COAST ARTILLERY JOURNAL

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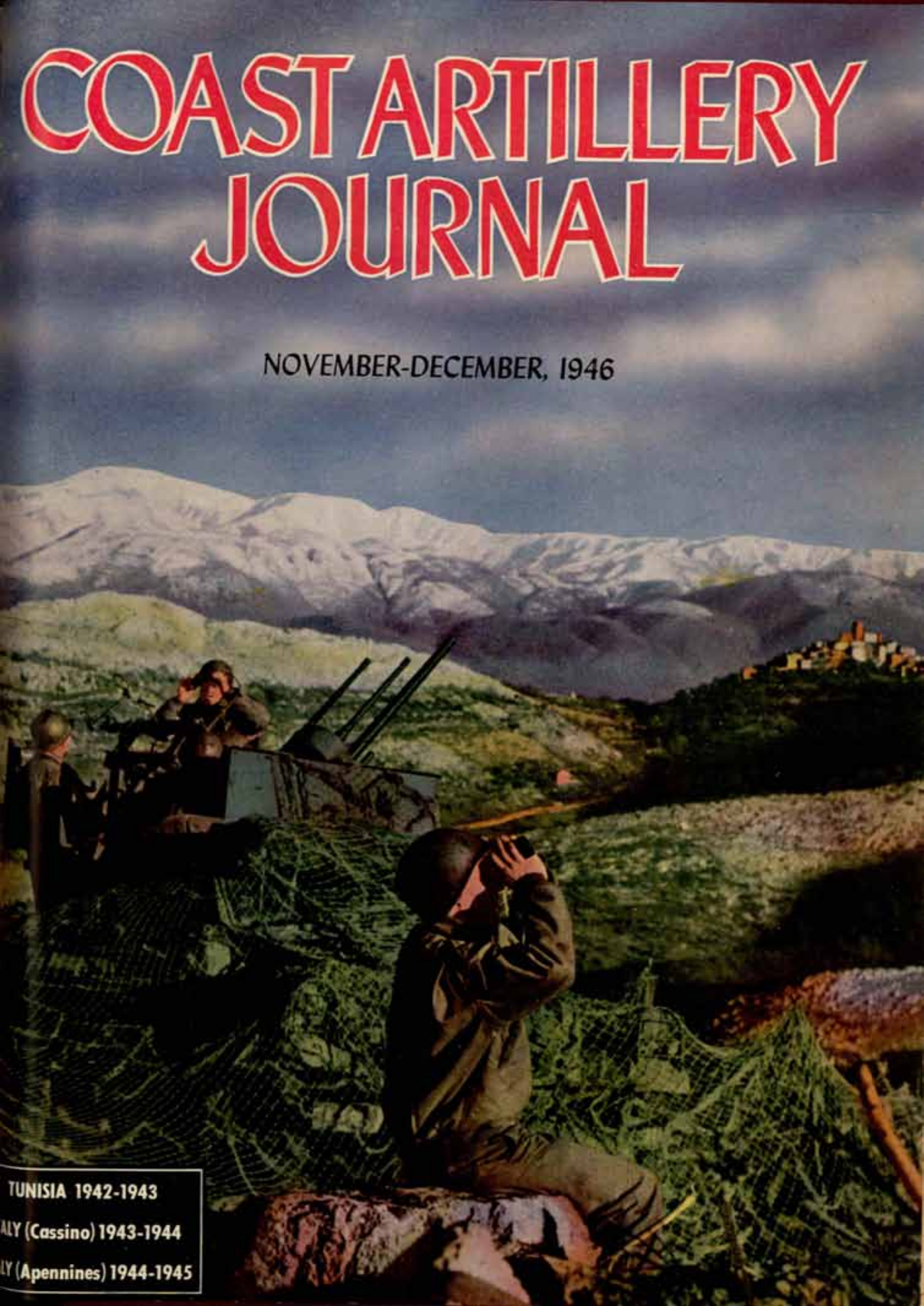

TUNISIA 1942-1943

ALY (Cassino) 1943-1944

LY (Apennines) 1944-1945

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
JACOB L. DEVERS
General, USA
Commanding

WAR DEPARTMENT
WAR DEPARTMENT GENERAL STAFF
SERVICE, SUPPLY, AND PROCUREMENT DIVISION
WASHINGTON 25, 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 conscientious performance of duty and successful accomplishments during the trying days of reconversion to peace, and my best wishes for a Merry Christmas and Happy New Year.

Leo. Lutes
LEO. LUTES
Lieutenant General, USA
President, Coast Artillery
Association

COAST ARTILLERY JOURNAL

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ACTIVITIES

71st

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

of the AAA BRIGADE

By Captain James G. Holmes, Jr.

Coast Artillery Corps

AA Brigade (Provisional) was established as a permanent unit on 11 December 1943, and designated as the st AAA Brigade.

Tunisia

Immediately following activation in March, Brigade eadquarters started on the long overland trip to join II orps near Thelepte, Tunisia. The following antiaircraft illery 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
443d AAA AW Battalion (SP)
Six AAA Batteries (AAMG) (Airborne)

The following additional units were assigned during e 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 be- of division commanders that searchlights, if com- itted in the forward areas, would bring down enemy e on themselves and other troops in the vicinity, the 3d ttalion of the 213th was not committed to action and ained in bivouac until employed in the defense of the erte and Ferryville areas following the surrender of e 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.

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 suppl

ots far to the west at Oran. He returned a few days r with a 30-truck convoy, loaded with everything m gun patches to radars. His arrival came only twenty-ur hours before the majority of the units were ready to part for Sicily, but using a ring of automobile headlights oughout the night a "supply dump" was established t the Bizerte docks from which vital supplies were ed prior to departure the following day.

The most significant accomplishments of this, the pio-r antiaircraft brigade in Europe in the control of anti-craft units in forward areas, were its evolution of bat-field tactics and technique and the preparation and dis-bution of a detailed SOP. The original version of this cument, prepared by General Hendrix and Colonel llivan, his Executive, was given wide distribution ong all antiaircraft artillery units and headquarters n in North Africa and, though later greatly amplified d improved upon, provided an excellent basis for study d planning purposes by other units prior to their tial entry into action. Detailed reports of "lessons rned" in this, the first European campaign, were also pared and dispatched to Allied Force Headquarters, and the Antiaircraft Artillery Command in the United States. f primary importance was the fact that for maximum ficiency and economy of means, control and coordination antiaircraft units should be exercised by especially ined antiaircraft commanders provided with adequate ffs as constituted by antiaircraft brigades and group adquarters. This was demonstrated negatively during st of the period of hostilities in Tunisia where, as a ult of wholesale attachments, tactical control of most iaircraft units was divided between the Corps antiair-ft officer, a Field Artillery brigade headquarters, and vari-s division commanders, resulting in little or no coordina-n and extreme wastage of resources at a time when they re critically short, in the face of a then strong and active emy air force. Later, during the slow and bitter advance Cassino through the congested and narrow Italian val-s, the Brigade, then employing a maximum of control ercised through two group headquarters, was to demon-rate the power and efficiency of a highly coordinated and illfully directed defense.

Sicily

In early August, 1943, the Brigade Headquarters boarded LST and sailed to Palermo, Sicily, whence it moved erland to the vicinity of Licata until more comfortable commodations were found in historic Agrigenta. Here, e Brigade was assigned to Seventh Army from 13 August 22 September, and to Allied Force Headquarters from 2 September to 18 October. The Brigade mission was e protection of ports and airfields in south Sicily. With e enemy air force inactive in this area, an A-20 airplane as obtained for tow-target missions and extensive target actices were conducted. These further sharpened the hooting eyes" of units destined to participate in the com-g encounters in Italy. The antiaircraft artillery units th the Brigade in Sicily were the 1st, 106th and 107th oups; the 215th, 216th, 401st and 406th Gun Battalions; e 103d, 431st, 433d, and 400th AW Battalions; the 4th 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 matériel and most of the Brigade 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

The Brigade Operations Detachment sets up its operations room in the shelter of a building in the Loiano area, Italy.

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 ground firing by Brigade units in the vicinity of Tazzola, Italy.

area between forward and rear antiaircraft artillery groups, each of which was required to redispose its allocated units so as to obtain a proper coverage of its assigned area. Thereafter changes of antiaircraft artillery dispositions were permitted only as the slow advance uncovered new terrain features requiring protection and as forward displacement of artillery necessitated a forward extension of the area coverage. Accurate advance information of forward artillery displacements was obtained by close liaison with the Corps and Divisional Field Artillery headquarters. This reduced antiaircraft artillery movements on the congested road nets to the absolute minimum.

The greatest and most determined air effort of the Germans 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 kills 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 carefully 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 battalion 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 take it, and the enemy forces were making use of religious buildings for observation posts and other military purposes, the Air Forces on the morning of 10 February 194 dropped 2,500 tons of bombs on the Abbey atop Monaste Hill and on fortifications within the city of Cassino at i base. Under control of II Corps Artillery, pinpoint targe such as machine-gun positions, mortar positions, and ca openings were assigned to the 90mm guns of the Brigad for fire during the preparatory phase of the infantry attac scheduled to follow the aerial bombardment.

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

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

On 27 March 1944, II Corps returned to the forwar area in a new sector relieving X Corps (British) along th Garigliano River on the Tyrrhenian coast. The Brigad followed and on 29 March assumed responsibility for ant aircraft artillery operations in II Corps area. The next si weeks were spent in preparation for the big offensive whic was to begin in May. During this period experiment work was done with antiaircraft artillery radars in an effo to pick up and track enemy artillery shells. By back-plottin the trajectory on a map the enemy artillery position coul be approximately located. This experimentation had th wholehearted support of Major General Geoffrey Keye II Corps Commander, and of members of the Corps an division field artillery units. As results obtained were co sidered promising, the 15th Army Group later organized joint American-British Radar Unit to further study an develop this practice.

At 2300 hours, 11 May 1944, the whole Italian fron exploded into action and the big drive for Rome was on The Brigade advanced with II Corps along the coast fron the Minturno River, through Fondi, around the bottlenec at Terracina toward Itri in the area where Fifth Arm troops from II Corps established contact with VI Corp troops from Anzio. Corps then moved on through Cisterna Cori, Volmontone, Albano, Frascati, Rome, and nort through Rome toward Viterbo. All enemy air attacks dur ing this advance were made at night. Antiaircraft artiller units would move by day and be in position to engage b dark. Enemy aircraft flew in low from several direction toward the points of attack making 90mm fire extremel difficult. Radar control was often unsatisfactory due to ter rain interference and to the large quantities of "window" dropped by the Germans. Bofors barrage fire was used t force the attacking planes to altitudes which would permi radar tracking. There was a definite need for searchlight in the forward area to pick up and illuminate low-flyin aircraft. Lieutenant Richard W. Baker, a staff officer o

Brigade, located two undamaged harbor defense searchlights on bogies taken from damaged German 88mm guns. Emergency searchlight crews were formed by Lt. Baker from cooks, clerks, and other personnel of Brigade headquarters. They were briefly indoctrinated into the use of searchlights and took battle stations along the highway south of Rome to become probably the first U. S. Mobile AA Searchlight Unit to see action at the front with mobile 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 assistance and provided experience for future work in this regard.

On 9 June 1944, the French Expeditionary Corps and British XIII Corps began replacing the II Corps on the front north of Rome and units of the Brigade withdrew to a rest area at Lido Di Roma a few miles south of Rome. During the last week in July the Brigade moved north with II Corps to assemble in the area near Peccioli, southwest of 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 for another winter.

During this period, to meet the needs for increased infantry strength and since enemy air power was definitely on 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 32d 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 only main supply route—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 reports 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. Some 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 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

Major General Geoffrey Keyes, Commanding General, II Corps, speaking to men of the 71st AAA Brigade, prior to firing the 200,000th round of ammunition fired by the Brigade at ground targets.

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 hou Thus began the Brigade's last and perhaps biggest j The hordes of prisoners began to arrive as scheduled a thereafter the Brigade Staff was constantly expanded, the need dictated, by officers drawn from the 442d Comb Team, Fifth Army, and IV Corps headquarters. Problem too innumerable to mention were solved by this hasti assembled, hard-working staff with the results that in amazingly short period a large and well organized c had sprung up, populated by more than 100,000 Germa prisoners and their guards. Many acres of ground we occupied by the thousands of impounded vehicles tak from the Germans as they arrived. The roster of Germ units in this city contained most of the famed divisions th had provided the Allies with such long and bitter oppo tion since the Salerno landing some 20 months befor Ultimately, under the administrations of the Brigade, th city rapidly grew smaller as its inmates were screene processed, and returned to Germany.

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

In its travels the Brigade left in its wake a trail of som 185 enemy aircraft definitely destroyed plus another 8 probably destroyed. The number driven off and damage by its busy guns or deterred from attacks by their presen will never be known. As a casualty-producing agency th number of enemy ground troops killed and wounded by i heavy and light antiaircraft guns must have been far great than was suffered by the enemy air forces, but those figur too must remain forever unknown. Some of its troops wit but little training assumed the role of infantry, and battle the veteran Germans valiantly. In services to its own troop the Brigade produced military police and trucking battalion which turned in performances equal to those of thei more experienced contemporaries. In the closing months o the campaign, it lighted the battlefield and facilitated th night operations of both the combat and service troop For distinctive individual service personnel of the Brigad received: 14 Legions of Merit, 36 Silver Stars, 208 Bronz Stars, 75 Soldier's Medals, and 137 Purple Hearts.

In the final analysis this is the story of the gun sectio the smallest antiaircraft artillery unit and only a "dot on th situation map," but a little group of highly trained me manning complex equipment with deadly precision, alway at the vital point when the enemy raider struck. Theirs wa the effort that brought smiles of pride to the faces of ou troops as the enemy faltered and crashed, or turned back i 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 geog-
hy of Russia than he does about the ingredients of
cht."

asmuch as a Gallup poll showed only 12% of our peo-
to be well informed concerning Russia, this imperti-
t observation is probably not too wide of the mark.
ether it be the difficult language or the Russian's profli-
use of consonants and their penchant for strewing x's
z's throughout their place names—whatever the cause,
mes and locations of Russian centers of industry as
as Denver, St. Louis, Atlanta, and Dallas are but dim-
cognized by the average citizen. He usually associates
long and unpronounceable jawbreakers with the heavy
arrows which adorned the news maps during the war.
considers the Ural mountains as a sort of Chinese wall
ating Europe and Asia. Siberia? That conjures up in
mind's eye the grammar school print of the bearded
e in fur cap and greatcoat madly beating his frothing
s 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
.

efore the war we could afford the luxury of ignoring
big slice of the good earth inhabited by the Russians.
ould 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
m saw a "Made in Russia" trademark on the shelf in
ocal store, and our contacts with Russian citizens were
hy and wholly second hand via the news print. Be-
Russia was so far away!

he war changed all that. The enormous successes of
Red Army after a series of disastrous reverses which
ght the Nazis almost to the shores of the Caspian Sea;
domitable courage of the Russian worker who labored
Mother Russia under almost inhuman conditions; and
unconquerable courage which kept the Russians in
war struck responsive chords in the American psy-
gy.

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

knowledge of Tovarich and his cohorts increased

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 rôle in the historical evolution of nations. It is the stage upon which each nation plays its part. It is a 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 rôle. Cæsar 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

Stretching for endless miles, her forest constitutes a valuable defensive weapon.

sixth of the earth's habitable land mass and nudges the Arctic ice cap. What conclusions might be properly drawn therefrom in an era of near supersonic speeds, guided missiles, and atomic power? Whether her position is an asset or a liability will be more readily perceived when her geography is more clearly understood.

Probably the most significant detail of Russia's geography is her immense size. Measuring some six thousand miles in an east-west direction and four thousand miles from north to south she is the colossus of the world. The United States, Canada, Mexico and Alaska could be tucked within her borders and still leave enough maneuver room to meet the demands of the most aspiring militarist. This huge land mass has more than once been of great strategic value to the Russians in time of crisis. It has permitted them to trade space for precious time. It has also allowed them to locate their sensitive industries beyond the reach of hostile ground forces. Moreover, the vast depth of their terrain has provided them with suitable maneuver space to deploy their forces removed from possible enemy attack. Blessed with a great abundance of natural resources deep within their home base, they have been relatively secure in guarding vital resources. Power sources essential for their industrial machine are also deep within the country. In sum, this vast territory which acts as a buffer to protect Russia's vitals from possible aggrandizement has probably been her most helpful single asset. Among the great modern powers Russia is in this respect better equipped to "roll with the punch" than any of her contemporaries.

The Russian Plain—some 8½ 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 and stretching from Poland to the broad and mighty Yanisei in Siberia, it contains thousands of miles of trackless, primeval

American states, and hot, arid deserts. Except for the ge tly sloping Urals rising occasionally to 3,000 feet and e tending 1,500 miles north to south, this tremendous ar is almost as flat as the proverbial pool table. To the east the Urals and extending about 1,200 miles to the Yenis lies one of the largest level areas in the world. This exten to the south from 1,000 to 1,600 miles until it meets w the mountainous southern frontier. Across this expanse hundreds of monotonous miles, the Trans-Siberian ra road runs in a straight line. Very few elevations of 1,0 feet are recorded in the remainder of this Plain. In Eu pean Russia were it not for a few feet of elevation, t majestic rivers of the Soviets would flow toward the no instead of toward the south.

The rivers of a nation are usually one of its most ch ished assets. In times of peace they provide one of the sential means for carrying on trade and commerce wi foreign states. Or, as they flow into oceans or seas, they p vide the means for access to the trade routes of the wor They link together the various parts of the state and h to bind the population into an economic unit. The lar rivers are a part of the song and story of a nation and p a dynamic part in the development of its national life. D ing times of strife, they provide defensive bastions, a play a vital part in the defense of the homeland by i peding and delaying the enemy's operations.

The rivers of Russia rise within the Russian Plain a follow their chosen courses to the sea. They, likewise, ha played an important part in the evolution of Russia. Rus claims a total of 180,000 miles of navigable waterways w a large number of interconnecting canals. Yet with e this astounding natural advantage the facts are not all her favor—especially from a military point of view. though a certain perversity affected Nature in planning rivers of Russia, the principal streams in European Ru all flow to the south. Those in Siberia—except the Am

frozen over for a large part of each year. Their flow is and irregular depending on the season. In the spring the coming of the spring thaws, some of the large rs are apt to show a tremendous increase in volume— Volga as much as eighty times—over the flow during summer season. During these flood periods, they over- their low banks and create havoc by inundating the country. They render communications well nigh im- sible. During times of drought, they are apt to fall to h low stages as to seriously impede navigation. On the lga—Europe's largest river—the conditions recited above ame serious enough to lead to the construction of huge rvoirs along its upper reaches in an attempt to contain water incident to the spring floods and to parcel it out ing times of drought. Along the major Siberian rivers, spring thaw is completed along the upper reaches while mouths are still frozen solid. Great damage results from consequent overflow, and when the ice finally breaks the mouth, the speed and volume reach tremendous pro- tions.

