing them, the British pilots led the Nazis safely through the defensive radar network unrecognized. The radar operators were unable to distinguish between a pip from the British planes which they were expecting and a pip from a Nazi for there was no observable difference in the appearance of either pip. The first indication of the electronic sentry's failure to detect the enemy was the crash of bombs. If Private Lockhard had had an identification system at Pearl Harbor he would have known that the detected planes were not the U. S. planes expected from the States.

Faced with realization that the radar was totally ineffective against the new tactics, the English radar technicians, working feverishly, developed a type of identification radar, the first IFF unit. This special unit produced an identifying pulse that appeared on the screen along with the target pip. With this new equipment installed in the RAF planes and working in conjunction with land-based and shipborne radar, the operator was at last able to identify the target as friendly by observing whether the additional signal accompanied the target pip. Since the enemy aircraft were not equipped with the special unit, they could immediately be identified as hostile simply by the lack of the distinctive identification pulse. IFF is the electronic analogue of the painted insignia on a fighter plane: instead of making its signal to human vision it made it to the radar. The addition of IFF made radar a relatively trustworthy long-range sentry that could distinguish between friend and foe.

In one of the earliest experimental forms a simple antenna was installed in an aircraft or surface vessel. The antenna was resonant to the radar frequency, and was switched on and off with a pulse that appeared on the screen along with the target pip. Since the enemy aircraft were not equipped with the special unit, they could immediately be identified as hostile simply by the lack of the distinctive identification pulse. IFF is the electronic analogue of the painted insignia on a fighter plane: instead of making its signal to human vision it made it to the radar. The addition of IFF made radar a relatively trustworthy long-range sentry that could distinguish between friend and foe.

These difficulties were in part overcome by the successive introduction of IFF Mark I and Mark II. Both of these systems employed a combined receiver-transmitter by means of
which airplanes could identify themselves to radars. The set normally was in the receiving condition but when energized by the receipt of a radar signal, it broke into oscillation and became a transmitter. The signal emitted from the identification equipment was radiated to the radar station together with the normal echo from the target, and the echo was thereby distorted in such a manner as to make recognition possible. The tuning of the set was mechanically swept through the bands of radar frequencies then in use, so that the recognition of targets on any radar was aided by the reception of periodic identification signals as the receiver-transmitter set tuned through the radar frequency.

Radar equipment now operates on such a large number of widely separated frequencies that it has become impractical to produce a single IFF set capable of tuning to all of them. To provide an adequate identification service operating in this manner it would, therefore, be necessary for aircraft and ships to carry simultaneously several different types of IFF sets. Further, it would be necessary to introduce additions and modifications to this equipment each time radar equipment on a new frequency was introduced.

Such increases in the amount of equipment carried, particularly in aircraft, could not be accepted. The difficulty has been overcome by the introduction of a universal frequency band for IFF, separate from that of the radar equipments on which the echoes must be recognized. In this manner, though the need for extra equipment still exists, it is possible to save installation of several IFF sets in each aircraft by the expedient of fitting auxiliary apparatus to the radar equipment on the ground, where considerations of weight and space are of less importance.

**Operation of an IFF System.**

The system of identification in use in the Armed Forces of the U.S. today is MARK III IFF. It is really just a "baby radar" with some of the regular radar units missing. It has an antenna, a transmitter, and a receiver, and in some instances its own indicators. In one respect it is strikingly different however. A radar set is a complete unit in itself in that no assistance is needed from the target to obtain an echo. In using an IFF system a ground or ship based IFF unit receives a response from a unit borne by the friendly interrogated plane or ship.

It is the function of the ground based portion to "challenge" the detected target and identify it as either friendly or hostile. Only friendly craft answer the challenge (providing they are equipped with the necessary unit).

**Components.**

The components which make up an IFF system are as follows:

1. **Interrogator:** A low-powered radio transmitter which emits challenging signals on some frequency in the IFF band, and which is associated with the radar equipment whose echoes must be recognized. The "echo-principle" is not used by the transponder. All that is required from the interrogator is enough power to send the questioning radio waves to any craft within range of the search radar. Of course, the signal must be strong enough when it reaches the target for it to be picked up by a special receiver carried solely by friendly air or surface craft.

2. **Transponder:** A combined receiver-transmitter, fitted in friendly aircraft and ships, usually weighing about 30 pounds, which receives a challenge pulse from an Interrogator and automatically returns a signal on the same frequency (or a different frequency, depending on the IFF system in use). The form and duration of the reply signal are controlled by a coding system. Although it can tell a ship or ground station that the plane carrying it is friendly, it can not furnish the pilot of the plane carrying it the same information about the ships below him.

3. **Responder:** A radio receiver, associated with the radar equipment which receives the reply returned from the Transponder and produces an output suitable for feeding to a display system. The Responder is usually combined into a single unit with the Interrogator.

**Principles of an IFF system.**

A block diagram of an IFF system associated with a radar system is shown in Figure I. Both the radar indicator and the interrogator are synchronized from the radar transmitter. Thus the interrogator pulse and the radar pulse are transmitted nearly simultaneously. The IFF antenna and the radar antenna use a common reflector in the case illustrated, so that the two pulses are radiated from the same place. The radar echo from the ship is shown at X on the indicator and the echo from a second target appears at Y. During the same time that the radar pulse is traveling out to the target, the interrogator pulse goes out and actuates the transponder on the friendly ship. The transponder response then returns to the antenna along with the radar echo. Since the target at Y does not have a transponder, it cannot identify itself as a friend. However, it must be realized that the lack of an IFF response is not a clear indication of the enemy character of a contact. The target at Y, then, is not necessarily an enemy, because the transponder may simply not have been turned on, or the equipment may be inoperative.
Transponder.

A transponder consists of a receiver, a transmitter and an antenna. The transmitter is normally quiescent and the receiver ready to receive. When an interrogating pulse is received, it is amplified many times. The large pulse is used to trigger the transmitter, causing it to reply to the interrogation on the frequency to which the transponder transmitter is tuned at that instant. Circuits in the transmitter control the character of the pulse sent out so that the interrogating pulse serves only to start the action. The action of the transponder is entirely automatic; it needs no attention from operating personnel after it has been turned on. Whenever a pulse is received, the set automatically transmits a reply. A weak pulse is received and this device then automatically sends out a strong pulse with almost no delay. As a result, the IFF reply usually is much stronger than the radar echo, because the echo contains only a small fraction of the power of the transmitted pulse which is reflected back toward the radar. Because of the nature of the transponder tuning, a reply is returned at intervals approximately 3 seconds long. In the Mark III system the transponder reply is coded by means of varying the width of the pulses transmitted on four successive frequency sweeps. A complete cycle of the code then is completed in a little less than 12 seconds. Several different codes are available. Future sets may even have the response in a different color.

Interrogator-Responder.

The interrogator-responder is the component of the most direct interest to Ground Force personnel since it is the portion of an identification system with which they come in contact. In the Mark III system the responder is tuned to the same frequency as the interrogator. Several interrogators operating together should be spread as wide apart over the band as possible to reduce interference and to avoid overinterrogation of the transponders. The responder is a conventional radar receiver which should require little attention from operators aside from a periodic check to insure peak tuning.

The antennas in use with Mark III interrogators may be mounted on the same reflector as the antenna array of the radar with which they operate or they may have an entirely independent array as is the case with AGF equipments. (Most AGF radars operate on much higher frequencies than the IFF band and hence can not use the same reflector.) Because of the low frequency used, the antenna is not highly directional.

The interrogator-responder may sometimes have its own indicator or the IFF information may be displayed directly on the radar scope. In general an "A" type indicator is used. By using another band of frequencies planes can be identified on a PPI scope. (Figure II.)

Destructors.

The IFF system does not provide an absolute means of recognizing radar contacts. Therefore, to help insure that the responses are authentic, it is important to deny the enemy use of any transponders that he may capture. As a means to this end, all transponders are provided with small explosive charges which may be detonated either by an impact switch operated by the deceleration of a crash landing, or by a switch operated manually by the pilot whenever there is a possibility of the plane's landing in enemy terri-
One cycle analysis of IFF operation.

Given an understanding of the makeup of the Mark III IFF system and the function of each unit, let us trace the operation of the equipment through one complete cycle.

Assume that the operator has detected a target at azimuth 80°, range 60 miles, and has identified it as a plane. His next step is to determine whether it is enemy or friendly. Keeping the antenna trained on the target, he turns on the IFF switch to put the interrogator into operation. He is now in the position of a sentry challenging a trespasser. (Normally the IFF switch is off and the interrogator is in standby, i.e., the transmitter is resting.) The interrogator sends out a pulse and the pulse of the search radar travel out to the target at the same speed. Both beams strike the plane surfaces and reach the antenna of the transponder. Part of the waves from the search radar are reflected, and a small part of the challenge pulse is bounced back, but it is so trivial that it dies out almost immediately.

Of the two wave fronts striking the transponder only those from the interrogator can be tuned in by the transponder receiver; the radar transmission is above the frequency range of the transponder. The echo from the search pulse has begun its return trip before the transponder receiver succeeds in triggering the transmitter. The coded signal is then transmitted to the responder.

Both the Germans and the Japs had some luck in building an airborne machine that triggered off from the challenges of our interrogators. Hence the necessity for frequently switching codes. The system of frequently changing the password minimized even further the possibility of the foe hitting upon a signal that might be confused with the friendly combination.

As soon as a target is identified as friendly, the IFF switch is turned off and the identifying signals cease, for the transponder is no longer being triggered. To continue to challenge a plane or ship is undesirable after it has been identified, especially near hostile areas, for the IFF signals travel over long distances and continuous questioning of one plane might enable the enemy to pick up the signals in the powerful receivers that are constantly combing the air for our transmissions. The interrogator should be kept in a standby condition, ready to challenge when the IFF switch is turned on.

ADDITIONAL USES OF IFF.

Emergency.

Second only in importance to identification is this application of the Mark III IFF system to the transmission of distress signals. Whenever a pilot is in trouble and finds that he must make a forced landing in the sea or a in jungle, he cannot turn on his radio to send out an S.O.S. to his home base, if he is in a war zone. Generally, he does not know what his exact geographical location is so his message would be of little help in any event. But by using the emergency position on his transponder he can show his location to the search-radar operator. Consequently, he switches to "Emergency" on the transponder box. Very likely a radar operator somewhere is searching the horizons. Detecting the plane, he turns on the IFF to identify it and on the screen sees the emergency signal flashing. Quickly reporting the azimuth and range of the emergency signal, the operator continues to track and report the plane until both it and the emergency signal disappear from the screen. The rescue plane or ship is promptly dispatched to the last reported azimuth and range position near which the plane has probably crashed. The use of IFF to indicate distress is responsible for the rescue of innumerable pilots and crewmen of disabled Allied planes and ships.

Ingenuity on the part of the users has led to additional uses of IFF, e.g.

1. Since only one of the codes is used for identification, the others have been used to transmit predetermined messages, i.e., "Sighted Sub," without resorting to radio.
2. The distance over which a plane can be tracked is greatly extended and the likelihood of losing a friendly plot is materially reduced when IFF is used as a tracking aid.
3. An IFF has its fade zones in which the signals disappear just as in the case of air-search radars. But, since these two sets do not work on the same frequencies they may be used to supplement one another; i.e. IFF can be used to track a friendly plot through the radar's fade zone. One of the projected improvements of IFF will enable identification of Flight Leader (FI).

LIMITATIONS OF IFF.

Operational

In spite of IFF, official reports from all theaters contain reports of our guns firing at our planes and ships. In the Southwest Pacific our naval gunners have mistakenly shot down Liberators, Mitchells, and Lightnings. In the Invasion of Sicily, twenty-three of our troops carried were shot down by our own naval antiaircraft. We also have reports of U. S. Destroyers attacking our own PT's and PT skippers have, on occasion, launched torpedoes at a friendly destroyer. Tragedies such as these have been variously attributed to equipment failure, failure of transponders, the interrogator's failure to turn on the equipment, or no IFF installation.

In the early part of 1944, a commission was sent to the Southwest Pacific to determine the reason for the repeated reports of failure of the IFF. Their findings may be summarized as follows:

(a) IFF is ineffective in nearly all theaters because the operation is poor.
(b) The equipment is reliable in a material sense, and it can be maintained so by relatively simple measures.
(c) The primary obstacle to improved effectiveness is lack of interest on the part of many responsible officers.

Operational surveys of IFF performance indicate that the percentage of ground station radar plots which are identified by IFF in the various theaters are:

<table>
<thead>
<tr>
<th>Theater</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southwest Pacific</td>
<td>50</td>
</tr>
<tr>
<td>South Pacific</td>
<td>80</td>
</tr>
<tr>
<td>Mediterranean</td>
<td>70</td>
</tr>
<tr>
<td>Central Pacific</td>
<td>85</td>
</tr>
<tr>
<td>U. S. A</td>
<td>75</td>
</tr>
<tr>
<td>Alaska</td>
<td>80</td>
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</tbody>
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Aside from the obvious danger that may result from an unsuccessful operation of the IFF system, other undesirable effects may appear. When 20 or 30 unidentified flights a
much daily there is no choice but to send fighters to intercept the contacts. If bogey after bogey turns out to be friendly, the pilots making the interceptions begin to feel disheartened and suffer a loss in morale; the antiaircraft batteries may well become slack after such anticlimaxes; and all personnel who were needlessly alerted become disgruntled. The worst feature of such failure is that the effect is cumulative. Because the gunners may have some hesitancy to fire on what might be one of their own planes, the pilot whose IFF is not functioning may not be fired on. The gunners' inaction therefore tends to make the pilot even less likely to use his IFF the next time, and this failure leaves the gunners' quandary still unresolved. Such a progressive breakdown of the system can result only in mistrust of IFF as a means of recognition, with ineffective air warning and fighter direction systems as a consequence.

Errors in the use of IFF may arise from lack of knowledge concerning IFF, lack of indoctrination as to the use of IFF, carelessness, confusion as to the doctrine in different areas, a confusion due to different doctrines prescribed by the different branches of the service in the same area. It is apparent that these factors which cause the largest part of the failure of the IFF system are in no way connected with the material aspect of IFF.

Reference has already been made to the fact that the fade areas of Radar sets and IFF sets will be different so that detected planes will not always show a response instantly. In general, the IFF energy does not stay as close to the surface as the higher frequency radar does. As a result, low-flying planes and surface vessels are often detected by microwave radar well before an IFF response is visible. Between two submarines, IFF is practically useless because the combination of very low antenna heights with the low frequency requires the subs to approach to a dangerously short range to obtain a response. Japanese radar pulses could trigger Mark III transponders. The range from which the responses are received is always greater than that from which the radar echo is returned, because the transponder serves as an amplifier for the Japanese radar pulse. For example, if the maximum range at which a plane can be detected is 70 miles, the transponder conceivably could be triggered by the enemy radar at a range of 100 miles. Since the IFF response will in general be much stronger than the radar echo, the IFF response will show even though the echo is not visible. This is a very great advantage to the enemy since it extends the range of his radar for detecting our planes. Therefore, IFF transponders should be turned off as airplanes approach enemy territory. This explains the main reason why our pilots do not have their transponders on.

In areas covered by both enemy and friendly radars it is necessary to strike a balance between the advantage of keeping the transponder energized to assist in recognition of radar contacts, and the danger of aiding the enemy by extending the effective range of some of his radars. It is important to realize that the IFF can serve as a recognition system for the enemy point of view, since targets that return an IFF response to their sets are enemy.

In general, it is more important for returning planes to have their transponders energized than for planes that are being away from their base. However, on long strikes the pilots must be briefed on the approximate positions of any friendly forces along their route, so that IFF can be on when the planes approach such forces.

The range at which an IFF response can be obtained from a target is dependent on the height of the interrogator antenna and the height of the transponder antenna. The

Posters like these were used during the war to improve the operation of IFF.
range is not related to the size of the target in any way. Thus, the IFF range on a single fighter plane is just as great as that on a flight of large bombers. Of course, the maximum range at which an IFF response can be returned is dependent also on the power radiated by the interrogator and the transponder, the sensitivity of the receivers in each of these pieces of equipment, and on the existing propagation conditions. However, the gain introduced by the transponder is offset almost completely by the relatively low power radiated by the interrogator in the present IFF system. As a result, the range at which a challenge can trigger the transponder is very nearly the same as the range at which an echo is just visible.

Omnidirectional antennas are always used with transponders in order that the ship or aircraft can be challenged and reply in any direction. However, these antennas rarely have perfect uniform coverage because they cannot be mounted in a position free of obstructions at all azimuths.

Resolution.

The directional antenna provided with AGF interrogators has a very broad pattern because space limitations will not permit a highly directional array to be built for the low frequency at which the IFF operates. In general, these antennas have bad side lobes in addition to rather broad main lobes. Consequently, the azimuth resolution of a Mark III IFF interrogator is worse than that of any of the radars with which it may be associated. The bad side lobes that appear at some azimuths distort the antenna pattern so badly that IFF responses may be returned from a near-by friendly target over nearly the full 360° irrespective of antenna azimuth. In order to permit the operator to observe IFF responses from either of two targets at the same range without confusion from the other, the angular separation between the targets must be 10° to 20°.

The side lobes of the interrogator antenna may often result in IFF responses being returned from bearings at which no radar echo appears. Recognition of friendly ships in a surface battle is almost impossible because of the confusion produced by the poor azimuth resolution of the interrogators, the false response triggered by side and back lobes, the multiplicity of responses that make it impossible to read the code.

The range resolution in the Mark III IFF system is between 1,000 and 1,500 yards, which is poorer than that of all radars now in use by AGF.

The recognition of a radar contact that results from the use of IFF is in a sense a negative process; that is, proper responses received from a radar target will indicate that it is friendly, while the lack of such responses indicates that the target is either hostile or is a friendly craft, either not equipped with an identification component or equipped with a component that is not functioning. However, any contact which does not respond correctly to an IFF challenge must be treated as enemy until some other means of recognition establishes its true character.

An IFF system is the only means so far developed whose capabilities of recognition match the radar's capabilities of detection. To be sure, there are several limitations inherent in the Mark III IFF system that prevent recognition of radar contacts under all conditions.

Summary.

In brief, then, Mark III IFF weaknesses may be summarized as follows:
1. Procedure of identification is a negative one.
2. A minimum of 15 seconds is consumed in the identification process.
3. Aircraft, where space and weight are always a factor, are required to carry extra equipment.
4. IFF signals can betray the location of our planes to the enemy at ranges greater than his maximum radar range.
5. Resolution is poor. Mark III IFF cannot identify two closely spaced planes or ships. A minimum of 10° of separation in azimuth is required.
6. The system requires action by two different units—a process which can never hope to achieve 100% effectiveness.
7. Mark III IFF has undesirable fade areas.

Present IFF equipment serves only to decrease the number of unidentified craft detected by radar and, unfortunately, is not the complete answer to the problem.

The Future.

IFF with all of its limitations and weaknesses is the only means now available for identification comparable to radar. Dr. Lee DuBridge, wartime head of the Services Radiation Laboratory at M.I.T., states, "This matter (identification) has been given a great deal of thought by some of the most thinkers in the electronics field and for the immediate future no means of positive identification of friend and foe appears practical. No matter how short the wavelength used, no electronic apparatus can hope to approach the capabilities of the human eye. And identification by the eye leaves much to be desired."

Since the war has ended much thought has again been turned to identification. Every time, however, the designers seem to come up with an interrogator-transponder-responder system. So the field is wide open for a positive means of instantaneous identification. Some entirely new system seems to be indicated perhaps even employing some field other than electronics. The COAST ARTILLERY JOURNAL will be glad to forward any ideas or suggestions to the proper channels and see that the inventor receives proper recognition and/or remuneration for said idea. Here's your chance.
A JOB WELL DONE
By Colonel Robert W. Robb, Infantry

One of the greatest breaks the U. S. Army ever got was when Kai Rasmussen fell asleep in night school. If the young Dane had been able to keep his eyes open and his mind on his books after a hard day of washing dishes in a steamy Albany restaurant, he probably wouldn't have joined the Army so he could learn English in the meantime.

It's a cinch he would have learned English anyhow, but it's an equal cinch he wouldn't have learned Japanese too. Because he did learn Japanese—the language and the people—he became one of our most potent secret weapons in the war against Japan.

For while history records that Japan was licked by ships and planes and guns and bayonets, she also was licked by her own language, literally forced to eat her words. That bitter dose was rammed down her throat by Kai Rasmussen, the Dane, and his 5,700 "Americans of Japanese Ancestry."

The story of the Dane and his Nisei was one of the closely held secrets of the war. In the early stages, the War Department didn't want the Japs to know how far we were progressing in mastering their language on a wholesale scale. They themselves have the devil of a time with their own language, and they considered it as effective as a code. They were pretty careless in what they wrote and what they sent over the air and field telephones. Our intelligence people were not anxious to jar them out of their blissful feeling of false security.

With the tactical need for secrecy ended, the War Department still kept a rein on the Nisei story, believing the Japs would prefer it that way, in view of what might happen to their relatives in Japan were the story known. Actually, the Nisei in khaki would have welcomed some favorable publicity.

"I'm worried about my folks in this country," a Nisei told me. "If I have any relatives in Japan, let them care of themselves."

But the story was known in the Army. When, in the stages of the war, the intelligence officer of one of the highest Army divisions in the Pacific reported that a Nisei language detachment was the biggest single asset a combat unit could have against the Japanese, he wasn't saying anything that General MacArthur or the War Department wasn't fully appreciative by then.

Kai Rasmussen knew that in 1941. He also was one of a handful of Army officers who knew what to do about it, while there still was some time to do it. Because he knew it, and did something about it, the war against Japan ended two years sooner than it might have otherwise. You don't believe it? Then argue it with Major General Charles A. Willoughby, the brilliant chief of General MacArthur's intelligence section. That's how important he thinks Rasmussen's Nisei were.

Today our yellow-skinned soldiers need neither praise nor defense. As Major General Clayton Bissell, then chief of the War Department Military Intelligence Division, said to them: "If you Japanese-Americans are ever questioned as to your loyalty, don't even bother to reply. Your magnificent work in the field has been seen by your fellow Americans. Their testimony to your gallant deeds under fire will speak so loudly that you need not answer."

Behind that testimony to America's Nisei, the backbone of our intelligence system in the Pacific, is another story. It is the story of Colonel Kai Rasmussen, the Danish immigrant.

Kai Rasmussen was not surprised six weeks before Pearl Harbor to know that the Army was unprepared to put Japanese-speaking officers and men into the field. The Army was not prepared to put much of anything into the field in those days, and certainly the study of Japanese had been an even less popular American pastime than basic military training.

He knew that a few "old Japan hands" who had served as Army language students in Japan, as had he, were keenly aware of the problem that would face our Military Intelligence Division in the event of war. Their surveys had brought to light the disheartening fact that there were not enough Japanese-speaking white men of military age in the United States to even begin to meet an emergency. They knew, too, that few Caucasians can learn Japanese quickly, and that even the exceptional few seldom attain the proficiency of one who instinctively "thinks like a Japanese."

