

COAST ARTILLERY JOURNAL

MARCH-APRIL 1948

Easter Greetings



FEATURING THE 102d AAA BRIGADE

Statement of GEN. OMAR N. BRADLEY

Chief of Staff

For ARMY DAY, 1948



"This ARMY DAY, more than two years after the end of history's most calamitous war, finds the Army of the United States engaged in the task of building a firm, lasting security for all people who have suffered the tragedy of aggression.

"The Army, both at home and in the occupied zones overseas, is charged with a great share of the responsibility for maintaining a watchful peace.

"To accomplish our mission, many soldiers are stationed great overseas distances from their homes. They are performing their duties, in many cases, under adverse and trying conditions. But they are undertaking them with the knowledge that theirs is a critically important duty.

"And they have pride in their roles as representatives of a free and powerful nation.

"The Army has a single purpose—to provide for the safekeeping of our nation.

"It can fulfill that assignment only with the constant awareness and generous support of the American people."

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ACTIVITIES of the

The 102d AAA Brigade was originally organized on 7 August 1919 as Headquarters, Coast Artillery Corps, New York National Guard but on 4 April 1929, it was redesignated Headquarters Coast Artillery Brigade, New York National Guard. Then on 1 September 1940, it was redesignated as Headquarters and Headquarters Battery, 102d Coast Artillery Brigade (AA), New York National Guard. On 5 September 1940, Major General Nathaniel Hillyer Egleston (NYNG) was assigned to command, after Brigadier General Ottman resigned.

The personnel of General Egleston's former Headquarters of the deactivated 21st Cavalry Division became the Staff of the 102d CA Brigade (AA) and the Headquarters Battery obtained its personnel from troops of the 21st Cavalry Division and the 51st Cavalry Brigade.

From September 1940 to induction in February 1941, all officers spent much time in schools endeavoring to master to some degree the theory and tactics of antiaircraft artillery. They also enrolled in and completed many Coast Artillery extension courses.

The three assigned regiments at this time were the 207th, formerly 107th Infantry, NYNG (the old Seventh Regiment), Colonel (now Brigadier General) Ralph C. Tobin, commanding; the 209th (a newly activated unit from Rochester and Buffalo, N. Y.) which contained many officers and men from the deactivated cavalry units of those two cities, Colonel (now Brigadier General) Kenneth R. Townson, commanding; and the 212th Coast Artillery Regiment

(AA), an old NYNG AA unit, Lieutenant Colonel (now Colonel) Francis A. Hause, CAC, (RA) commanding.

The Brigade Headquarters and Headquarters Battery with its three regiments, was inducted into Federal Service on 10 February 1941, and assigned as the organic AAA brigade of the First Army. At induction, Major General Egleston (NYNG) became a Brigadier General, USA.

Advance parties of all Brigade units moved by motor to Camp Stewart, Georgia, and arrived 19 February 1941. The main body moved by rail on 19 February 1941 and arrived the following day. After completion of both mobilization training and also advanced training, the entire Brigade again moved, this time to Hoffman, North Carolina for the purpose of participating in the First Army maneuvers.

Prior to departure for overseas, the Brigade Headquarters and Headquarters Battery served at Camp Stewart for a short time and then in December 1941, it relieved the alerted 40th CA Brigade (AA) and functioned as Headquarters, Philadelphia AAA Region, AAC, EDC, initially with three mobile regiments assigned (the 71st, 76th and 77th.) The region extended from Trenton, New Jersey, to just below Washington, D. C., so the Brigade had little trouble keeping occupied.

In July 1943 while at Fort George G. Meade, Maryland, the Brigade was relieved from AAC, EDC, and placed under control of Army Ground Forces through the Antiaircraft Command, Richmond, Virginia. As a result of this

102d AAA BRIGADE

By Brigadier General H. Russell Drowne, Jr.

change in assignment, the 102d returned to Camp Stewart and while there, was redesignated Headquarters and Headquarters Battery 102d AAA Brigade on 21 July 1943.

From September 1943 to March 1944 the Brigade was assigned to Third Army (and later Fourth Army) Director Headquarters, in the Louisiana Maneuver Area,

with its headquarters at Leesville, Louisiana. General Egleston was transferred to Washington on 15 January 1944 and the Executive Officer, Colonel H. R. Drowne, Jr. (Now Brigadier General) took the helm until the assumption of command by Brigadier General La Rhett L. Stuart, USA, on 15 March 1944.



One of the gun sections of Battery "A," 471st AAA AW Battalion in position at Clark Field.



Location of Brigade units in and around Clark Field. The Brigade CP at this time was in Angeles.

During the Louisiana maneuvers, the Brigade supervised the training of one brigade, eight groups, sixteen automatic weapons battalions, and four gun battalions.

Then followed a series of short term assignments at Mitchel Field to the First Air Force and at Camp Pickett, Virginia, to the XIII Corps and the XVIII Corps respectively.

On 20 October, 1944, the Brigade departed for Camp Stoneman, California, where it completed its final preparations incidental to foreign service. Little did the personnel realize that the Brigade was destined for deactivation at this same camp a little over two years later.

The Headquarters and Headquarters Battery of the Brigade with General Stuart in command, departed from San Francisco, California, aboard the U.S.A.T. *Sea Scamp* on 16 November 1944 and arrived at Finschhafen, New Guinea, on 5 December 1944.

The Brigade was assigned to the 14th Antiaircraft Command and while at Finschhafen, established a semi-permanent camp but no tactical mission was assigned and no subordinate units were attached.