The principal disadvantage of Soviet rivers, however, is their usefulness is restricted to river traffic. In other ds, they do not give free uninterrupted year around ac- to the trade routes of the world. In European Russia, principal rivers empty either into the Black Sea from ch vessels must still pass the Dardanelles to gain the n road, or they empty into the Caspian Sea—a dead end. Siberia they lead into the Arctic Ocean where they are ound most of the year. Even the Amur perversely turns hward as it wends its way eastward. It is this lack of quate means of access to the world's trade routes which through the centuries led the Russians to attempt to re a "window" in Europe. With cold, bleak Murmansk only ice-free northern port under the Red Banner it is 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-

Lake Baikal—the geographic Achilles heel of the eastern Siberian hinterland.

The Russians plan on adverse climatic conditions. Russian Sentry photographed at 40° below.

ing of endless miles between the larger cities of European Russia and rolling on for hundreds of miles in Siberia they constitute a very valuable defensive weapon. Legend has it that the Russian state was born in a forest.

As the forest belt extends southward it gradually loses certain characteristics due principally to climatic changes. The forests thin out; the trees change from coniferous to deciduous types; the vegetation differs. In European Russia, there is the land of the Russian breadbasket—the Ukraine. It is also the Black Earth region—the area extending well into Asiatic Russia—where the fine, rich earth produces in greatest abundance for Russia's 190 millions. It is the site of many of Russia's main industrial centers—the heartland of the Soviet Union. To the south, the land gives way to the mountain meadows and the fertile valleys of the Caucasus and to the "Black Gold" area where Hitler intended to seize the oil for the mechanized armies of the Reich.

The most graphic change in the terrain occurs in Central Asia—the steppe country which covers some 1.7 million square miles of Russian Asia. This is the land of nomadic tribes, the hunting grounds of the fierce Mongolian conquerors of whom Timur, the grandson of Kublai Kahn was among the ablest. An able administrator, diplomat, and soldier he ruled from the Dragon Throne in his capital city, Samarkand, still one of the principal cities of the Republic of Uzbeck. Russian Asia is four times greater than its European counterpart, and within its boundaries it contains many of Russia's most important resources. The greater part of it belongs to the Russian Socialist Federal Republic, but the six Soviet states which comprise the remainder of this vast hinterland are not to be discounted. Their varied resources play a large part in the Soviet's economic planning. Besides, you'll find Russia's Hollywood there!

And what of the climate in which most of the Russians live? Certain extremes of temperature in the tundra region have already been cited, but these pertain to the land of the reindeer and the hardy Siberian frontiersman. What about the "average" climate? It has been noted facetiously that there is a lot of fresh air in Russia—but none of it in Russian homes. This is perhaps the best clue to findin an answer to the average Russian climate. Leningrad ha an average yearly temperature of less than 40 degrees Fah renheit while Moscow farther south has an average onl slightly higher. During the winter, the Muscovites accep the bitter cold with an apathetic calm and do not becom unduly exercised about the weather until the thermomete drops below −30 degrees. July is the warm season whe the temperature averages about 65 degrees—but not fo long. Nights are very cool and snow falls before the first o October. Ice skating is in vogue by mid-October.

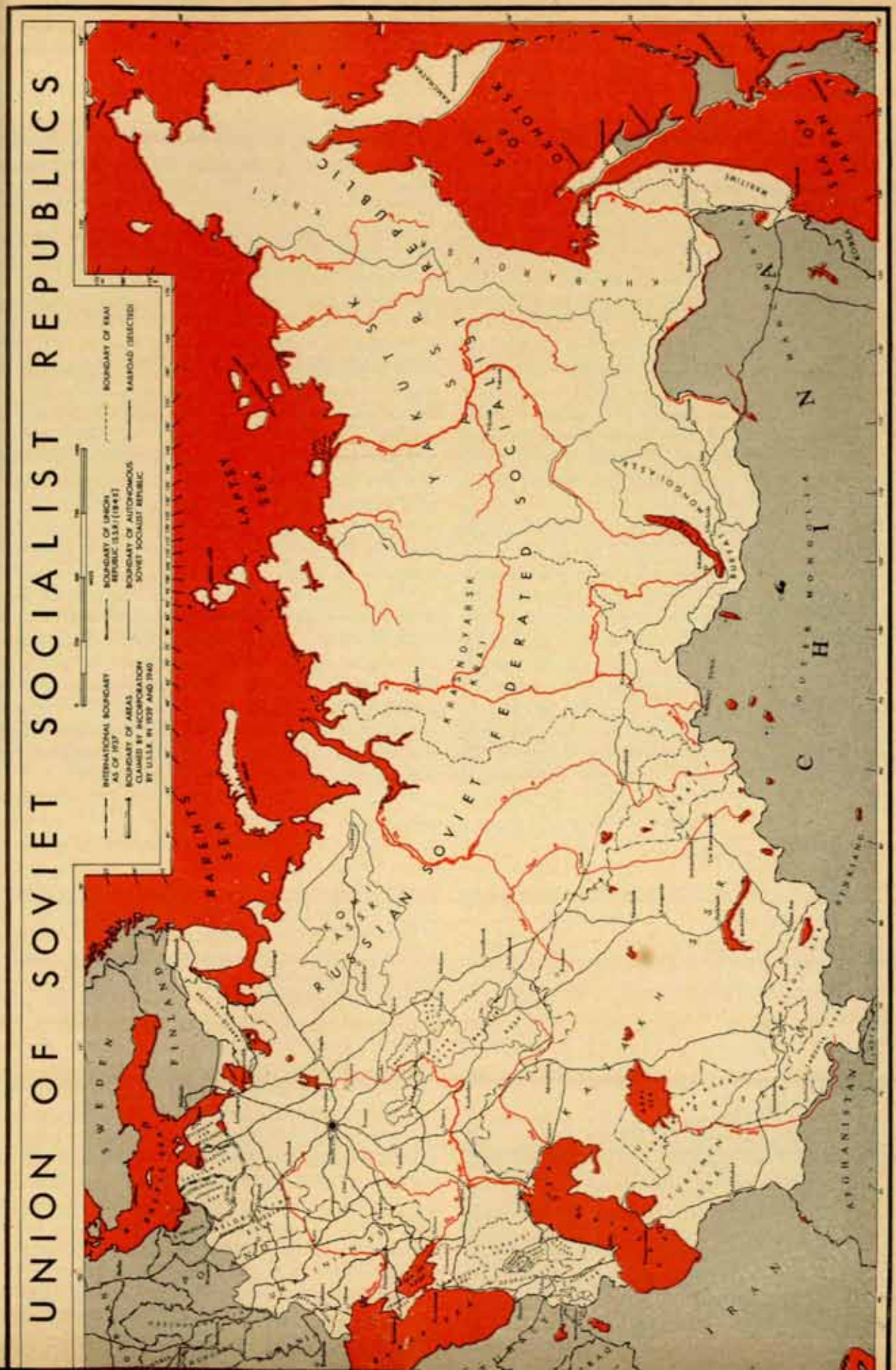
All throughout the Russian Plain, summers are com paratively short. South of the tundra and throughout th coniferous forest area, the winters are long and severe, th relative severity becoming more pronounced in the eas In the west, the dead of winter temperature averages clo to 20 degrees. Due principally to the climatic effect of th Atlantic Ocean. In the east, the effect of the Arctic Ocea is very pronounced and midwinter temperatures in easter Siberia will average as low as −50 degrees. As a cons quence, Siberia's great rivers are frozen over for more tha 200 days of the year. The snowfall is heavy, and snow lie like a heavy blanket on the forests to prevent the cold fro penetrating the ground deeply.

Except along the southern fringes of the great Russia Plain the climate is not inviting. It is subject to extremel low temperatures, cold, gloomy, raw days throughout lon snowy winters; rainy spring thaws with accompanying floo —the so-called "rasputitsa" periods—short, rainy transition periods before the summers set in for their brief stay—ve short fall periods with noticeably lower day-to-day temper tures; and then a return to the long, unforgiving wint cycle again. Yet even this latter season has it compens tions. The inadequate roads which, during the spring, sum mer, and fall were impassable quagmires are now froze once more and again provide the means of access and egre to the adjoining villages and to the nearest town. This the season, therefore, of Russian festivals and fairs whe the country folks can get to town. The snow and ice provid a magic carpet for the Muzhik and his family.

It would appear that the Russian Plain is a rigorous re gion. It is indeed a land of startling contrasts as this pape has endeavored to point out. In writing of Soviet geograph Cressey has stated the case with admirable restraint. H writes, "Too much of the land is too cold, or too dry, o too wet, or too infertile, or too inaccessible, or too some thing else."*

This brief account of Russian geography has attempte to suggest the vast proportions of the Soviet Union; to po tray its gargantuan size; its major physical features, the ge eral aspects of its terrain and climate and by inference th defensive strength of the Russian state as it has expande eastward almost daily since the days of Peter the Grea No consideration has been given herein to the treasure tro of natural resources which places the Soviet Union in leading position among the world's Great Powers. In th connection, for instance, reference was made to the froz wastelands of northern Siberia. Nothing therein indica

*Cressey, Geo. B., *Asia's Lands and Peoples*, Chap. 15, McGraw-H Book Company, New York, 1944.

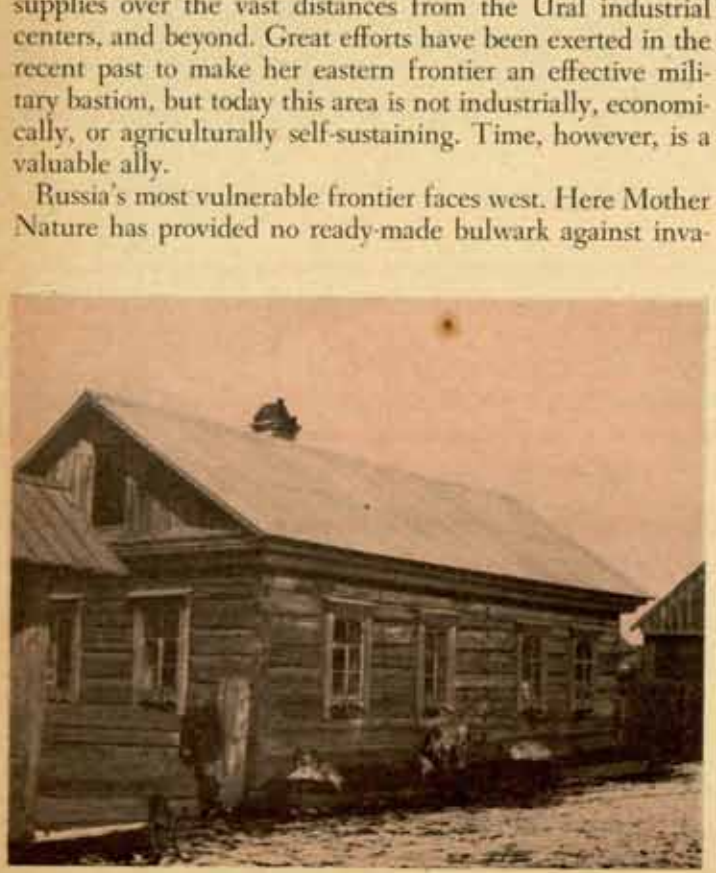

UNION OF SOVIET SOCIALIST REPUBLICS
INTERNATIONAL BOUNDARY AS OF 1937
BOUNDARY OF AREAS CLAIMED BY INCORPORATION BY U.S.S.R. IN 1939 AND 1940
BOUNDARY OF UNION REPUBLIC U.S.S.R. (1940)
BOUNDARY OF AUTONOMOUS SOVIET SOCIALIST REPUBLIC
BOUNDARY OF KRAI
RAILROAD (SELECTED)
SEA OF OKHOTSK
SEA OF JAPAN
LAPTEV SEA
BARENTS SEA
RUSSIAN SOVIET FEDERATED SOCIALIST REPUBLIC
KHABAROVSK KRAI
YAKUTSKAYA
KHABAROVSK
MONGOLIA
CHINA
SWEDEN
FINLAND
AFGHANISTAN
IRAN

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 strategical 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 skein 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 neig bors. From this direction have come all attacks in mode times. Napoleon's Grand Army en route to Moscow fo lowed the east-west route to the north of the Pripet Marshe Hitler's troops, on the other hand, followed the souther route through the Ukraine. At present there is no first-cla military power to her west. Yet if and when a worthy wes ern foe emerges to challenge her, the same routes whic lured Napoleon and Hitler will again be a temptation conquest.



Typical Russian home.

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

In naval affairs, however, the Soviet position is uninvi ing. Her four short openings to the world's sea lanes a barred off by foreign powers. In addition, her sea frontie are widely separated and are not mutually supporting. A a consequence, her naval forces would face the alternati of either being contained or engaged in detail with prob able unfavorable results. Russia's geographical position de nitely bars her from becoming a leading naval power r gardless of her ability to provide herself with the necessar fleet.

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

For years the Soviets have shown a marked interest i the mysteries of the Arctic. Movements of the ice pack, e ploration for new lands to the north of Siberia, studies o Arctic Ocean currents, and investigations into meteorolog cal phenomena have engaged the attention of some of h best scientists. The Russians without doubt possess compr hensive information in these respects. They no doubt hav the most complete data available regarding Arctic wind their directions and velocities, and of Arctic storms, their i cidence and probable directions, thanks largely to the pi neer research work of Professor Otto Schmidt and his co leagues. Dependable forecasts for transpolar flights of p loted or pilotless aircraft will depend largely upon acceptab weather information. Soviet geography permits the Russian to establish and maintain the necessary weather stations i appropriate high latitudes.

Russia's river systems as already indicated are effectiv military obstacles. Her principal streams are broad and sub ject to seasonal flooding and freezing. They inundate larg areas and tend to render the terrain unsuitable for militar operations. In addition, their tributaries overflow and creat bogs and marshes. It has been estimated that fully 20% o Russian terrain is marshland and consequently unsuited fo habitation. Great marshes such as the Pripet Marshes an those immediately east of the Urals and extending towar the Ob river are important military obstacles.

Nature seems to have endowed the Russian state with all the attributes essential to achieve unity. Indeed it has been remarked by numerous observers that the topography of the Russian land mass has contrived to prevent the formation of another state within her borders. From Poland to the Pacific and from the Arctic to Afghanistan there are no geographic barriers deemed essential to induce or to promote the formation or development of a hostile nation state.

But all of Russia's geographic characteristics are not carried on the credit side of the world's ledger. Russia suffers from being too big—and consequently too ungainly. Her vast distances tend to impede mobility especially when that mobility is circumscribed by very poor communications. Russia has practically no first-class highways and a very mediocre railroad net. Throughout great sections of the Russian Plain her roads are poor and usually immobilized during the spring thaws. After the thaws, come the summer rains which tend to reduce the roads to quagmires. Changes in elevation are so slight that throughout the spring and summer, the countryside is virtually a bog due to the poor drainage. Some inundated areas cover several hundred square miles. During such times reliance for movement of military personnel and supplies must rest on the railway system which is perpetually under a severe strain.

A distinct peculiarity of the principal rivers in European Russia is that the western banks are normally much higher than their eastern banks. As a consequence when used as defensive barriers in the past by Russian defenders, the western river banks have permitted the enemy to look down the throats of their Russian adversaries.

Except in the Ukraine, where the forests have been cleared and where the wide treeless plains invite the type of maneuver reminiscent of the 19th century, the terrain of European Russia is a disadvantage to the defender. The forests and swamps, lakes and bogs which hinder the enemy's ability to move and to maneuver similarly affect the Russians' ability to deploy their forces. In Asiatic Russia due principally to the very feeble road net and an inadequate rail system, this disadvantage is accentuated.

The Soviet's older industrial centers are relatively open targets to air attack. They are clustered about the ancient European cities of Leningrad, Moscow, and Kuibyshev from which the most effective rail system fans out to lesser industrial areas. Industrial centers deep in the Siberian hinterland are the Kremlin's defense against the acknowledged vulnerability of her erstwhile economy. A great deal of comment has appeared concerning this mass migration of Russian industry to positions behind the Urals. The movement of their industrial base into Siberia is dictated not only by considerations of defense but by the necessity of bringing the industry closer to the sources of raw materials due to long and poor communication lines. These industries are being established along the southern tier of Siberian states where a more seasonable climate and adequate power sources will permit the most rapid expansion of the Soviet economy—especially heavy industry. At the same time these vital industries have been moved to positions as remote from possible air attack as the terrain permits.

What sort of balance might be struck regarding Russia's geographic position? With all but one of her frontiers facing mountains, deserts, or icy wastes; with her tremendous area in which to give and take; with her natural, unrivalled defensive strength due to her many marshes, swamps and lakes; with her trackless forests; and with her industrial base soon to be dispersed over the largest undeveloped land mass on the globe, the Soviet Union is today less vulnerable than any of her contemporaries to the threat of ground and air attack including—as far as fortune permits a glimpse of the future—the age of guided missiles and atomic power.

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 commandant, 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 11th 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 at Fort Bliss 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 Mexica, 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."

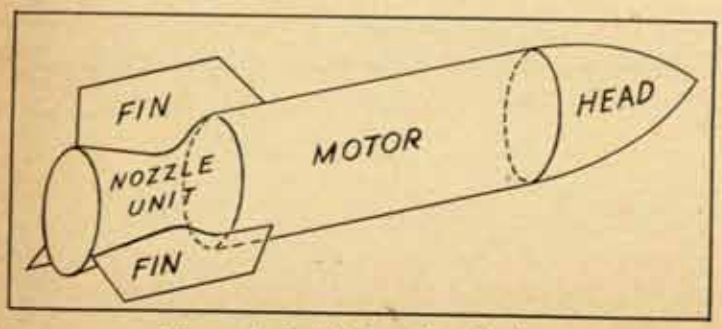


Figure 1—**Solid Propellant Rocket.**

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 tangental 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

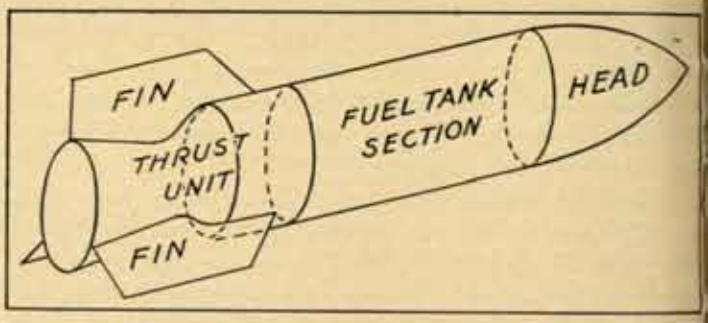


Figure 2—**Liquid Propellant Rocket.**

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

early part of the flight before the air speed is great ough to make the fin rudders effective.