To Captain Rasmussen and his colleague the answer was obvious. To build a combat intelligence service for war in the Pacific, the country must depend upon its citizens of Japanese Ancestry. Equally obvious was the general unpopularity of such an answer. As a matter of fact, the shooting war had been on for many months before all of the commanders in the field shed their qualms about having "Japs" in their outfits. The Navy never did come around to using Nisei, although the Marines had to bor-
row Army personnel for most of their assault operations.

Out of this preliminary thinking of a handful of Japanese experts was born the Fourth Army Intelligence School, a few short weeks before Pearl Harbor. In an abandoned hangar at Crissey Field adjacent to the Presidio of San Francisco, fifty-eight Nisei and two Caucasians began their training. When war struck on the morning of 7 December, the tiny school was jarred to the steel girders of its hangar classroom. The FBI, Army and Navy swooped down on every Japanese suspect. General John L. DeWitt put into motion the greatest forced evacuation of American citizens in our history. Nobody liked the idea of having eight Japanese instructors and fifty-eight students sitting right in the middle of San Francisco's Harbor Districts.

So the War Department directed the school be moved to Camp Savage, Minnesota. With the school went Lieutenant Colonel Kai Rasmussen to take over the strangest command in the U. S. Army.

The trail that led him from a countryside home near Copenhagen to a school for Japanese-American soldiers in Minnesota was a winding one. It might more logically have ended in the compound of the French Foreign Legion in sun-baked Sidi bel Abbes.

Kai Rasmussen was born in 1902, the son of a Danish landowner. In England, the elder Rasmussen would have been called "the squire." The name Rasmussen gave their son has kept him busy explaining for a quarter of a century, particularly since becoming a Japanese specialist.

"Nearly everyone thinks it's a Japanese or Chinese name," he says, "and suspects I am part Oriental. But it's a good, though uncommon, Danish name, brought to the country by the Gypsies after the Genghis Khan invasion."

Graduating from a Danish college right after the close of World War I, young Kai became a cable engineer with an international cable company. When the cable business was curtailed—Russia withdrawing behind an iron curtain (1921 model) was one of the contributing factors—Rasmussen lost his job.

Because radio looked like a coming industry, and Kai was ambitious, he headed across the seas to America in 1922 where a young man could study under the best technicians. But the America he found was one in the depths of a postwar depression. With war veterans finding the going tough, there was small chance or even sympathy for a Dane whose English was limited to a few basic words. He needed a job to pay for his schooling, and before he could study radio, he had to learn English.

The job he got was washing dishes in an Albany restaurant. It looked like the answer to his problems, to wash dishes all day and go to night school to study English.

But Fate had a different idea.

"It didn't take me long to find that was no way to get an education," Colonel Rasmussen says. "After eight hours in that steamy kitchen, my head over a tub of hot water, I was groggy by dinnertime. I fell asleep in school every night. So I was kicked out."

Perhaps because every Scandinavian instinctively looks to the sea, Rasmussen turned to the U. S. Navy. When he tried to enlist, the Navy had a three-word answer—no, no and no. One was for not being a citizen, the second for night. So I was kicked out."

So what happened when I got to Denmark," he says—"I was arrested anyhow."

Undaunted, Rasmussen headed for a Marine recruiting office. The Marines would overlook his Danish citizenship, but missing teeth and flat feet, never!

"So I tried the Army," says the Colonel. "It was third choice then, but I know now that Lady Luck was walking with me, flat feet and all.

"I'll never forget how hard the recruiting officer tried to talk me out of joining the Army. I couldn't speak enough English to argue with him, so we had it out in German. I was determined to get into the service, where I could earn a living and get an education during working hours. I beat him down."

Private Rasmussen, USA, got to sea, but only as far as Hawaii, which still is a long way from Denmark, in any direction. By that time he had learned enough English to handle himself in the tough 19th Infantry—and those were the days when the Regular Army doughtfoot spoke very unique English. The Dane must have done well with the academic brand too, because he passed the entrance examination to West Point. That is a difficult enough trick for anyone, but in the case of Pfc Rasmussen, only a couple of years away from his native land, he had to battle it out with 625 aspirants for thirteen vacancies to the Point.

"With my teeth repaired, my arches arching and my head in the clouds," he recalls, "I set off for West Point. Then my dream collapsed, and my arches very nearly along with it. The Army woke up to the fact I was not a citizen! I never will know exactly why the Army waived its rule for me. But it did, and I was admitted to the Academy."

That citizenship boggy was not to be buried yet, though. In the middle of 1926, Cadet Rasmussen was given a furlough to go home and visit his family. Suddenly it occurred to him that not only was he not a citizen of the United States, but technically he was a deserter from the Danish Army. Denmark had compulsory military training, and Rasmussen had sailed away without securing permission from the Army. One foot on Danish soil and the King's constabulary would drag him off to jail.

By this time the Army was used to wrestling with the problems of its Danish cadet, so it took this one in stride. He was whipped down to Washington and given his citizenship papers despite insufficient residence in the country.

"So what happened when I got to Denmark," he says—"I was arrested anyhow."

He was found guilty and fined. Then the tolerant court waived the fine.

Kai Rasmussen was graduated and commissioned a second lieutenant, Coast Artillery Corps in 1929. A year in the states and three years in the Philippines convinced him of what every older Regular Army officer knew—that all a junior officer could look forward to in our emasculated Army was a routine job of running a mess or a post exchange. Not much better than the Albany restaurant.

By this time a confirmed believer in greener pastures, and with a good record of finding good grazing, Rasmussen discovered that the Army sent selected officers to Japan on "language details." It is doubtful if any officer who had come through that ordeal would willingly do it over again were the calendar to be turned back. It means terrible some missing teeth, and the other for a pair of flat feet.

"It is doubtful if any officer who had come through that ordeal would willingly do it over again were the calendar to be turned back. It means terrible
months of long days and nights grappling with the most difficult of all the world's major languages. It means more months of bitter service with the Japanese Army—one phase that seems effectively eliminated from the curriculum for some time to come.

To a frustrated lieutenant who liked to keep moving, it meant a chance to do something. His application for the assignment was approved in 1936, and for the next four years he learned the Japanese language and the people who speak it. His knowledge of the people as well as of the language was to be one of his major assets in his vital job in the war that already was being planned in Tokyo.

Probably every American who reads magazines is acquainted with the story of Colonel Warren J. Clear's face-saving bout with a Japanese boxer, during Clear's tour of duty in Japan. Rasmussen didn't have to prove his manhood in physical combat, but like Colonel Clear and all others who had gone before him, he did have to pass his test of face.

"The Japanese Army made it a point to try to show up every American officer who served with it," Rasmussen explains. "Once you walked into their trap, you either gained face or lost it. You either were 'in' for the rest of the tour, or you were 'out.' The Japs had a bad record of making our fellows lose face, but they never gave up trying."

Rasmussen's test came on a reconnaissance march in the mountains. He was ordered to accompany a party scouting for a suitable firing area. The detachment commander, a Japanese lieutenant, told him politely that inasmuch as an American could not be expected to keep up with the Japanese soldier on a mountain march, a horse would be provided for him.

Japanese military intelligence does not trickle down to young lieutenants, so how was the grinning young junior officer to know that his American subordinate was a former West Point cross-country captain?

It was even less reasonable to expect him to know that Rasmussen had a set of golf cleats in his pack. In fact, Rasmussen himself cannot explain why he had brought that odd equipment. He didn't stop to wonder then. He just fastened the cleats to a pair of GI shoes, and notified the duty officer that he would walk with everyone else.

"We started out at 5 a.m. on a 27-mile hike," Rasmussen states. "The mountains were in bad condition for walking. The side of each rise was covered with snow; the other side, thickly carpeted with pine needles. By noon the Japanese obviously were losing their enthusiasm for the job. We had a meal of rice, seaweed and plum, and started off again. The Japanese lieutenant in command was tiring. With my cleated GI shoes I was taking snow and the pine needles with comparative ease. It was time to turn the tables.

"You're tired," I told the lieutenant. "You rest and I'll go and locate a firing area."

You can imagine a Japanese officer losing face that way! Waiting for an answer, I started out rapidly, the Japanese following me frantically and having a terrible time keeping their footing. I led them a chase all over the mountains. In the late afternoon, we found a horse. The lieutenant rode it home. Most of the soldiers didn't get back to camp until the next day."

You know, I never was invited on a hike again!"

Rasmussen would have liked it better had all his training been physical. As a language, there should be a law against Japanese. Not for nothing did Japanese officers boast openly that they needed no codes because Westerners could not learn to read and write their language, particularly their "shorthand" styles—'gyosho' and 's6sho.' The American language students had to master 3100 of the 6000 Chinese ideographs used in the written language, "kanji," and the syllabary of 73 abbreviated ideographs used phonetically, called "kana."

"When you have learned the ideographs," Rasmussen says, "you have just begun to fight. When the Japanese took over the Chinese written language, they included one or more Chinese pronunciations for each ideograph, to which they added Japanese pronunciations.

"Thus each ideograph can have up to 25 pronunciations, depending on the way it is used. Ideographs are written in 'kaisho,' or block writing; in 'gyosho,' an abbreviated handwritten script, and in 's6sho,' a very abbreviated script. In addition, the military frequently uses 'shoten' and 'reisho,' two ancient and formal styles.

If that isn't complicated enough, the "kana" syllabary, by which the 75 sounds in the language are reproduced phonetically, can be written in five ways, of which the three most common are "katakana," "hiragana," and "hentaiga." When you add to that some words having 20 or more diverse meanings, it is apparent that Japanese never will be a course for football players looking to coast through college.

"To top it off," Rasmussen adds as a final note, "you have to understand the Japanese mind to figure out what one is saying. It is impossible to translate military Japanese literally and make logical English out of it."

It is apparent that Colonel Rasmussen had no illusions as to the magnitude of the job handed him at Camp Savage in 1942. After four years in Japan, he did not consider himself a fluent linguist. Yet he faced the necessity of turning out Japanese-speaking soldiers, trained also in combat intelligence, on a mass production basis. He had learned that only three per cent of America's Nisei were accomplished linguists, another four per cent proficient, and three per cent sufficiently familiar with the language to be capable of mastering it after prolonged intensive training. America's Japanese were too American.

The first batch of students, every man a volunteer and most of them leaving behind families in barbed-wire enclosures, found a grueling routine awaiting them. The day started at 6 in the morning. The last compulsory study class ended at 9 p.m. Voluntary study was permitted up to 10:30.

To possible scoffers at the thought of voluntary study, let it be known that Colonel Rasmussen had to direct the night duty officer to search the school area every night to halt unauthorized study after "lights out."

To provide white officers, Colonel Rasmussen established a "prep school" at the University of Michigan, where selected Caucasians were given basic training to fit them to compete with the Nisei in the "advanced" school. White officers were needed, although few of them ever equalled the Nisei in language proficiency. Many Nisei became officers, and good ones, but it was found that language detachments in the field functioned better administratively with Caucasians.
casian officers. For one thing, they generally took better care of their men.

A Nisei detachment, and command duty at the language school, was an officer's paradise. The Nisei was a model of discipline. Overseas, the record of venereal disease, absence-without-leave and general misconduct among Nisei personnel stands by itself.

"I sent 5700 of them into the field," Colonel Rasmussen declared with justifiable pride. "Not one went sour."

Rasmussen's Nisei served with front-line units. Alone, they entered caves to talk suicide defenders into surrender. They flew over Japan in bombers, intercepting Japanese pilots' radio orders. They crawled into no-man's-land to tap Japanese communications lines. They interrogated prisoners under fire. Through the long nights they pored over tattered bits of Japanese scribbling found in the jungle or taken from prisoners. They translated the entire Japanese plans for the naval battle of the Philippines. From Attu to Guadalcanal to Tokyo they were in the front ranks, providing the enemy information upon which each of General MacArthur's skillfully planned maneuvers was based.

The Nisei's job is not finished. They are proving as invaluable in the postwar occupation of Japan as they were in the fight to reach Japan. In June, the language school moved from its most recent post, Fort Snelling, Minn., to the Presidio of Monterey, California.

For Colonel Rasmussen, the war's most unique and unsung task is done. He has asked for foreign service.

The War Department probably wonders just what the Dane considers "foreign service."

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**AGF to Send 400 Officers to Civilian Universities**

The military necessity for keeping abreast of continuing scientific developments and advances in academic fields has been publicly reaffirmed as the Army Ground Forces announced plans to send approximately 400 officers yearly to a score or more of the nation's leading schools and universities for advanced study.

To be available to officers possessing outstanding scholastic backgrounds, the courses studied will be primarily in the fields of engineering and the physical sciences. In addition, a number of courses in non-technical fields, but having a definite military application, will also be taken by qualified officers.

With courses designed to cover a period of two years, Army Ground Forces will prescribe only the general scope of study, with specific curricula and the content thereof to be designated by the educational institution concerned. In general, each course will entail the number of hours of graduate work normally required for a master's degree.

In order that maximum benefits of the Army's investment in officer education may be realized, training of more youthful members of the Ground Forces' postwar officer corps is underlined by the program's age eligibility requirements.

Officers must be under 30 years of age on June 1 of the year in which they begin their courses. Waivers of this age ceiling for a limited number of officers under 35 who possess exceptional qualifications for a particular field of study are authorized.

In addition, to be eligible to receive the training an officer must possess the following qualifications:

1. Be an officer of the Regular Army, or an officer in one of the civilian components of the Army of the United States who has submitted application for commissioning in the Regular Army, or an officer of the civilian components who is serving for an indefinite period and indicates his readiness to continue on active duty for at least four years subsequent to completion of his course of study.

2. Have had a minimum of one year of commissioned service, and be commissioned in one of the four basic ground arms: Infantry, Cavalry, Field Artillery, or Coast Artillery.

3. Have a general efficiency rating of excellent or higher.

4. Hold a degree of Bachelor of Science or Bachelor of Arts or equivalent in an appropriate field.

Those chosen to pursue courses in scientific and technical fields must in addition show a comprehensive degree of undergraduate preparation in mathematical subjects.

Advanced study will be conducted in the following fields of the technical and physical sciences:

- Automotive Engineering
- Acoustics
- Communications Engineering
- Atomic Energy
- Electronics
- Nuclear Physics
- Aerodynamics (as related to propulsion and guidance of Guided Missiles)
- Optics and Light
- Meteorology

Training on postgraduate levels will be offered also in the following nontechnical fields: Business Administration, Journalism, Personnel Psychology, Political Science and Foreign Service, and Public Administration.

Some of the schools and universities which have agreed to participate in the program subject to the availability of facilities are as follows:

- Harvard School of Business Administration
- Massachusetts Institute of Technology
- Yale University
- New York University
- Columbia University
- University of Rochester
- Syracuse University
- Princeton University
- University of Pennsylvania
- Johns Hopkins University
- Georgetown University
- Georgia School of Technology
- University of Michigan
- Illinois University
- University of Chicago
- Illinois Institute of Technology
- University of Wisconsin
- University of Missouri
- State University of Iowa
- Rice Institute
- University of California at Los Angeles
- California Institute of Technology
Problem of Using Radar Against Moving Ground Targets*

By Lieutenant Colonel John W. Green, Coast Artillery Corps

Early in the war, the British Army attempted to detect tanks with radar installed in planes and the German Army tried to use radar against tanks on the Russian plains but the results of these attempts were so sketchy and indicated so little success that no further investigation was made. The problem always encountered was that of too many "fixed echoes." Echoes from the ground, trees, buildings, rocks and all other objects, man-made and natural, filled the radar scopes when a radar was directed to a section of ground terrain. It was almost impossible to identify one of these echoes in the clutter, as coming from a certain object. The Radiation Laboratory had done some work on developing a detection device which would show only planes when they were flying low and which would eliminate the echoes received from fixed objects. The equipment developed could not only be used for tracking aircraft, but also to some degree for the detection of other moving objects. Various difficulties were encountered, however, among which was the obtaining of sufficient transmitter power, which prevented the equipment's being put into production. By the summer of 1944 the actual success had been obtained on the problem of detecting moving objects on the ground.

The contrast displayed by terrain echoes depends primarily on such differences in the scattering properties of reflecting surface, and only secondarily on the relative conductivity or dielectric constant of the material in it. For example, echoes from non-conducting sands are stronger than the echoes from surrounding sea water, which is a better conductor. The sea reflections are stronger, but in form, they closely approximate the specular reflection from a mirror and hence glance off at an angle away from the radar, whereas the land reflections are scattered backwards to the radar.

The above principle and past experiences with radar made the interest of the author in the detection by radar of moving ground targets. In September, 1944, the German Air Force had dwindled to so few planes that the United States Army had many surplus anticraft radars of the SCR-584 type. Permission was asked of the Commanding General of the 44th AAA Brigade, to conduct certain preliminary tests on ground target detection in Corsica, and a SCR-584 radar, complete with operating personnel, was sent for this purpose.

The SCR-584 was installed at several different locations and its antenna system directed toward roads which were visible from the radar site. The range from the radar to points on these roads was known and the roads selected were fairly or nearly parallel to the radar beam. In this way object moving on the road would show a change in range on the radar scope. An observer with field glasses placed where he could keep the road under observation.

In most cases the fixed echoes were very prominent on the radar range scope but a careful correlation of their action at the ranges of roads being observed and the visual observation of the road at the same ranges brought out some interesting findings. The fixed echoes from objects along a road would "dance" or vibrate rapidly as a vehicle moved past them. The range to the point where the echoes vibrated was the true slant range of the vehicle. At times an echo from the vehicle was seen which was stronger than that of the surrounding fixed echoes. The azimuth of the vehicle was determined by the intersection of the radar range, when transferred to a map, and the road as shown on the map. Accurate ranges and azimuths to a moving vehicle were thus determined. It was observed that when a moving vehicle stopped, or passed behind an obstruction, its location could not be determined.

These tests were made on moving vehicles at ranges varying from less than one mile to approximately fifteen miles. Good indications were obtained on vehicles moving down a winding road on the near side of a mountain fifteen miles away. Often during the tests the road on which vehicles were moving could not be seen from the radar location due to fog or poor visibility. Under these conditions the visual observer was placed near the observed road and was in radio contact with the personnel at the radar. The results obtained in the tests performed in Corsica indicated that radar could be used to detect moving ground targets.

DISCUSSION OF EXPERIMENTAL PROCEDURES AND FINDINGS

Siting of the Radar.

The prime consideration which must be given to siting of a radar for ground target detection is "line of sight" from the radar to the area where targets are to be detected. This produces the greatest amount of "ground clutter," or echoes from objects in the area to be searched. These echoes sometimes produce slight inaccuracies in azimuth determination but proper plotting on a map, using the radar range as the accurate data factor, usually compensates for azimuth inaccuracies. The most effective radar site is as close to the infantry front lines as the situation will permit after careful consideration of the road conditions, terrain characteristics and the general situation, both friendly and enemy. Normally, the higher a radar can be placed, the greater the area that is in "line of sight." A hill or forward slope from which the enemy front line and his lines of communication can be seen is the most desirable. Often a radar can be successfully sited to "look up or down" a valley or "up" a hill in order to detect enemy movements.

The SCR-584 used in these tests presented other problems in siting which would not prevail in radar equipment designed for this use. Its size and weight often made it impossible to get it into otherwise perfect sites. It was found
that if the radar is to be operated from a site for a long period of time it is often practical to go to considerable trouble to prepare the site and emplace the radar.

In general, possible sites can be selected from a map, but the actual site to be occupied can only be selected by ground reconnaissance of the area.

**Operation of the Radar.**

Operation of the radar will vary depending upon the type used. The operation as explained herein is for the SCR-584 and was determined from experience during the tests.

**Occupation of Position and Orienting of the Equipment.**

After a site is selected, it usually must be occupied under cover of darkness. Plans for occupation of position, route to the position, surveying and placing of aiming stakes for orienting should be made during daylight hours if possible. The coordinates of the radar location must be surveyed accurately and an aiming stake located at least 300 yards from the radar. When the radar is put into the operating position, it can then be oriented with a map of the area. In the case of the SCR-584, if the ground is level or nearly level, it can be moved into position and the leveling jacks need not be lowered. By operating the equipment from the pneumatic tires, a minimum of time is needed to occupy and vacate a site—both of which are very necessary in this type of work. When properly emplaced, oriented, and adjusted the SCR-584 has a normal azimuth of plus or minus 10 mils (1 mil equals .06 degree), and a range accuracy of plus or minus 25 yards on moving ground targets.

**Operation of the SCR-584 and Detection of Targets:**

The SCR-584 is put into normal operation as it would be for detecting aircraft except that the spinner motor is turned off, the antenna dipole is turned to a vertical position and certain other units pertaining to aircraft detection are not used. Only the two circular range scopes are used and one operator can operate the equipment. The operator sits at the center of the control panel where he can watch the range scopes and at the same time position the antenna with the positioning controls. The receiver gain must be monitored so that received echoes are just below receiver saturation as the antenna is moved in azimuth over the sector to be searched. The operator usually sees a target indication on the coarse range scope first and switches to the fine range scope for accurate range. Targets do not appear as normal echoes but have a peculiar vibration or flutter unlike the echoes from objects around them. It is upon that peculiar vibration or flutter that the entire detection and identification of moving ground targets is based. The radar is sensitive enough to receive echoes from small bushes, trees and similar objects. If they are moved or something passes between them and the radar, their echoes will change in strength and appear to bounce or vibrate. A light breeze will cause the trees and bushes to vibrate slowly and rhythmically, while a strong wind will cause them to vibrate rapidly and with less rhythm. If the wind is blowing, trees and bushes can be plotted on the map from the indications received at the radar. Echoes from personnel, vehicles, shell bursts, and other moving objects all have characteristic echoes unlike those from trees or stationary objects. When a target is detected, the operator sets the range hairlines properly on it and adjusts the antenna by "bracketing" until he receives the strongest indication. He can then read the azimuth from the azimuth indicator dial and the range from the range dial.

**Target Interpretation:** Once a target has been detected the next problem is to identify it. Experience and correlation with other known factors are the bases for identification. Accurate determination of numbers and types of objects in a target is often impossible. Personnel give echoes which have no rhythm and are "jerky" in nature although a man swinging a pickaxe or using a shovel in digging a foxhole may produce an echo which has a certain repetitious flutter. A vehicle usually gives an echo which moves faster in azimuth and range than personnel. The echo is stronger and has a fast vibration. The echo from a vehicle depends on its speed and the roughness of the road.

**Plotting of Targets:** To be useful, target information must be plotted on a map. A table or map board is set up in the SCR-584 van with a map of the area placed upon it. The map should be covered with acetate or plastic. Friendly front lines, patrols, artillery "no fire lines" and other information may be marked on the acetate and changed as the situation changes. Radar targets can then be plotted on the map and their locations used for "intelligence," for field artillery firing data, warning of attacks by the enemy, etc. The radar can be used to spot shell bursts in range with respect to a target and proper adjustments can then be made in the field artillery fire. No accurate deflections can be determined by the SCR-584 radar but visibility often permits making these through a telescope and the visual deflections combined with radar range spotting give accurate fire correction data.

**Effect of Weather Conditions:** A strong wind may entirely prevent successful operation. A high wind causes the trees and bushes to sway so violently that the echoes from them bounce and vibrate to such an extent that other targets cannot be detected. If the trees and bushes are windy at the same time, then the effect of the wind is increased.

The data obtained in the experimental work shows that use of radar for detection of moving ground targets was feasible and of practical value. Radar equipment used for the experimental work was not designed for this purpose but gave much valuable information which can be used in the design of special equipment. Tests proved that the radar could be used during either a static or fluid situation.

Further study should be conducted on the problem of radar detection of moving ground targets and on the designing of special equipment for this purpose. Consideration should be given to the development of a battery-powered radar capable of being operated from a front-line infantry foxhole and of detecting enemy movement over ranges of two or three thousand yards. A second set should be designed which is mounted on a vehicle capable of navigation over rough terrain. The radar itself should be designed to give range accuracies of plus or minus one yard and azimuth accuracies of plus or minus 1 mil in ranges of fifty thousand yards.

The SCR-584 should be modified to give greater accuracy when operated to detect moving ground targets.
SEACOAST ARTILLERY

By Captain Richard P. Fullmer, Coast Artillery Corps

Editor's Note: The following message by Major General Frederick and article on "Seacoast Artillery" by Captain Fullmer appeared in the "Other Branches" section of the November-December issue of the Armored Cavalry Journal and is reproduced here with permission.

Seacoast Artillery is an effective defense of the coast. Coastal defenses are not everywhere, but the question has been clearly proven that wherever seacoast armament is emplaced, it is a strong deterrent to assault, even after the most intensive preparation.

Fortunately during the last conflict the seacoast defenses of the continental United States were not called on to actively engage the enemy, but in no way does this render these defenses outmoded or unnecessary. On the contrary, since these defenses represent the final barrier to any enemy water-borne landing, their importance and vitality must never be underestimated nor allowed to deteriorate.

The following examples effectively illustrate the contributions made by seacoast defenses in the destruction, detention or withdrawal of attacking naval forces.

In 1941, the mere existence of the harbor defenses of Manila and Pearl Harbor dissuaded the Japanese from assault. In 1942, Corregidor and its attached forts denied to the Japanese the use of captured Manila harbor facilities for five months.

The Japanese were surprised by the resistance offered at Wake Island, too. The meager Marine seacoast defenses there, consisting of six 5-inch guns, sank seven Japanese warships, including one cruiser, and damaged two more before being finally reduced and overwhelmed. Dieppe's seacoast defenses beat off a heavy Commando raid that had lost the element of surprise, and in six hours the Allied forces lost more than two-thirds of their ships and men.

The seacoast defenses of Tarawa, manned by Imperial Japanese Marines, ravaged and almost beaten flat by a murderous naval and aerial bombardment, took a cruel toll of our attacking forces. The Soviet seacoast defense of Sevastopol, besieged by land and denied all help, fought off frequent fierce, determined German assaults, and successfully repulsed the enemy for two months. The French coast artillerymen in Oran, Algeria, survived aerial and heavy naval attack. During the naval engagement, the British reported that the shore batteries were active and accurate up to 24,000 yards. In fact the major battery at Oran was never silenced. The stubborn defenses at Lorient, Saint Nazaire, Calais and Dunkirk, interfered seriously with Allied supply and sharply reduced the speed and security of the Allied advances.

Consider, especially, the role and value of Corregidor. In an effort to speed up the Bataan campaign, the Japanese began a series of amphibious operations at the southern tip of the Bataan peninsula. The intention was to place Japanese troops behind the embattled Americans on the peninsula, cut off their retreat, and so force a quick end to the campaign. The first Japanese landing was attempted within the range of the seacoast armament on Corregidor. The old, obsolete 12-inch mortars of the seacoast artillery smashed that amphibious attack completely. No attacks were ever launched within seacoast armament range again. From 2 January, when the Japanese took Cavite just across the bay, until 5 May 1942, Corregidor was under constant fire.

"Never before in the history of arms have the requirements of warfare demanded the cooperation, coordination and mutual understanding that today's weapons and methods make necessary. The increased tempo of warfare and the greater power of weapons impose upon all soldiers the obligation to seriously endeavor to know the capabilities, limitations and problems of all branches of the armed forces. The complex organization, the intricate equipment and the high degree of specialization of a modern army preclude any man becoming an expert in all its fields. But if each in his own field is to give the greatest service, and to receive the maximum support and assistance, he must know what is expected of him and what he may expect from others. The closer we can come to thinking in terms of the whole team rather than the elements of it, the more smoothly and efficiently will the team perform when the occasion to use it arises."

"If the Armored Cavalry Journal, through its 'Other Branches' Section, stimulates a desire for knowledge and understanding of the branches other than one's own, it will perform a real and commendable service."

Major General Robert T. Frederick

Major General, U. S. Army,
Assistant Commandant, The Artillery School,
Officer In Charge of Seacoast Branch
aerial and artillery bombardment. One by one the smaller, unprotected, rapid-fire batteries were knocked out but the turret and casemated large-caliber guns continued firing to the very end. It is a source of endless pride to the Coast Artillery Corps that Fort Drum’s 14-inch turret battery fired its last defiant round at the Japanese only five minutes before the final surrender by General Jonathan Wainwright. This heroic resistance of Corregidor was an inspiration to the Nation.

At home, alerted seacoast defenses protected our harbors and anchorages from attack. A German submarine slipped into the harbor at Scapa Flow and torpedoed a British cruiser early in the war. Seacoast defenses of both coasts prevented this from happening to us.

In almost every instance of determined seacoast resistance to landing assault, the artillerist has had to be a gunner, a combat engineer, a demolitions expert, an infantryman, and in many instances an expert in electrical, and highly intricate mechanical equipment.

A modern seacoast artillery battery is a complex unit. The combined efforts of many men are required to fire one salvo from a modern coast artillery 16-inch battery at a naval target. Some men operate or serve the pieces; others are assigned many different important duties—operation of the radar, computation of firing data, maintenance of communications, running the power plants, observation of the target and of firing, and technical maintenance of delicate equipment. Well trained crews can deliver two accurately aimed explosive projectiles every sixty seconds; at this rate, a 16-inch battery can fire with pin-point precision twelve tons of high explosive projectiles every five minutes. Behind this firing, the complex fire control structure contains a highly skilled radar section which locates and tracks targets under any conditions of visibility and furnishes information on target location constantly to the computing section. The computing section operates an electrical data computer which converts the radar information on the present location of the target into future azimuth and elevation settings, i.e., the direction and distance of the target, for the guns. These settings are electrically transmitted to the gun pointer and the elevation setter of each gun. In the majority of cases, this equipment and personnel are well protected in deep, strong, reinforced concrete emplacements.

In this impregnable self-sufficiency is rooted the tough fiber of seacoast artillery resistance to assault. All mobile seacoast batteries attempt to approximate the indomitable indestructibility of these fixed installations by digging in and preparing for the contingency of final assault.

Seacoast troops man artillery that includes 16-inch rifles, 8-inch and 6-inch guns (most of which are at present casemated), 155mm Long Toms and 90mm dual purpose guns, as well as 40mm automatic weapons. In the 90mm and 40mm classes, the seacoast troops fire antiaircraft missions in addition to their normal seaward mission.

In this respect it may be noted that, contrary to public opinion, our present seacoast matériel is not obsolete but is perfectly capable of destroying any of the present waterborne vessels of modern warfare. However, it is visualized that in the not too distant future practically all of this matériel will be replaced by guided missiles.

Coast Artillery troops also operate underwater mine defenses, including the Army Mine Planter. The submarine mines planted by the Coast Artillery are the largest and most intricate mines used by the armed forces. All of these mines are controlled electrically from shore and are a threat only to enemy vessels. When hostile vessels, surface or underwater craft, are detected in the mined areas, individual mines closest to the enemy may be set off deliberately by the shore control station, or the entire mine field may be energized so that the approach of a vessel detonates a mine.

All these normal operations of the seacoast troops, including the operation of seacoast searchlights, require long and intensive training. Added to them, however, is training for individual combat, for infantry combat, for light field engineering and field fortifications, for field orientation and survey work, for demolition work, and for basic field artillery firing. In the latest war, seacoast artillerists were hurriedly transferred into other services and arms and rapidly trained to perform the duties of their new assignments, with a minimum of difficulty. Whole units were converted overnight into field artillery units, infantry replacement units, port battalions, and quartermaster units without extensive instruction. The speed with which this transformation was accomplished proved the adaptability of the seacoast soldier and the validity of this hard-won fundamental training. Coast Artillery units participated in landing operations as shore parties, infantry troops, artillery troops, military police, and performed a host of other duties, sometimes with only a briefing on board the assault vessels before disembarking.

The knowledges and skills of the seacoast artillery troops were used in this latest war in so many diverse ways that the identification of seacoast troops was almost lost in the constant turmoil and stress of the struggle.

In the near future, the advent of radically new weapons will provide the attacker with means for swifter, more diversified and powerful thrusts as well as improving the accuracy and strength of the defender. Therefore the coast defender of tomorrow must be capable of rapid movement and concentration of power against any threatened point on American coasts. The Coast Artilleryman’s background of proven adaptability, versatility and fundamental understanding of combat principles has prepared him well for solving the ever changing problems of coastal defense. The tested flexibility of seacoast organization and the demonstrated resilience of the seacoast soldier are now the foundations on which to build now a force capable of quickly meeting and absorbing the enemy’s hardest blows and so helping win the needed time for our national mobilization and organization for the counterblow. Intensive training, constant drill, endless repetition of defense exercises, minute scrutiny of methods and procedures, target practices, field maneuvers, and continuous research for the development of newer and better weapons, all these will drive home to each seacoast artillerist his ultimate purpose, to move, stand and fight.

For the present he will man the conventional seacoast artillery but with the development of new weapons, reassured that new defenses will replace the old and the seacoast artillerist will be ever vigilant to assure that at all times he is prepared to do his part in the defense of our country at home and on our island outposts.
Leadership in World War II*  
By Major General Clarence R. Huebner

EDITOR'S NOTE: Although the Journal has refrained from participation in the controversy over the caste system, this article was so well recommended and written by such an outstanding officer that we deemed it worthy of reproduction here.

Winston Churchill recently quoted one of Marlborough's veterans on the shifting attitude of the public toward the soldier. Two hundred and fifty years ago the veteran made this observation:

"God and the soldier we adore
In time of danger, not before:
The danger passed and all things righted,
God is forgotten and the soldier slighted."

Something of that sort is now going on against the leadership of World War II, a leadership which it should scarcely be necessary to point out was a winning one. But unlike Marlborough's veteran had in mind, this attack does not reflect any forgetfulness of the soldier on the part of the public. It is directed at the Brass Hats, so-called senior officers mostly, but in a larger sense, all officers.

Some of this attitude is undoubtedly purposeful; some of it, I suppose, reflects what may be an increasing disrespect for authority that appears to be all too prevalent throughout the whole world today. Some of it, I feel rather莫名ly, is due to the misdirected editorship of some, not all, of the service newspapers. It should be manifest that the Army, in time of war, is not the place for personal journalism.

The origin or the purpose of the offensive against Brass, however, is not of so much importance as the fact that, until the Doolittle report, no constructive suggestion, in so far as I can see, had come from it. Much harm, instead, has been done, and my only purpose in agreeing to write this article is to point out to American parents that thousands of your sons are still overseas and in camps in this country. Their welfare, their safe return home is the responsibility of the Brass Hats. It is a responsibility we feel keenly.

As a junior commander in World War I and a Division and Corps Commander in this war, I have had to face the loss of more than 10,000 of my men killed and 50,000 wounded. Those of you who have not had to live day in and day out for months at a time under this burden can have no appreciation of its weight. I have to sleep with that. Don't begrudge me an occasional bed in a foxhole or omate château (I have slept in both), or an extra bit of food to keep a nervous stomach going.

As I understand the agitation, everybody agrees on the need for discipline, though I doubt the sincerity of some of the agitators in this respect, but it is contended there should be ways of maintaining it other than those employed by the armed forces.

Maintaining discipline among large groups of men is largely a matter of psychology and the methods pursued vary with the personality and ability of the particular commander concerned. The young man entrusted to our care may be the apple of his mother's eye at home, he may be cultured, given to no delinquencies. But these same men, removed from family influence and thrown into a mass, can become a mob unless properly trained and controlled. One rotten apple in a barrel can spoil the whole lot.

I think it is a credit to American military training that the millions who served in this war, through the grimiest experience that can come to man, many in places far remote from civilization, are returning to their homes having defeated the armies of the most powerful nations on earth, with none of their refinement or earlier home training erased. They are more seasoned and more likely they have a soberer outlook on life. They have seen much but they are not lacking in their former social graces.

You will hear from time to time of a veteran who has committed a crime. Before you attribute it to his war experience you had better check up on his record prior to entering the service.

In connection with the various ways in which Brass seeks to maintain discipline, keep in mind that in addition to the flower of American manhood which we got, we also got the dregs. Right at this point, I must say I can't make my heart bleed over the alleged drastic sentences that were meted out to serious offenders overseas—rapists, murderers, thieves, those who went A.W.O.L. in the face of the enemy. There was a method in their conduct, an animal-like cunning.

**Some Chose Cowardice**

Being the type of men they are, they figure they are better off than the thousands lying in graves and the other thousands who lie maimed in our hospitals. Their shirking of their duty, their deliberate making of themselves ineligible for duty may be responsible for your own boy not coming back. They are still eating and sleeping and enjoying good health. I have had men of this type look me squarely in the face and say:

"Go ahead and punish me. I know you can't shoot me."

In the nation's hour of peril the Armed Forces enlisted the cream of American manhood, but also had to contend with a great part of our riffraff...
They preferred the punishment they got, to facing the enemy with the other men.

The process of review of court-martial sentences has been in effect for many years and has operated long before this agitation about alleged hard treatment began.

I know of no better way of getting justice than by employing Army Courts-Martial. They are equipped to get at the facts, and in most cases they do. Naturally they are more efficient when manned by experienced officers than under a greatly expanded and hastily thrown together Army, but in any case, our system of reviews precludes any appreciable miscarriage of justice.

I feel that I know something about the relationship of officers and enlisted men. I have been both. My boyhood was spent on a Kansas farm. After leaving high school, I joined the Army as a private in 1910 and have served in every rank, including corporal, sergeant, even the much-abused mess sergeant, and the various commissioned grades.

The wife of an officer, by instructing me in her home, assisted in preparing me for my second lieutenancy. In those days we did not have the fine school system now in operation. The day I was commissioned, it was a group of West Pointers that came to congratulate me and invite me to join them at dinner. Incidentally, through self-study, it took me but six years to attain a commission, whereas a West Pointer has a pretty exacting regime for four years.

Of all the criticism of our Army setup that I have heard, that about the "caste" system is the most absurd. Our Allies must be amazed to hear about it, as well as about the alleged mistreatment of our men, the best paid, best clothed and best cared-for in any army. Every single soldier in this war had the opportunity to get a commission. He had only to make an application and then, of course, to pass the tests, whether through Officers' Candidate School or otherwise. Literally hundreds of commissions were given on the battlefields. Our emergency officers were not taken from the aristocracy, the boarding schools, or any other single group. They came from all walks of life. Let's look at some figures:

More than 500,000 enlisted men became officers. Two-thirds of the officers who served in the wartime Army, other than medical officers and chaplains, were promoted from the ranks.

Between Pearl Harbor and 2 September 1945, there was an aggregate of 872,000 male commissioned officers in the Army. Of these approximately 72,000 were medical officers and chaplains. Of the remaining 800,000 some 531,000, or 66.37 per cent, were commissioned after serving as enlisted men in this war. Most of these officers were former enlisted men who were graduates of Officer Candidate Schools. Others were commissioned after Air Forces training and some won battlefield promotions for conspicuous gallantry in action or distinguished leadership.

Nine thousand officers of the wartime Army, out of a total of some 872,000, were graduates of West Point. An equal number came from Regular Army officers who were originally commissioned from sources other than West Point.

Of the West Point Graduates, I would like to call attention to three of the wartime classes. The class of 1942 had 373 graduates. Of this number, 32 died and 37 were wounded. The class of January, 1943, with 409 members, suffered 28 dead and 42 wounded. The class that graduated on June 1, 1943, with 515 members, lost 43 killed and 63 wounded.

If any group has done more for our country, then let it speak up.

General of the Army Eisenhower was a military academy graduate, as was Gen. Omar Bradley, but it is interesting to note that many others of the leading military personalities of the war were not West Point graduates. General of the Army George C. Marshall, wartime Chief of Staff, was commissioned from civil life in 1901. Gen. Thomas T. Handy, Deputy Chief of Staff, was also appointed from civil life. Lieut. Gen. John E. Hull, head of the Operations Division, War Department General Staff was graduated from an officer's training camp during the first World War. Maj. Gen. Clayton L. Bissell, wartime Assistant Chief of Staff, G-2, entered the Army as an enlisted man in World War I.


Lieut. Gen. George Grunert, who succeeded General Drum as head of the Eastern Defense Command, entered the service as a private in the Regular Army. Lieut. Gen. Ben Lear, who commanded the Army Ground Forces for a time during the war, served as an enlisted man in the Colorado National Guard during the war with Spain.

Gen. Courtney H. Hodges, commander of the First Army, under Bradley, and Gen. Walter C. Krueger, commander of the Sixth Army, under MacArthur, a West Point graduate, both rose in the course of their careers from private in the Regular Army to full general. Lieut. Gen. Lucian K. Truscott, commander of the Third Army and Lieut. Gen. Leonard T. Gerow, former commander of the Fifteenth Army, were both commissioned from civil life.

Officers From Civilians, Too

Lieut. Gen. Walter B. Smith, now ambassador to Russia, General Eisenhower's Chief of Staff during the Mediterranean and North African operations, and at Supreme Headquarters in France and Germany—as well as Lieut. Gen. Richard K. Sutherland, General MacArthur's Chief of Staff during the war—entered the Army from civil life.

Gen. George C. Kenny, head of General MacArthur's Air Forces during most of the war, is a former enlisted man. Lieut. Gen. James H. Doolittle, who led spectacular air attacks on Japan, Germany and Italy, first entered the service as an enlisted flying cadet in 1917.

Lieut. Gen. Troy H. Middleton, commander of the Eighth Corps during operations in France and Germany, is also a former enlisted man of the Regular Army. Lieut. Gen. Raymond S. McLain, who became a corps commander during the war, was for many years an officer of the Oklahoma National Guard.

I think this list compares favorably, relatively speaking.
The subordinate official in business, the man with newly acquired authority, has been the bane of many a man's existence. In grabbing 90-day officers, we understandably do not get men who are all born leaders; neither do we get majors and colonels of that capacity. We of higher Brass are forever removing and shifting them. Obviously, there is a way out of all this. Through universal training, between wars, we could insure, to the highest degree possible, that every man who should be an officer becomes one, and that people who should not be officers are not appointed.

There is nothing in the regulations, nothing in the military set-up that is conducive to an officer becoming a rotter or abusing his privileges. There is, in fact, every safeguard that can be properly devised to prevent it. True, wearing an officer's uniform does not in itself make a man a gentleman; nor have we learned a way to change human nature.

If we are forced to select our wartime officers quickly, the development of the science of psychology may help; but I doubt if we will ever be able to look inside a man and determine his leadership fitness.

I must confess that I do not understand the allegation that an enlisted man is not looked upon as a gentleman by the officers.

**INTERESTS ARE DIFFERENT**

Officers and enlisted men lead their separate social lives just as do the executives and employees of business. Generally, they have different associations, different senses of responsibility. When I was an enlisted man and went to town with the gang, I certainly didn't want an officer along. He would cramp our style. Similarly the officer could not pitch in with us. He was responsible not only for his own conduct but ours as well.

A young man with a creditable war record recently aired quite a list of grievances in a radio debate. Why, in Europe, he complained, the officers and enlisted men used separate bathing beaches. I suppose he was referring to the establishedleave areas. Manifestly, a high point in the enlisted man's holiday was to get away from authority. The areas were arranged with this in view. But I challenge anyone to say that the officers' areas were one whit better than those for the enlisted men. As a matter of fact, the organized entertainment in this country and abroad was for the enlisted men. The officers got in occasionally on sufferance.

In the Army as elsewhere, men of the same rank usually run together—the corporals, the sergeants, the second lieutenants, the captains, so on up the line to the general who more than likely is a very lonesome man, indeed.
 Without the insignia, rank nevertheless exists throughout the whole civilian structure. The ambitious private seeking to cultivate the top sergeant, is, in the eyes of his unambitious fellows, a bootlicker. Go into any business office in the country and you will find pretty much the same situation.

It might be possible for a junior officer to go out and frolic with some of his men one night and conduct a purely impersonal leadership of his command the following day but the story of human affairs argues against it. The fact, too, that so many men, instead of seeking to improve their own lot in life, have complexes against those of higher authority, would seem to argue against fraternization.

**Favoritism Is Taboo**

Very probably we have to fight against favoritism more in the Army than in other enterprises because a life (someone's and ours) instead of an increase in pay may be involved. In World War I, nine graduates of the First Officers' Training Camp were assigned to my command. All nine were killed. I should hate to think at any time I favored any one of those young men over the others, or any other man over them. Impersonal dealings with subordinates is called for in the profession of fighting.

In conclusion, I must admit that the greater the responsibility in the Army, as elsewhere, the greater the privileges. Unlike the private, the corporal does not have to do KP. And when you get up to High Brass there is someone to pack your bag and you don't have to carry a pack. At that, we are lagging behind our Russian friends. Their Army went in for a rare form of "democracy," but has now swung back to where the Brass rates many more privileges than in our Army—even an orderly after retirement. That makes an old codger of 57 years, like me, quite envious.

Oh, I suppose there are quite a few young men, now returned to civilian life, who are smarting under the time they had to stand at attention while a shavetail told them off.

But I wonder if they've ever had an experience with an irate traffic cop. That's when a man is really helpless.

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**ON ARMISTICE DAY**

The following poem from a letter written by Lt. Jack Spear to his mother a few days before he was killed in the Battle of the Bulge is reproduced herewith in commemoration of Armistice Day:

If you keep faith with me you need not weep
If I am killed, for I will not complain
Of any death if by it others gain
The things I think are worth my life to keep,
The right to have, to know, to love, to speak.
If all win these, I will endure my pain
And on the battlefront, where I have lain,
Will find an honored place in which to sleep.
But if when peace returns to you once more
You break the word you gave humanity
By keeping not the pledge to which you swore,
Then carve in stone this epitaph for me:
"Here lies a fool who placed his hope in war
And gave his faith to insincerity."
Planning U. S. Industrial Mobilization

by Leonard J. Grassman

The "Prep Agency" of the United States is the Army-Navy Munitions Board, one of the most important and least publicized mediums of our national readiness against possible future aggression. In this article Leonard J. Grassman gives the first complete picture of just what the ANMB is and what it does.