The Ramjet, Aerothermodynamic Duct or "Athodyd"

The simplest jet engine is the "ramjet" illustrated in ure 4, as it has no moving parts. But its operation does

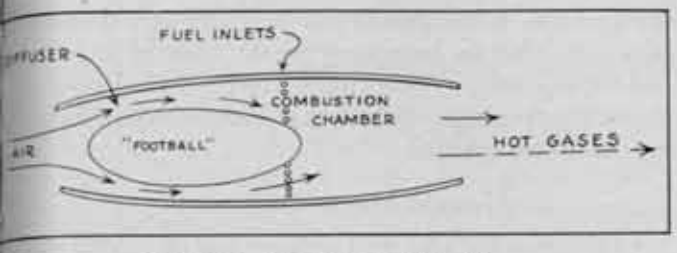


Figure 4—**Ramjet or Athodyd.**

seem so simple. The question arises, "Why should burn- a fuel inside a combustion chamber open at both ends ke the thing go one way and not the other?" The an- er is, "The burnt gases do not *make* the thing go either r, but once it is going fast enough in the right direction y *keep* it going." Anyone who has watched a blowtorch or lding torch has seen how the base of the flame remains me distance away from the torch tip as long as the velocity the gases and their mixture are right. At that distance the ocity of the flame in the mixture equals the velocity of mixture itself and the "flame front" remains stationary. e same thing takes place in the ramjet when it is moving t enough. High velocity air entering the ramjet is slowed wn and has its pressure increased in the diffuser before ering the combustion chamber. Fuel, from tanks not own, is sprayed into the air stream and the mixture is nited. When the speed of the ramjet is high enough the me front remains in the combustion chamber and the gases are expelled through the nozzle at high velocity. e momentum of the jet of hot gases is greater than the mentum of the air taken in. The excess momentum pro- es the thrust to drive the ramjet forward. The "football" nter, designed to control the airflow, may provide a space war head, fuel tanks, or control equipment.

The Intermittent Jet or "Aeropulse"

The intermittent jet engine shown in Figure 5 has a grid ucture containing a number of small one-way flap valves d fuel injectors, a combustion chamber, and a long tail- pe smaller than the combustion chamber. Fuel is sprayed through an array of small injectors behind the flap valves. ese valves are closed when the pressure in the chamber eeds that on the front, hence this device can operate ile standing still if its combustion cycle is properly started. rting requires detonation of an explosive mixture, such

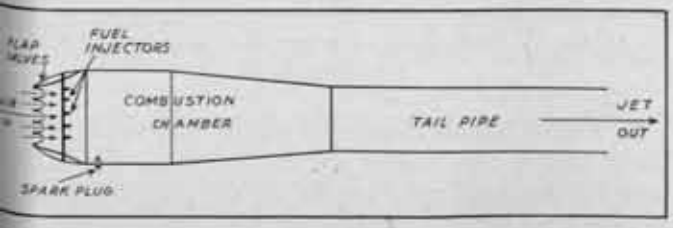


Figure 5—**Intermittent Jet or Aeropulse.**

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 cen-

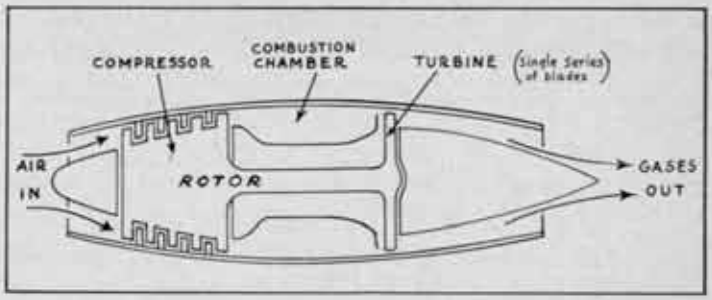


Figure 6—**Turbojet.**

trifugal 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 its 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 a high probability of proper performance, and the factors to be weighed are those affecting economic cost rather than personnel risk.

In the conventional fire control of artillery, one insurmountable barrier to accuracy lies in the inability of the projectile to change its course after firing. Because of the considerable time-of-flight of the shell, the target may have altered its course and, since the variables which affect the trajectory of a shell are never adequately known, the probability of a hit against a distant target is dismally small. 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-ship, or otherwise; 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.

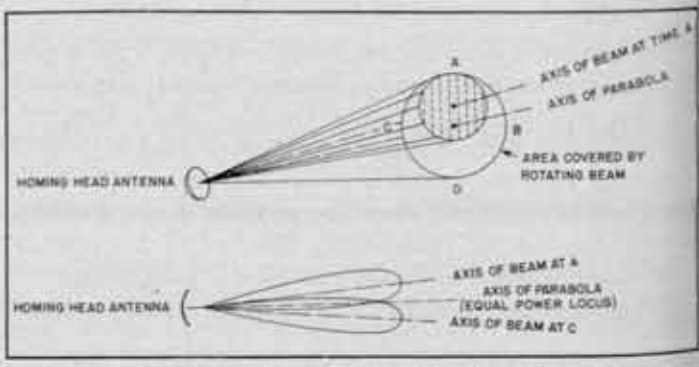


Figure 1—**Derivation of target direction signals from a homing head.**

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 measure

ent are much the same. First of all, the sensing element ust be sharply directional so that it can perceive small gular misalignments. The optical or radio sensing ele-ent is then rotated so that its axis of highest sensitivity is ghtly eccentric with respect to the direction in which it looking. As shown in Figure 1, if the target is slightly the principal axis, the signal is stronger on one side than e other, and the amount and direction of this deviation n then be measured and converted to electrical signals actuate the internal controls.

Having obtained signals from a homing head which can form the missile whether or not its scanner is pointed at e target, there are several ways in which the information n be used. The simplest of these is that which requires e missile to travel directly toward the target at all times. he scanner is pointed directly ahead in the missile, and e controls are actuated so that the axis is always in line ith the target. In this way, a pursuit course is described, hich is a classical problem in differential calculus. This illustrated in Figure 2. In the simplicity of the system

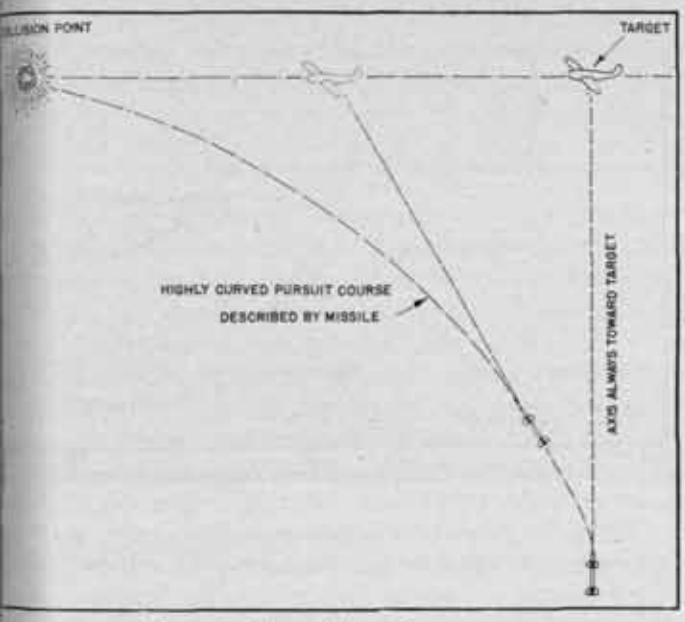


Figure 2—**Pursuit homing course.**

s its undoing. If the accelerations required of the missile such a course are computed, it will inevitably be found at they become increasingly large on the last portion of e trajectory which is the most critical in obtaining a hit, less the target is either quite large or fixed in position. nce the antiaircraft application is one of the most im-rtant of all the fire control cases, the use of direct homing inst fast targets appears of little use.

There are other methods open, however, which alleviate s difficulty. Assume that the homing head, in addition to termining the direction of the target, is able to measure e angular rate of change of its course direction as it pur-es the target. If the missile can be set on a course which akes the rate of change of this angle zero, we have estab-hed the condition under which the missile travels direct-toward the collision point. The diagram of Figure 3 shows e approximate characteristics of such a course. The missile mpletes the final and critical portion of its trajectory as traight 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.

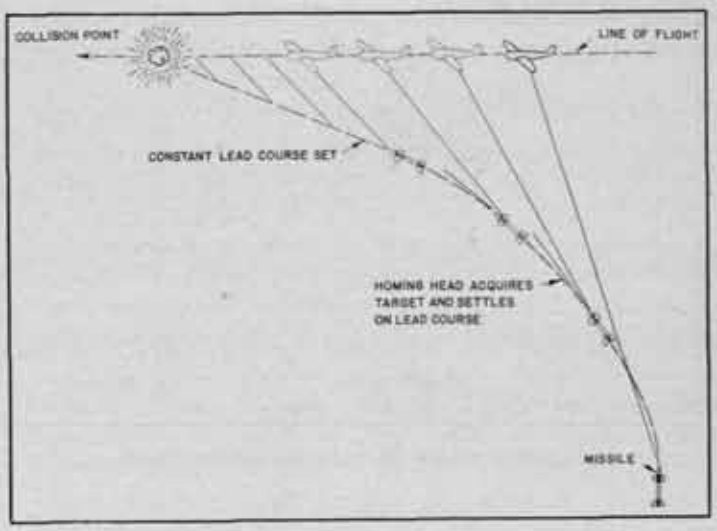


Figure 3—**Lead homing course in which apparent target motion is reduced to zero by the homing head.**

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 posi-

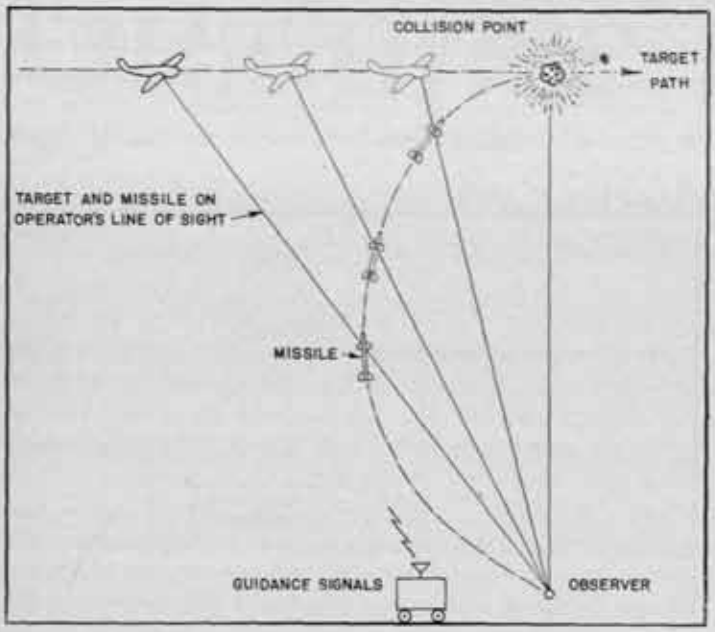


Figure 4—**Line of sight guidance system.**

tion. This is illustrated schematically in Figure 4 where a pilotless aircraft is being guided to intercept a bomber. If the guidance is working properly, the observer always sees the missile between himself and the target. It will be appreciated that in order to maintain this relation, the missile always must fly toward a point between the present position of the target and the impact point, and that the path of the missile in space is curved. Calculations of the accelerations required from the control system of the missile show that the control requirements are not as stringent as in the case of pure homing, although high manuverability is still required during the terminal portion of the trajectory.

A system somewhat similar to the German system was used on the American guided bombs Azon and Razon. Here the missiles were dropped from a moving aircraft toward fixed targets, and the operator in the plane maintained the falling bombs in the line-of-sight from the plane to the target. The problem is in many respects the inverse of the antiaircraft case just described.

An important variation of the optical line-of-sight system is that which uses a radar set capable of target tracking instead of the optical method. Considerable maneuverability is required from the missile in this case, and as target speeds become higher and higher, the system becomes more and more difficult to use.

Collision Course Principle

The system requiring the least effort of all in the process of overtaking a moving target employs the collision course principle. In the firing of artillery and ordinary torpedoes against moving targets, the fire control apparatus computes, from a knowledge of the target motion and the ballistic characteristics of the shell, that point in space toward which the projectile must be directed to eventually collide with the target. Of course, the target may not be executing a predictable path, and considerable uncertainties of other types give rise to large errors with this type of fire control. In the case of the guided missile, the collision course system changes in a very important manner. Here it is interesting to note that no longer will erratic motions of the wind an 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 coördinates 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).

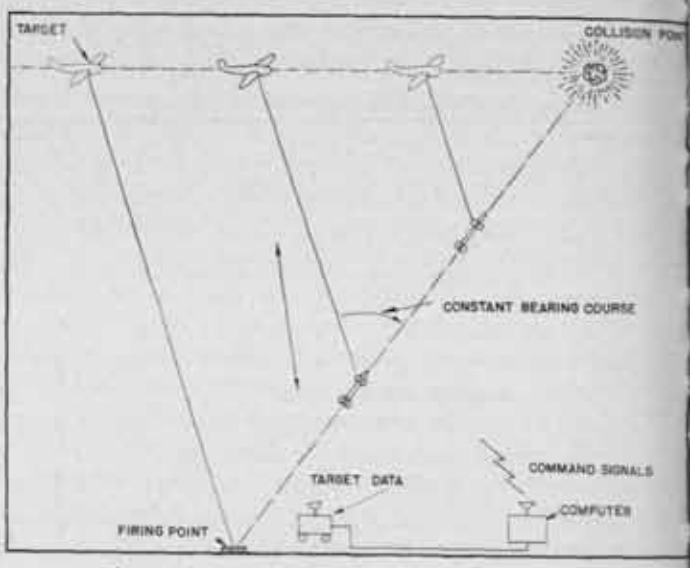


Figure 5—**Collision course command system.**

So far, the systems discussed were those having particular application to the moving target case. As will be realized these systems are useful only within the ranges in which the intended targets may be followed by radar or other means.

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 of this principle is possible.

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 other physical points 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 hyperbolas 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 secrecy 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 have 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 pedulous 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 thence 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 allowances 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 airport 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 experiment. It is ready for active combat use. It is now standard 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 installation.

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 antiaircraft 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 released 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.

*Science News Letter, October 26, 1946.

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 operational 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.

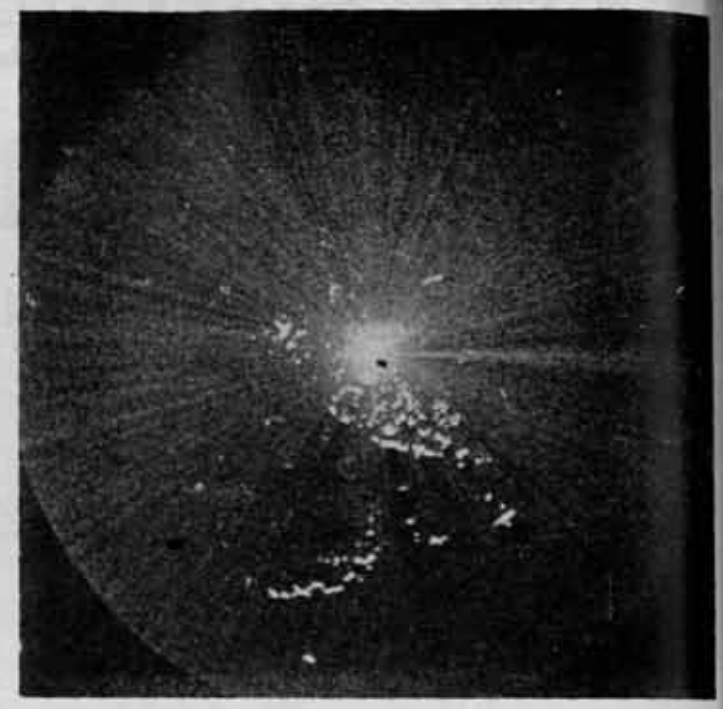
Radar For Seacoast Artillery

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) = $\sqrt{2 \times \text{antenna height (feet)}}$. 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 indicators both displaying radar signals produced by long-range 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 transmitter 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 wavelengths 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 neighborhood 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 radar targets when viewed from directions near the front; that is, when viewed from a position near the target. The bulbous leading edges of conventional subsonic streamlining 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 Germans developed sheet material capable of absorbing radio waves with very small reflection. This material is similar in many respects to the antireflection coatings used on glass surfaces in high-quality optical instruments. It can be applied over the surface of any object whose radar detectability it is desired to reduce, such as the exposed upper hull and superstructure of a U-boat. Quite possibly, similar coatings will be used on the long-range offensive airborne missiles of the future, and the problem of radar detection will thus be greatly increased.

The rapid wartime progress in radar development suggests that technical improvement in radar will soon provide 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 hemisphere 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 wartime radar experience.

So far, only the problem of radar detection has been mentioned. Two other problems have at least equal importance. One is the problem of identification. When dozens of targets return radar signals within the field of view of a given radar set, it is necessary to have a means of determining, within seconds, which signals come from normal air traffic and which are returned from possible hostile 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 detected is hostile. But the enormous densities of conventional, 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 vehicle 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 continuity 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 target and intercepting missile to provide data for ground control of the interception of the target, this property of the SCR-584 is a very serious drawback.

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 information 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 essentially this, by having two separate radar sets scanning respectively in azimuth and elevation. No attempt has yet been made to design a similar radar for antiaircraft fire control. 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 27), this issue.

curacy 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 coördinates 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 war is 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 radar will play a very important rôle 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.

*See "Guidance For Missiles" (page 18), this issue.

Crichlow Slide Rules

The Book Department of the Seacoast Branch, The Artillery School, Fort Scott, California, desires to dispost 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.

Identification of Friend or Foe

By Lieutenant Colonel Leonard M. Orman, Coast Artillery Corps

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 rôle, 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 tails 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 ex- [illegible] 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 so as to produce regular fluctuations in the size of the echo received at the radar. So simple a system was soon found to be inadequate due to such factors as its uncertainty, the introduction of new radar equipment using different frequencies, and the persistent demands for recognition at greater range.