The United States must be ready to meet any threat of war. It cannot entrust its security to the conjectures of successful and lasting peace until there is concrete assurance that such a peace is an actuality, not just a possibility. In the meantime, it must remain strong enough to maintain that security. "The price of Liberty is eternal vigilance."

General of the Army Dwight Eisenhower lent the weight of his military genius and leadership to this belief in stating: "National security is a state of organized readiness to meet external aggression by a quick and effective mobilization of public opinion, trained men, proved weapons, and essential industries, integrated into the most efficient instrument of armed defense, and reinforced by the support of every citizen. The security establishment comprises all the people, all our enterprises, all our government."

The government has created an agency to aid in providing us with lasting preparation until we reach that age of peace when such preparedness is no longer necessary.

The "Prep Agency" of the United States is the Army-Navy Munitions Board, one of the most important and least publicized mediums of our national readiness against possible future aggression. It is a board devoted to research in preparation for national emergency and an over-all liaison between our national material might, our industry, and our combat elements.

Although this agency was originally constituted in 1922, it is doubtful that many Americans knew even of its existence—certainly not its functions.

In its 25 years of existence, the ANMB has passed through many periods of change and evolution—from a token body without much significance to its extremely important stature at present. Today, most of its work is concerned with four major responsibilities: the development, during peacetime, of an industrial mobilization plan which will when effectuated develop the national economy and harness industry effectively to the military need in any future emergency; the development and expediting of joint procurement between the War and Navy Departments and is assigned policy control of all joint agencies lying between the services wherein they concern themselves with matters of this nature; and is also concerned and responsible for developing and expressing military interest of the services in all matters pertaining to our national import and export.

The Board, at present, is composed of its civilian chairman, Mr. Richard R. Deupree, prominent industrial head, the Under Secretary of War, Mr. Kenneth C. Royall, and the Assistant Secretary of the Navy, Mr. W. John Kenney. The routine of the Board and its operational functions are administered by an Executive Committee consisting of the civilian chairman of

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the Board, assisted by two deputy executive chairmen, one a general officer of the Army, Major General Sidney P. Spalding, USA, and one a flag officer of the Navy, Rear Admiral Roger W. Paine, USN. The executive committee is assisted by a staff of about fifty Army and Navy officers and Civil Service employees drawn from the two departments. In policy matters, the Board is advised by a committee made up of the Chief of Staff of the Army, the Chief of the Army Air Forces, the Director of Service, Supply and Procurement of the War Department General Staff, the Chief of Naval Operations, the Deputy Chief of Naval Operations for Air, and the Chief of the Material Division, Office of the Assistant Secretary of the Navy.

Two Special Assistants Brigadier General Edgar P. Sorrensen and Rear Admiral Thomas B. Combs, aid the Executive Committee by reflecting the views of the Army and Navy Air Forces.

Assisting the Executive Committee in carrying out the responsibilities of the Board, supervising and coordinating the work of all subordinate elements to insure close liaison with appropriate agencies of the War and Navy Department and preventing unnecessary delays in the prosecution of the work of the Board is the Secretariat. Comprised of the Army-Navy alternates, Colonel Nathaniel M. Martin, C.E., and Captain G. M. Prevost, U.S.N.R., the Secretariat also insures that plans for the procurement of new items are integrated with the development of such items, maintains close liaison with the agencies responsible for research and development and keeps the Board currently informed on all such matters, along with making special and detailed studies or plans as directed by the Executive Committee or the Board.

One of the foremost of the ANMB projects is the Industrial Mobilization Plan, an instrument of progressive planning designed to evolve with the development of our industrial strength and scientific progress so that in the event of a national emergency, our industrial might and knowledge can be harnessed quickly. Strong belief that the War Production Board, properly constituted, is to be the inevitable cornerstone of an effective industrial harness in any forthcoming emergency, the ANMB has authorized the creation of a group of distinguished civilians, selected from those with War Production Board experience in the late war, to develop a manual which will embody the organizational changes in the WPB structure considered necessary as the result of actual experience with the one which was developed in the midst of the war. This group will also make recommendations on a complete pattern for the war agencies which they feel will be necessary to be brought into being with the outbreak of war.

Planning of this nature will prevent a repetition of the confusion and frustration experienced by those representatives of industry who hurried to the capital early in the emergency to offer their wares for the defense of our nation only to run into the lack of proper agencies to utilize their efforts or to assign proper priority, etc. Currently, and since the end of the war, the Army-Navy Munitions Board is aiding in a sensible disposal program for the disposition of war plants acquired by the government during the war, and is also aiding in the retention program—a project to create sufficient "stand-by" plants and other facilities to aid in "to war" conversion and wartime production. It has also completed and will promulgate shortly its pattern of all the inter-agency, service, and civilian industrial advisory committees it considers will be necessary to cover its industrial mobilization responsibilities. The pattern comprises about 75 committees covering the complete industrial field and under them will be created numerous sub-committees to handle specific detail and technical assignments.

Under the Executive Committee are four planning divisions, Materials, Products, Services, and Procurement, from which spring the numerous special committees and sub-committees which encompass all the problems involved.

Materials Division, which collates the military, naval, civilian, and allied requirements of materials, such as steel, copper, aluminum, etc., in an emergency, devises plans for production and supply of such materials, and is responsible for the development of stock piles. It is also concerned with the current study of underground sites, which have proven militarily expedient in modern warfare.

In the recent inspection of representative types of underground sites throughout the nation, conducted by the Corps of Engineers for the Army-Navy Munitions Board, the results of which have not been published, it has become evident to observers that, contrary to common conception, caves do not make the best underground sites, which have proven militarily expedient in modern warfare. Materials Division, which collates the military, naval, civilian, and allied requirements of materials, such as steel, copper, aluminum, etc., in an emergency, devises plans for production and supply of such materials, and is responsible for the development of stock piles. It is also concerned with the current study of underground sites, which have proven militarily expedient in modern warfare. One observer, technically qualified, has noted that soft stone areas, of which there are plenty in the United States, rather than soil, make for better underground sites. It appears that mines and quarries are much more easily adaptable to industrial purposes desired in underground utilization. One observer, technically qualified, has noted that soft stone areas, of which there are plenty in the United States, rather than soil, make for better underground sites.

The importance of underground sites in modern warfare need not be amplified. In an atomic war, should the bomb not be outlawed in future warfare, utilization of below-surface facilities is a must. The effects of strategic bombing in Europe and Japan during the war have already proven that even in the use of the lesser weapons, underground factories and facilities are an absolute necessity. The good condition of such facilities in Germany after bombing which obliterated whole cities proves the greater impregnability of Mother Earth and, even now, as our Prep Agency prepares plans for such utilization, it is rumored that
another government, using war prisoner labor, has built
the biggest underground airfield in the world in a
highly dominating and commanding area, which has
a great, semi-global, air striking potential. Great Britain's
enormous, mile-long, underground factory, which with-
stood the rigors of the Battle of Britain, is a monument
of strength of below-surface spaces.

In the study of underground sites, one Corps of
Engineers colonel put forth a plan substituting Ameri-
can machinery for hand labor in the Japanese “cut-and-
cover” techniques for building concrete shelters, mini-
ture hangars, and sub-terrain storage facilities. The
Jap technique allows for rapid construction with a
maximum use of natural formation and permits con-
crete construction without forms.

In the stock-piling planning, when the President ap-
proved Public Law 520, which authorized $100,000,000
to ANMB to begin stock-piling of materials essential to
our national security, it is estimated that around $300,-
000,000 will be needed for this purpose during the
fiscal year. The hundred million dollars was granted
during the wind-up of the last session of the 79th Con-
gress under the stock-piling act which contemplates the
acquittal of scarce but essential items at a cost of around
2,100,000,000, to be spent over a five-year period.

To date, the Board has formalized the stock-pile ob-
jectives, year by year, as to composition and require-
ments, and has determined and directed the purchase
of the first year’s increment after clearance by State,
Commerce and Agriculture Departments and CPA.
The Board is developing a supplemental list of items
for additional purchase in fiscal 1947 for presentation
to Congress for approval, and has also contacted many
industrial associations which concern themselves with
metals, minerals, and materials, and plans continued
consultation with qualified industrial groups in carry-
ing forward its stock-piling programs.

In the initial stock-piling stage, ANMB is concern-
ing itself primarily in drawing from the nation’s vast
surplus supply of war materials. From this stock are
being drawn essential materials necessary to national
security, but even in this early stage, the ANMB must
keep its eye on our plies of other essential materials, an
element which must cause them and the industrialists
of the nation great concern because many of these
items essential to the stock pile are desired by industry
civilian manufacture. Relative to this dilemma,
Mr. Deupree, head of ANMB, stressing that every
precaution is being taken not to cripple civilian econ-
yomy, said nevertheless that an industrial mobilization
and stock-piling program is definitely in the making,
indicating that certain materials, although critical in
civilian production, must be maintained in the stock
pile against an emergency.

In stock-piling, the ANMB, by transfer from war
surplus and purchase, assembles huge stocks of critical
and essential items and materials. Of these, some are
lasting and remain a stable stock, some become obso-
lete and must be replaced, while those with a tendency
to become stale, lose strength, or perish are rotated—
turned back into market and replaced with fresh and
vital material. When purchasing or selling for the pile,
the Board conducts its market activities in a quiet man-
ner in order to frustrate attempts to speculate on these
activities and also to prevent a physical effect on either
the national or world market.

Other national resources, although not assembled in
the stock pile, actually are earmarked in “paper con-
sideration” so that, if needed, their source and manner
of procurement will be but a simple manner of refer-
ence and execution.

The Products Division, which collates the military,
naval, civilian and allied requirements for manufac-
tured products in an emergency, devising plans for
the production of such products, makes recommenda-
tions to the Board concerning the modification or
abandonment of existing facilities, the development or
construction of new facilities and the allocation of
existing industrial capacities in an emergency. One of
the causes responsible for the creation of this committee
is the entangled problem of producing for more than
one service and one nation.

The Procurement Coordination Division supervises
and coordinates all phases of procurement by the serv-
ces wherever joint requirement exists, preventing
duplication of effort, eliminating competitive bidding
between the War and Navy Departments, insuring
 equitable distribution of production and further stand-
ardizes design, contract procedures and procurement
specifications.

In joint-procurement for the services, standardization
of items between the services is a major problem, and
the standardization of any item or class of items is
given careful attention. For example, in a radar set of
similar operating characteristics, the Army must have
dust protection, while the Navy sets must be of com-
paratively small size and resistant to gunfire shock.
Differences such as these must, if they possibly can, be
reconciled.

However, despite the difficulties, a considerable
amount of progress has been made. The volume pur-
chase of food and lumber is already integrated, and,
in textiles and clothing, footwear and petroleum prod-
ucts, there is close collaboration between the services
in the buying operation. The most notable progress is
in the field of medical and surgical supplies. The serv-
cices have not only established a joint buying office in
New York, but have succeeded in standardizing about
85 per cent of the items each of them use.

On October 15 of this year, President Truman ap-
proved an amendment to the authority of the Army-
Navy Munitions Board, the principal effect giving the
Chairman of the Board authority to assign to either
the War or Navy Department or to a joint agency the
procurement of any item purchased for the use of either
or both services.
In connection with this approval, the President stated that concentrating in one agency the procurement of each type of common or substantially similar items by the armed services will mean an undoubted savings in money and personnel for the government and will simplify the furnishing of supplies and munitions by industry to the armed services. This authority also includes the power of final decision in the event of disputes between the two departments arising out of the determinations made by the Chairman of the ANMB. Such decisions will be binding on both the War and Navy Departments.

The fourth major division of ANMB, "Services," is charged with formulating plans for the development and control of manpower, transportation, electrical energy and other services required for the mobilization of industry in an emergency; to act as a liaison between the Board and government agencies dealing with finance, price or manpower control, transportation, public relations, or economic warfare, and to supervise and coordinate the preparation of plans for the establishment or activation of such agencies as would be required in an emergency.

"Decentralization of industrial facilities," a much discussed subject by contemporary strategists, either industrial or military, is another subject of interest to the Board.

Modern warfare, which places the whole of the United States within striking distance from many foreign points emphasizes the importance of such decentralization. The Board, in recognizing the importance of decentralization, is making a study of the extent to which Industry is centralized and is doing everything possible to foster dispersal of new and/or future additional plants and facilities to strategically decentralized locations.

Recently the ANMB was given another great responsibility when it was charged with the responsibility for determination of the military interest in national import and export. Because of this, the Board holds membership on inter-agency State Department committees which concern themselves with different phases of economic foreign policy and its members have been active in steps being taken to conserve our national resources.

As evident from the foregoing definition and analysis of the Army-Navy Munitions Board and its activities, the ANMB is a great network of committees whose studies reach into every possible phase of our national structure to bring forth elements for the protection of our national security and to construct the machinery which will make our nation capable of a quick swing to prepared strength in the event of a national emergency. The Board, in acceptance of all these duties, is acutely alive to the great responsibilities it has assumed. It realizes that there must be evolved, in peacetime, practical and well understood mechanisms whereby in a minimum period of time the nation can effectively get into high gear at the beginning of an emergency to produce the requirements of war. These essential mechanisms cannot be evolved or executed with dispatch without the complete cooperation, support and understanding of government, industry, and labor.

The Army-Navy Munitions Board, now, as it goes into full-grown action, is indicative that our nation has reached the end of that indifference of thought and action which has heretofore left our nation inadequately prepared to defend itself. The "Prep Agency," of the United States, with its "gathering" activities, will meet any future emergency just as the squirrel meets the winter—PREPARED.

It is the style these days to criticize everything that was done during the war, to point out how much better the job should have been done. But the fact is that the world has never seen a production performance like that of war production in those five years. Planes never took off the runways in such numbers; ships never slid into the water so fast; tanks never came down the line with such speed. The job had to be done, and it was done.—SECRETARY OF WAR ROBERT P. PATTERSON.
Accommodations Overseas for Dependents

The Journal has gathered the following information regarding facilities at foreign service posts where Coast Artillery Corps personnel and dependents will probably be stationed. Additional information may be obtained on some of the other stations by writing the Journal.

Housing:

Dependents are brought overseas in accordance with instructions published by the War Department, setting up priorities. Once overseas assignment of quarters is made, a board of officers of all grades has classified all quarters as suitable for field grade officers, company grade officers or enlisted men. A high standard on all quarters is maintained and none were accepted that did not appear to be entirely satisfactory. Many of the quarters, however, have been badly neglected. A repair and redecoration program, therefore, has been instituted which is half finished, but is expected to be completed prior to the arrival of dependents. In some areas, dependents will occupy existing modeled homes, hotels, and other buildings.

The permanent housing phase of the dependents' housing program is getting under way. Site studies and community planning are nearly completed. Standards of connection and types of buildings, moreover, have been established. In general, buildings will be limited to nine stories with single family dwellings and two- to four-unit apartment houses for officers, enlisted men and civilian employees. All housing units will be low cost frame structures that, due to the limitations on material and labor, will be below the standards for such housing in the United States.

The apartment unit will be two-story with kitchen, living and dining rooms on the first floor and the bedrooms and baths upstairs. Each unit will be completely furnished with all the essentials including refrigeration, heat, dishes, iron, linens, and curtains.

It is well to keep in mind that the electrical current in Japan is 100-volt 50-cycle. That in the U. S. is 110-120- and 60-cycle. Practically all electrical devices that are used in the States will operate on this slower cycle and lower voltage. However, they will not operate as well as they would upon the voltage for which they were designed. This applies to vacuum cleaners, radios, refrigerators, electric irons, heating pads, and lamps. The types of equipment made that are standard in the U. S. will not operate properly on the slower Japanese current. Electric clocks and electric phonographs with synchronous motors. It is advisable that these items not be bought unless they are known to operate on 100-volt 50-cycle current.

The water supply in Japan will vary with the locality but systems will be designed to insure an adequate supply for domestic use.

In site planning, areas are reserved for recreational purposes and for the later construction of commissaries, post exchanges, and servants' dormitories. In some developments these facilities are now within a reasonable distance.

The houses which have been described will be allotted to all families except in the cases of large families where an effort will be made to provide additional space.

Upon arrival in Yokohama temporary housing will be provided dependents going on to other parts of Japan or they will leave by special trains immediately upon arrival.

Medical Care:

All personnel before proceeding to Japan should arrange with the family physician or surgeon of nearest Army Post to be currently immunized against smallpox, typhoid, tetanus, cholera, and typhus. Inoculations may be started at home and completed at POE. In addition, children should be immunized against diphtheria and whooping cough. Individuals should be in possession of records showing dates of the above immunizations. Sufficient supplies of vaccines will be available in Japan to accomplish additional and future routine and special vaccinations as will be required.

Foods will be available and will be procured only through Army sources. Powdered and evaporated milk are included in the ration scale, and arrangements are being made to include special baby foods for providing nutrition adequate for infant and child feeding.

Water for drinking and cooking purposes must be chlorinated prior to use. Constant supervision of municipal water sources and supplies is being carried out to provide a potable water. It is expected that municipal water supplies in some localities will be safe without further treatment and information to that effect will be published from time to time. Houses for civilian dependents will have adequate sanitary appliances. Measures for protection from insects and rodents will be provided.

Adequate hospital installations and facilities are to be maintained in Japan to provide medical care for civilian dependents. It is anticipated that certain hospitals having out-patient service, dental service, and optical repair service will be designated for dependent and civilian use. Such hospitals will be staffed with personnel qualified in obstetrics, gynecology, and pediatrics.

Schools:

No Japanese schools are suitable for the education of American children. The few parochial schools that have exist have had their plants damaged and destroyed and their instructors removed. It is planned to establish the first eight grades of school in each large community by the use of civilians suitably trained. A private subscription toward these schools will be necessary. High schools will be or-
organized in a similar manner. However, the subjects will be limited to the bare essentials that will enable students to remain in school in Japan for at least a year without too large a gap in their education. High school subjects will cover generally mathematics, English, history, and a language. No colleges or universities exist in Japan suitable for the education of American children nor is it planned that any college courses be given. Parents should consult with local school authorities as to what courses of elementary or high school level are advised for continuation of children’s education.

There are available, through various schools in the U.S., correspondence courses which will enable parents to teach their own children or hire tutors to do so.

Food, Clothing and other Supplies:

Japan is going through a state of inflation wherein the prices of many of the articles purchased are ten times the amount of the high prices that existed at the end of the war. Kimonos which normally sold for 60 yen now sell for 1,200 to 1,500. Most of the articles for sale are of very low quality and of little artistic value. Perfumes, soaps, and other toilet articles are unobtainable except in the Post Exchanges.

Since the climate in the areas where most people will live runs from the same kind of summer that you have in the central section of the U.S. to the type of winter which prevails in the central section of the North Pacific Coastal region, a variety of weights of clothing will be needed. During about five months of the year, heavy overcoats, children’s ski clothes, etc., will be comfortable.

During these months and into the spring, suits, both winter and lighter weights, too, will be practical. Cotton and light summer clothes, on the other hand, will be suitable for the rest of the year in almost all regions of Japan. Due to the long periods of dampness and rainy seasons which are so prevalent, raincoats, galoshes, boots, etc., will be needed throughout the entire year.

Miscellaneous (Automobiles):

The highways in Japan are generally poor, however, short trips to near-by ocean and mountain areas can be made from the larger cities. Most streets in cities are narrow, rough, and present a problem to driving civilian type vehicles. Dependents will be permitted to bring private vehicles. The problems of maintenance will be great. No garages are to be constructed. It is advised, therefore, that dependents do not bring vehicles unless the person in Japan who requested their presence indicates what vehicles can be used.

Surplus jeeps will be made available for purchases by personnel. The cost of these will be reasonable, depending on the condition of respective vehicles. These can be fixed so as to be quite comfortable. They will provide an excellent means of transportation, can be serviced with means at present available, and will be more easily maintained in operation than private vehicles.

European Theater (i.e., Germany, Austria, and France):

Housing:

In the Occupied Zones of Germany and Austria, military communities have been established to serve the various military installations scattered throughout the zones. For the most part these communities are immediately adjacent to the near vicinity of the military installations themselves. Military communities have been established with due consideration to available German housing and personnel assigned to the military installation will receive quarters in the existing houses. The type of house will naturally vary in each community and within the communities themselves to include brick houses, stucco houses, frame houses, etc., but they will be entirely adequate in accordance with normal standards for military personnel and their families.

Heating is available; in many cases this is central heating. In other cases, rooms are heated by individual stoves and heating units, but in all cases, adequate heating will be provided. For the most part coal is the source of heat.

In areas other than the Occupied Zones of Germany and Austria, quarters for dependents will not be furnished by the Army and arrangements in those areas must be made by the individual applying for transportation of dependents. An individual must present evidence that he has obtained quarters at the time his application for the movement of his dependents is filed. In most liberated areas and in Paris particularly, there is a critical shortage of housing as a result of war damage. Quarters can be obtained, however, and the Army assists personnel in locating quarters by maintaining quartering offices where information is assembled and disseminated. The rent, of course, will vary with the type of quarters.

Quarters made available for dependents (in Occupied Zones of Germany and Austria) will be furnished from items obtained from local German sources. The bulk of the furniture will be that furniture within the home itself at the time of requisitioning, supplemented by furniture and equipment which is now being produced locally by German manufacturers. Furnishings will include stoves, refrigerators, kitchen utensils, porcelain, glass and silverware. Bed linen will not be normally furnished although a limited amount of standard size Army sheets and pillow slips can be purchased from Army stocks and Army blankets to a limited extent can be drawn in the local communities. It should be unnecessary for dependents to bring household furnishings overseas. Individuals should, however, consider the desirability of bringing with them such additional items as bedding, table linen, personal silverware, etc., which will add to their individual comfort.

The stoves and refrigerators available in the theater should be adequate although they will not be as modern and advanced as the type normally used in the States. If individuals desire to bring their own stoves or refrigerators consideration should be given to the fact that the normal current in the theater is 220 volts and gas pressures available for domestic purposes vary from those normally employed in the States.

It is difficult to foresee at this time what items of household furniture or equipment would be useless or damaged by the climate overseas. The comment above as to electrical stoves and refrigerators, however, is applicable to all items of electrical equipment in view of the difference in voltage, and if such furnishings are brought from the States, consideration should be given to also bringing transformers to permit their utilization with 220-volt current. It is
ed that it will be possible to obtain all items required
for normal living from sources within the theater as pro-
tion of civilian items is reestablished.