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

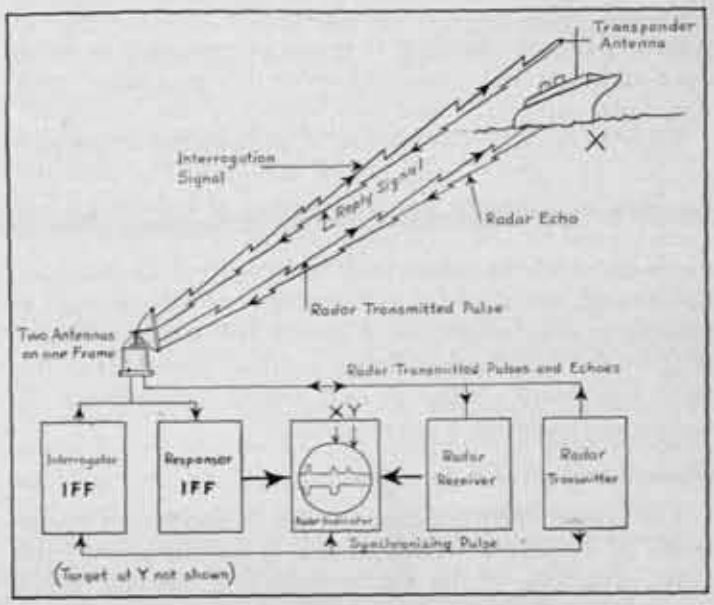


Figure 1. Block diagram of radar and IFF

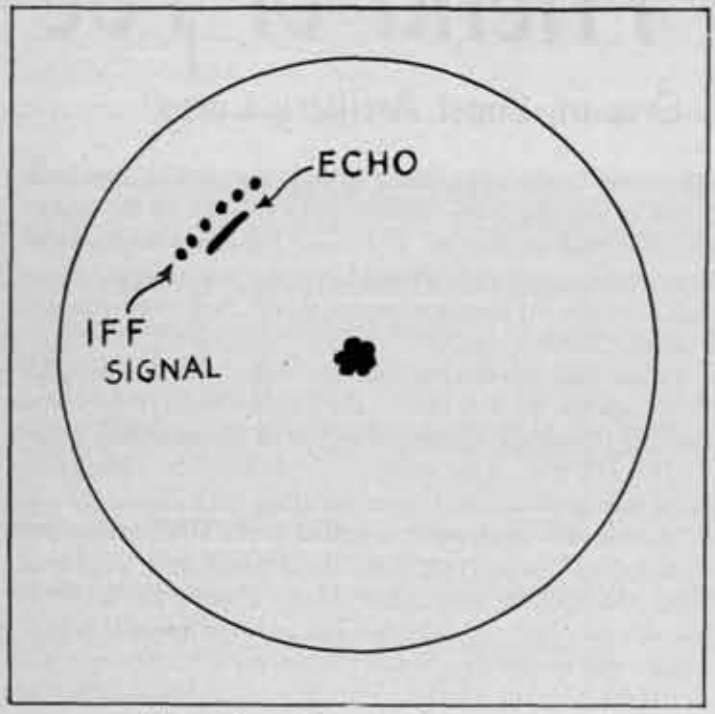


Figure II. PPI Scope with IFF signal.

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:

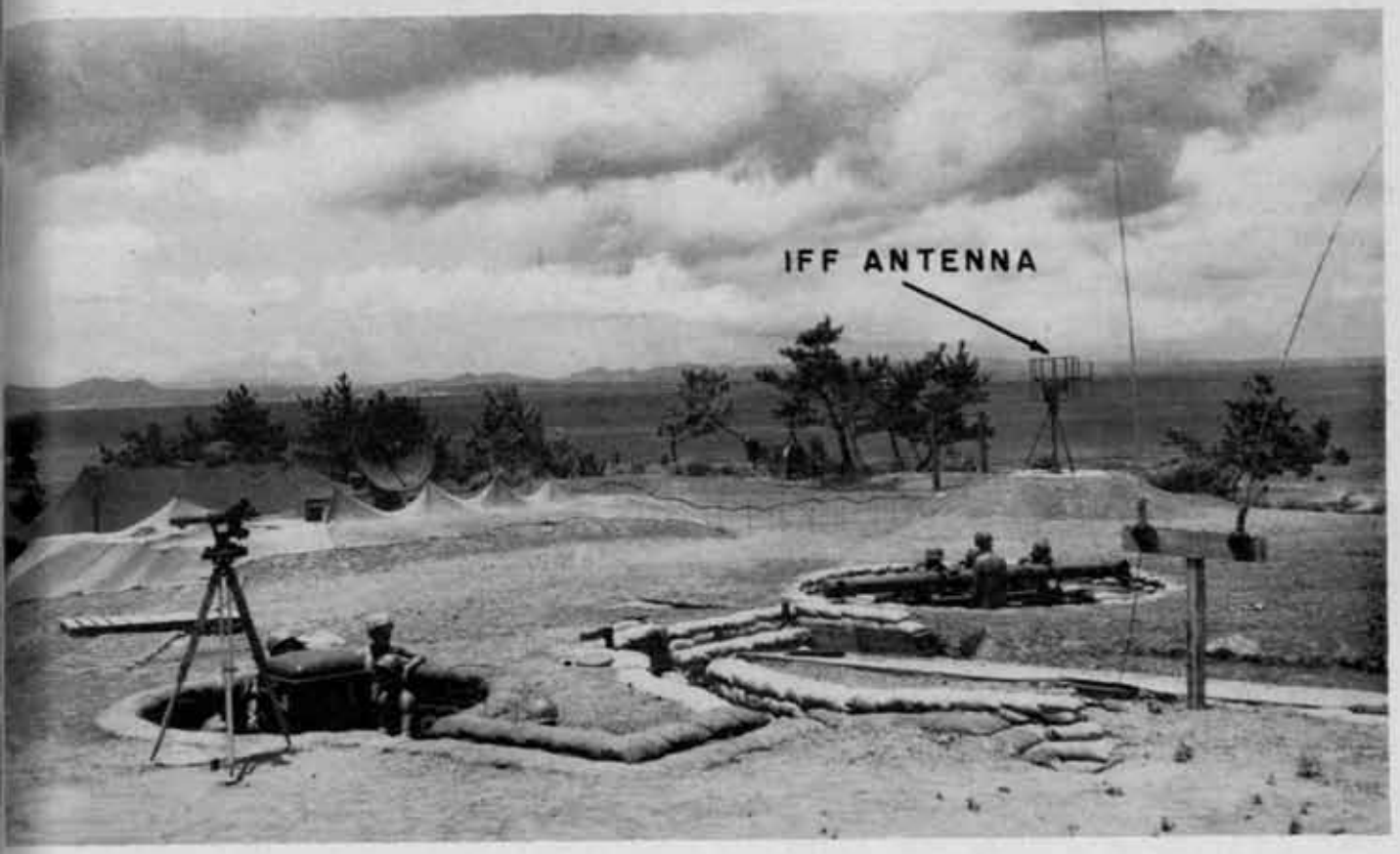
1. *Interrogator:* A low-powered radio transmitter which emits challenging signals on some frequency in the IFF band, and which is associated with the radar equipment whose echoes must be recognized. The "echo-principle" is not used by the transponder. All that is required from the interrogator is enough 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. *Responser:* 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 Responser 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 travelling 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.



An IFF set at a 90mm battery position.

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-Responser.

The interrogator-responser 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

In the Mark III system the responser 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 responser 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-responser 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 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 responser.

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 at sea or in a 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. 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 carriers 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 14 various theaters are:

	Per Cent
Southwest Pacific	50
South Pacific	80
Mediterranean	70
Central Pacific	85
U. S. A.	75
Alaska	80

Aside from the obvious danger that may result from unsuccessful operation of the IFF system, other undesirable effects may appear. When 20 or 30 unidentified flights ap

proach 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 disgusted 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 hesitance 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.

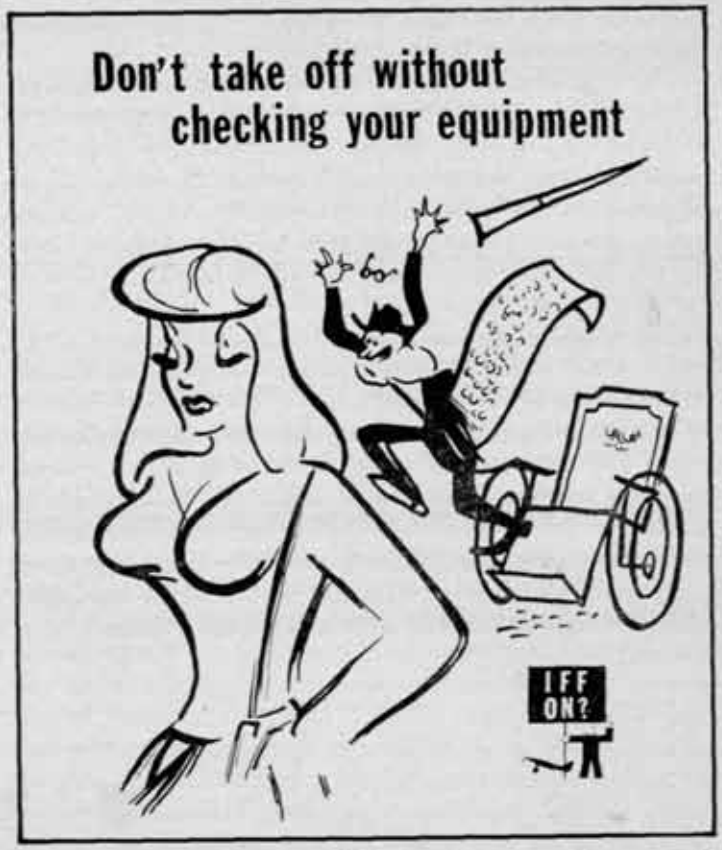
Errors in the use of IFF may arise from lack of knowledge concerning IFF, lack of indoctrination as to the use of IFF, carelessness, confusion as to the doctrine in different areas, or confusion due to different doctrines prescribed by the different branches of the service in the same area. It is apparent 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 flying 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 foremost 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 interrogater-transponder-responser 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 hen Kai Rasmussen fell asleep in night school.

If the young Dane had been able to keep his eyes open d his mind on his books after a hard day of washing shes in a steamy Albany restaurant, he probably wouldn't ve joined the Army so he could learn English in the ytime.

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

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

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

With the tactical need for secrecy ended, the War Depart-nt still kept a rein on the Nisei story, believing the sei would prefer it that way, in view of what might hap-n to their relatives in Japan were the story known. Actu-, the Nisei in khaki would have welcomed some favor-le publicity.

"I'm worried about my folks in *this* country," a Nisei sol-r told me. "If I have any relatives in Japan, let them e 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 ghest Army divisions in the Pacific reported that a Nisei guage detachment was the biggest single asset a combat could have against the Japanese, he wasn't saying any-g that General MacArthur or the War Department n't fully appreciate—by then.

Kai Rasmussen knew that in 1941. He also was one of 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.

Colonel Kai Rasmussen

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 Defenses.

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 Rasmus and Anne 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 some missing teeth, and the other for a pair of flat feet.

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 doughfoot 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 bogy 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 has come through that ordeal would willingly do it over again were the calendar to be turned back. It means terrible

nths of long days and nights grappling with the most ficult of all the world's major languages. It means more nths of bitter service with the Japanese Army—one phase at seems effectively eliminated from the curriculum for me time to come.

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

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

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

Rasmussen's test came on a reconnaissance march in the ountains. He was ordered to accompany a party scouting a suitable firing area. The detachment commander, a panese lieutenant, told him politely that inasmuch as an merican could not be expected to keep up with the Japa-ese soldier on a mountain march, a horse would be pro-ded for him.

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

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

"We started out at 5 a.m. on a 27-mile hike," Rasmussen ates. "The mountains were in bad condition for walking. he side of each rise was covered with snow; the other side y but thickly carpeted with pine needles.

"By noon the Japanese obviously were losing their en-siasm for the job. We had a meal of rice, seaweed and plum, and started off again. The Japanese lieutenant in mmand was tiring. With my cleated GI shoes I was taking snow and the pine needles with comparative ease. It s time to turn the tables.

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

"You can imagine a Japanese officer losing face that way! t waiting for an answer, I started out rapidly, the Japa-e following me frantically and having a terrible time ping their footing. I led them a chase all over the moun-ns. In the late afternoon, we found a horse. The lieuten-t rode it home. Most of the soldiers didn't get back to p 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—"gyōsho" and "sōsho." 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 'gyōsho,' an abbreviated hand-written script, and in 'sōsho,' a very abbreviated script. In addition, the military frequently uses 'shōten' and 'reisho,' two ancient and formal styles."

If that isn't complicated enough, the "kana" syllabary, by which the 73 sounds in the language are reproduced pho-netically, can be written in five ways, of which the three most common are "katakana," "hiragana" and "hentaigana." 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 liter-ally 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 intelli-gence, on a mass production basis. He had learned that only three per cent of America's Nisei were accomplished lin-guists, 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 en-closures, found a gruelling 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 un-authorized study after "lights out."

To provide white officers, Colonel Rasmussen established a "prep school" at the University of Michigan, where se-lected Caucasians were given basic training to fit them to compete with the Nisei in the "advanced" school. White of-ficers 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 Cau-

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 this Dane considers "foreign service."

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

"The contrast displayed by terrain echoes depends priarily on such differences in the scattering properties of e reflecting surface, and only secondarily on the relative nductivity or dielectric constant of the material in it."* r example, echoes from non-conducting sands are stronger an the echoes from surrounding sea water, which is a betr conductor. The sea reflections are stronger, but in form, ey closely approximate the specular reflection from a mirr and hence glance off at an angle away from the radar, hereas the land reflections are scattered backwards to the dar.

The above principle and past experiences with radar oused the interest of the author in the detection by radar moving ground targets. In September, 1944, the German r Force had dwindled to so few planes that the United ates Army had many surplus antiaircraft radars of the CR-584 type. Permission was asked of the Commanding eneral of the 44th AAA Brigade, to conduct certain preiminary tests on ground target detection in Corsica, and a CR-584 radar, complete with operating personnel, was tained for this purpose.

The SCR-584 was installed at several different locations d its antenna system directed toward roads which were ible from the radar site. The range from the radar to nts on these roads was known and the roads selected were rallel or nearly parallel to the radar beam. In this way object moving on the road would show a change in range the radar range scope. An observer with field glasses was 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

*See also article "Employment of Radar by XV Corps Artillery" by Gen. E. S. Ott, Page 39, July-August issue of the JOURNAL.

Fink, "Radar Warfare."

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. Its 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 plio-film. Friendly front lines, patrols, artillery "no fire line" and other information may be marked on the acetate and changed as the situation changes. Radar targets can 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 wet at the same time, then the effect of the wind is increased.

The data obtained in the experimental work shows that the use of radar for detection of moving ground targets is 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 to 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 ten yards and azimuth accuracies of plus or minus 1 mil to ranges of fifty thousand yards.

The SCR-584 should be modified to give greater azimuth 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. That coastal defenses are not everywhere begs the question. It 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 direct assault. In 1942, Corregidor and its attached forts alone 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

Major General Robert T. Frederick

"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."

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 turreted 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 artilleryman 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 one-ton 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 Planters. 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 undersea 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 artillerymen 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 vessel 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 good 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 artilleryman 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, rest assured that new defenses will replace the old and the seacoast artilleryman will be ever vigilant to insure 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 what 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 strongly, 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 ornate 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 grimmest 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."

Nation's Business for July, 1946.

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 régime 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 61 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 officers' 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.

The wartime Adjutant General of the Army, Maj. Gen. James A. Ulio, and Lieut. Gen. Harold L. George, head of the Air Transport Command, are former enlisted men. Maj. Gen. Lewis B. Hershey, Director of Selective Service, is a former officer of the Indiana National Guard. Lieut. Gen. Hugh A. Drum, former head of the Eastern Defense Command, and Lieut. Gen. John L. DeWitt, former head of the Western Defense Command, entered the Army from civil life during the war with Spain.

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

with the number of men who have started at the bottom in industry and gone to the top.

But let's assume for the moment that all the officers come from West Point. Where do those cadets come from? Is West Point a place to which our "privileged" classes send their sons to lead the life of a playboy ever afterwards? Is it a place into which you can buy entrance? Obviously not.

The great majority of the entrants to the Academy are appointed by the members of Congress—the members of the House and the members of the Senate—all told 531 of them. These men and women reflect our Democracy. They, themselves, are of all races and creeds, of all stations of life. Some of them represent rural communities, some urban, some industrial. They are lawyers, farmers, and shopkeepers. The youngsters whom they appoint come from their constituencies. The President and Vice President also make some appointments and a few are made from the enlisted ranks of the Army. But the great bulk of the appointments are made by members of Congress and are from every state and territory. Where is there any caste in this system?

Our democracy uses these men as the nucleus of our military leadership; they comprise only a small group when war comes. Our ROTC program attempted to train officers during the years of peace preceding the war. However, only a few availed themselves of this opportunity. Many refused commissions after graduation.

To add to this nucleus, we grab hastily, when war comes, from reserve officers, the National Guard, from civilians generally. We attempt to make officers in a short time. It goes without question that there were some men chosen in this way who did not measure up when the real test came, that there were other men, who served in noncommissioned grades, who should have been in their place. Is this the fault of the Big Brass, or yours?

All Were Not Perfect

Certainly, there were junior officers in this war to whom enlisted men were required to give respect but who were not entitled to it. If we Big Brass are to look after the welfare of your sons whom you never intended to go to war, but a war for which you voted through your elected representatives, could it be any other way?

Under the pressure of wartime conditions we can't have a man, an individualist, sizing up another man, his appointed leader, before deciding whether he will obey the latter's orders or not.

Under fire, discipline is extremely important to the success of the action, and the welfare of everyone involved in it. Authority must be clear and absolute. Many of the customs and practices the agitators now complain about are simply required education for the safest and most effective conduct in battle.

Each man's own safety along with that of others is involved. In this respect, I would venture to say there were no more misfits, or misassignments in the Army set-up than in civilian organizations of comparable size. Throughout our society there are men who think they should be the boss instead of the other fellow, and in some instances they are undoubtedly right. We of Brass are not responsible for human nature. I believe it was Mark Twain who said something to the effect that from the age of 12 to 20, he was appalled at his father's ignorance and from then on, amazed at his intelligence. Ambitions exist and are gratified the same in the Army as elsewhere in life. The only real difference is that we are, in time of war, engaged in a much grimmer business with life or death as the pay-off. Again I want to emphasize that war is a business where the life or death of the individual and continued existence or destruction of the nation are the stakes. Of all the professions, that of the soldier is the most exacting on the individual no matter what his rank. If we are to live through and win any future war thrust upon us, we should be exceedingly cautious in changing a pattern that has won every one of our past wars.

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 established leave 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.

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 responsibility for the administration and operation of the statutes covering the stock-piling of strategic and critical materials against the need of a 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 for factory or storage use. The natural twists, variations of level, make for a great amount of reconstruction. Another detrimental factor existent in caves is high humidity, which is harmful to stored materials. 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 withstood 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 American machinery for hand labor in the Japanese "cut-and-cover" techniques for building concrete shelters, miniature hangars, and sub-terrain storage facilities. The Jap technique allows for rapid construction with a maximum use of natural formation and permits concrete construction without forms.

In the stock-piling planning, when the President approved 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 Congress under the stock-piling act which contemplates the accrual 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 objectives, year by year, as to composition and requirements, 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 carrying forward its stock-piling programs.

In the initial stock-piling stage, ANMB is concerning 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 piles 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 for civilian manufacture. Relative to this dilemma, Mr. Deupree, head of ANMB, stressing that every precaution is being taken not to cripple civilian economy, 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 obsolete 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 manner 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 consideration" so that, if needed, their source and manner of procurement will be but a simple manner of reference and execution.

The Products Division, which collates the military, naval, civilian and allied requirements for manufactured products in an emergency, devising plans for the production of such products, makes recommendations 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 services wherever joint requirement exists, preventing duplication of effort, eliminating competitive bidding between the War and Navy Departments, insuring equitable distribution of production and further standardizes 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 comparatively 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 purchase of food and lumber is already integrated, and, in textiles and clothing, footwear and petroleum products, 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 services 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 approved 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 re-ding facilities at foreign service posts where Coast Artil-ry Corps personnel and dependents will probably be tioned. Additional information may be obtained on me of the other stations by writing the JOURNAL.

PAN:

ousing:

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

The permanent housing phase of the dependents' hous-g program is getting under way. Site studies and com-nity planning are nearly completed. Standards of con-uction and types of buildings, moreover, have been ablished. In general, buildings will be limited to nine es with single family dwellings and two- to four-unit artment houses for officers, enlisted men and civilian ployees. All housing units will be low cost frame struc-es that, due to the limitations on material and labor, will below the standards for such housing in the United tes.

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

It is well to keep in mind that the electrical current in an is 100-volt 50-cycle. That in the U. S. is 110-120-and 60-cycle. Practically all electrical devices that are chased in the States will operate on this slower cycle and lower voltage. However, they will not operate as l as they would upon the voltage for which they were gned. This applies to vacuum cleaners, radios, re-erators, 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 cur-are electric clocks and electric phonographs with chronous motors. It is advisable that these items not be ght unless they are known to operate on 100-volt 50-e 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 existed 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-

ganized 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 *(Inc. 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. Fo the most part these communities are immediately at, or i the near vicinity of, the military installations themselve Military communities have been established with du consideration to available German housing and personne assigned to the military installation will receive quarters i the existing houses. The type of house will naturally var in each community and within the communities them selves to include brick houses, stucco houses, frame house etc., but they will be entirely adequate in accordance wit normal standards for military personnel and their familie Heating is available; in many cases this is central heatin in other cases, rooms are heated by individual stoves an heating units, but in all cases, adequate heating will b provided. For the most part coal is the source of heat.

In areas other than the Occupied Zones of German and Austria, quarters for dependents will not be furnishe by the Army and arrangements in those areas must be mad by the individual applying for transportation of dependent An individual must present evidence that he has obtaine quarters at the time his application for the movement o his dependents is filed. In most liberated areas and in Par particularly, there is a critical shortage of housing as result of war damage. Quarters can be obtained, howeve and the Army assists personnel in locating quarters b maintaining quartering offices where information is as sembled and disseminated. The rent, of course, will var with the type of quarters.

Quarters made available for dependents (in Occupie Zones of Germany and Austria) will be furnished fro items obtained from local German sources. The bulk o the furniture will be that furniture within the hom themselves at the time of requisitioning, supplemented b furniture and equipment which is now being produce locally by German manufacturers. Furnishings will includ stoves, refrigerators, kitchen utensils, porcelain, glass an silverware. Bed linen will not be normally furnished a though a limited amount of standard size Army sheets an pillow slips can be purchased from Army stocks and Arm blankets to a limited extent can be drawn in the loca communities. It should be unnecessary for dependents t bring household furnishings overseas. Individuals should however, consider the desirability of bringing with the such additional items as bedding, table linen, persona silverware, etc., which will add to their individual comfor

The stoves and refrigerators available in the theate should be adequate although they will not be as moder and advanced as the type normally used in the States. I individuals desire to bring their own stoves or refrigerator consideration should be given to the fact that the norma current in the theater is 220 volts and gas pressures avai able for domestic purposes vary from that normally em ployed in the States.

It is difficult to foresee at this time what items of house hold furniture or equipment would be useless or damage by the climate overseas. The comment above as to electri stoves and refrigerators, however, is applicable to all ite of electrical equipment in view of the difference in vo age, and if such furnishings are brought from the Sta consideration should be given to also bringing transform to permit their utilization with 220-volt current. It is

ed that it will be possible to obtain all items required normal living from sources within the theater as pro- tion of civilian items is reestablished.

dical Care:

Immunization: All Civilian dependents of military per- nel proceeding to the European Theater will be im- nized within one year of embarkation against: Smallpox, phoid and Paratyphoid fever and Typhus fever.

Diphtheria immunization is required of all dependents ween the ages of 6 months and 35 years who are travel- to this theater, unless such dependents have been ermined to be Schick negative.

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

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

hools:

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

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

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

d, Clothing and other Supplies:

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

In view of the prevalence of rationing of food available m the civilian markets, it is not believed that food will obtainable from local civilian sources for the present; ever, it undoubtedly will be possible at a later date to chase an increasing number of items directly from ci- n sources as local food conditions permit.

s to special baby foods, the Army Exchange Service will k certain standard items and powdered milk, condensed and other milk food products will be handled. How- , it is suggested that dependents bring with them spe- items of baby food which may be prescribed for indi- al diets, at least in sufficient quantity to insure that it be available pending the complete stocking of Army hanges.

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

Toilet articles and preparations may be purchased from Army sources.

Any quantities of the above preparations may be brought along at 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, however, 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 shortages which may possibly develop during the establishment of Army Exchange facilities.

At the present time it is not contemplated that gasoline, oil and grease will be rationed. If a rationing system is instituted, 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, servants 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 occupied and local needs. Normally, a cook and a maid servant 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," individuals 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

below prevailing States prices, but in some instanc slightly higher than Sales Commissaries. Fresh milk is o tained through these commissaries. The available supply limited and is controlled by medical officers' prescription Officers above the grade of Captain are authorized char accounts. Captains and below must pay cash.

Several of the Post Exchanges operate small groce meat and vegetable departments. The Post Exchanges al carry small stocks of imported items.

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

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

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

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

HAWAII

Housing:

During the war, all of the quarters were used to hou the maximum number of officers, consequently, the norm allocation of quartermaster furniture was insufficient provide such articles as chairs and tables for the large nu ber of individuals in each house. To meet this need, th was established an Army factory in which the Enginee built quite a bit of very satisfactory furniture. This h been distributed to the various houses so that, in a pinc families may get along with the articles formerly provid by the Quartermaster as supplemented by those made the Engineer Shops.

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

Adequate quarters are provided commensurate with ra or grade of applicant. Houses may be of a permane brick, cement, or stucco-type, or may be of a low-c housing frame-type. Houses may have from 2 to 6 b rooms. In general, heating in the Hawaiian Area is n necessary; however, some houses contain fireplaces.

Civilian houses and apartments are available. Becau of great demand, however, it is difficult to find suitab civilian housing. Rental may range from $75.00 to $300.0

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

Medical Care:

Medical attention is excellent and readily accessible

ols:

The schools are excellent and school busses are pro- d where necessary.

d, Clothing and other Supplies:

The Army has been on the Island of Oahu for a long and facilities compare favorably with those available the mainland. There are two large commissaries, one Honolulu and one at Schofield Barracks, which are rea- bly available to all who wish to use them. Most of the provide bus service for those desiring to go to the missary.

Food stocks, in general, are the same as on the mainland. ain items such at tomatoes and fresh vegetables are ed in availability. Food is not rationed. Special baby ds are available. Fresh milk is available in the Hawaiian as well as all common feeding preparations. Ice is ble for quarters which do not have electric refrigera- Stocks of canned goods, fresh and frozen vegetables, s, seafood, and local products are available for purchase vilian markets. Dependents need bring only sufficient s to satisfy the needs during the ocean voyage.

cellaneous:

ll household furnishing can be purchased locally. ever, in general, prices for household goods are high. o stoves or refrigerators should be brought overseas. h stoves and refrigerators are furnished with each set arters.

LIPPINES:

ing:

o concrete information may be furnished on housing neral and embarkation of dependents is contingent allocation of available facilities or rental of civilian nce by the individual desiring dependents to join

commodations are available at the AAATC, San elino, Zambales in a limited quantity.

cal Care:

edical care available is generally excellent. A twenty- ed hospital is in operation at the AAATC for emer- es only. Normally the 4th General Hospital at la will service all dependent personnel.

ols:

blic schools to which Americans are admitted are tained in many towns of the Philippines. Presently a ar elementary and a four-year high school curriculum ed to the educational requirements of the Philippines 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 few 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 hat 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, floating on bits of debris, in bancas, and boats. Approximately fifty men were picked up and set ashore at the North Dock, Corregidor.

tillery in Bataan commenced firing on the remaining shi anchored off the North Dock, Corregidor, presumably an attempt to prevent the further evacuation of troops fro Bataan to Corregidor. Several of the ships received dire hits and commenced to burn or sink. The remaining shi weighed anchor and proceeded into the North Channe around the east end of Corregidor and anchored in th South Bay where they were defiladed from the enemy ar lery from Bataan. However, in order to do this, they had come directly into the enemy line of fire while roundin the east end of Corregidor, and several of the ships were h performing this maneuver. The Mine Planter *Harrison* m neuvered about, and proceeded west, directly into the min field, utilizing a secret channel in the mine field, and l under cover of the west end of Corregidor until dusk th evening. At this time orders were received via radio to a tempt to locate a sailboat from Mariveles, Bataan, co taining survivors from Bataan. With all possible ligh blacked out, due to the fact that Bataan had already bee surrendered, the mine planter proceeded back to Marivel Harbor and searched throughout the harbor for the sa boat. The sailboat could not be located there so the plant set out to sea in further search. After searching some mil out, the planter was suddenly picked up by the searchligh of an enemy naval vessel. The search had to be abandon and the planter returned safely to Corregidor and anchor in the South Bay.

In order to conserve again the rapidly diminishing supp of fuel oil at this time, all machinery of the mine plant was kept idle except when some mission had to be pe formed. Most of the work done by the planter after the f of Bataan was accomplished at night. The personnel wou leave the mine planter at dawn and spend the day on Co regidor, returning to the planter at dusk. Machinery wou be tested and necessary adjustments and repairs made at th time, to insure that the planter was in proper operati condition.

On 1 May 1942, a skeleton crew was ordered to be left o board due to the lack of fuel oil. The remaining personn were assigned to various gun batteries and to the beach d fenses of Corregidor.

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

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

The surviving personnel of the *Harrison* were tak prisoner by the Imperial Japanese Army on 6 May 1942

The *Harrison* received three Presidential Unit Citati for her gallant deeds.

MOONLIGHT CAVALRY

By Lieutenant Jack C. Berry, Coast Artillery Corps

A sentry stood in the shadows of a searchlight silhouetted artillery flashes along the front—his hands were thrust p into his overcoat pockets and his breath clouded te in the sharp air. The blanket of crisp snow on the gian countryside reflected the glow of a brittle moon hung in cold loneliness near the horizon.

Another soldier hunched across the small clearing to- d the light.

"That you, Sal?" the sentry inquired.

"Yeah. What's up?"

"Nothin' so far. Guess the b—s got cold feet."

"Yeah, guess so. You can knock off now . . . we got cof- n the tent." Sal glanced over the sky. "Jees, it's cold!"

The relieved sentry stooped into the squad tent and ggered to a pot-bellied stove near the center pole, spread- his stiff fingers above the cherry-red lid. His crew es were too engrossed in their sergeant's account of a quest in Rennes to notice the new arrival. He lit a ette, lifted his overcoat in the rear, and rubbed his dquarters as he turned his back to the stove to listen. e sergeant concluded his anecdote to everyone's satis- on then looked toward the stove.

"Anything doing outside, Olson?"

"Nope. Little artillery fire in the east and there was e ack ack in the north awhile ago, but nothin' come this

A telephone's ring interrupted their talk. The sergeant bed the phone and barked, "Section three, Sergeant is!" He listened for a tense moment then slammed n the receiver and bellowed, "One of the radars has coming in fast and low from the north, HIT IT!"

The clearing flushed with darting men, pulling on over- s as they ran. Seconds later the power plant coughed hummed low then roared into the proper RPM's. The hine gunner clenched his teeth as he slammed the bolt is gun to drive one of the long cartridges home.

"Still coming in . . . ten thousand . . . get ready!"

They tensed as the broken drone of a plane came faint e north. Suddenly a radar controlled light sliced up ugh the darkness. It searched for an instant then d a Messerschmitt 210 in the edge of the beam. Two beams shot up as if pulled by a master switch.

The sergeant screamed, "IN ACTION!"

Their searchlight whined and the power plant slowed e current drained from it. A white beam lunged sky- to the plane impaled like a tiny silver cross in the Ack ack sprang from the ground with a roar. Hot s from the multi-barreled machine guns weaved to- the intersection like angry, red snakes.

Staccatos of sharp barks from the 40mm cannon sent tiles darting upward, trailing streams of fire, to burst in puffs of yellow far into the night. The German maneuvered frantically to evade the beams by twisting and rolling then banking into a steep dive. Several lights lost him, but others clung to him with their grip of death. The heavens were filled with streaks of red and golden spangles, and in the midst of it all, the cone of blue-white searchlight beams moved with the elusive aircraft.

In a last desperate effort, the Messerschmitt dived down the beam toward Section three. His guns blazed defiance. The searchlight operator leaped into his slit trench behind the sandbagged emplacement. Olson, yards away at his control station, kept the plane centered in light.

The machine gunner sighted through slitted eyes at the left motor of the plunging plane . . . his gun chattered . . . a stream of tracers disappeared into the motor and empty cartridge cases bounced into the pit. He sprayed bullets across the nose to the other motor as he would water from a garden hose. Flames, fed by a severed fuel line, burst from the two motors. The plane erupted and flaming debris filled the air, falling like showers of hot coals.

The operator reached the light and threw the switch. Sergeant Davis shouted above the hubbub from his position at the field phone, "All clear! Only one in the raid!"

At the base of his machine gun, the gunner squatted to gather the expended cartridges.

The debris was still burning, each flame surrounded by a round patch of dark ground where the snow had melted. Heated cartridges from the plane's gun were exploding erratically all about.

The sergeant turned and walked toward the tent. Inside he lifted the platoon net telephone and spoke, "Lieutenant? Yes, sir, we got him! No, no one hurt at all. I have my report ready . . . light in action 0242 hours . . . light doused at 0246 hours . . . plane illuminated 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 sergeant conveyed this to the lieutenant. He listened for a few seconds then chuckled, "Yes, sir, I'll tell them. Over."

He put down the phone and turned to his crew. "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 witnessed 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 would be subjected to, and the adequacy or inadequacy their measures should be a great aid to us. There is doubt that during the war just passed we had an excelle system but it was not battle tried as were the British a German.

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

It is further proposed that initial efforts be devoted establishing correct procedures before the actual formati of the program. This may be accomplished by consulti the leaders in the development of new weapons, expe enced industrialists and prominent officials in our gove ment.

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

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

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

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

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

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

6. The early warning facilities available to the commu ity.

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

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

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

2. Bombproof shelters—A study of the requirements personnel, matériel, food, etc. The construction of un ground power plants, communications and other utili may fall in this category.

3. Camouflage—With the advent of bombing by t

uflage lost some of its importance. However, visual ing is still considered the most accurate. In addition, countermeasures may be expected to offset radar ing to some degree.

Sabotage—There are many subdivisions under this ing but one measure that may be made progressive is creening of factory employees and the conduct of y checks in installations where manufacture or re- h vital to the defense of our country is being con- d.

Obstacles—Areas conducive to the landing of enemy s and gliders must be made unserviceable to these in time of war. Necessary surveys and materials must pared and kept in readiness.

Damage Control—This phase of passive defense is all ssing to include fire extinguishing, repairs to public ies and clearing of debris by utilization of private and c equipment.

Evacuation—Evacuation of civilian injured from subjected to enemy action.

Defense against Biological Warfare—The potentiali- f this type of warfare are unlimited and any system of e defense would fall short if this potentiality were nsidered.

Defense Against Chemical Warfare—Plans for gas- ing factories and shelters and provisions for the pro- n of the civilian populace constitute this division.

Bomb Disposal—Besides disposing of unexploded and the designation of restricted areas, other means for the protection of the populace from this menace would fall under this heading.

11. Demolition—This section should cover plans for the destruction of vital installations in the event of imminent capture to deny their use to the enemy.

12. Alarms—Due to the complexity of modern warfare different alarms must designate the various alerts in order that appropriate action may be taken since measures vary considerably with the type of attack.

In this short space it is impossible to cover all the ramifications of an efficient passive defense system.

We have merely attempted to point out the main subdivisions which must be considered in the organization of such a program to emphasize the necessity for its inception with a minimum of delay and to stress the magnitude of responsibilities involved.

We sincerely hope that this magnitude of responsibilities confronting the three components of the army will effect a solidarity so essential to the welfare of our country. Only through unselfish and wholehearted cooperation can we achieve the degree of organization and efficiency so vitally necessary for our national security.

There is no place in any of the three components for one who harbors past grievances or present prejudices to the detriment of the task at hand.

The three components must be molded into a unified body with one single purpose—the protection of the United States—and no one individual or group of individuals must be allowed to thwart this aim, whether the individual or group be Regular Army, National Guard or ORC.

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.

Coast Artillery Journal

Fifty-fifth Year of Publication

COLONEL W. I. BRADY, Editor
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Sgt. Eric F. Rhodes, Cir. Mgr.
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The JOURNAL prints articles on subjects of professional and general interest to personnel of all the components of the Coast Artillery Corps in order to stimulate thought and provoke discussion. However, opinions expressed and conclusions drawn in articles are in no sense official. They do not reflect the opinions or conclusions of any official or branch of the War Department.

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The United States Coast Artillery Association

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The purpose of the Association shall be to promote the efficiency of the Coast Artillery Corps by maintaining its standards and traditions, by disseminating professional knowledge, by inspiring greater effort towards the improvement of matériel and methods of training and by fostering mutual understanding, respect and coöperation among all arms, branches and components of the Regular Army, National Guard, Organized Reserves, and Reserve Officers' Training Corps.

News and Comment

This Issue's Cover

The cover for this issue shows an M-15 of one of t 71st Brigade's self-propelled battalions in Italy. It has be used as a cover illustration because the history of the 7 appears in this issue and because it shows the typical te rain in which the Brigade operated during a great porti of the Italian campaign.

Guided Missiles Program

Under a recent War Department directive, The Co manding General, Army Air Forces has been made resp sible for WD activities pertaining to the research and d velopment of guided missiles.

This directive however will not alter or affect the cu rent experiments or contracts of the Ordnance Depa ment and Signal Corps except that their guided miss activities will be conducted with the cognizance of the Am Air Forces.

The AAF Technical Committee, consisting of repres tatives from all using and developing agencies, will assi projects to the separate research and development agenci except that in case of a disagreement within the committe the issue will be referred to the Research and Developme Division of the War Department for disposition. The Co manding General, Army Air Forces has been directed utilize existing facilities of other War Department agenc to the maximum.

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

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

The War Department is now studying plans for the fu delegation of responsibility for the operation of guid missiles.

AGF Guided Missile Group Chief Transferred

Colonel Clare Armstrong, Chief of Section for the An aircraft Artillery, Harbor Defense and Guided Miss Group of Headquarters Army Ground Forces has be transferred. His new assignment is that of Military Atta to Belgium and Luxembourg.

Although his successor has not been appointed, it is p sible that Colonel John Davis, who has been Colonel A strong's assistant, will continue in the capacity of Sec Chief as he has done since the departure of Colonel A strong.

Election of New Executive Council Members

he President and three other members of the council be elected to replace the following members whose 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

he following members will hold office until 31 Decem- 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.

ll active members of the Association are eligible to vote all necessary instructions are contained in the ballot his page. Please forward complete ballots to the COAST ILLERY JOURNAL, 631 Pennsylvania Ave., N.W., hington 4, D. C.

ERRATA—SEPTEMBER-OCTOBER ISSUE ADDRESS SUPPLEMENT

BRIGADIER GENERAL

Rupert E., HQ, HQ & SV. Group, GHQ, AFPAC, APO No. 500 PM, San Francisco, Calif.