Immunization:

All Civilian dependents of military person-
nel proceeding to the European Theater will be ini-
tized within one year of embarkation against: Smallpox,
Diphtheria and Paratyphoid fever and Typhus fever.

Diphtheria immunization is required of all dependents
between the ages of 6 months and 55 years who are travel-
ing to this theater, unless such dependents have been
examined to be Schick negative.

All dependents are entitled to medical service at the
hospital designated. Service is in the form of dis-
rassy cure, hospitalization and, in emergencies, home
clinic.

Clinic schedules will be in effect for the convenience of
and information regarding the schedule of the station
spital in the vicinity will be included in the indoctrina-
literature distributed.

Comprehensive plans have been forwarded to the War
Department for approval covering the education of children
in the first grade through high school.

There will be no civilian schools attended in the occu-
pied zones; informational and advisory service will be pro-
d to aid parents and students in selecting colleges in
ear-by countries in Europe.

Present plans provide for schools which will be rep-
resentative of the American standards.

Clothing and other Supplies:

All items of food, except fresh milk and ice, will be made
available through Quartermaster Sales Commissaries and
the Army Exchange. Arrangements for the procurement of
fresh milk and ice are now being negotiated.

In view of the prevalence of rationing of food available
on the civilian markets, it is not believed that food will
be obtainable from local civilian sources for the present;
never, it undoubtedly will be possible at a later date to
raise the number of items directly from civilian
surers as local food conditions permit.

In special baby foods, the Army Exchange Service will
make standard items powdered milk, condensed
other milk food products will be handled. How-
ever, it is suggested that dependents bring with them spe-
cific items of baby food which are prescribed for indi-
ual diets, at least in sufficient quantity to insure that it
be available pending the complete stocking of Army
changes.

Production of civilian clothing is limited at the present
time within the theater just as is production of all civilian
items, and such production as is available is strictly rationed
for local civilians. It is possible, however, for clothing to
be made either by individual dressmakers and tailors if the
service is furnished. In order to be assured of an adequate
supply, it is recommended that dependents bring
them sufficient clothing for approximately one year.
At that time it is believed that sufficient clothing can be
purchased from local civilian sources or through the Army
Exchange.

Toilet articles and preparations may be purchased from
Army sources.

Any quantities of the above preparations may be obtained
along with the user's convenience since at the present time
such preparations have been rationed in the theater and
are not plentiful.

Laundry, dry cleaning, shoe repair and similar services
will be provided through Army Exchange facilities.

Miscellaneous:

Facilities are being established for the maintenance and
repair of automobiles through Army Exchange garages and
service stations. The sale of tires and other spare parts of
standard make will also be available. It is suggested, how-
ever, that all vehicles being shipped to the theater be placed
in first-class running condition, including the replacement
of all worn tires, to guard against any local or critical short-
ages which may possibly develop during the establishment
of Army Exchange facilities.

At the present time it is not contemplated that gasoline,
and oil and grease will be rationed. If a rationing system is in-
nstituted, sufficient gasoline, oil and grease will be available
for all normal use.

It is considered desirable for dependents to bring their
privately owned vehicles with them. Plans are being made
for the sale of certain standard U.S. manufactured vehicles
and undoubtedly other vehicles will be obtainable in time
from local sources. These vehicles, however, will not be
available in any large quantities for some time. It is also
possible to purchase vehicles from Office of the Foreign
Liquidation Commission, although these vehicles, for the
most part, consist of jeeps since it is not expected that any
appreciable surplus of captured sedans will be available.

Servants:

In the Occupied Zones of Germany and Austria, serv-
ants are being provided for families through employment
offices supervised by the Army and Military Government,
and these servants are paid by the local burgomeister as an
item of occupation cost. This is the only method by which
help can be obtained at the present time in view of the
"Trading with the Enemy Act." The number of servants
furnished depends, of course, on the type of house occu-
pied and local needs. Normally, a cook and a maid
are furnished and in many cases a gardener is also provided.
It is believed that as soon as authority is received to make
exceptions to the "Trading With the Enemy Act," indi-
viduals may make arrangements for additional help, such
as a nursemaid, but such help will probably be charged to
the individual affecting the employment.

In areas other than the Occupied Zones, the hiring of
servants is a matter of the individual concerned dealing
through the local employment agency, and it is believed
that sufficient help can be obtained through those facilities.

Panama Canal Zone:

Housing:

Housing for the families of military personnel is not
adequate to meet requirements fully. Therefore, it is
necessary for the head of the family to arrange for quarters
before bringing his family to the Canal Zone.
Medical Care:

The Medical Department operates a General Hospital at Fort Clayton and a Station Hospital at Fort Gulick which are currently providing medical service for the dependents. In addition to most of the clinics normally operated by General Hospitals, these hospitals are operating obstetrical services. East post has a dispensary with medical officers available for emergency cases and for handling minor ailments and injuries.

In addition to the Army medical service, the Panama Canal operates two hospitals which are available to military personnel and their dependents and are equipped to render complete medical service. The Gorgas Hospital is located at Ancon on the Pacific Side. The Margarita Hospital, which is a new hospital and replaces to a large extent the Colon Hospital, is located at Margarita on the Atlantic Side near Fort Gulick.

Schools:

The Panama Canal operates a superior school system including a junior college. Elementary and high schools are located on both sides of the Isthmus, and are readily accessible to all posts. The Junior College is located in Balboa on the Pacific Side.

Tuition and books are free through the High School. Tuition for Junior College is fifty dollars per year and books are purchased by students.

The schools are fully accredited by the Middle States Association of Colleges and Secondary Schools.

The Elementary School Kindergarten to 6th grade inclusive.

Junior High 7th and 8th grades.

Senior 9th to 12th grades inclusive.

Junior College 13th and 14th grades.

Students are admitted to the schools initially on United States School credits and placed according to achievement tests. Further information regarding Canal Zone schools will be found in the publication entitled "Public Education in Canal Zone," which may be obtained from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Food, Clothing and other Supplies:

The Q.M. operates two large commissaries, one at Ft. Gulick for personnel stationed on Atlantic Side and one at the Post of Corozal for those stationed on the Pacific Side. The commissaries carry a very good stock of staple groceries, a fair stock of fresh meat, poultry and dairy products and some fresh fruits and vegetables. The prices are reasonable and most cases slightly less than prices in Panama Canal Commissaries. There are no charge accounts.

The Panama Railroad operates a number of excellent commissaries which are similar to the so-called General Stores. They carry quite a complete stock of staple groceries, fresh meats, poultry and dairy products, fruits and vegetables, some clothing, a very good stock of shoes, a considerable number of the more essential household items and gadgets, a limited stock of imported china, a fair stock of proprietary drugs, cosmetics and tobaccos. Electrical household appliances are practically nonexistent at the commissaries. The prices are extremely high and are considerably below prevailing States prices, but in some instances slightly higher than Sales Commissaries. Fresh milk is obtained through these commissaries. The available supply is limited and is controlled by medical officers' prescription. Officers above the grade of Captain are authorized charge accounts. Captains and below must pay cash.

Several of the Post Exchanges operate small grocery, meat and vegetable departments. The Post Exchanges also carry small stocks of imported items.

Some fresh vegetables may be obtained from Chinese gardens in the Canal Zone. The gardens are under sanitary supervision of the Health Department of the Panama Canal Department. Native fruits are obtained at native markets and roadside stands.

Native markets are available in Panama City and Colon. Except for some native fruits, they are not generally patronized by residents of the Canal Zone.

Both Panama City and Colon have a number of excellent stores which are able to supply practically all needs that cannot be met by Sales and Panama Railroad Commissaries. Prices are higher than in the Canal Zone.

Uniforms: The Q.M. operates a sales store at Post of Corozal at which issue clothing and some officer clothing may be obtained. All posts have tailor shops which are capable of making officers' uniforms.

Hawaii

Housing:

During the war, all of the quarters were used to house the maximum number of officers, consequently, the norm allocation of quarter master furniture was insufficient to provide such articles as chairs and tables for the large number of individuals in each house. To meet this need, the Army built quite a bit of very satisfactory furniture. This has been distributed to the various houses so that, in a pinch, families may get along with the articles formerly provided by the Quartermaster as supplemented by those made by the Engineer Shops.

The normal procedure now for families coming to Hawaii is to insure that they have a place to live before transportation is authorized. Admittedly, this causes some inconvenience to the individuals but it is a wise precaution since the housing situation in Hawaii, like everywhere else, is very critical.

Adequate quarters are provided commensurate with rank or grade of applicant. Houses may be of a permanent brick, cement, or stucco-type, or may be of a lowered housing frame-type. Houses may have from 2 to 6 bedrooms. In general, heating in the Hawaiian Area is unnecessary; however, some houses contain fireplaces.

Civilian houses and apartments are available. Because of great demand, however, it is difficult to find suitable civilian housing. Rental may range from $75.00 to $300.00.

Houses and apartments of all sizes and quality are being rented. The choice is dependent only upon availability and ability to pay. Houses and apartments are similar to those on the mainland.

Medical Care:

Medical attention is excellent and readily accessible to dependents.
ACCOMMODATIONS OVERSEAS FOR DEPENDENTS

Schools:
The schools are excellent and school busses are provided where necessary.

Clothing and other Supplies:
The Army has been on the Island of Oahu for a long time, and facilities compare favorably with those available on the mainland. There are two large commissaries, one in Honolulu and one at Schofield Barracks, which are readily available to all who wish to use them. Most of the stores provide bus service for those desiring to go to the commissary.

Food stocks, in general, are the same as on the mainland. Main items such as tomatoes and fresh vegetables are abundant in availability. Food is not rationed. Special baby foods are available. Fresh milk is available in the Hawaiian Islands, as well as all common feeding preparations. Ice is available for quarters which do not have electric refrigerators. Stocks of canned goods, fresh and frozen vegetables, fish, seafood, and local products are available for purchase from civilian markets. Dependents need bring only sufficient food to satisfy the needs during the ocean voyage.

Household furnishings can be purchased locally. However, in general, prices for household goods are high. Stoves or refrigerators should be brought overseas. Stoves and refrigerators are furnished with each set of quarters.

Philippines:

Public schools to which Americans are admitted are maintained in many towns of the Philippines. Presently a four-year elementary and a four-year high school curriculum is maintained. The courses are all taught in English, with the exception that Tagalog is taught one period each day. It is understood that few American children attended these schools prior to the war.

In Manila area, there are thirteen private schools at the kindergarten level. In general, the curriculum of the private schools follows that of the public schools. There, available schools are run by private individuals or corporations. The tuition fees of these schools vary slightly. Approximately $2.50 to $4.00 per month for each student was charged for the kindergarten level, $2.50 to $5.00 at the primary level, $2.50-$6.00 at the intermediate level, and $4.00-$7.50 at the high school level. These prices may be increased due to higher operating cost. Pupils are required to purchase books and supplies.

However, as yet, the educational problem has not been solved at the AAATC since it is located 110 miles from Manila.

Food, Clothing and other Supplies:

Sales commissaries are or will be in operation near the main housing areas. It will be possible to obtain many of the same items from these stores that are carried in the sales commissaries in the United States. These will include staple groceries, some fancy grocery items, fresh meats, some vegetables and fruits and cleaning and preserving materials. Special baby food will be carried in stocks. Ice will be available. It is very likely that all items will be rationed. Bread is available at sales commissary.

Enough clothing should be brought to last the tour of duty. The stores and stocks of clothing are not sufficient for dependents to rely on obtaining wearing apparel, millinery, or shoes. The Army Exchange will stock some things such as handkerchiefs, scarves, stockings, and other small items. Once again, whatever is here is very costly. The fine cloths for which the Philippines were renowned the world over are presently virtually unobtainable. Actually, the natives need every piece of clothing which is brought over through commercial channels.

It is advisable to bring mostly summer clothing. Some woolen items should be included on the chance that part of the tour of duty will be in a temperate climate. Native dressmakers are extremely skillful. If within baggage allowances, there is room for cloth materials, one should certainly include them.

Miscellaneous:

Government laundries are available and dry cleaning is available through a commercial plant in operation in Manila.
The USAMP "General George Harrison" in the Harbor Defenses of Manila and Subic Bay

By Arnold A. Bocksel, CWO

During the campaign in the Philippines, from the period of 7 December 1941 to 6 May 1942, the personnel of the U.S. Army Mine Planter General George Harrison were engaged in the planting and maintenance of the various groups of mines, comprising the mine field, protecting the entrance to Manila Bay. There were approximately 35 groups of mines in all.

In addition, the mine planter laid and maintained communication cables between Corregidor and other points. Food, water, and other necessary supplies were also transported by the mine planter to the various outposts in Manila Bay and on various occasions troops were transported to Bataan Peninsula.

The mine planter operated daily in the mine fields renewing and repairing defective mines, cables, firing devices, etc. During actual enemy air attacks and artillery bombardments, operations were carried on whenever possible. There never was an instance when any mine equipment was ever cut loose from the planter to enable the mine planter to leave the mine field during enemy air attacks and artillery bombardments. The mine planter was equipped with two 50 cal. and two 30 cal. machine guns which were manned by mine planter personnel during enemy air attacks and upon other warranted occasions.

The utmost economy in the operation of all machinery was rigidly adhered to in order to conserve the rapidly diminishing supply of fuel oil. Due to the tight blockade of the Philippines at this time by the enemy, the prospects of securing fuel oil from outside sources were very slim.

During the latter part of February 1942, the mine planter's fuel oil supply was almost exhausted, and operations necessarily became limited. The following members of the mine planter, Edgar Rosenstock, Captain, CAC, Commanding; Arnold A. Bocksel, CWO, Chief Engineer, AMPs and Stanley Dee, T-3, with the use of a mine yawl searched through the bombed and abandoned ships in and around Manila Bay in an attempt to locate any fuel oil that might still be contained in the tanks of these vessels. After one week of searching through these ships fuel oil was finally located on board the S.S. San Jose in several of the double bottom fuel oil tanks. This vessel had been bombed by the enemy early in the war and was completely burned out. The fuel oil obtained from this vessel was sufficient to refuel the Harrison, as well as several of the Navy Mine Layers, in Manila Bay at that time. Full operations in the mine field continued as a result.

On 8 April 1942, the mine planter received orders at approximately 2300, to weigh anchor and proceed into Mariveles, Bataan, and there to await further orders. The Mine Planter arrived in Mariveles shortly thereafter. At 0530 the following morning, orders were received to proceed back to the North Dock, Corregidor. Survivors from Bataan were sighted in the Bay, swimming on bits of debris, in bancas, and boats. Approximately fifty men were picked up and set ashore at the North Dock, Corregidor.

On 3 May 1942, at approximately 1100, in the South Bay of Corregidor, the Harrison was dive-bombed by enemy planes. Two bombs struck the planter, on the starboard side amidships; passing through the starboard lifeboat, through the boatdeck, and exploded in the tool-room, blowing the steel bulkhead to the engine room. Ship's superstructure on the starboard side was completely destroyed and four of the men aboard killed.

The General George Harrison is reported to have been sunk on either the 4 May 1942 or 5 May 1942 by further enemy bombings.

The surviving personnel of the Harrison were taken prisoner by the Imperial Japanese Army on 6 May 1942. The Harrison received three Presidential Unit Citations for her gallant deeds.
sentry stood in the shadows of a searchlight silhouetted artillery flashes along the front—his hands were thrust into his overcoat pockets and his breath clouded the sharp air. The blanket of crisp snow on the far countryside reflected the glow of a brittle moon hung in cold loneliness near the horizon.

A sentry hunched across the small clearing toward the stove.

"That you, Sa1?" the sentry inquired.

"Yeah. What's up?"

"Nothing so far. Guess the b——s got cold feet."

"Yeah. What's up?"

"Busy. Little artillery fire in the east and there was a ack in the north awhile ago, but nothing come this late."

"Yeah, guess so. You can knock off now, we got coffee in the tent." Sa1 glanced over the sky. "Jees, it's cold!"

He lit a lighter, lifted his overcoat in the rear, and rubbed his fingers above the cherry-red lid. His crew were too engrossed in their sergeant's account of a quest in Rennes to notice the new arrival. He lit a cigarette, lifted his overcoat in the rear, and rubbed his teeth as he slammed the bolt of his gun to drive one of the long cartridges home.

The relieved sentry stooped into the squad tent and other soldier hunched across the small clearing to look toward the stove.

"Anything doing outside, Olson?"

"Nope. Little artillery fire in the east and there was a ack in the north awhile ago, but nothing come this late."

"Telephone's ring interrupted their talk. The sergeant picked up the phone and barked, "Section three, Sergeant on!" He listened for a tense moment then slammed the receiver and bellowed, "One of the radars has come in fast and low from the north, HIT IT!"

The receiving flushed with darting men, pulling on overcoats as they ran. Seconds later the power plant coughed and identified as an ME-210 250 rounds of fifty caliber expended—one ME-210 shot down, category one.

"What's that, sir? ... No, sir, the crew was all burned to hell! ... No, sir, I didn't find a Luger, but the others are still looking. Just a second, sir, here they come now."

He inquired of those just entered, "Find anything?"

"No, there was just one Luger on em, and it's all burnt to hell, and the barrel is bent.

"The lieutenant says for us to be a little more dainty when we knock these guys down. He still hasn't got him a good Luger!"

They all laughed.
Active and Passive Defense of the United States

On several occasions Lieutenant General LeRoy Lutes has emphasized the necessity for a strong ACTIVE DEFENSE against the rockets of the future. Likewise he has spoken of the probable necessity for the establishment of a perimeter defense of the United States as well as critical industrial areas.

When we consider the number of regular army antiaircraft troops that will be available in time of peace for this task, we realize that it is a job, and a tremendous one, for the National Guard and Officers Reserve Corps.

As if this in itself were not enough there is a still larger task facing these two components in the organization of the entire country for PASSIVE DEFENSE.

The defense against rockets although demanding much thought and planning is as yet not of general concern but the passive defense against heavy bombardment and possible atomic bomb attacks demands immediate attention as the weapons necessitating this defense are already in existence.

The vital role played by the passive defense agencies in the defense of the British Isles was not only a source of inspiration to its armed forces, it minimized and finally virtually neutralized the effects of enemy air attacks launched against the United Kingdom thus freeing the armed services to repel any enemy assault landings which may have been forthcoming.

The degree of organization and research consistent with the development of these agencies within the British Isles assumed astronomical proportions before they reached the peak of efficiency which we all so well remember.

During this period Germany was on the offensive on the ground and in the air, and the defense of the homeland had been given very little thought perhaps with the now outmoded idea that a good offense is the best defense.

It was not long before she realized that the two were not synonymous, as massed allied air attacks began to bring destruction to Germany proper. Feverishly passive defense measures were instigated and civilians mobilized for its execution. Eventually the organization functioned at a parallel in efficiency to its British counterpart as witness by the fact that the Wehrmacht continued to fight a surprisingly strong war though the vital installations were being constantly subjected to extremely heavy air raids.

In both cases, many lessons were learned through the trial and error method and much destruction wrought initially before success was attained in the various fields of passive defense.

In view of this it is recommended that a passive defense program be immediately initiated for the United States and its possessions and that a study be made of the British and German systems in order that we may incorporate into our plan the experiences of both these nations. In this respect it is felt that we may benefit more by the experiences of the Germans since the scale of the bombing in Germany in all probability more closely resembled the types of attacks we would be subjected to, and the adequacy or inadequacy of their measures should be a great aid to us. There is doubt that during the war just passed we had an excellent system but it was not battle tested as were the British and German.

It is proposed that a board of officers and civilians be appointed to make studies and recommendations for the preparation of a national network of passive defense.

It is further proposed that initial efforts be devoted to establishing correct procedures before the actual format of the program. This may be accomplished by consulting the leaders in the development of new weapons, experienced industrialists and prominent officials in our government.

It is believed that if government, state and city agencies and industrialists are well informed and kept abreast of developments in new weapons, they will draw proper conclusions as to the passive defense requirements in the localities. Likewise National Guard, Reserve units and unaffiliated officers should be contacted and all parties informed on the following subjects:

1. Passive defense measures utilized by the British and Germans with recommendations for their improvement of officials who have actually seen the plans in operation.

2. Camouflage recommendations in general and for particular installations concerned.

3. The assistance the Government, Army and Navy are prepared to offer.

4. Capabilities of new weapons. (This may be done without disclosing the characteristics.)

5. Capabilities of any aggressor nation along with information concerning probable areas of attack in the event of hostilities.

6. The early warning facilities available to the community.

Passive Defense Measures. The organization of active measures demands the utmost in discretion, cooperation and foresight. In its inception, the public must not be lulled into the same feeling of false security as the overt possesses when he buries his head in the sand. Nor on the other hand should loose talk and awesome literature concerning modern warfare alarm the populace unduly.

A cool logical analysis must be made of the following phases of the over-all passive defense picture:

1. Dispersion-The separation and decentralization of vital governmental and industrial agencies. This may include recommendations for locations for new factories, expansion of old ones.

2. Bombproof shelters-A study of the requirements for personnel, matériel, food, etc. The construction of underground power plants, communications and other utilities may fall in this category.

3. Camouflage-With the advent of bombing by
A captured enemy document, written by a division commander, perhaps pays as great a tribute to all the forces responsible for supply of the front-line troops as can be found. He wrote:

"I cannot understand these Americans. Each night we know that we have cut them to pieces, inflicted heavy casualties, mowed down their transport. We know, in some cases, we have almost decimated entire battalions. But—in the morning, we are suddenly faced with fresh battalions, with complete replacements of men, machines, food, tools, and weapons. This happens day after day. If I did not see it with my own eyes, I would say it is impossible to give this kind of support to front-line troops so far from their bases."—From the Report by the Supreme Commander to the Combined Chiefs of Staff on the Operations in Europe of the Allied Expeditionary Force.
This Issue's Cover

The cover for this issue shows an M-15 of one of the 71st Brigade's self-propelled battalions in Italy. It has been used as a cover illustration because the history of the 71st appears in this issue and because it shows the typical terrain in which the Brigade operated during a great part of the Italian campaign.

Guided Missiles Program

Under a recent War Department directive, The Commanding General, Army Air Forces has been made responsible for WD activities pertaining to the research and development of guided missiles.

This directive however will not alter or affect the current experiments or contracts of the Ordnance Department and Signal Corps except that their guided missiles activities will be conducted with the cognizance of the Army Air Forces.

The AAF Technical Committee, consisting of representatives from all using and developing agencies, will assign projects to the separate research and development agencies except that in case of a disagreement within the committee the issue will be referred to the Research and Development Division of the War Department for disposition. The Commanding General, Army Air Forces has been directed to utilize existing facilities of other War Department agencies to the maximum.

The Research and Development Division of the War Department General Staff is headed up by Major General Henry S. Aurand (transferred from CAC to Ordnance 1920). Brigadier General Earl S. Hoag (formerly Corps) is Deputy Director. Colonel Herbert W. Marsh GSC (CAC) is Chief of the Development Group of that Division.