COLONELS

nd, Howard F., Jr., 122 Fairview Road, Springfield, Delaware nty, Pa:
, Manly B. (erroneously listed as Lieutenant Colonel), HD of mbia, Fort Stevens, Oregon.
D. D., 3082 South Woodrow St., Arlington, Virginia.
-Stahle, Chas., Centre Furnace, State College, Pa.

LIEUTENANT COLONEL

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

CAPTAIN

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

Coast Artillery Orders (Page 76)

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

National Guard Instructors (Page 55)

—Colonel Ercil D. Porter, Infantry.

CAC ROTC Instructors (Page 58)

University, Fordham, New York—Colonel Norman E. Hart- CAC.

eplacement and School Command Inactivated

31 October, the Replacement and School Command nactivated and its functions were made the responsi- of Headquarters, Army Ground Forces at Fort Mon- irginia.

BALLOT

UNITED STATES COAST ARTILLERY ASSOCIATION

INSTRUCTIONS AND INFORMATION

The President and three members of the Executive Council are to be elected on this ballot, to replace officers whose terms of office expire December 31, 1946. Please show your interest in the Association by voting.

Please record your vote by making an "X" in the appropriate square or indicate your choice by writing in the name of your candidate. Ballots received with signatures, but with no individual votes recorded, will be considered proxies for the President of the Association.

Each candidate was considered in connection with the geographic location of his residence. It is considered advisable to have at least five members of the Council residing in or near Washington in order to facilitate the transaction of business.

Ballots received after January 31, 1947, cannot be counted.

Ballots may be collected by Post, Battalion, or other unit commanders and forwarded under one cover.

Locally prepared ballots, cast by those who do not wish to mutilate their Journals, will be accepted if they are signed.

FOR PRESIDENT (1947-1948)

☐ Lieutenant General LeR. Lutes
Director of Services, Supply and Procurement Division, W.D.G.S.

☐ _____

FOR MEMBERS OF THE EXECUTIVE COUNCIL

From Organized Reserves Corps (one member)

☐ Colonel Charles M. Boyer, ORC
Assistant Executive Director, ROA, Washington D. C.

☐ _____

From National Guard (one member)

☐ Colonel John C. Henagan
Services, Supply and Procurement Division, W.D.G.S.

☐ _____

From Army of the United States (Vote for one)

☐ Colonel Joe Moss
Pers. Off., CA Sec., Hq AGF, Washington, D. C.

☐ Colonel Paul French
Chief of Organization Branch, Organization and Training Group, National Guard, Washington, D. C.

☐ Colonel Robert J. Wood
Deputy Chief Plans & Policy, Plans and Operations Division, War Department General Staff.

☐ _____

☐ _____

_____
Signature

_____
Rank and Organization

_____
Address

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 matériel 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 Asso tion by tendering his resignation in writing.

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

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

Article V

Section 1. Meetings, both annual and special, shall be h 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, each active member shall be entitled to one vote on all qu tions, subject to the provisions of Articles VI and XVI.

Article VI

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

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

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

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

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

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

Article VII

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

Article VIII

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

Article IX

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

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

Article X

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

Section 2. Five members shall constitute a quorum for ness.

Section 3. The Executive Council shall have charge of general administration of the affairs of the Association the Articles set forth in this Constitution. It shall authori

penditure of the funds, audit the accounts of the Secretary-reasurer, control the records and property, define the policy d supervise the contents of its publications; in general it ll take such measures, within the limits of this Constitution, it may deem most expedient to further the objects of the sociation.

Article XI

The Secretary-Treasurer

He shall perform such duties as are usually specified for such ficers. He shall keep a journal of the proceedings of the ecutive Council and of the regular and special meetings of e Association. He shall have charge of the finances and cor-spondence of the Association, under the Executive Council, d be at all times subject to its orders. He shall keep accu-e account of the finances of the Association, and at each nual meeting of the Association, or on demand of the Execu-e Council, he shall make a complete report of the financial te of the Association and such other matters as may be lled for by the Council.

Article XII

The Association shall publish an annual report and shall nish this report and bulletins of timely professional interest all members.

Article XIII

There shall be neither assessments nor annual dues.

Article XIV

The organization of the Coast Artillery Association may in-de Branch Associations.

Article XV

Section 1. This Constitution shall be considered as adopted d shall be in effect when it shall have been accepted and sub-bed to by not fewer than one hundred persons having the lifications prescribed for active members, who shall then d thereafter be known as Charter Members of the Associa-n.

Section 2. Immediately upon the adoption of this Consti-n the Charter Members shall proceed to the election of officers according to Section 5, Article VI of this Constitu-n. For this election all persons eligible for active member-p shall be considered eligible for election as officers of the sociation. Officers so elected shall qualify as members of the sociation 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 mbers. Votes may be cast in person or by properly authen-ed proxies. To obtain consideration of any proposed nge, 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 be submitted at least one hundred and twenty days prior e time of meeting. The Executive Council will direct the etary to give notice of the proposed amendment to all mbers entitled to vote so that it may be received at least days prior to the meeting at which it is to be considered. notice will contain the proposed amendment and the es of the proposers.

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

BALLOT

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. K. Marshall
Col. L. L. Davis	Lt. Col. K. E. Tilton
Col. Edward Barber	Lt. Col. G. N. Adams
Col. Paul H. French	Lt. Col. L. J. Davis
Col. A. P. Sullivan	Major R. M. Colquitt
Col. W. L. 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. Lacouture, 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

Delaware

Headquarters & Headquarters Battery, 198th AAA Group
945th AAA AW Battalion

District of Columbia

Headquarters & Headquarters Battery, 340th AAA Searchlight Battalion (Type C)
Medical Detachment, 340th AAA Searchlight Battalion (Type C)
Headquarters & Hqrs. Btry., 260th AAA Group
Headquarters & Hqrs. Btry., 380th AAA AW Battalion

Minnesota

Headquarters & Hqrs. Btry., 216th AAA Group
256th AAA AW Battalion
257th AAA AW Battalion

New Jersey

Headquarters & Headquarters Battery, 254th AAA Group

Pennsylvania

Headquarters & Headquarters Battery, 51st AAA Brigade
213th AAA Group
Battery C, 899th AW Battalion
151st AAA Operations Detachment
Headquarters & Headquarters Battery, 416th AAA AW Battalion
Medical Detachment, 688th AAA AW Battalion
Medical Detachment, 416th AAA AW Battalion
Battery C, 688th AAA AW Battalion

Virginia

Headquarters & Headquarters Battery, 710th AAA Gun Battalion (Type A)

The following consolidated list indicates the assignment of National Guard instructors by States:

Alabama—Col. Paul O. Franson, Inf., Senior Instr.
Arizona—Col. John T. Zellers, Senior Instr.
Arkansas—Col. D. M. Scott, Inf., Senior Instr.
California—Col. Leonard R. Boyd, Inf., Senior Instr.; Col. John H. Harrington, CAC, Instructor; Lt. Col. Charles M. Gilbert, CAC, Instructor.
Colorado—Col. Dennis E. McCunniff, Inf., Senior Instructor.
Connecticut—Col. Arthur E. Wilson, CAC, Instructor; Major James E. McElroy, CAC, Instructor.
Delaware—Col. Charles W. Gettys, CAC, Senior Instructor; Lt. Col. William H. Francis, CAC, Instructor.
District of Columbia—Col. Charles M. Myers, CAC, Senior Instructor; Lt. Col. John B. Manley, Jr., CAC, Instructor.
Florida—Col. Harold Haney, Inf., Senior Instructor; Col. Webster F. Putnam, CAC, Instructor; Major Willi E. Corley, Jr., CAC, Instructor.
Georgia—Col. Clifford J. Mathews, Inf., Senior Instructor; Col. Logan O. Shutt, CAC, Exec. to Sen. Instr.
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—Col. John A. Andrews, Inf., Senior Instructor
Louisiana—Col. Francis A. Woolfley, Inf. Senior Instructor
Maine—Col. Joseph L. Ready, Inf., Senior Instructor.
Maryland—Col. James R. Hamilton, Inf., Senior Instructor
Minnesota—Col. Mose Kent, Inf., Senior Instructor; Lt. Col. Lawrence W. Adams, CAC, Instructor.
Mississippi—Col. Thomas G. Oliphant, FA, Senior Instructor.
Nevada—Col. Harold S. Johnson, CAC, Senior Instructor
New Hampshire—Col. Carroll A. Bagby, Inf., Senior Instructor; Lt. Col. Peter L. Urban, CAC, 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—Col. Charles E. Rayens, Inf., Senior Instructor; Col. Harold P. Detwiler, CAC, Instructor; Col. Harry W. Lens, CAC, Instructor; Lt. Col. Robert B. Barry, Jr., CAC, Instructor.
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; Major Clarence E. Gushurst, CAC, Instructor.
Oklahoma—Col. David W. Craig, FA, Senior Instructor.
Oregon—Col. John M. Hamilton, FA, Senior Instructor; Lt. Col. Pennock H. Wollaston, CAC, Instructor.
Pennsylvania—Col. Leo T. McMahon, FA, Senior Instructor; Col. Donald McClean, CAC, Instructor; Major 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—Col. Edwin E. Keatley, Inf., Senior Instructor.
Tennessee—Col. Rufus S. Ramey, Cav., Senior Instructor
Texas—Col. John T. Murray, Inf., Senior Instructor.
Utah—Col. Christiancy Pickett, FA, Senior Instructor.
Vermont—Col. Joseph K. Mitchell, Cav., Senior Instructor
Virginia—Col. Harry F. Meyers, CAC, 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
Hawaii—Col. Ercil D. Porter, Inf., Senior Instructor.
Puerto Rico—Col. Edward L. Strohbehn, FA, Senior Instructor.

Organized Reserve Corps

The following list of the state instructors and their locations, supplements the list published on page 54 of the September-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 corrected in this one and appear as they should be in the following 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. Wrean, CAC, Senior Instructor, Nashville, Tenn.

FOURTH ARMY

Colonel Otto Ellis, FA, Senior Instructor, Little Rock, Arkansas.
Colonel Douglas J. Page, FA, Senior Instructor, New Orleans, La.
Colonel Albert N. Rothermich, Inf., Senior Instructor, Albuquerque, N. M.
Colonel John P. Evans, Inf., Senior Instructor, Oklahoma City, Okla.
Colonel Hurley E. Fuller, Inf., Senior Instructor, Austin, Texas.

FIFTH ARMY

Lt. Col. Roy K. Kauffman, CAC, Ass't. 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, Ass't. 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. Btry. 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.

SIXTH 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, Portland Ore.
852d CA Battery S/L (HD) from C to A, Portland, Ore.
876th CA Battery (155) from C to A, Portland, Ore.
802d CA S/L Battery (HD) from C to A, San Diego, Calif.
832d CA Gun Battery from C to A, San Diego, Calif.

SEVENTH ARMY

321st AAA AW Battalion from C to B, Tuscaloosa, Ala.
373d AAA AW Battalion from C to C, Wilmington, N. C.
376th AAA AW Battalion from C to B, Charleston, S. C.
378th AAA AW Battalion from C to C, Wilmington, N. 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.
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 Antiaircraft 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 Artillery School at Fort Sill under the new titles 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:

a. Basic Branch
b. Advanced Branch

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

Officers Courses with Tentative Starting Dates:	*Length*	*Class Capacity*	*Course Capacity*	*Yearly Output*
*Associate Basic: 1 April	13 wks	25	25	75
Seacoast Electronics: 29 January	18½ wks	10	10	20
Submarine Mines: 29 January	18½ wks	10	10	10
Advanced Gunnery: 10 March	13 wks	10	10	10
Enlisted Courses with Tentative Starting Dates:				
Diesel Motors: 8 January	18½ wks	12	12	24
Electrical: 8 January	18½ wks	12	12	24
Gun Data Computer: 8 January	18½ wks	12	12	24
Seacoast Radar: 8 January	18½ wks	12	12	24
Submarine Mine Operator: 8 January	18½ 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.

The following will be dropped from the curriculum of the present Antiaircraft Artillery School:

Course	*Effective Date*
a. Basic Branch	15 February 1947
b. Advanced Branch	At end of current school year
c. Officer Communications	29 January 1947
d. Officers Motor (Transferred to Knox)	20 December 1946
e. PMS&T	At once
f. National Guard Instructor	At once
g. Enlisted Motor (Transferred to Knox)	14 February 1947
h. Enlisted Communications Chief	29 January 1947
i. Enlisted Radio Operator	29 January 1947
j. Armorer and Artillery Mechanics	July 1947

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

Officers Courses with Tentative Starting Dates:	*Length*	*Class Capacity*	*Course Capacity*	*Yearly Output*
*Associate Basic: 8 Jan.; 22 Jan.; 5 Feb.; 19 Feb.; 24 Mar.; 14 Apr.; 5 May; 26 May	13 wks	35	70	270
Radar: now operating	37 wks	25	25	25
Guided Missiles: now operating	37 wks	25	25	25
Research and Analysis: now operating	37 wks	20	20	20
Enlisted Courses:				
Radar Repair: now operating	37 wks	45	45	45
Fire Control Electrician: now operating	37 wks	50	50	50

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

*Associate Basic and Associate Advanced Courses are those offered for National Guard and ORC officers.

* * *

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.

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 commandant of the AARTC while Colonel Charles H. Treat and Colonel Lawrence E. Shaw command respectively the 11th and 12th Groups.

* * * * *

HEADQUARTERS
REPLACEMENT AND SCHOOL COMMAND
ARMY GROUND FORCES
Fort Bragg, N. C.

14 October 1946

333.1 GNRSG

SUBJECT: Report of Inspection
TO : Commanding General
Antiaircraft Artillery Replacement Training Center, Fort Bliss, Texas

1. I have just read with pleasure and satisfaction the complimentary report made as a result of the inspection of the Antiaircraft Artillery Replacement Training Center by officers of this headquarters. Please accept my congratulations upon the fine showing made and inform members of your command of our feelings in the matter.

2. A copy of this report is attached hereto for your information.

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 signed 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

TO : 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, technique of fire and tactics of antiaircraft artillery in the American Army have steadily progressed.

In World War II our Antiaircraft Artillery was greatly expanded and their troops were stationed all over the world. More than once these troops proved their versatility by not only fighting in their normal rôle 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 our Antiaircraft Artillery. We are happy to celebrate their Twenty-ninth Anniversary.

Sincerely yours,

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

1st Ind

AHFCG

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

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

In World II, Antiaircraft Artillery Units, composed of entirely of National Guard, Organized Reserve Corps and AUS personnel, were an invaluable part in the winning team in every theater of operations. On the beaches of North Africa to Normandy, Iwo Jima and Okinawa, in Europe and the Pacific islands, and in the buzz bomb raids of London and Antwerp, American Antiaircraft Units acquitted 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, Army 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 retained command until 5 December 1941 when he assumed command of the 33rd AAA Brigade.

He was promoted to Brigadier General 17 December 1941 and after commanding 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 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 584s for ground detection work in the XV Corps Sector during the campaigns in France and Germany. (Page 37)

Captain Richard P. Fullmer 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 [illegible] during the period he writes about. (Page 54)

Lieutenant Jack C. Berry writes of an incident whi occurred (basically) in his platoon of Battery C, 225th S 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 you efforts in compiling and publishing the address supplemen which accompanied the September-October issue of th COAST ARTILLERY JOURNAL and to express generally m appreciation for the JOURNAL as a valuable aid during m military service.

Much of my active duty service was spent as an offic on the General Staff of Headquarters XIV Corps, an assig ment which took me away from an intimate contact wit the Coast Artillery Corps. Under these conditions, I looke to the JOURNAL to keep me informed on Coast Artillery a fairs.

Now that I have been relieved from active duty, I antic pate that the JOURNAL will serve as a valuable adjunct t War Department publications in furthering my militar training. I am hoping that you will devote considerab space in forthcoming issues to articles dealing with ne developments designed especially to assist the Reserve O ficer in maintaining his state of training at the same leve attained as a result of active service. I trust that in th months to come, the JOURNAL will play such an importan part in Coast Artillery affairs as to warrant expansion publication on a monthly basis.

Yours for continued success,

PAUL F. LUETH, JR.,
Major, CA-Res.

* * *

Review for Maj. Gen. Meyer

Major General G. Ralph Meyer, retired, was honor late in October with a retirement review followed by a r ception at the Antiaircraft and Guided Missile Center, Fo Bliss, Texas.

Two Antiaircraft Artillery Groups with Colonel H. McMorrow acting as Commander of Troops passed in r view before the retired General. With General Meyer the reviewing party was Major General J. L. Homer, Co manding General of the Antiaircraft and Guided Miss Center.

In deference to General Meyer's graduation from A napolis before he transferred to the army in 1911, t massed 62d and 247th AGF Bands played "Anch Aweigh" while the two Generals were inspecting the troo before they passed in review.

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

Since his retirement, General Meyer has concentra on his lifelong hobby of studying and painting bird He has already gained nation-wide recognition for his w with the Audubon Society and is currently preparing d ings and an article for the National Geographic Soci

ACOAST SERVICE

TEST SECTION

individual, whether or not he is a member of the service, is invited to submit constructive suggestions relating to ems under study by the Seacoast Service Test Section, Army Ground Forces Board No. 1, or to present any new em that may properly be considered by the Section. Communications should be addressed to the President, Sea- Service Test Section, Army Ground Forces Board No. 1, Fort Baker, California.

pertaining to Antiaircraft Artillery should be sent to the Antiaircraft Test Section, Army Ground Forces Board 4, Fort Bliss, Texas.

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

COLONEL R. E. DINGEMAN, Director

LT. COL. JAMES T. BARBER
LT. COL. WILLIAM R. MURRIN
LT. COL. GEORGE B. WEBSTER, JR.
LT. COL. FREDERICK N. WALKER, JR.
MAJOR FRANCIS J. PALLISTER
CAPTAIN RICHARD T. PULLEN, JR.
CAPTAIN HAROLD R. BRANTNER

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fset Method Firing. The project on the offset method ing with the AN/MPG-1 radar, discussed in the Sep- er-October issue of the JOURNAL, is continuing. A ed target practice procedure for this method of firing een drafted. Since the records for an offset practice e obtained by photographing the tracking or spotting of the radar, it is obvious that the camera procedure vital importance. Current tests include photograph- e tracking scope of an AN/MPG-1 during regular e practices (155mm) in order to ascertain the type nera equipment and procedure needed to obtain opti- results.

mm HE Subcaliber Ammunition. Service tests have started on an HE round for 75mm subcaliber tubes M8, M9, M12 and M25. Heretofore, only inert pro- s have been fired in these tubes with a resultant small h. The HE round was developed to increase the size splash and to give a better echo on the scopes of the MPG radar. Tests to date have given very satisfac- sults.

ntilation 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 place 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 had been experienced with primers sticking in these type guns and this modified spindle was developed in an effort to remedy this.