Since the function of the Antiaircraft Artillery and Guided Missiles Branch at Bliss is the operational testing of equipment, this directive will not affect the status of Bliss.

The War Department is now studying plans for the first delegation of responsibility for the operation of guided missiles.

AGF Guided Missile Group Chief Transferred

Colonel Clare Armstrong, Chief of Section for the Antiaircraft Artillery, Harbor Defense and Guided Missiles Group of Headquarters Army Ground Forces has been transferred. His new assignment is that of Military Attaché to Belgium and Luxembourg.

Although his successor has not been appointed, it is possible that Colonel John Davis, who has been Colonel Armstrong's assistant, will continue in the capacity of Section Chief as he has done since the departure of Colonel Armstrong.
Election of New Executive Council Members

The President and three other members of the council are to be elected to replace the following members whose terms of office expire on 31 December 1946:

Lieutenant General LeR. Lutes (President)
Brigadier General E. A. Stockton
Brigadier General E. A. Evans
Brigadier General R. M. Starr

The following members will hold office until 31 December 1947:

Brigadier General Aaron Bradshaw, Chief of Service Group; Service, Supply and Procurement Division, W.D.G.S.
Colonel Hobart Hewett, Developments Section, HQ, AGF, Fort Monroe, Va.
Colonel W. I. Brady, Editor, COAST ARTILLERY JOURNAL, Washington, D. C.
Colonel A. P. Sullivan, Executive, Plans and Policy Office; Service, Supply and Procurement Division, W.D.G.S.
Colonel E. G. Martin, Artillery Branch, G-3 Section, HQ, AGF, Fort Monroe, Va.

Active members of the Association are eligible to vote. All necessary instructions are contained in the ballot page. Please forward complete ballots to the COAST ARTILLERY JOURNAL, 631 Pennsylvania Ave., N.W., Washington 4, D. C.

ERRATA—SEPTEMBER-OCTOBER ISSUE
ADDRESS SUPPLEMENT

Brigadier General
Drew E., HQ, HQ & SV Group, GHQ, AFPAC, APO No. 500
7 M. San Francisco, Calif.

Colones

F. Howard F., Jr., 121 Fairview Road, Springfield, Delaware
Jr., P.O. Box 184, Manly B. (erroneously listed as Lieutenant Colonel), HD of
D. D., 3082 South Woodrow St., Arlington, Virginia.

Stahl, Chas., Centre Furnace, State College, Pa.

Lieutenant Colonel

Albert J., 4414 36th St., Arlington, Va.

Captain

William P., 126 Moffat Road, Waban 68, Mass.

Coast Artillery Orders (Page 76)

Sam C. Russell, student, National War College, Washington 25,
Michael M. Irvine, Alaskan Department, APO 942, Seattle, Washington.

National Guard Instructors (Page 55)

Colonel Earl D. Potter, Infantry.

CAC ROTC Instructors (Page 58)

University, Fordham, New York—Colonel Norman E. Hur.

Replacement and School Command Inactivated

On 31 October, the Replacement and School Command was activated and its functions were made the responsibility of Headquarters, Army Ground Forces at Fort Monro, Virginia.
Amendment of Association Constitution

Application has been made for the amendment of the Constitution of the Coast Artillery Association.

In order to assist MEMBERS in voting, the entire constitution is published below, followed by the ballot for the amendments.

Before voting, attention is invited to ARTICLES IV and VI as they now stand and to ARTICLE XVI which explains the procedure for amendment.

The primary purpose for submitting the proposed amendments was to make active memberships available to all present and former enlisted men as well as present and former officers of the Coast Artillery Corps.

CONSTITUTION OF THE UNITED STATES COAST ARTILLERY ASSOCIATION

ARTICLE I

The name of the Association shall be the United States Coast Artillery Association.

ARTICLE II

The offices and headquarters of the Association shall be in Washington, D.C.

ARTICLE III

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 toward improvement of material and methods of training, and by fostering mutual understanding, respect and cooperation among all arms, branches and components of the Regular Army, Organized Reserves, National Guard, and Reserve Officers Training Corps.

ARTICLE IV

Section 1. The Association shall consist of Active, Associate, and Honorary members.

Section 2. The following shall be eligible for active membership:

a. Commissioned officers, active or retired, of the Coast Artillery of the Army of the United States.

b. Commissioned officers, active or retired, of the Staff Corps and Departments of the Army of the United States who at any time have served in the Coast Artillery.

c. Commissioned officers, active or retired, of the Philippine Scouts who have served in the Coast Artillery.

d. Former commissioned officers of Coast Artillery of honorable records in the Army of the United States.

e. General officers, active or retired, of the Army of the United States.

Section 3. The following shall be eligible for associate membership:

a. Commissioned officers and former commissioned officers in good standing of the United States Army, Navy, Marine Corps, Coast Guard, and the Public Health Service.

b. Warrant officers and noncommissioned officers of the Coast Artillery of the Army of the United States.

c. Members of Coast Artillery units of the Reserve Officers Training Corps and Citizens' Military Training Camps.

Section 4. The following shall be eligible for honorary membership:

a. Civilians who have demonstrated their interest in national military preparedness.

b. Persons who have rendered distinguished services to the Association or to the United States.

Section 5. Any member may withdraw from the Association by tendering his resignation in writing.

Section 6. Any member may be expelled from the Association for cause by the unanimous vote of the Council; provided, that before any member is expelled, he shall have been given an opportunity to be heard in his own defense.

Section 7. For the purpose of this constitution the Army of the United States shall be considered to be composed of the Regular Army, Organized Reserves, and the National Guard.

ARTICLE V

Section 1. Meetings, both annual and special, shall be held as provided by the by-laws.

Section 2. All members of the Association shall have privilege of the floor at any meeting of the Association, and each active member shall be entitled to one vote on all questions, subject to the provisions of Articles VI and XVI.

ARTICLE VI

Section 1. The elective officers of the Association shall be a President, a Vice President, and seven members of the Executive Council. They shall hold office for two years until their successors have been appointed.

Section 2. The officers of the Association shall be chosen from the active members.

Section 3. The Executive Council shall appoint a Secretary-Treasurer to hold office at the pleasure of the Council. The Secretary-Treasurer shall be an officer of the Regular Army duty at Washington. If he is not a member of the Council he shall have no vote in its deliberations.

Section 4. At least five of the elective officers shall be Coast Artillery Officers on active duty.

Section 5. At the regular election of officers of the Association next succeeding the adoption of this constitution, the President and four members of the Council shall be elected for a term of two years and the Vice President and three members of the Council shall be elected for one year; and the after, at each successive annual meeting, successors shall be elected for the full term of two years.

Section 6. A vacancy occurring among elective officers shall be filled by the Executive Council for the unexpired part of the term.

ARTICLE VII

The duties of the officers of the Association shall be such as are incident to their respective offices and such as the by-laws or the Association directs.

ARTICLE VIII

The Executive Council shall have the power to make, alter, or amend the by-laws.

ARTICLE IX

The Coast Artillery Journal shall be the official publication of this Association.

Subscription to the Journal shall not be considered essential to membership or as dues for membership.

ARTICLE X

Section 1. The Executive Council shall consist of the President, the Vice President, and the seven elected members.

Section 2. Five members shall constitute a quorum for the transaction of any business.

Section 3. The Executive Council shall have charge of the general administration of the affairs of the Association, and the Articles set forth in this Constitution. It shall author...
ARTICLE XI
The Secretary-Treasurer
He shall perform such duties as are usually specified for such officers. He shall keep a journal of the proceedings of the Executive Council and of the regular and special meetings of the Association. He shall have charge of the finances and correspondence of the Association, under the Executive Council, and be at all times subject to its orders. He shall keep an account of the finances of the Association, and at each annual meeting of the Association, or on demand of the Executive Council, he shall make a complete report of the financial state of the Association and such other matters as may be called for by the Council.

ARTICLE XII
The Association shall publish an annual report and shall furnish this report and bulletins of timely professional interest to all members.

ARTICLE XIII
There shall be neither assessments nor annual dues.

ARTICLE XIV
The organization of the Coast Artillery Association may include Branch Associations.

ARTICLE XV
Section 1. This Constitution shall be considered as adopted and shall be in effect when it shall have been accepted and subscribed to by not fewer than one hundred persons having the qualifications prescribed for active members, who shall then thereupon be known as Charter Members of the Association.

Section 2. Immediately upon the adoption of this Constitution the Charter Members shall proceed to the election of officers according to Section 5, Article VI of this Constitution. This election shall be held by secret ballot and shall be in accordance with the rules prescribed for active members. Officers so elected shall qualify as members of the Association before assuming office.

ARTICLE XVI
Amendment
Section 1. This Constitution may be amended or altered by affirmative vote of two-thirds of the ballots cast by active members. Votes may be cast in person or by properly authenticated proxies. To obtain consideration of any proposed amendment, a written application requesting such consideration setting forth, in detail, the nature of such change and reasons therefor, shall be signed by not fewer than twenty members and submitted to the Secretary. This application shall be submitted at least one hundred and twenty days prior to the time of meeting. The Executive Council will direct the Secretary to give notice of the proposed amendment to all members entitled to vote so that it may be received at least ten days prior to the meeting at which it is to be considered. Notice will contain the proposed amendment and the signatures of the proposers.

Section 2. The mailing of proposed amendments to the last known address of any active member not less than ninety days prior to the date of the meeting shall constitute due notice.

For the Amendment of the Constitution

ARTICLE IV
It is moved that Sections 2 and 3 be amended to read as follows:

Section 2. The following shall be eligible for active membership: All officers and enlisted men or former officers and enlisted men of the Coast Artillery Corps of the Army of the United States.

Yes. No

Section 3. The following shall be eligible for associate membership: All officers and enlisted men and former officers and enlisted men of the Army of the United States, Navy, Marine Corps, Coast Guard and members of the Coast Artillery units of the Reserve Officers Training Corps.

Yes. No

ARTICLE VI
It is moved that Sections 1 and 4 be amended to read as follows:

Section 1. The elective officers of the Association shall be a President, a Vice President and seven members of the Executive Council all of whom shall be members of the Coast Artillery Corps. They shall hold office for two years or until their successors have been appointed.

Yes. No

Section 4. At least five of the elective members shall be personnel residing in Washington, D.C., or vicinity, a minimum of three to be on active duty.

Yes. No

In accordance with Section 1, Article XVI, the following members signed the application for amendment:

Brig. Gen. Aaron Bradshaw
Lt. Col. G. A. Baldry
Col. L. B. Weeks
Lt. Col. E. D. Light
Col. Joe D. Moss
Lt. Col. O. R. Marshall
Col. T. L. Davis
Lt. Col. K. F. Tilton
Col. Edward Barber
Lt. Col. G. N. Adkins
Col. Paul H. French
Lt. Col. I. J. Davis
Col. A. P. Sullivan
Major R. M. Colquitt
Col. W. F. McPherson
Major G. R. Evans
Col. F. T. Folk
Major C. J. Odenweller, Jr.
Col. E. G. Martin
Major Theodore Johnson
Col. W. H. Brucker
Major M. C. Ross
Lt. Col. C. L. Partin
Capt. A. J. Lacourt, Jr.
Lt. Col. N. B. Wilson
Capt. M. A. Rogers

1st Lt. E. L. White

(A proxy will be designated by members only when they desire to delegate their authority to vote.)

Proxy to

Signature of Member

Rank and organization

Address
National Guard

Below listed by States, are all the Coast Artillery Corps National Guard units which have been federally recognized as of the middle of November:

**California**
- 112th AAA Brigade
- 233d AAA Group
- 250th AAA Group

**District of Columbia**
- Headquarters & Headquarters Battery, 198th AAA Group
- 945th AAA AW Battalion

**Delaware**
- Headquarters & Headquarters Battery, 198th AAA Group
- 945th AAA AW Battalion

**Florida**

**Georgia**

**Idaho**
- Col. James W. Barnett, Cav., Senior Instructor.

**Illinois**
- Col. C. I. McClure, FA, Senior Instructor; Maj. Raymond S. Isenson, CAC, Instructor.

**Iowa**
- Col. Robert L. Taylor, FA, Senior Instructor.

**Kentucky**

**Louisiana**
- Col. Francis A. Woolley, Inf., Senior Instructor.

**Maine**

**Maryland**

**Minnesota**
- Col. Mose Kent, Inf., Senior Instructor; Lt. Col. Lawrence W. Adams, CAC, Instructor.

**Mississippi**
- Col. Thomas G. Olyphant, FA, Senior Instructor.

**New Hampshire**
- Col. Carroll A. Bagby, Inf., Senior Instructor.

**New Jersey**
- Col. Frederick Herr, Cav., Senior Instructor.

**New Mexico**
- Col. Claude M. Thiele, CAC, Senior Instructor; Col. Clarence E. Rothgeb, CAC, Brigade Instructor.

**New York**

**North Carolina**
- Col. William T. Fitts, Jr., Inf., Senior Instructor; Lt. Col. Stewart L. McKenney, CAC, Instructor.

**North Dakota**
- Col. Eric A. Erickson, FA, Senior Instructor.

**Ohio**
- Col. Robert H. Van Volkenburgh, CAC, Senior Instructor; Maj. Clarence E. Gushurst, CAC, Instructor.

**Oklahoma**
- Col. David W. Craig, FA, Senior Instructor.

**Oregon**

**Pennsylvania**
- Col. Leo T. McMahon, FA, Senior Instructor; Col. Donald McLean, CAC, Instructor; Maj. Matthew J. Redlinger, CAC, Instructor.

**Rhode Island**
- Col. Horace Harding, FA, Senior Instructor.

**South Carolina**
- Col. Paul R. M. Miller, FA, Senior Instructor.

**South Dakota**

**Tennessee**
- Col. Rufus S. Ramey, Cav., Senior Instructor.

**Texas**
- Col. John T. Murray, Inf., Senior Instructor.

**Utah**
- Col. Christainy Pickett, FA, Senior Instructor.

**Vermont**

**Virginia**
- Col. Robert L. Strohbehn, FA, Senior Instructor.

**Washington**
- Col. Dean Luce, CAC, Senior Instructor; Lt. Col. J. K. McCormick, CAC, Instructor.

**Wisconsin**
- Col. Archibald M. Mixson, Inf., Senior Instructor.

**Wyoming**
- Col. Robert E. Turley, CAC, Senior Instructor.
Organized Reserve Corps

The following list of the state instructors and their locations supplements the list published on page 54 of the November-October issue of the Journal.

Two changes will be noted in the list of senior instructors. Colonel Alba C. Spalding, CAC, is now senior instructor for the State of Kentucky instead of Colonel John Rodman, Infantry. Colonel John D. Kelly, Cavalry, is senior instructor for the State of Illinois instead of Colonel Edwin A. Smith, Infantry.

Names which were in error in the last issue have been rectified in this one and appear as they should be in the foregoing list.

**FIRST ARMY**

Colonel Irving C. Avery, Inf., Senior Instructor, Trenton, N. J.

**SECOND ARMY**

Colonel Edward F. Adams, CAC, Senior Instructor, Indianapolis, Ind.

Captain LeRoy M. Ludwig, CAC, Unit Instructor, Indianapolis, Ind.

Colonel Alba C. Spalding, CAC, Senior Instructor, Louisville, Ky.

Colonel John M. Lentz, FA, Senior Instructor, Baltimore, Md.

Colonel George F. Young, CAC, Senior Instructor, Columbus, Ohio.

Colonel James B. Carroll, CAC, Senior Instructor, Philadelphia, Pa.

**THIRD ARMY**

Colonel Hiram W. Tarkington, FA, Senior Instructor, Jacksonville, Fla.

Colonel John K. Miller, Inf., Senior Instructor, Atlanta, Ga.

Colonel Joy T. Wream, CAC, Senior Instructor, Nashville, Tenn.

**FOURTH ARMY**

Colonel Otto Ellis, FA, Senior Instructor, Little Rock, Arkansas.


Colonel Albert N. Rothermich, Inf., Senior Instructor, Albuquerque, N. M.

Colonel John P. Evans, Inf., Senior Instructor, Oklahoma City, Okla.

Colonel Hudley E. Fuller, Inf., Senior Instructor, Austin, Texas.

**FIFTH ARMY**

Col. Roy K. Kauffman, CAC, Asst. Senior Instructor, Denver, Col.

Colonel John D. Kelly, Cav., Senior Instructor, Chicago, Ill.

Colonel John H. Featherston, CAC, Senior Instructor, Des Moines, Iowa.

Colonel John F. Landis, Inf., Senior Instructor, Minneapolis, Minn.

Colonel Luke D. Zech, Inf., Senior Instructor, Bismarck, N. D.

Lt. Col. William B. Reardon, CAC, Asst. Senior Instructor, Milwaukee, Wis.

**SIXTH ARMY**

Colonel Thomas G. Poland, Inf., Senior Instructor, Phoenix, Ariz.

Colonel Roger Hilsman, Inf., Senior Instructor, San Francisco, Calif.

Colonel Robert W. Yates, FA, Senior Instructor, Reno, Nev.

Colonel LeCount Slocum, FA, Senior Instructor, Seattle, Wash.

The following ORC units have been activated and the ultimate change in category of each unit is indicated, followed by their station:

**FIRST ARMY**

305th AAA Brigade, Hq. & Hq. Bty. from C to A, New York City, N. Y.

**SECOND ARMY**

113th AAA Brigade from C to B, Cincinnati, Ohio.

377th AAA AW Battalion from C to A, Pittsburgh, Pa.

466th AAA AW Battalion, from C to A, Roanoke, Va.

535th AAA AW Battalion, from C to B, Indianapolis, Ind.

307th CA Battalion (HD) from C to A, Norfolk, Va.

312th CA Battalion (HD) from C to C, Newport News.

853d CA Battery from C to C, Mansfield, Pa.

**THIRD ARMY**

323d AAA AW Battalion, from C to A, Billings, Mont.

382d AAA AW Battalion from C to A, Oakland, Calif.

304th CA Battery (HD) from C to A, Portland, Ore.

331st CA Gun Battery (HD) from C to A, San Francisco, Calif.

332d CA Gun Battery (HD) from C to A, San Diego, Calif.

**FOURTH ARMY**

321st AAA AW Battalion from C to B, Tuscaloosa, Ala.

373d AAA AW Battalion from C to A, Wilmington, N. C.

376th AAA AW Battalion from C to B, Charleston, S. C.

634th CA Battery from C to C, Wilmington, N. C.

830th CA Battery (155) from C to A, Mobile, Ala.

854th CA Battery (155) from C to C, Wilmington, N. C.

**FIFTH ARMY**

855th CA Battery (155) from C to A, Charleston, S. C.

856th CA Battery (155) from C to B, Savannah, Ga.

Orders on General Homer and General Frederick

Under orders just issued, Major Generals John L. Homer and Robert T. Frederick have been detailed as Assistant Commandants of the Artillery School. In addition General Homer is designated "Officer in Charge" of the Anti-Aircraft Artillery and Guided Missiles Branch and General Frederick, "Officer in Charge" of the Seacoast Branch.
Revision of Army Ground Forces School System

With a view to consolidating the Service Schools, reducing overhead and more completely integrating the whole A.G.F. school system, certain changes have been made under a directive issued by General Devers on 17 October. Now that the Antiaircraft Artillery School and Coast Artillery School have been redesignated as branches of the Antiaircraft Artillery and Guided Missiles Branch and The Seacoast Artillery Branch respectively, the curriculum at both installations has been altered.

One noticeable change is the consolidation of all A.G.F. officers' and enlisted men's motor courses at The Armored School, Fort Knox, Kentucky, and the addition of an enlisted men's track vehicle course for antiaircraft personnel which will also be held at Knox.

The following courses will be dropped at end of current school year from the present Coast Artillery School curriculum:

- Basic Branch
- Advanced Branch

The new curriculum of The Seacoast Branch of the Artillery School will be as shown below:

<table>
<thead>
<tr>
<th>Course</th>
<th>Effective Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Basic Branch</td>
<td>15 February 1947</td>
</tr>
<tr>
<td>b. Advanced Branch</td>
<td>At end of current</td>
</tr>
<tr>
<td></td>
<td>school year</td>
</tr>
<tr>
<td>c. Officer Communications</td>
<td>29 January 1947</td>
</tr>
<tr>
<td>d. Officers Motor (Transferred to Knox)</td>
<td>20 December 1946</td>
</tr>
<tr>
<td>e. PMST</td>
<td>At once</td>
</tr>
<tr>
<td>f. National Guard Instructor</td>
<td>At once</td>
</tr>
<tr>
<td>g. Enlisted Motor (Transferred to Knox)</td>
<td>14 February 1947</td>
</tr>
<tr>
<td>h. Enlisted Communications Chief</td>
<td>29 January 1947</td>
</tr>
<tr>
<td>i. Enlisted Radio Operator</td>
<td>29 January 1947</td>
</tr>
<tr>
<td>j. Armorer and Artillery Mechanics</td>
<td>July 1947</td>
</tr>
</tbody>
</table>

The new curriculum of The Antiaircraft Artillery and Guided Missiles Branch of the Artillery School will be as shown below:

<table>
<thead>
<tr>
<th>Course</th>
<th>Class</th>
<th>Course</th>
<th>Tentative Starting Dates:</th>
<th>Length</th>
<th>Capacity</th>
<th>Capacity Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Basic Branch</td>
<td>1</td>
<td>25</td>
<td>25</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Advanced Branch</td>
<td>1</td>
<td>10</td>
<td>10</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Officer Communications</td>
<td>1</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
- Diesel Motors: 8 January, 18 1/2 wks: 12 12 24
- Electrical: 8 January: 18 1/2 wks: 12 12 24
- Gun Data Computer: 8 January: 18 1/2 wks: 12 12 24
- Seacoast Radar: 8 January: 18 1/2 wks: 12 12 24
- Submarine Mine Operator: 8 January: 18 1/2 wks: 12 12 24

The starting dates shown are not necessarily the exact time the courses will begin, but have been used as a basis for planning.

AARTC Commended on Inspection

As a result of an inspection of the facilities, activities and training at the Antiaircraft Artillery Replacement Training Center at Fort Bliss, the following letter was received from the Commanding General, Army Ground Forces.

To: Commanding General, Antiaircraft Artillery Replacement Training Center, Fort Bliss, Texas.

Although space precludes the publication of the entire report, it is interesting to note that it contained no adverse comments and all matters reported on were rated either superior or excellent.

Colonel Evan C. Seaman is commendant of the AARTC while Colonel Charles H. Treat and Colonel Lawrence E. Shaw command respectively the 11th and 12th Groups.

333.1 GNRSRG

SUBJECT: Report of Inspection

BY COMMAND OF GENERAL DEVERS:

/s/ Ralph J. Canine
/t/ RALPH J. CANINE
Brigadier General, GSC
Chief of Staff
Antiaircraft Artillery Anniversary

The following letter was written by General Devers and used by General Hodges in commemoration of the 29th anniversary of the Antiaircraft Artillery:

HEADQUARTERS
ARMY GROUND FORCES
OFFICE OF THE COMMANDING GENERAL
Fort Monroe, Va.

4 October 1946.

SUBJECT: Antiaircraft Artillery Anniversary

Commanding General, First Army
Governors Island, New York 4, N. Y.

Twenty-nine years ago in October, 1917, the Antiaircraft artillery of the United States Army was established when a small group of Artillery officers were detailed to attend the French Antiaircraft Artillery School.

Since that time the development of weapons, techniques and tactics of antiaircraft artillery in the American army have steadily progressed.

During World War II our Antiaircraft Artillery was greatly expanded and their troops were stationed all over the world. It was only once that these troops proved their versatility by not fighting in their normal role but additionally as close support direct fire artillery and even, upon occasion, as infantry.

The Army Ground Forces take great pride in the outstanding technical accomplishments and superb fighting traditions of their Antiaircraft Artillery. We are happy to congratulate them on their Twenty-ninth Anniversary.

Sincerely yours,

JACOB L. DEVERS
/s/ JACOB L. DEVERS
General, USA
Commanding

General, USA
Commanding

AHFCG

HEADQUARTERS FIRST ARMY, Governors Island, New York 4, N. Y., 10 October 1946

Commanders, Class I and II Installations
Commanding General, First Service Command
Officer-in-Charge, NY-NJ & Delaware Military District

In World War II, Antiaircraft Artillery Units, composed entirely of National Guard, Organized Reserve Corps and US personnel, were an invaluable part in the winning team in every theater of operations. On the beaches of Normandy, Iwo Jima and Okinawa, in Europe and the Pacific islands, and in the buzz bombs of London and Antwerp, American Antiaircraft acquired themselves with distinction worthy of the highest praise.

It is a pleasure to add my personal compliments and congratulations to those of the Commanding General, Ground Forces for a job well done.

COURTNEY H. HODGES
/s/ COURTNEY H. HODGES
General, U. S. Army
Commanding

General Curtis Given Federal Recognition

Federal recognition as a General Officer of the National Guard has been given to Brigadier General Charles G. Curtis of Allentown, Pennsylvania as Commanding General of the 51st AAA Brigade.

General Curtis served on the Mexican Border and later in Europe as a lieutenant with the 28th Division in World War I.

He reentered the Pennsylvania National Guard in 1920. After serving through various ranks in the historic 213 CA (AA) Regiment, he was promoted to colonel and assumed command of the regiment in 1938.

After taking this regiment into Federal Service in September 1940, General Curtis remained in command until 4 December 1941 when he assumed command of the 33rd AAA Brigade.

He was promoted to Brigadier General 17 December 1941 and remained in command of the antiaircraft defenses of San Diego, he moved to Fort Bliss to assume command there.

He took the 51st AAA Brigade to Europe in February 1944 and as its Commanding General, participated in the Normandy, Northern France, Rhineland and Central Europe Campaign as well as receiving Battle participation credit for operations of the Brigade in the air defense of Great Britain.

He returned to inactive status 14 January 1946.

General Curtis is one of the few general officers to resume command of his wartime brigade and the 51st may well be expected to maintain the standards and traditions gained in combat.

Unit Histories

The following unit histories have been received at the JOURNAL office since the last issue:

38th AAA Brigade
*51st AAA Brigade
*213th AAA Group
24th AAA Group
863d AAA AW Battalion

*(Both units included in one book)
About Our Authors

Captain James G. Holmes served in the 71st AAA Brigade from the time it was activated until its deactivation. In addition to being Aide-de-Camp, he was historian for the Brigade throughout its existence. (Page 2)

Colonel Carl F. Tischbein, after writing the "Activities of the 14th AAA Command" which appeared in the last issue, makes another interesting contribution to this issue in his article about Russia, on which he is well informed. (Page 9)

Dr. Ancel St. John is an engineer in the Rocket Development Division, Research and Development Service, Office of Chief of Ordnance. (Page 16)

Captain G. H. Drewry, Jr., is a member of the Air Branch Development Group, Research and Development Division, W.D.G.S. He graduated from California Institute of Technology in 1946 with an MS in Aeronautics. He has been on two special missions to Germany in connection with the German V-1 and V-2. (Page 16)

Gifford E. White is in charge of the Special Weapons Engineering Department of Sperry Gyroscope Company. He is responsible for carrying on research in guided missiles and pilotless aircraft. This is Dr. White's second contribution to the Journal, his other article on Rockets appeared on page 10 of the July-August issue. (Page 18)

Louis N. Ridenour is a professor of physics at the University of Pennsylvania. During the war he served as Assistant Director of the Radiation Laboratory at M.I.T., and later as chief Radar Advisor to General Spaatz then commanding USSTAF. (Page 23)

Lieutenant Colonel Leonard M. Orman makes his sixth consecutive contribution to the Journal in this issue. As previously stated, Colonel Orman is now an instructor in the Department of Electronics and Electricity at the United States Military Academy. (Page 27)

Colonel Robert W. Robb as an assistant in the G-2 Section of Fourth Army watched Colonel Rasmussen organize the first Japanese language school and later as Chief of the Training Branch, Military Intelligence Division, W.D.G.S., Colonel Robb was in contact with Colonel Rasmussen who was then Commandant of the Military Intelligence Service Language School at Fort Snelling, Minn. (Page 33)

Lieutenant Colonel John W. Green first conducted experiments in the radar detection of ground targets while in Corsica in September 1944 as Radar Officer of the 44th AAA Brigade. Later in 1944 and early 1945 Colonel Green personally supervised the use of 58s for ground detection work in the XV Corps Sector during the campaigns in France and Germany. (Page 37)

Captain Richard R. Fulmer as Public Relations Officer for General Frederick wrote the story on Seacoast Artillery for the Armored Cavalry Journal and did such a good job that we are using it also. (Page 39)

Major General Clarence R. Huebner as Commanding General overseas of the famous First Division and later the V Corps writes with authority on the much discussed and controversial subject of officer selection. (Page 41)

Leonard J. Grassman is an Informational Specialist in the Press Section, War Department Public Relations Branch. This is his second article in as many issues. (Page 45)

CWO Arnold A. Bocksel was Chief Engineer of the Armored during the period he writes about. (Page 54)

Lieutenant Jack C. Berry writes of an incident which occurred (basically) in his platoon of Battery C, 225th S/A Battalion on Xmas Eve 1944 as he says, "I have added flight or two of fancy." (Page 55)

To the Editor:

I wish to take this opportunity to thank you for your efforts in compiling and publishing the address supplement which accompanied the September-October issue of the COAST ARTILLERY JOURNAL and to express generally my appreciation for the Journal as a valuable aid during my military service.

Much of my active duty service was spent as an officer on the General Staff of Headquarters XIV Corps, an assignment which took me away from an intimate contact with the Coast Artillery Corps. Under these conditions, I looked to the Journal to keep me informed on Coast Artillery affairs.

Now that I have been relieved from active duty, I anticipate that the Journal will serve as a valuable adjunct to War Department publications in furthering my military training. I am hoping that you will devote considerable space in forthcoming issues to articles dealing with new developments designed especially to assist the Reserve Officer in maintaining his state of training at the same level attained as a result of active service. I trust that in the months to come, the Journal will play such an important part in Coast Artillery affairs as to warrant expansion of publication on a monthly basis.

Yours for continued success,
Paul F. Luette, Jr.,
Major, CA-Res.


Major General G. Ralph Meyer, retired, was honored late in October with a retirement review followed by a reception at the Antiaircraft and Guided Missile Center, Fort Bliss, Texas.

Two Antiaircraft Artillery Groups with Colonel H. A. McMorrow acting as Commander of Troops passed in review before the retired General. With General Meyer in the reviewing party was Major General J. L. Homer, Commanding General of the Antiaircraft and Guided Missile Center.

In deference to General Meyer's graduation from Annapolis before he transferred to the army in 1911, the massed 62d and 247th AGF Bands played "Anchors Aweigh" while the two Generals were inspecting the troops before they passed in review.

Before his retirement, General Meyer commanded the Antiaircraft Command and the Antiaircraft Artillery School at Fort Bliss. Prior to this he was the Commanding General of the Panama Coast Artillery Command, and Deputy Commander of the Panama Canal Department.

Since his retirement, General Meyer has concentrated on his lifelong hobby of studying and painting birds. He has already gained nation-wide recognition for his work with the Audubon Society and is currently preparing drawings and an article for the National Geographic Society.
individual, whether or not he is a member of the service, is invited to submit constructive suggestions relating to items under study by the Seacoast Service Test Section, Army Ground Forces Board No. 1, or to present any new items that may properly be considered by the Section. Communications should be addressed to the President, Seacoast Service Test Section, Army Ground Forces Board No. 1, Fort Baker, California. Pertaining to Anti-aircraft Artillery should be sent to the Anti-aircraft Test Section, Army Ground Forces Board No. 4, Fort Bliss, Texas.

Any recommendations made or views expressed herein are those of Army Ground Forces Board No. 1 and are not to construed as representing the opinion of all War Department or Army Ground Forces Agencies.

COLONEL R. E. DINGEMEAN, Director

LT. COL. JAMES T. BARBER

LT. COL. WILLIAM R. MURRIN

LT. COL. GEORGE B. WEBSTER, JR.

CAPTAIN HAROLD R. BRANTNER

OFFSET METHOD FIRING. The project on the offset method firing with the AN/MPG-1 radar, discussed in the September-October issue of the Journal, is continuing. A new target practice procedure for this method of firing has been drafted. Since the records for an offset practice test are obtained by photographing the tracking or spotting of the radar, it is obvious that the camera equipment is of vital importance. Current tests include photographing the tracking scope of an AN/MPG-1 during regular target practice (155mm) in order to ascertain the type of equipment and procedure needed to obtain optimum results.

HE SUBCALIBER AMMUNITION. Service tests have started on an HE round for 75mm subcaliber tubes M8, M9, M12 and M25. Heretofore, only inert practice rounds have been fired in these tubes with a resultant small splash. The HE round was developed to increase the size of the splash and to give a better echo on the scopes of the MPG radar. Tests to date have given very satisfactory results.

INITIATION OF TRAILER V-9/MPG-1 WITH RADAR SET MPG-1. The Section has recommended that the V-9/MPG-1 Ventilation Modification Kit be adopted in place of the present standard ventilation system. The major parts of the kit are a louvered front door having a hinged watertight cover, a two-piece canvas curtain with air duct cutouts, two canvas air ducts, two air deflector assemblies and two collapsible rain hoods. When both canvas air ducts are connected from the blower to the curtain, air is circulated through the front operating space. By using only one duct, fresh air is blown into the front operating space and the other blower furnishes fresh air to the rear of trailer. The tests show that the modified ventilation system will reduce temperatures inside the trailer from 10 to 20 degrees more than the present standard system. However, ventilation alone will not provide the required comfort for operating personnel in areas where temperatures are above 90 degrees or where the relative humidity is high. Air conditioning equipment is a necessity for almost all climates; it is an imperative necessity for the hotter and more humid climates.

MODIFIED OBTURATOR SPINDLE FOR 6-INCH GUNS M1903A2 AND M1905A2. A modified obturator spindle for 6-inch guns M1903A2 and M1905A2 will be tested in the near future. Reports from the field indicate that trouble has been experienced with primers sticking in these type guns; and this modified spindle was developed in an effort to remedy this.
Since the publication of the last newsletter, the personnel situation in the Pacific has changed considerably. Officers and men have been returned to the States in ever-increasing numbers and their replacements, though willing, frequently do not have the desired degree of technical skill. Intensive on-the-job training programs are being emphasized in all commands in an effort to improve the situation.

Colonel Leonard L. Davis, Commanding Officer of the 2273d AAA Command (Hawaii), and Colonel William McFadden, Commanding Officer of the 69th AAA Group (Saipan), were recent visitors in the Tokyo area for the purpose of attending an air-defense conference sponsored by the Commanding General, Pacific Air Command, United States Army.

Information has been received that the War Department has approved the plan for utilizing AAA technical instruction teams, trained in the States, in this Theater. It is estimated that the program will be fully operational by June, 1947.

Because of the frequent use of searchlight batteries as separate units in the Pacific during the past war and the present trend for their use primarily with automatic weapons battalions, a proposal to augment separate searchlight batteries by five (5) enlisted men and some additional equipment is under study. Such an increase would permit the batteries to perform their own administrative functions when operating separately, thus relieving the units to which they are attached.

To obviate the need for organizing provisional radio-controlled airplane target detachments, it has been recommended to the War Department that tables of organization and equipment for such a detachment be authorized. Proposed tables, providing one officer and seven enlisted men and such equipment as was found necessary for operation during the war in the Pacific, were included with the recommendation.

As a means of eliminating duplication in the technical services, consideration is now being given to recommending that (1) the Ordnance Department be given the responsibility for development, issue, and maintenance of fire control radar, and all wheeled vehicles; (2) the Chief Signal Officer be charged with the development of searchlight materiel, power plants, and other electrical equipment; (3) the Chief of Engineers be assigned the responsibility for all tools and construction equipment. The motivating consideration is to have maintenance and supply of a complete unit, such as the gun, director, and radar, in the searchlight and its radar, be the responsibility of one service.

The "Report of AAA Activities in the Pacific War" now being reviewed by the Historical Division of the War Department Special Staff. It is hoped that approval will be granted and that distribution of this fine document can be made shortly.

The first draft of the rewrite of the History of the 14th AAA Command has been completed. Art work, being accomplished by a Japanese artist, is showing promise and high expectations are held for a document of which antiaircraft artillerymen can well be proud.
The 138th AAA Group, consisting of Group Headquar-
ters and Headquarters Battery, 753d AAA Gun Battalion
(AR), 209th AAA AW Battalion (SP), 933d AAA AW
Battalion (SM) and the 82d Chemical Mortar Battalion,
continued its primary mission of performing security guard
the Yokohama area. Five hundred forty-nine arrests
made during the quarter ending 30 September 1946.
To other group units, the 162d AAA Operations Detach-
ment and Btry "C," 325th AAA Sit Battalion have train-
ed their primary mission and are achieving excellent
units at Johnson Army Air Base, Irumagawa.
In spite of readjustment losses and lack of replacements,
effort is being made to carry on antiaircraft training
meeting fluctuating security guard requirements.
Training is based on a rotational system within each
battalion.
At present two batteries of the 209th Battalion and one
battery from each of the other units are on full-time train-
ing. Key artillery personnel from the batteries furnishing
security guards, attend classes with the training batteries.
Battalion commanders rotate the training battery about
every forty-five (45) to sixty (60) days. A very small
nucleus of combat-trained antiaircraft enlisted personnel
and Regular Army enlistees form the basis on which the
organizations are building.
All training is directed toward a combined field exercise
and target practice. To date one and one-half batteries of
the 209th Battalion have made a motor march to MITO
for such exercises. The first antiaircraft target practice by
U. S. Army troops in Japan was fired by a platoon of the
209th half-tracks on 30 September.
The 82d Chemical Mortar Battalion had a platoon with
the 11th Airborne Division in its recent amphibious
maneuvers near YOKOSUKA. Another platoon is now at
MITO for a field exercise and 4.2" chemical mortar prac-
tice.
The search for an area for gun target practices is still
continuing. The bridges on the route to MITO must be
reinforced to take the guns. Other areas being considered
are in the vicinity of CHOSHI and KAKEZUKA. The
Navy has indicated that it will take the guns by LST to
KAKEZUKA thereby providing the gun battalion with
amphibious training.
The group is fortunate in being able to maintain close
relations with the 314th Composite Wing which furnishes
towed missions upon request. To supplement towed mis-
sions an RCAT Detachment is being formed at Johnson
Army Air Base.
The 753d AAA Gun Bn (SM) has been working hard
in preparation for its target practice, scheduled for the lat-
ter part of November. Though hampered by changing dis-
charge and rotation policies, real progress is being made
and both officers and men are eagerly awaiting the oppor-
tunity to demonstrate their capabilities.

Lt. Col. R. C. Dougan assumed command 8 September
1946. Captains Cook, Hunter, Knight, Zaldo and Lieuten-
ant Weaver reported to the battalion the first part of Sep-
tember.
The battalion at present is 35% T/O strength which
reduces the training program to occupation or on-the-job
training. Thirty-eight men are attending the XXIV Corps
University where practical as well as classical subjects are
taught. A new chapel constructed by soldier labor was dedi-
cated 8 September 1946. Colonel Yeager, Chaplain Corps,
officiated.

Lt. Col. R. C. Dougan, Commanding

The *452d AAA AW Battalion (SP) in Korea is assigned to Headquarters Special
Crops, XXIV Corps. The battalion is located in a con-
dated area one-half mile east of the Kimpo Airfield.
Present plans call for the erection of additional quonset
houses, laying out a new gun park, and enlarging the athletic
field. A new enlisted men’s and officers’ club will be con-
structed in the very near future by the Corps Engineers.
The exodus of personnel from Brigade Headquarters Battery to the Replacement Center for return to the United States for discharge during the months of August and September leaves only six of the "old" men. Replacements being received from the United States are mostly high school graduates, young and inexperienced, but willing to learn, and potentially good soldiers. Some have already displayed their desire to improve themselves for their new assignments by enrolling in courses in typing, shorthand, and drafting at the Philippine Institute for the Armed Forces (PIIFTAF) which is being conducted by AFWESPAC for the United States Armed Forces in the Manila area. Others who arrived too late to enroll for the Eighth Term are anxiously awaiting the start of the Ninth Term in November.

Several holidays were observed during the month of August. On 1 August personnel were excused from official duties at 1100 to permit the observance of, and attendance at, funeral services for former President of the Philippines Manuel Luis Quezon. 14 August, the first anniversary of the unconditional surrender of Japan, was also declared a holiday. At a ceremony attended by all troops stationed at Camp Camarilla, General McConnell read a message from General MacArthur, and delivered an address of his own. In addition, there was an invocation, benediction, and a program of martial music. At the conclusion of this ceremony the troops were dismissed for the rest of the day.

On the first ship bringing dependents to the Philippine Islands, which arrived in Manila on 1 August, were the families of General McConnell and Major David Y. Nanneney. General and Mrs. McConnell and their two sons are now residing in the Admiral Apartments on Dewey Boulevard in Manila. Major Nanneney was formerly assigned to the Brigade and is now G-2 of the Philippine Ground Force Command.

During the period 23 August to 14 September several changes were made in the assignments of officer personnel of Brigade Headquarters. Colonel Frederick L. Topping returned from TDY in the United States, was relieved from assignment to this headquarters, and was assigned to Headquarters, Philippine Ground Force Command, as Deputy Chief of Staff. 1st Lt. William J. Palm was relieved of duty as Aide-de-Camp to General McConnell and was assigned to Headquarters, Philippine Ground Force Command, with duty as A & R and T & E Officer. Colonel Peter K. Kelly was announced as Executive Officer of the Brigade on 6 September. Captain Richard Walner, Commanding Officer, Headquarters Battery, went from duty to sick in hospital and was replaced by Captain Molloy C. Vaughn, Jr., who after just returning from TDY in the United States was assigned to this command. When discharged from the hospital Captain Walner was assigned to Headquarters, Philippine Ground Force Command, for duty with the G-4 Section.

Among the new men assigned to the Btry is Pfc Macaria Villaloboz of Magdalena, New Mexico, a former member of the 200th CA (AA) Regiment which fought on Bataan. On 10 April 1942, he celebrated his thirtieth birthday as prisoner of the Japs—one day after the surrender of the American forces on Luzon. He was a member of that group of prisoners of war who made the "Death March" from Bataan, but through a quirk of fate escaped making the march. He was assigned to the third of fifteen trucks which carried the group from their surrender point to San Fernando. After an overnight stay at San Fernando the "Death March" began. However, the Japs ordered the personnel who were assigned to the first three trucks to proceed to Camp O'Donnell by truck to prepare the camp for the arrival of the "marchers." He was imprisoned at Camp O'Donnell until 1 June 1942, when he was transferred to Cabanatuan where he remained until liberated by the 6th Ranger Bn on 30 January 1945. He lost about forty pounds while a prisoner but has since regained most of the lost weight. He returned to the United States and was discharged, but four months later he reenlisted in the Regular Army for three years.

136th AAA Group, Okinawa, APO 331

Lieutenant Colonel F. T. Berg, Commanding

The readjustment program has stripped this Group of approximately 14 officers and 28 enlisted men assigned. Of these, several officers and enlisted men have been loaned to other organizations of the Ryukyu Command in order to keep certain essential functions such as communications and ration points operating.

The most noteworthy change to the community has been the arrival of dependents. The following officers have their families here now: Lt. Col. Iver A. Peterson, Major William H. Barnett, Major Willard W. Mize, Major Hugh L. Turner, Jr., Major John R. M. Covert, Capt. John F. Mangan, Capt. Derosey C. Cabell, 2dLt. Edward M. Korp, CWo Rafad Hair.

The above families are living in converted quonsets on which the antiaircraft troops did considerable work.

The following officers expect their families shortly: Lt. Col. Frederick T. Berg and Major Paul B. Wolff. Major Paul B. Wolff, recently commissioned in the Regular Army, was assigned to this command last month.

At the beginning of 1947 it is anticipated that this command will be filled up. At that time an intensive training program will be instituted and plans are now being drawn up in preparation for the instigation of this program.
Two Radio Controlled Airplane Target Detachments and the 2026th AAA Gun Battalion (Mbl) (Type "A") (PS) (Prov) were activated. The RCATD units will fly the targets to be used in antiaircraft firing in the late fall.

The 2026th AAA Gun Battalion is an AFVESPAC battalion whose function is to furnish the cadre for all AFVESPAC and RYUKYUS antiaircraft units to be activated and trained at the Antiaircraft Artillery Training Center.

601 recruits from AB-VESPAC AG Recruiting Depot reported to the Training Center in increments of 120 in the last few days of August and the first few days of September. These men were placed in the 2026th upon activation and will act as cadres for other units when trained.

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for duty and was assigned as Commanding Officer, 70th AAA Group, APO 74. The following officers reported for duty during September:


Basic training was continued for Philippine Scout units stationed at San Marcelino and the first week of basic training for 600 Philippine Scout recruits was started 9 September. The Training Center was in the path of a typhoon which swept the area during the early morning hours of 11 September doing major damage to installations. Time lost repairing the damage and rehabilitating living quarters of the troops necessitated repeating the training scheduled for that week.