Coast Artillery Newsletters

Antiaircraft Office, GHQ, AFPAC, Tokyo, Japan, APO 500

BRIGADIER GENERAL WILLIAM F. MARQUAT
Antiaircraft Officer

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 matériel, 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, or the searchlight and its radar, be the responsibility of one service.

The "Report of AAA Activities in the Pacific War" is 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 the antiaircraft artillerymen can well be proud.

138th AAA Group, Yokohama, Japan, APO 503

COLONEL CHARLES A. FRENCH, *Commanding*

The 138th AAA Group, consisting of Group Headquarters and Headquarters Battery, 753d AAA Gun Battalion (SM), 209th AAA AW Battalion (SP), 933d AAA AW Battalion (SM) and the 82d Chemical Mortar Battalion, continued its primary mission of performing security guard in the Yokohama area. Five hundred forty-nine arrests were made during the quarter ending 30 September 1946. Two other group units, the 162d AAA Operations Detachment and Btry "C," 325th AAA Slt Battalion have training as their primary mission and are achieving excellent results at Johnson Army Air Base, Irumagawa.

In spite of readjustment losses and lack of replacements, every effort is being made to carry on antiaircraft training while meeting fluctuating security guard requirements. This 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 training. 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 practice.

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 missions 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 latter part of November. Though hampered by changing discharge and rotation policies, real progress is being made and both officers and men are eagerly awaiting the opportunity to demonstrate their capabilities.

*452d AAA AW Battalion (SP), Korea, APO 712

LT. COLONEL R. C. DOUGAN, *Commanding*

The *452d AAA AW Battalion (SP) the only antiaircraft battalion in Korea is assigned to Headquarters Special Troops, XXIV Corps. The battalion is located in a consolidated area one-half mile east of the Kimpo Airfield. Present plans call for the erection of additional quonset huts, laying out a new gun park, and enlarging the athletic field. A new enlisted men's and officers' club will be constructed in the very near future by the Corps Engineers.

Lt. Col. R. C. Dougan assumed command 8 September 1946. Captains Cook, Hunter, Knight, Zaldo and Lieutenant Weaver reported to the battalion the first part of September.

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 dedicated 8 September 1946. Colonel Yeager, Chaplain Corps, officiated.

32d AAA Brigade, Luzon, P.I., APO 707

BRIGADIER GENERAL FRANK C. MCCONNELL, *Commanding*

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 (PIFTAF) 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. Nanney. General and Mrs. Connell and their two sons are now residing in the Admiral Apartments on Dewey Boulevard in Manila. Major Nanney 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 I & E Officer. Colonel Peter K. Kelly was announced as Executive Officer of the Brigade on 6 September. Captain Richard Walmer, 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 Walmer 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 Macario 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 a 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 to approximately 14 officers and 28 enlisted men assigned. Of these, several officers and enlisted men have been loaned to other organizations of the Ryukyus Command in order to keep certain essential functions such as communications and ration points operating.

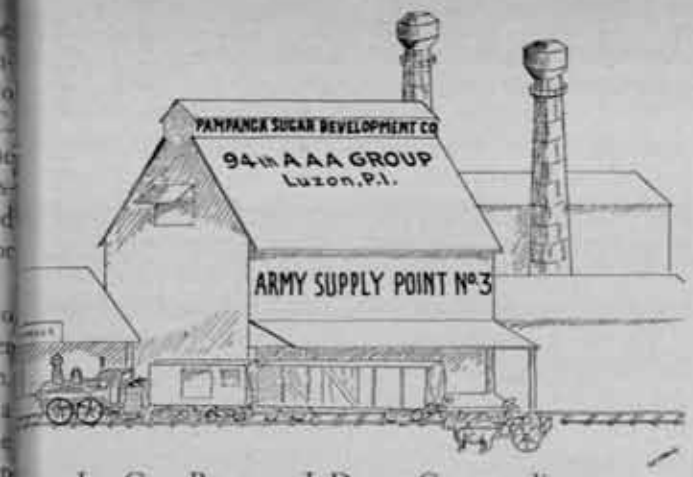
The most noteworthy change to the community has been the arrival of dependents. The following officers have their families here now: Lt. Col. Iver A. Peterson, Major William H. Barnett, Major Willard W. Mize, Major Hugh J. Turner, Jr., Major John B. M. Covert, Capt. John F. Mangan, Capt. Derosey C. Cabell,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



LT. COL. BERNARD J. DREW, *Commanding*

The 94th AAA Group is continuing its mission of op-ting Army Supply Point Number 3, at San Fernando, mpanga, Luzon, P. I. The mission of this Supply Point o supply the 12th and 14th Infantry Divisions (PS) d various small American service units in this area with ss I, II, and IV Quartermaster Supplies as well as sup-s of all the Technical Services.

With the 12th Infantry Division (PS) reaching its T/O ngth during August and the 14th Infantry Division S) getting its first shipment of troops, more and more ons and equipment were moving into and through the pply Point on the way to troops. As much of the equip-nt as possible is routed to Capas, where a railhead has n established by the 12th Infantry Division (PS) for oading by that unit.

Supplies at the beginning of August were starting to low with shortages in many items of ration issue. Some these shortages could be taken care of by substitution, many were items for which no substitutes were avail-le. These shortages made it necessary for Lt. Col. Drew, mmanding Officer of the 94th AAA Group, to spend ch of his time in Manila conferring with the heads of agencies supplying us to determine the cause of the rtages and get supplies rolling once more to the Supply nt. On 5 August Colonel Watkins, S-4, PHIBCOM, de an official visit to ASP No. 3 to check on the reported rtages and found them to be as reported. On the 6th and 7th some of the much needed stock began to arrive at the Supply Point. Another inspection on the 7th by Colonel Watkins and Lt. Col. Pratt, of the Quartermaster General's Office, AFWESPAC, brought assurance of continued supplies.

The 14th of August was celebrated as an official holiday in commemoration of the first anniversary of the unconditional surrender of Japan. Many of the men attended religious ceremonies in the Chapels of near-by units.

On the 16th of August Brigadier General McGaw, G-3, AFWESPAC, and staff, accompanied by Colonel Hodson and Colonel Watkins of PHIBCOM, inspected the area of ASP No. 3. On the same day Captain Harr, Food Advisor, AFWESPAC, who is making a study of Philippine ration issue, visited the Supply Point.

On 1 September 1946 arrangements were made by PHIBCOM to secure locally produced fresh fruit and vegetables for issue from this Supply Point. These fresh fruits and vegetables are a welcome substitution to the menu as the canned fruit and vegetables which they replaced were not always available.

With the addition of ten two and one-half ton trucks secured in August and other trucks from 30th Philippine Scout Replacement Depot and 12th Infantry Division (PS) many of the more critically needed supplies are now being trucked from Manila, saving many days' waiting time on the delivery.

On 23 September 1946 the 10th QM Bakery Platoon moved from ASP No. 3 to Camp O'Donnell, where it is going into operation to produce bread for the 12th Infantry Division (PS). Upon reaching Camp O'Donnell the 10th QM Bakery Platoon was relieved from attachment to 94th AAA Group and attached to 12th Infantry Division (PS). The 9th QM Bakery Platoon will continue to supply the 12th Infantry Division (PS) with bread until such time as the 10th QM Bakery Platoon gets its bakery equipment installed and operating. During this period 700,000 lbs., or approximately 350,000 loaves of bread were produced at the bakery of ASP No. 3.

Classes I, II and IV QM Supplies as well as supplies of all the Technical Services were received and distributed to approximately 3,500 United States troops and 29,000 Philippine Scout Troops during this period.

Antiaircraft Artillery Training Center

San Marcelino, P. I.

APO 74

COLONEL FRANCIS A. HAUSE, *Commanding*

The ratio of officers departing to officers reporting for ty to the Training Center has gradually swung in favor those assigned for duty. This month is the first since Day that more officers have reported for duty than have

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 AFWESPAC battalion whose function is to furnish the cadre for all AFWESPAC and RYUKYUS antiaircraft units to be activated and trained at the Antiaircraft Artillery Training Center.

601 recruits from AFWESPAC 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.

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

Captain James W. Young, First Lieutenant Joe W. Alexander, Captain Ambrosio Patacsil, First Lieutenant Mart L. Helfrich, Jr., CWO Stanish, Captain Earle T. Radish, Captain William E. Lee, Captain George E. Barker, Captain Clarence A. Magnus, Captain Edward Y. Ridgely, First Lieutenant William R. Sutterfield, First Lieutenant Herbert C. Hellwitz, First Lieutenant Michael Sorbello, First Lieutenant Stuart L. Cowles, First Lieutenant Neil J. O'Donnell, Major Oliver E. Wood, Major Charles D. Sauvinet, Captain Charles J. Shea, Captain John C. Wolfe, Lieutenant Colonel Arland E. Bigelow, First Lieutenants Frank Arwood and George W. Pettigrew.

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.

At Schofield Barracks on 4 October 1946, the 2273d AAAC (HAW) furnished an antiaircraft artillery demonstration during a visit by Lieutenant General Hull, Commanding General of USAFMIDPAC, to elements of this command. This demonstration included a drill wherein each participating unit started with its equipment in traveling position and placed it in firing position. The 295th AAA Searchlight Battalion provided a complete searchlight-detector section. A 40mm Automatic Weapons fire unit participated from the 865th AAA Automatic Weapons Battalion. A complete 120mm gun battery from the 97th AAA Gun Battalion completed the display. The demonstration was particularly effective. The emplacement of the 120mm gun battery in 23 minutes, completely oriented and synchronized, was outstanding in view of the current personnel status of the command.

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. Brantner, Captain John W. Fletcher and Captain Willis H. Tassie.

PANAMA COAST ARTILLERY COMMAND

BRIGADIER GENERAL F. P. HARDAWAY, *Commanding*

A new group of casuals, many with previous service in ama, were welcomed into the Panama Coast Artillery mmand by Brig. General F. P. Hardaway on Monday, October, at the Coast Artillery Training Center at Fort ador. These men, who arrived a few days before the ouncement of the War Department's policy to release 1945 inductees, have helped to fill the resulting person- gaps in Panama Coast Artillery organizations.

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

The Coast Artillery Command Safety Director, after dy of various methods for the implementation of the Department Safety Program, selected as a thoroughly ticable solution, a procedure which had been adopted the Harbor Defenses of Balboa, Fort Amador, Canal e.

In addition to the Safety Director required by War De- ment instruction the Harbor Defenses of Balboa and of Fort Amador appointed a Safety Council composed wenty enlisted men from all batteries and all post ities. These men were authorized to make on-the-spot ections of safety violations and to investigate and make mendations for the elimination of all hazards.

Frequent Safety Council meetings are conducted by the ty Director, at which all directives and changes thereto discussed so that all concerned are familiar with the safety methods.

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

ements of Harbor Defenses of Cristobal, Fort Sher- played a major role in demolition operations, 4 Oc- , 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 Galeta 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. HOMER, *Officer In Charge*

The following changes occurred during the month of September 1946:

ARRIVALS

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

DEPARTURES

Rank Name	*Dept.*
Lt. Col. Perry B. Priest	AGF Bd No. 4, Ft. Bliss Texas
Major Walter T. Belland	Sep C, Ft. Sam Houston, Tex.
Major William J. Bennett	FA Sch, Ft. Sill, Oklahoma
Major Joseph C. Cox	Second Army, Va. Mil. Dist., Blacksburg, Va.
Major James R. Dillon	Hq, 2d Army, Baltimore, Md.
Major John B. B. Trussell	O/S RD, Ft. Lawton, Wash.
Major Fred L. White	CA School, Ft. Winfield Scott, Calif.
Capt. John E. Boyd	O/S RD, Ft. Lawton, Wash.
Capt. Lewis H. Burruss	The Abn Sch, Ft. Benning, Ga.
Capt. James B. Clark	AGF Bd No. 4, Ft. Bliss, Texas
Capt. George W. Herbertson	5th AAA Gp, Ft. Bliss, Texas
Capt. Jethro T. Hudgins	O/S RD, Ft. Lawton, Wash.
Capt. James McKeen	Sep C, Ft. Sam Houston, Tex.
Capt. Stephen M. Snopkowski	5th AAA Gp, Ft. Bliss, Texas
Capt. Charles H. Talbot	O/S RD, Fort Lawton, Wash.
Capt. Isom C. Threatt	SAC, 35th AAAF Base Unit, Bolling Fld, D. C.
Capt. Charles A. Wooten, Jr.	Sep C, Ft. Sam Houston, Tex.
1st Lt. William J. Berger	O/S RD, Cp. Kilmer, N. J.
1st Lt. Paul C. Dunn, Jr.	O/S RD, Cp. Kilmer, N. J.
1st Lt. James E. Hollihand	O/S RD, Ft. Lawton, Wash.
1st Lt. Charles S. Kingman	Sep C, Ft. Sheridan, Illinois
1st Lt. Allen R. Moran	O/S RD, Cp. Kilmer, N. J.
1st Lt. Howard A. Simonides	O/S RD, Cp. Kilmer, N. J.

*Redesignation for the Antiaircraft Artillery School (see page 64).

The following changes occurred during the month of October 1946:

ARRIVALS

Rank Name	*Dept.*
Brig. Gen. Robt. M. Montague	Ass't Commandant of AA GM School
Lt. Col. Arnold D. Amorosa	D of I Department
Capt. Alvin O. Oyen	Extension Courses Dept.
WOJG Charles R. Stewart	Not yet joined

DEPARTURES

Rank Name	*Dept.*
Col. Robert H. Van Volkenburgh	Senior Instructor, Ohio N. G. Columbus. Ohio
Lt. Col. Fred F. Newman	Sep Det, 4001 ASU this sta
Lt. Col. James K. Saunders	Sep Det, 4001 ASU this sta
Major John E. Bowman	USMA, West Point, N. Y.
Major Floyd R. Brown	Sep Det, 4001 ASU this sta
Major Sidney W. Drennen	Sep Det, 4001 ASU this sta
Major Alvis F. Jackson	Sep Det, 4001 ASU this sta
Major Harold O. McCallum	Sep Det, 4001 ASU this sta
Major Franklyn J. Michaelson	Sep Det, 4001 ASU this sta
Capt. Blyde B. Carroll	The Abn Sch, Ft. Benning, Ga
Capt. Robert H. Kassner	Sep Det, 4001 ASU this sta
Capt. Lester P. Lanelli	O/S Replacement Depot, Cp Stoneman, Calif.
Capt. Nicholas P. Mastores	Sep Det, 4001 ASU this sta
Capt. Kenneth W. Ramsey	Los Angeles High School, Los Angeles, Calif.
Capt. James M. Rowan	Sep Det, 4001 ASU this sta
Capt. Charles E. Stoetzer	Det of Patients, WBGH, El Paso, Texas
1st Lt. Paul H. Bachelor	Sep Det, 4001 ASU this sta
1st Lt. Stanley J. Davies	Army Forces Pacific, Tokyo, Japan
1st Lt. Joseph P. Fraser, Jr.	Sep Det, 4001 ASU this sta
1st Lt. Robert L. Kelly	Sep Det, 4001 ASU this sta
1st Lt. Daniel O. King	Sep Det, 4001 ASU this sta
1st Lt. Richard L. Kunde	Sep Det, 4001 ASU this sta
1st Lt. Leslie T. Laurence	O/S Repl Depot, Cp. Kilmer N. J.
1st Lt. C. J. Le Van	O/S Repl Depot, Cp. Stoneman, Calif.
1st Lt. Walter W. Long	3543d AAF BU, San Antonio Texas
1st Lt. John A. McGrane	O/S Repl Depot, Cp. Stoneman, Calif.
1st Lt. George O. Moseley	Sep Det, 4001 ASU this sta
1st Lt. Michael J. Syso, Jr.	Sep Det, 4001 ASU this sta
2d Lt. William Etingoff	Sep Det, 4001 ASU this sta
CWO Edward A. Todd	Office of Senior Ground Inst Missouri N. G., Jefferson City, Missouri
CWO Wilber J. Whaite	Inf School, Ft. Benning, Ga
CWO Doyle L. Woodward	Sep Det, 4001 ASU this sta
WOJG Lester L. Hill	Sep Det, 4001 ASU this sta

he Seacoast Branch, The Artillery School*

ajor General Robert T. Frederick, *Officer In Charge*

ersonnel changes as of 30 September are as follows:

Arrivals

r Albert A. Maykovich	Tng Publ O, Dept of Tng Publ, CA Sch
or Fred L. White	Instructor Artillery, Dept G&T, CA Sch
t. Victor J. Tuliszewski	Supply O, General, Dept of Eng, CA Sch
t. Horace G. Williams, Jr.	Asst I & E O, Hq & Hq Det, HDSF
t. Richard P. Fulmer	Hq & Hq Btry, CA Sch
lt. Leon J. Sonders	Company O, CA Sch
lt. William H. Sprigg	Athletic & Recreation O, CA Sch
lt. John R. Halisky	Tng Aids O, CA Sch

Departures

Col. Henry G. Fowler	Trfd to Det of Pnts, LGH, San Francisco, Calif.

*designation for The Coast Artillery School (see page 64).

Major Frank J. F. Polifka	Trfd to AAA School, Ft. Bliss, Texas
Capt. Reno A. Mazzucchi	Trfd to AAA School, Ft. Bliss, Texas
Capt. Edwin Kalbfleish, Jr.	Trfd to Washington Univ., St. Louis, Mo.

Personnel changes as of 31 October are as follows:

Arrivals

Major Lloyd C. Hall	Instructor, Dept Sub-Mines, Atry Sch
Capt. Albert W. Farley, Jr.	Det Comdr, Arty Sch
Capt. William A. Hancock	Btry Comdr, 29 CAMP Btry, Arty Sch
1st Lt. Thomas G. Worley	Instructor, Arty Gunnery, Arty Sch

Departures

Lt. Col. John J. Guy	Trfd to O/S Repl Depot
Major John C. Linderman	Trfd to O/S Repl Depot
Capt. Harry L. Darden	Trfd to O/S Repl Depot
Capt. Lawrence W. Stephens	Trfd to O/S Repl Depot
Capt. John J. Bulmer	Trfd to O/S Repl Depot
Capt. Worth C. Connor	Trfd to O/S Repl Depot
1st Lt. Leon J. Sonders	Trfd to O/S Repl Depot
WOJG George L. Michel	Trfd to 345th TC Harbor Craft Co, Ft. Eustis, Va.
Major Dean J. Natali	Separated from Service
Major William J. Oakes	Separated from Service
Major John H. Wiggs	Separated from Service
Capt. James S. Tretten	Separated from Service
Capt. John R. Higgins	Separated from Service
Capt. Paul Rutkovsky	Separated from Service
Capt. Jacob Miller	Separated from Service
1st Lt. Clark Edwards	Separated from Service
1st Lt. Winfield S. Winter	Separated from Service
1st Lt. Warren R. Fritze	Separated from Service
1st Lt. Lahma W. LaFon	Separated from Service
1st Lt. John M. Periale	Separated from Service
1st Lt. Merle E. Cox	Separated from Service
1st Lt. Clarence L. O'Brien	Separated from Service
1st Lt. Henry R. McCrone, Jr.	Separated from Service
1st Lt. John K. Willis	Separated from Service
CWO James Kelly	Separated from Service

60th AAA Group (N.G.)

Washington, D. C.

Colonel Leroy S. Mann, *Commanding*

he War Department has granted Federal Recognition e following units: Group Headquarters and Head- ers Battery; Headquarters and Headquarters Battery, Antiaircraft Artillery Searchlight Battalion; Medical chment, 340th Antiaircraft Artillery Searchlight Bat- ; and Headquarters and Headquarters Battery, 380th ircraft Artillery Automatic Weapons Battalion.

adquarters and Headquarters Battery, 260th Antiair- Artillery Gun Battalion was scheduled for inspection cognition purposes on November 15, 1946 and the Ordnance Maintenance Company (Antiaircraft) spection on December 15, 1946. This will complete 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.

COAST ARTILLERY ORDERS

WD and AGF Special Orders covering period 31 August through 18 October 1946. Promotions and demotions are not included.

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. Detailed as Senior Instructor Organized Reserves State of Indiana.
Armstrong, Clare H., to detail in GSC asgnd to GSC w/troops.
Brown, Robert D., to retire.
Bullene, Lathrop R., to Fifth Army Br US Disciplinary Bks, Ft. Leavenworth, Kans.
Carroll, James B., to Hq Second Army, Baltimore, Md. w/sta at Philadelphia, Pa. detailed as Senior Instructor Organized Reserves State of Penna.
Carson, Marion, detailed to GSC asgnd to GSC w/troops.
Clayton, Lawrence L., to AGO, Washington, D. C.
Conable, Morris E., to retire.
Davis, John W., to detail in GSC asgnd to GSC w/troops.
Eaton, Galen P., to retire.
Flory, Lester D., to AGF Bd No. 4, Ft. Bliss, Texas.
Gallant, E. B., to detail in JAGD.
Glasgow, Ralph I., to detail in TC.
Hardy, Robert M., to OC of S, Washington, D. C.
Hartman, Allison R., to OC of S, Washington, D. C.
Harvey, Thomas H., to USMA, West Point, NY w/sta at University of Michigan, Ann Arbor, Mich.
Harwell, Malcolm H., to Hq & Hq Det HD of Boston, Ft. Banks, Mass.
Hatch, Melton A., to AAA Repl Pool AARTC, Ft. Bliss, Texas.
Heathcote, Earle W., to Hdqtrs. Base Command, APO 868, c/o Postmaster, Miami, Florida.
Hendrix, Raleigh R., to Hq AGF, Ft. Monroe, Va.
Hiddleston, Eugene W., to CA (SC) ORP, Ft. Winfield Scott, Calif.
Hincke, John I., to detail at Univ of Pittsburgh, Pittsburgh, Pa.
Hunter, Howard W., to retire.
Irvine, Michael M., to Alaskan Dept, APO 942, Seattle, Wash. (erroneously entered as reld fr active dy in last issue).
Jolls, Ephraim P., to retire.
Jones, Clifford R., to AGO Casuals, Wash., D. C.
Lowder, James R., to retire.
McNamee, William L., to Gnd Dev Sec., Fort Monroe, Va.
Putnam, Webster F., Jr., to Hq Seventh Army, Atlanta, Ga., w/sta at Jacksonville, Fla. detailed as Instructor Florida NG.
Ritchie, Isaac H., to OC of S, Washington, D. C.
Routh, David B., to detail in GSC asgnd to GSC w/troops.
Rowntree, Kenneth, to retire.
Russell, Sam C., to Student Nat'l War College, Washington, D. C. (erroneously entered as reld fr active dy in last issue).
Rutherford, Dorsey J., to retire.
Scott, Willard W., to Seventh Army, Ft. Bragg, N. C.
Shepherd, Charles E., to detail as member GSC asgnd to GSC w/troops.
Shutt, Logan O., to Hq Seventh Army, Atlanta, Ga., w/sta at Savannah, Ga., detailed to Instr Georgia NG.
Sturman, J. Foxhall, to detail as member GSC asgnd GSC w/troops.
Thompson, Merle D., to Hq AGF, Ft. Monroe, Va.
Tomlin, Robert F., to retire.
Vandersluis, Howard J., to detail in TC.
Van Volkenburgh, Robert H., to Hq Second Army, Baltimore, Md., w/sta at Columbus, Ohio, detailed as Senior Instructor Ohio NG.
Walter, Eugene H., to Hq First Army, Governors Island, N. Y.
Wilson, Arthur E., to Hq First Army, Governors Island, N. Y., w/sta at West Hartford, Conn. and detailed as Instructor Connecticut NG.
Wolx, Charles M., to retire.
Young, George E., to Hq Second Army, Baltimore, Md. w/sta at Columbus, Ohio, detailed as Senior Instructor Organized Reserves, State of Ohio.

Lieutenant Colonels

Alexander, Dana S., to retire.
Barry, Robert B., Jr., to AAA Repl Pool, Ft. Bliss, Texas.
Bates, Raymond H., to Hq, AGF, Ft. Monroe, Va.
Black, Edwin F., to OSW, Washington, D. C.
Borden, Nathaniel, to CA (SC) ORP, Ft. Winfield Scott, Calif.
Broyles, Harmon E., to Hq AGF, Ft. Monroe, Va.
Coffin, Ralph B., to AARTC, Ft. Bliss, Texas.
Connor, Robert T., to Hq First Army, Governors Island, N.Y., w/sta at Jersey City, N.J., detailed as instructor New Jersey NG.
Day, John B., to Ft. Eustis, Va.
De Rita, Joseph, reld fr active dy in IGD.
Eason, James F., to Hq AGF, Ft. Monroe, Va.
Erwin, John Francis, reld fr active dy.
Fish, James H., to detail at Michigan State College of Agriculture and Applied Science, East Lansing, Mich.
Francis, William H., to Hq, First Army, Governors Island, N.Y., w/sta at Wilmington, Del., detailed as Instr Delaware NG.
Franson, Paul O., to Naval Amph Base, Little Creek, Va.
Gregory, Samuel S., to Hq AGF, Ft. Monroe, Va.
Heinrich, Charles T., to Hq Fifth Army, Chicago, Ill.
Howell, Joseph R., to Hq AAF AC/AS-3 for dy w/the Office of Special Assistance for Antiaircraft, Washington, D. C.
Harding, Harry J., to El Paso High School, El Paso, Texas.
Harnett, John S., to detail in CE.
Hart, John E., to OC of S, Washington, D. C.
Janowski, Raymond, to USMA, West Point, N. Y.
Johnson, Bruce H., to First Army, Hq First Sv Command, Boston, Mass.
Johnson, Harold O., to OSW, Washington, D. C.
Kauffman, Roy K., to Hq Fifth Army, Chicago, Ill., w/sta at Denver, Colo., detailed as Senior Instructor Organized Reserves State of Colorado.
Knapp, Ernest C., to Coast Artillery Repl Pool (Seacoast Artillery), Ft. Winfield Scott, Calif.
McEniry, Charles T., to detail in QMC.
Manley, John B., Jr., to Hq Second Army, Baltimore, Md., w/sta at Washington, D. C., detailed as Instructor District of Columbia NG.
Mohr, Frederick C., reld fr detail in Inf.
Molloy, Robert W., to Command and Staff College, Ft. Leavenworth, Kansas.
Munske, Charles R., to WDPC, Ft. Dix, N. J.
Owen, William V., to detail in TC.
Parr, Wayland H., to detail in TC.
Piram, Joseph S., to OC of S, Washington, D. C.
Quirey, William O., to Hq Fifth Army, Chicago, Ill.
Raymond, Montgomery B., to Hq AGF, Monroe, Va.
Reardon, William B., to Hq Fifth Army, Chicago, Ill., w/sta at Pierre, S. D., detailed as Senior Instructor Organized Reserves State South Dakota.
Ritchie, Walter P., to OC of S, Washington D. C., for dy w/Legislative and Liaison Di
Rumph, Raymond W., to USMA, West Point N. Y.
Schultz, Marion H., to AARTC, Ft. Bliss, Tex
Shearouse, James D., to Armed Forces Staff College, Norfolk, Va.
Sherman, Elliott W., to Fourth Army, Ft. Worth Texas.
Spann, Cecil E., to Hq AGF, Ft. Monroe, Va.
Urban, Peter L., to Hq, First Army, Governors Island, N. Y., w/sta at Laconia, N. H., detailed as Instructor N. H. NG.
Walker, Julian A., to AARTC, Ft. Bliss, Tex

Majors

Adcock, Charles W., to Seacoast Service Test Station AGF Board No. 1, Fort Bragg, N. C. w/sta at Ft. Winfield Scott, Calif.
Backstrom, Bert H., to CA School, Fort Winfield Scott, Calif.
Baker, Marshall W., to Fort Story, Va., w/sta at Oceana, Va., for duty with Air Support Control Unit No. 2 (NAAS) US Atlantic Fleet.
Bennett, William J., to FA School, Fort Sill Okla.
Bowman, James W., to AARTC, Fort Bliss Texas.
Bowman, John E., to USMA, West Point, New York.
Brown, Burrell G., to AAA Repl Pool AARTC Fort Bliss, Texas.
Chittendon, Albert O., to Univ. of California Berkeley, Calif.
Conelly, Raymond James, to CA (SC) ORP, Fort Winfield Scott, Calif.
Corbett, John B., to CA (SC) ORP, Fort Winfield Scott, Calif.
Crane, Richard J., to OC of S, Washington, D.
Dayton, Allan S., AAA Repl Pool, Fort Bliss Texas.
Deeds, John Frederick, relieved from active dut
Elam, Charles R., to AARTC, Fort Bliss, Tex
Fielder, Arthur A., Hq. Fifth Army, Chicago Ill.
Flynn, James Frederick, relieved from active d
Gregory, Clyde, detailed in AGD.
Gundlach, Phillip J., to Office US Joint Chiefs of Staff, Washington, D. C.
Gundry, Charles E., to AAA Repl Pool, Fort Bliss, Texas.
Gushurst, Clarence E., to Hq Second Army Baltimore, Md., w/sta at Cleveland, Ohio and detailed as instructor Ohio NG.
Hammond, Harold Curtis, to 1549th ASU Philadelphia Rctg Dist, Philadelphia, Pa.
Hawes, Milton D., to Seventh Army Hq & Hq Det, HD of Pensacola, Fort Barrancas, Fla.
Holdsworth, Edward Hanson, to 267th AA Group, Fort Bliss, Texas.
Horton, William F., to AAA Repl Pool, Fort Bliss, Texas.
Howze, Frank B., to USMA, West Point, New York.
Huth, Lawrence Henry, to CA (SC) ORP, Fort Winfield Scott, Calif.
Isenson, Raymond S., to Fifth Army, Fort Sheridan, Ill.
Ivey, Richard G., to be retired.
Jencks, Frederick W., detailed in Cavalry.
Jensen, Martin Edward, to 450th AAA AW Bn Fort Bliss, Texas.
Larocca, Gerard A., to First Experimental Guided Missiles Group, Eglin Field, Fla.
Lyon, Richard Don, to AAAORP AARTC Fort Bliss, Texas.

ey, Charles C., to 267th AAA Group, Bliss, Texas.
y, James E., to Hq First Army, Governors d, N. Y., w/sta at Bridgeport, Conn., ed as Instructor Connecticut NG.
m, Joseph R., to Utah State Agricultural ge, Logan, Utah.
t, Frank Glover, Jr., to 5th AAA Group, Bliss, Texas.
, John Edwin, to 267th AAA Group, Fort , Texas.
y, Rueben W., to Hq Seventh Army, At- , Ga., w/sta at Savannah, Ga., for duty Asst to Senior Instructor Georgia NG.
, Walter H., to 60th AAA AW Bn, Fort , Texas.
r, Charles F., to Hq AGF, Fort Monroe,
, John C., to Hq AGF, Fort Monroe, Va.
, Paul E., to CA (SC) ORP, Fort Winfield , Calif.
, Frank J., to AAA School, Fort Bliss, s.
, Robert B., relieved from active duty.
, Raymond J., to Hq AGF, Fort Monroe,
t, Harmon P., to AAA Repl Pool AARTC, Bliss, Texas.
, Archie W., to Fifth Army US Army Sv., 403 Federal Bldg., Detroit, Mich.
, Tom J., to 267th AAA Group, Fort , Texas.
, Howard Loren, to Hq & Hq Det 13th Bn, Fort Winfield Scott, Calif.
, Calvin O., to FA School, Fort Sill, Okla.
, Marion H., detailed in JAGD.
t, Joseph C., to Hq & Hq Btry CA ol, Fort Winfield Scott, Calif.
, Kyle Franklin, to 34th Operations Det., Bliss, Texas.
way, Joseph E., to Georgia School of nology, Atlanta, Ga.
r, John K., Jr., detailed at Agricultural Mechanical College of Texas, College on, Texas.
, Stanley Mashburn, to 322d AAA AW Fort Bliss, Texas.
, Gordon George, to CA (SC) ORP, Winfield Scott, Calif.
, William D., detailed at Fordham Uni- y, Fordham, N. Y.
, Eben L., to AAA Repl Pool AARTC, Bliss, Texas.
er, Willis F., to AAA Repl Pool, Fort , Texas.
, Verne R., resigned.
e, James Woodrow, to 284th AAA AW Fort Bliss, Texas.
, Edison E., to 60th AAA AW Bn, Fort , Texas.

CAPTAINS

r, Aaron G., to CIC Center Holabird Depot, Baltimore, Md.
, Leonard Carl, to Hq & Hq Btry CA Sch, Winfield Scott, Calif.
n, William E., to AARTC, Ft. Bliss, s.
, Paul H., to 68th AAA Gun Bn, Ft. Bliss, s.
, Thomas John, to AAA ORP AARTC, Bliss, Texas.
, Harry E., Jr., to reld fr detail in Inf.
, Chester K., to detailed in Ord Dept.
, Earl Spofford, to relieved from active
, Perry K., to AAA Sch, Ft. Bliss, Texas.
n, Stephen C., to 267th AAA Gp, Ft. , Texas.
, Lewis H., to The Abn School, Ft. Ben- , Ga.
ell, C. D., to AAAORP AARTC, Ft. , Texas.
ll, Merle Eugene, to AAAORP AARTC, liss, Texas.
, Clyde B., to The Abn Sch, Ft. Benning,
John Edgar, to Hq & Hq Det 13th CA Ft. Winfield Scott, Calif.
rhain, Clifton H., to AAA Sch, Ft. Bliss, s.
Childress, Herbert Jefferson, to 450th AAA AW Bn, Ft. Bliss, Texas.
Clark, James B., to AGF Board No. 4, Ft. Bliss, Texas.
Cone, Sidney L., to detail at Kansas State College of Agriculture and Applied Science, Manhattan, Kansas.
Connor, Thomas R., to First Army Rctng Dist No. 11, Haverhill, Mass.
Cooper, William Carlis, to AARTC, Ft. Bliss, Texas.
Cox, Elmer C., to Harbor Defenses of Portland, Ft. Williams, Me.
Cue, Howard F., to AGO Casuals, Washington, D. C.
Damon, Charles Wood, Jr., to 639th AAA AW Bn, Ft. Bliss, Texas.
Daudelin, Roland G., to AAA Repl Pool AARTC, Ft. Bliss, Texas.
Davis, Dabney C. T., to 1st Experimental Guided Missile Gp, Eglin Field, Fla.
Daniel, Roy Edward, to 639th AAA AW Bn, Ft. Bliss, Texas.
Daniel, Roy E., Jr., to 267th AAA Gp, Ft. Bliss, Texas.
Devlin, Raymond P., to AAA Repl Pool, Ft. Bliss, Texas.
Donahue, Patrick H., to Manhattan Engr Dist Sandia Engr Base, Albuquerque, N. M.
Drumgoogle, James Cornelius, to CA (SC) ORP, Ft. Winfield Scott, Calif.
Dunn, Cary G., to detail Univ of Pittsburgh, Pittsburgh, Pa.
Easley, James W., to First Army Hq & Hq Det, HD of Long Island Sound, Ft. Wright, N. Y.
Farwick, Harry A. C., to OC of S, Wash, D.C.
Forks, Louis John to 267th AAA Gp, Ft. Bliss, Texas.
Geehan, Bernard T., to detail at Michigan State College of Agriculture and Applied Science, East Lansing, Mich.
Gibson, John C., to AGF Bd. No. 4, Ft. Bliss, Texas.
Grant, Benson, to 529th AAA AW Bn, Ft. Bliss, Texas.
Greiner, John B., to reld fr detail in Inf.
Gregg, Henry, to AAA Repl Pool, Ft. Bliss, Texas.
Gutterman, George K., to Counter Intelligence Corps Center, Holabird Sig Depot, Baltimore, Md.
Haine, Walter A., to detail in Sig C Hq, Ft. Monmouth, N. J.
Hallonell, Noel E., to Hq., Ft. Belvoir, Va.
Hancock, William Augustus, to Hq & Hq Det, 13th CA Bn, Ft. Winfield Scott, Calif.
Hays, Walter Lowey, to 322d AAA AW Bn, Ft. Bliss, Texas.
Hilferty, William Russell, to AAAORP AARTC, Ft. Bliss, Texas.
Hollis, Patrick M., to Fifth Army, Ft. Sheridan, Ill.
Howard, Charles E., to 60th AAA AW Bn, Ft. Bliss, Texas.
Howard, Robert W., to 529th AAA (AW) Bn, Ft. Bliss, Texas.
Hutchins, Leroy Washburn, to CAC WDPC, Ft. Dix, N. J.
Jopling, Daniel W., to CA (SC) ORP, Ft. Winfield Scott, Calif.
King, James B., to University of Alabama, University, Ala.
Kosiorek, Stephen T., to USMA, West Point, N. Y.
Larson, Durfee, to detailed in CE.
Lazzara, Angelo, to detailed at Chicago High Schools, Chicago, Illinois.
Lewis, Otto B., to AAA Repl Pool, AARTC, Ft. Bliss, Texas.
Linn, Lavon P., to AARTC, Ft. Bliss, Texas.
Lucius, Dixon Wright, to AAAORP AARTC, Ft. Bliss, Texas.
McCartney, Robert W., to 267th AAA Gp, Ft. Bliss, Texas.
McClure, Charles Carroll, to AAAORP AARTC, Ft. Bliss, Texas.
McNerney, Thomas Loren, to 284th AAA AW Bn, Ft. Bliss, Texas.
Master, El Roy P., to resigned.
Mazzucchi, Reno A., to AAA Sch, Ft. Bliss, Tex.
Michael, George P., to detail as member GSC asgnd to WDGS.
Mohn, Samuel Rouse, to HD of San Diego, Ft. Rosecrans, 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.
Niemi, Elvin Frederick, to (AA) AAAORP AARTC, Ft. Bliss, Texas.
Odom, Hart Salbide, to AAAORP AARTC, Ft. Bliss, Texas.
Olcott, William Ransom, to AAAORP AARTC, Ft. Bliss, Texas.
Oyen, Alvin O., to AAA Sch, Ft. Bliss, Texas.
Pallo, John G., to 60th AAA AW Bn, Ft. Bliss, Texas.
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