Hawaiian Artillery Command

Major General George F. Moore, Commanding

On 28 August 1946, Major General George F. Moore, Commanding General of the Hawaiian Artillery Command, left Oahu for a two weeks' visit of Army installations in the Pacific. Going by way of Kwajalein, Guam, and Iwo Jima, General Moore arrived in Tokyo on 31 August to confer with General Douglas MacArthur. On his return, General Moore visited Shanghai, Okinawa, Saipan, and the Philippine Islands. Every effort is being made to compensate for the loss of experienced personnel by "on-the-job" training, specialist schools within the command, and full use of specialist schools conducted by the Commanding General, USAFMIDPAC. From 15 August to 15 September a school was conducted within the command for the purpose of improving personnel administration. The shortage of personnel, however, continues to preclude intensive training, field exercises, and target practice.

On 6 September 1946 a football team, given the name of the "Cannoneers," was formed within this command to represent the Hawaiian Artillery Command in the Oahu All Service Football League. At the present time, the "Cannoneers" are leading the league, having won all four games and lost none.

HQ 2273d AAA Command (HAW)

Colonel Leonard L. Davis, Commanding

This period has seen an almost complete turnover of enlisted personnel and a continual decrease in the officer strength, particularly in battery grades.

Through utilization of optimum quotas in the specialist training schools conducted by the Commanding General, USAFMIDPAC, units are keeping most of their key positions filled with trained personnel. However, the shortage of Antiaircraft Artillery School trained technical specialists is felt keenly. Courses under the supervision of the Commanding General, USAFMIDPAC, include communications, electronics, motors, cooks and bakers, and clerical work. In addition, units have been conducting schools on the M-10 director, gunnery, and motor maintenance.

HQ 2274th HSAC

Colonel John T. de Camp, Commanding

During the period covered by this newsletter, the personnel situation in this command improved because of replacements received from the mainland. This has helped materially to carry out our mission which includes the maintenance of the numerous seacoast installations scattered throughout Oahu.

The new Commanding General of the USAFMIDPAC, Lieutenant General John E. Hull, recently inspected several seacoast installations and commented favorably upon the condition of the installations. Major General George F. Moore, the Commanding General, Hawaiian Artillery Command, has also inspected practically all the seacoast installations under his jurisdiction and rated most of them superior.

A new member of the Seacoast Command is Colonel E. B. McCarthy, who has recently arrived from the States. Officers who returned to the States recently include: Captain Harold B. Brandner, Captain John W. Fletcher and Captain Willis H. Tassie.
A new group of casuals, many with previous service in Panama, were welcomed into the Panama Coast Artillery Command by Brig. General F. P. Hardaway on Monday, October, at the Coast Artillery Training Center at Fort Amador. These men, who arrived a few days before the announcement of the War Department's policy to release 1945 inductees, have helped to fill the resulting personnel gaps in Panama Coast Artillery organizations.

Thirteen enlisted men of the Panama Coast Artillery were returned to the United States during September and October to receive OCS training. Ten of these were selected to attend the Army Officers Candidate School at Fort Benning, Ga., and three were transferred to the U.S. Military Academy Preparatory Training Detachment at Stewart Field, N.Y., where they will pursue a course of instruction designed to prepare them for competitive examinations for admission to West Point to fill vacancies listed to enlisted men of the Army of the United States.

The Coast Artillery Command Safety Director, after study of various methods for the implementation of the Tar Department Safety Program, selected as a thoroughly suitable solution, a procedure which had been adopted by the Safety Council, at which all directives and changes thereto are discussed so that all concerned are familiar with the safety methods.

In addition to the Safety Director required by War Department instruction the Harbor Defenses of Balboa and of Fort Amador appointed a Safety Council composed of twenty enlisted men from all batteries and all posts. These men were authorized to make on-the-spot inspections of safety violations and to investigate and make recommendations for the elimination of all hazards. Frequent Safety Council meetings are conducted by the Safety Director, at which all directives and changes thereto are discussed so that all concerned are familiar with the safety methods.

Although the loss of many fine athletes, due to the recent release of men inducted during 1945, had a crippling effect on some team rosters, the Coast Artillery Command is utilizing its sports and athletics program and encouraging post competition and selection of post teams for competition within the Command and with outside groups.

The elements of Harbor Defenses of Cristobal, Fort Sherman, played a major role in demolition operations, 4 October, in which mines were used to destroy the sunken merchant vessel, SS Lena Mikovic, and erase the last Panama Canal navigation hazard resulting from World War II.

The Lena Mikovic had been lying in about sixty feet of water, approximately a mile off the Cristobal breakwater, since June 1942, when she inadvertently entered the mine field which was armed for contact firing. The plan to utilize mines in demolishing the derelict was adopted after that method proved effective in clearing a sunken barge from the approaches to the Pacific entrance to the Canal in April of this year.

The U.S. Army Mine Planter Weaver, with a planting section from Battery “C,” Harbor Defenses of Cristobal and assisted by divers from the Panama Canal Marine Division, placed sixteen loaded ground mines, which had been recovered from the mine field, in position on the deck of the sunken vessel.

On Friday morning, 4 October, the mines were fired from a control boat lying behind the Cristobal breakwater. An investigation made by divers immediately following the detonation of the 48,000 pounds of TNT showed that the derelict had been completely demolished.

On Thursday, 11 October, Major General Ray E. Porter, Deputy Commander of the Panama Canal Department, conducted an inspection tour of Panama Coast Artillery installations on the Atlantic side of the Isthmus. During the morning, General Porter witnessed automatic weapons firing on towed targets at Gela Island Firing Point, by crews of the 903d AAA (AW) Battalion, and visited field position installations of the 746th AAA Gun Battalion. That afternoon he visited Fort Sherman, where he presented the Coast Artillery Command’s “Outstanding Mess” plaque to Battery “A,” Harbor Defenses of Cristobal. This makes the second successive month that Battery “A” has held the lead in competition for the best mess in the Panama Coast Artillery Command.

Three classes were graduated from the Coast Artillery Training Center at Fort Amador on Saturday, 28 September. At ceremonies held in the Training Center auditorium on that date, Col. W. L. McCormick, Executive Officer of Headquarters, Panama Coast Artillery Command, presented diplomas to twenty enlisted men, from various Panama Coast Artillery units, who had successfully completed courses of instruction in Radio Maintenance, Radar Maintenance and AW Fire Control.

The Coast Artillery Training Center, which was established at Fort Amador in July, 1942, to provide training for the large influx of untrained Coast Artillery men during the expansion period, has trained to date 6,106 men in the various specialist courses. Of this number 2,311 were officers, 2,593 Continental, and 1,202 Insular enlisted personnel.

In addition, the Training Center has shared in the Good Neighbor policy to the extent that it has conducted special courses, in Spanish, for 103 officer and enlisted men students from various Latin-American countries—Chile, Ecuador, Guatemala, Peru, Bolivia, Colombia, Paraguay and Honduras.

Sergeant Major Stanley Braun of Headquarters, Panama Coast Artillery Command at Fort Amador, was appointed a second lieutenant in the Army of the United States on 21 October, and assigned to duty as Military Personnel Officer at Fort Gulick, Canal Zone. Lieutenant Braun, served in Panama in 1943 and 1944.
**The Antiaircraft Artillery and Guided Missiles Branch, The Artillery School**

*Fort Bliss, Texas*

**Major General John L. Hommer, Officer In Charge**

The following changes occurred during the month of September 1946:

### ARRIVALS

<table>
<thead>
<tr>
<th>Rank Name</th>
<th>Dept.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capt. James P. Carey</td>
<td>Dept. of Research &amp; Analysis</td>
</tr>
<tr>
<td>Capt. George W. Herbertson</td>
<td>SD w/5th AAA Group, Ft. Bliss, Texas</td>
</tr>
<tr>
<td>Capt. Jack R. Kennaman</td>
<td>En route to join</td>
</tr>
<tr>
<td>Capt. Harry Shabanowitz</td>
<td>Dept. of Extension Courses</td>
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<tr>
<td><em>Lt.</em> Archie Chase</td>
<td>Unasgd (Sk in hosp)</td>
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<tr>
<td><em>1st Lt.</em> Carleton D. Sherburne</td>
<td>Not yet joined</td>
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### DEPARTURES

<table>
<thead>
<tr>
<th>Rank Name</th>
<th>Dept.</th>
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<tbody>
<tr>
<td><em>Lt. Col.</em> Perry B. Priest</td>
<td>AGF Bd No. 4, Ft. Bliss Texas</td>
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<tr>
<td>Major William J. Bennett</td>
<td>FA Sch, Ft. Sill, Oklahoma</td>
</tr>
<tr>
<td>Major James R. Dillon</td>
<td>Hq, 2d Army, Baltimore, Md.</td>
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<tr>
<td>Major Fred L. White</td>
<td>CA School, Ft. Winfield Scott, Calif.</td>
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<tr>
<td>Capt. James B. Clark</td>
<td>AGF Bd No. 4, Ft. Bliss, Texas</td>
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<tr>
<td>Capt. George W. Herbertson</td>
<td>5th AAA Gp, Ft. Bliss, Texas</td>
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<tr>
<td>Capt. James McKeen</td>
<td>Sep C, Ft. Sam Houston, Tex.</td>
</tr>
<tr>
<td>Capt. Stephen M. Snopkowski</td>
<td>5th AAA Gp, Ft. Bliss, Texas</td>
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<tr>
<td>Capt. Isom C. Threatt</td>
<td>SAC, 35th AAAF Base Unit, Bolling Fld, D. C.</td>
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<td>退任 for the Antiaircraft Artillery School (see page 64)</td>
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<tr>
<th>Rank Name</th>
<th>Dept.</th>
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<tbody>
<tr>
<td>Col. Robert H. Van Volkenburgh</td>
<td>Senior Instructor, Ohio N. C. Columbus, Ohio</td>
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<tr>
<td>Lt. Col. Fred F. Newman</td>
<td>Sep Det, 4001 ASU this sta</td>
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<tr>
<td>Lt. Col. James K. Saunders</td>
<td>Sep Det, 4001 ASU this sta</td>
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<td>Major John E. Bowman</td>
<td>Sep Det, 4001 ASU this sta</td>
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<td>Major Floyd R. Brown</td>
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<td>Major Sidney W. Drennen</td>
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<td>Major Alvis F. Jackson</td>
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<td>Major Harold O. McCallum</td>
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<td>Major Franklin J. Michaelson</td>
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<td>Capt. Blyde B. Caroll</td>
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<td>Capt. Robert H. Kassner</td>
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<td>Capt. Lester P. Lanelli</td>
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<td>Capt. Nicholas P. Mastroes</td>
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<td>Capt. Kenneth W. Ramsey</td>
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<td>Capt. James M. Rowan</td>
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<td>Capt. Charles E. Stotzer</td>
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<td>1st Lt. Paul H. Bachelor</td>
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<td>1st Lt. Stanley J. Davies</td>
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<td>1st Lt. Joseph P. Fraser, Jr.</td>
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<td>1st Lt. Robert L. Kelly</td>
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<td>1st Lt. Daniel O. King</td>
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<td>1st Lt. Richard L. Kunde</td>
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<td>1st Lt. Leslie T. Laurence</td>
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<td>1st Lt. C. J. Le Van</td>
<td>Sep Det, 4001 ASU this sta</td>
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<td>1st Lt. Walter W. Long</td>
<td>Sep Det, 4001 ASU this sta</td>
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<td>1st Lt. John A. McGrane</td>
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<tr>
<td>1st Lt. George O. Moseley</td>
<td>Sep Det, 4001 ASU this sta</td>
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<tr>
<td>1st Lt. Michael J. Syso, Jr.</td>
<td>Sep Det, 4001 ASU this sta</td>
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<tr>
<td>2d Lt. William Etingoff</td>
<td>Sep Det, 4001 ASU this sta</td>
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<tr>
<td>CWO Edward A. Todd</td>
<td>Sep Det, 4001 ASU this sta</td>
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<tr>
<td>CWO Wilber J. Whaite</td>
<td>Sep Det, 4001 ASU this sta</td>
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<tr>
<td>CWO Doyle L. Woodward</td>
<td>Sep Det, 4001 ASU this sta</td>
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<tr>
<td>WOJG Lester L. Hill</td>
<td>Sep Det, 4001 ASU this sta</td>
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The following changes occurred during the month of October 1946:
inspections of the various subordinate headquarters of the Group. Formation of the line batteries of the battalions will depend on return of the armory by the FBI to the District Guard.

Recruiting for all units is proceeding on a cadre basis. Vacancies still exist in the Searchlight, Automatic Weapons, and Gun Battalions for qualified noncommissioned personnel. The Ordnance Maintenance Company and the Radar Maintenance Detachments also have some vacancies.

The District of Columbia was unable to participate in the Nation-wide return of colors to the units of the National Guard because of unavailability of its Armory. It is hoped that the near future will see the return of the use of this structure for the units of the Guard.

1st Lt. George W. Kennedy, Jr., Group Communications Officer has been designated Signal Maintenance and Repair Supervisor for the District of Columbia. Applications for the many caretaker assignments allotted the District are now being processed.
MAJOR GENERAL

Goodman, William M., to retire.

BRIGADIER GENERALS

McSherry, Frank J., to retire.
Stockton, Edward A., Jr., to retire.
Strong, Alden G., to retire.
Underwood, Edgar H., to retire.
Wilson, John H., to retire.

COLONELS

Adams, Edward F., to Hq Second Army, Baltimore, Md., w/sta at Indianapolis, Ind. Det. as Senior Instructor Organized Reserve State of Indiana.
Armstrong, Charles R., to AGO Casuals, Wash., D.C.
Barnum, Henry W., to detail as member GSC assigned GSC Bns.
Thompson, Merle D., to Hq AGF, Ft. Monroe, Va.

Tomin, Robert F., to retire.

Van Neste, Horace J., to detail in TC.
Van Volkenburgh, Robert H., to Hq Second Army, Baltimore, Md., w/sta at Columbus, Ohio, det. as Senior Instructor Ohio NG.

Walter, Eugene H., to Hq First Army, Governors Island, N.Y., w/sta at West Hartford, Conn. and det. as Instructor Connecticut NG.

Wolk, Charles M., to retire.
Young, George E., to Hq Second Army, Baltimore, Md., w/sta at Columbus, Ohio, det. as Senior Instructor Organized Reserve State of Ohio.

LIEUTENANT COLONELS

Alexander, Dana S., to retire.
Barr, John W., Jr., to AAA Repl Pool, Ft. Bliss, Texas.
Black, Edwin F., to OSW, Washington, D.C.
Borden, Nathaniel, to CA (SC) ORP, Ft. Winfield Scott, Calif.
Coffin, Ralph B., to AARTC, Ft. Bliss, Texas.
Cotton, Robert T., to Hq First Army, Governors Island, N.Y., w/sta at New York City, N.Y., det. as instructor New Jersey NG.

De Rita, Joseph, reld fr active dy in IGD.
Espinosa, John Francis, reld fr active dy in ADCA.
Fletcher, John B., to Hq AGF, Ft. Monroe, Va.
Fisher, John Francis, w/sta at Civil Engineers School, Ft. Bragg, N.C.
Hartung, George W., w/sta at Hq AGF, Ft. Monroe, Va.
Hatch, Melton A., to AAA Repl Pool, AARTC, Ft. Bliss, Texas.
Heathco, Earle W., to Hq, West Point, N.Y.

Galloway, Ralph L., to detail in Fort Bragg, N.C.
Hardy, Robert M., to OC of S, Washington, D.C.
Harvey, Thomas H., to USMA, West Point, N.Y.

Hartman, Allison R., to OC of S, Washington, D.C.

Harvey, Malcolm W., to Hq & Hq Det HD of Boston, Mass.

Hatch, Melton A., to AAA Repl Pool, AARTC, Ft. Bliss, Texas.
Hicks, John J., to detail at Univ of Pittsburgh, Pittsburgh, Pa.
Hinckley, Eugene W., to CA (SC) ORP, Ft. Winfield Scott, Calif.
Hinske, John J., to detail at Univ of Pittsburgh, Pittsburgh, Pa.
Hunter, Howard W., to retire.
Irwin, Michael M., to Alaskan Dept, APO 942, Seattle, Wash. (erroneously entered as rel’d active dy in last issue).

Jolls, Ebihram P., to retire.
Jones, Clifford R., to AGO Casuals, Wash., D.C.
Lowder, James R., to retire.
McNiece, William L., to Gnd Det Sec, Fort Monroe, Va.

Pinnix, Webster F., Jr., to Hq Seventh Army, APO 906, Gd Det Sec, Ft. Bragg, N.C.
Quayle, J. C., to detail as member GSC assigned GSC Bns.
Rowntree, Kenneth, to retire.
Russell, Sam C., to Student Nat'l War College, Washington, D.C. (erroneously entered as rel’d active dy in last issue).
Scott, Willard W., to Seventh Army, Ft. Bragg, N.C.
Shepherd, Charles E., to detail as member GSC assigned GSC Bns.
Shutt, Logan O., to Hq Seventh Army, Atlanta, Ga., w/sta at Savannah, Ga., det. toInstr Georgia NG.

Sheehan, Joseph Foxhall, to detail as member GSC assigned GSC Bns.
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Sheehan, Joseph Foxhall, to detail as member GSC assigned GSC Bns.
Thompson, Merle D., to Hq AGF, Ft. Monroe, Va.

Tomin, Robert F., to retire.

Van Neste, Horace J., to detail in TC.
Van Volkenburgh, Robert H., to Hq Second Army, Baltimore, Md., w/sta at Columbus, Ohio, det. as Senior Instructor Ohio NG.

Walter, Eugene H., to Hq First Army, Governors Island, N.Y., w/sta at West Hartford, Conn. and det. as Instructor Connecticut NG.

Wolk, Charles M., to retire.
Young, George E., to Hq Second Army, Baltimore, Md., w/sta at Columbus, Ohio, det. as Senior Instructor Organized Reserve State of Ohio.
COAST ARTILLERY ORDERS

Michael, George F., to detail as member GSC and WDGS.

Mohn, Samuel Rouse, to HD of San Diego, Ft. Bliss, Calif.

Moore, Ansel Dewitt, to relieved from active duty.

Morton, Paul A., to CA (SC) ORP, Ft. Winfield Scott, Calif.

Murphy, Joe K., to Kansas State College of Agriculture and Applied Science, Manhattan, Kansas.

Newman, James W., to CA School, Ft. Winfield Scott, Calif.

Niblack, Carlton Olin, to AAA ORP AARTC, Ft. Bliss, Texas.

Niami, Elvin Frederick, to (AAA) AAROP AARTC, Ft. Bliss, Texas.

Odent-Hall, Sidibe, to AAA ORP AARTC, Ft. Bliss, Texas.

Olcott, William Ransom, to AAAORP AARTC, Ft. Bliss, Texas.

Owen, Alvin O., to AAA Sch, Ft. Bliss, Texas.

Palacios, John G., to 60th AAA AW Bu, Ft. Bliss, Texas.

Pavick, Peter D., to Manhattan Engr Dist, Sandy usage base, Albuquerque, N. M.

Penzkofer, Claire Benjamin, to AARTC, Ft. Bliss, Texas.


Piccirilli, Albert Adrian, to HQ First Army w/sta at Ft. Dix, N. J., TDFP.


Ramsey, Kenneth W., to Los Angeles High Schools, Los Angeles, Calif.

Riccio, Joseph A., to 10th Counter Intelligence Det, First Army, Boston Fld Office, Boston, Mass.


Ring, James Sidney, to AARTC, Ft. Bliss, Texas.

Rodes, William Robert, to 529th AAA AW Bu, Ft. Bliss, Texas.

Rouse, Edward B., to (CA) (SC) ORP, Ft. Winfield Scott, Calif.

Scott, Belden P., Jr., to detailed in Ord Dept, Sandia Engr Base, Albuquerque, N. M.

Skirvin, Cyrus Alexander, to 639th AAA AW Bu, Ft. Bliss, Texas.

Smith, Sanford Arthur, to AAAORP AARTC, Ft. Bliss, Texas.

Sokolick, Frank, to Ft. Geo. G. Meade, Md.

Squires, Max E., to Sixth Army Hq & Det, HD of San Diego, Ft. Rosecrans, Calif.

Standish, Albert C., to detail at Princeton Univ, University, N. J.

Stewart, Loren F., to AAA ORP AARTC, Ft. Bliss, Texas.

Szanski, Edward Joseph, to 60th AAA AW Bu, Ft. Bliss, Texas.

Tassie, Willis H., to (CA) (SC) ORP, Ft. Winfield Scott, Calif.

Trigg, William Grant, to 34th AAA Gunnery, Ft. Bliss, Texas.

Utley, Harold Chauncey, to 5th AAA Gp, Ft. Bliss, Texas.

Verbock, Michael, to AARTC, Ft. Bliss, Texas.

Voyatzis, Polivos A., to Manhattan Engr Dist, Sandia Eng Base, Albuquerque, N. M.

Weeks, Carl G., to AAA Sch, Ft. Bliss, Texas.

Williams, Norman O., to AAA Repl Pool, Ft. Bliss, Texas.

Woodson, Bob M., to AAA Repl Pool, Ft. Bliss, Texas.

Wolff, Otto Frank, to CAC AARTC, Ft. Bliss, Texas.

Young, Cecil C., to AAA Repl Pool, Ft. Bliss, Texas.

1ST LIEUTENANTS


Andrews, Henry S., to AAA Sch, Ft. Bliss, Texas.

Barani, Ernest Joseph, to AAAORP AARTC, Ft. Bliss, Texas.

Bennett, Charles Columbus, to 233rd Searchlight Bn, Cp Hood, Texas.

Bilhowicz, Ted, to relieved fr active dy.

Birrell, William Neibaur, to CAC AAAORP AARTC, Ft. Bliss, Texas.
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<td>Smith, James W.</td>
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<td>Snow, Frank G.</td>
<td>to Counter Intelligence Coord. Center, Holabird Sig Depot, Baltimore, Maryland</td>
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<td>Sparks, Lawrence E.</td>
<td>to First Army HQ &amp; Det, HD of New York, Ft. Tilden, N. Y.</td>
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<td>Toomas, Grover E.</td>
<td>to 322d AAA AW Bn, Ft. Bliss, Texas</td>
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<td>Thwaites, Prior N.</td>
<td>to Army Security Agency Two Rock Ranch Station, Petaluma, Calif.</td>
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<td>Tipton, William Woodrow</td>
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<td>Tuscany, Franklin Hawthorne</td>
<td>to 592nd AAA Bn, Ft. Bliss, Texas</td>
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<td>Unrath, Walter J.</td>
<td>to 108th Counter Intel Corps Det, Hq First Army, New York, N. Y.</td>
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<td>Williams, Russell Howard</td>
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<td>Wilson, David J.</td>
<td>to 450th AAA AW Bn, Ft. Bliss, Texas</td>
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<td>Woodward, Joseph G.</td>
<td>to AGO Casuals, Washington, D. C., f/dy w/War Analysis Prog.</td>
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<td>Worley, Thomas G.</td>
<td>to SC (ORP, Ft. Winfield Scott, Calif.</td>
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<td>Young, Evert Charles</td>
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2D LIEUTENANT

Hammond, Norman C., to detailed in CAC.
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