General Stuart was appointed Deputy Commander of the 14th Antiaircraft Command and spent most of his time at that Headquarters which was located about one quarter mile north of Brigade headquarters. Most of the 102d staff was placed on temporary duty with the higher headquarters or was engaged in instruction of groups and battalions in operating observation posts and AAORs with particular stress being placed on necessary radio and wire communications.

On 10 February 1945, the Brigade was alerted to move to Manila, Philippine Islands, and departed Finschhafen aboard the U.S.A.T. *Jane Addams*, 0930 16 February 1945.

The 158th Operations Detachment, which had been attached a month earlier, was detached and the following units attached for the movement: Headquarters and Headquarters Batteries, 6th and 35th AAA Groups and 156th AAA Operations Detachment. The ship arrived at Hollandia, Dutch New Guinea, on 19 February and departed in convoy two days later. The convoy arrived at Tacloban 1400 26 February where it anchored in the harbor to await the formation of another convoy. About 2200 hours the night of 1 March 1945, enemy aircraft bombed Tacloban harbor installations and the Tacloban air strip. Shore AA fired a few rounds but the ship AA guns were not released to fire. No damage was reported other than the burning of a B-17 on the airstrip. A night fighter pursued an enemy plane that appeared over our ship at an altitude of about 100 feet and it was reported that the Jap plane was shot down. Men of the Brigade Headquarters Battery helped man the navy AA guns throughout the trip and did so with a great deal of enthusiasm as a result of this incident. The convoy sailed at 1100, 3 March 1945, with the *Jane Addams* as flagship and the master, Captain Harold F. De Lasaux, as Commodore. It arrived Subic Bay (Luzon) 1800 hours 7 March 1945 and departed 1300 hours 9 March 1945 for Manila where it arrived as the first troop convoy to enter Manila harbor after its recapture. While passing Fort Drum, Fort Hughes and Corregidor at the entrance to the harbor, P-51s could be seen bombing the first two as enemy troops were still in occupation of them. Anchor was dropped at 1945 hours 9 March 1945 and the Commanding General and Executive Officer went ashore the following morning for orders.

Although port authorities wished the units to debark at midnight and bivouac in an area south of Manila that had not been cleared of enemy land mines, debarkation was not made till the next morning and bivouac established in the Grace Park section north of Manila.

After being assigned to Sixth Army, the Brigade Headquarters moved by motor convoy to Angeles, Pampanga Province, a distance of approximately 50 miles and located about 6 miles south of Fort Stotsenberg and Clark Field. The old Pamintuan residence on Miranda Street was used for a CP for the Brigade and 156th Operations Detachment and the men were quartered on the estate grounds where a mess hall and hutments were constructed during the following weeks. The mission assigned was the defense of all army installations on Luzon South of latitude 15 degrees, 30 minutes North with operational control of fire under the control of the 86th the Fighter Wing (V Fighter Command). These installations included Clark Field, San Marcelino airstrip, Naval areas around Subic Bay and many vital targets in and near Manila. In addition to the antiaircraft defenses, the 6th Group of the Brigade operated a staging area in Manila for newly arrived troops.

Besides the 6th Group, the Brigade had now attached the 14th, 120th and 251st groups plus all their attached battalions.

Shortly thereafter, the Brigade's strength was augmented

by the arrival of the 472d AW Battalion, the 734th Gun Battalion and the 350th Searchlight Battalion.

However the 507th and 734th AAA Gun Battalions and Battery "C" of the 373d AAA Searchlight Battalion were placed under operational control of the 43d Infantry Division and later XI Corps for ground support missions.

On 16 April 1945, the 6th AAA Group left Manila to establish the AAA defenses of airfields at Florida Blanca and Porac (Pampanga Province). The following units were attached to this group: 734th AAA Gun Battalion, 472d AAA AW Battalion (less Batteries "A" and "C"), 950th AAA AW Battalion (less Batteries "B" and "D") and the 2d Platoon of Battery "C," 227th AAA Searchlight Battalion.

During this period, Battery "C" of the 507th AAA Gun Battalion undertook ground support missions with IX Corps.

This entire period was characterized by a redistribution of various units in an effort to balance the defenses and some units were transferred to the 68th Brigade as a result.

On 24 May 1945, the 102d AAA Brigade with all attached units was relieved from attachment to Sixth Army and passed to the control of the Commanding General Allied Air Forces with primary attachment to Fifth Air Force and further attachment to V Fighter Command, Fifth Air Force. Two additional AAA Groups were given to the brigade at this time: the 197th AAA Group in charge of the AAA defenses at Lingayen and Laoag, and the 94th AAA Group at Mindoro.

Subsequent to 24 May 1945 numerous changes in the defense occurred. Batteries "B" and "D" 950th were detached from the 120th AAA Group and attached to the 6th AAA Group and moved to supplement the AAA defense of the 6th AAA Group at Florida Blanca Airstrip and important bridges in the vicinity.

The first platoon of the 725th AAA Separate Searchlight Battery was attached to 120th AAA Group and established the searchlight defense of Subic Bay.

Battery "D" of the 210th AAA AW Battalion arrived at Subic Bay from a ground mission with the 158th RCT and was attached to the Brigade, with further attachment to the 120th AAA Group.

Batteries "C" and "D" of the 470th AAA AW Battalion were detached from the 102d and attached to the 40th Brigade.

The 197th AAA Group was relieved of its mission of defending bridges south of Lingayen.

The 14th AAA Group was detached from the Brigade and attached to Sixth Army, while the 10th AAA Group was attached and took over control of units formerly under 14th AAA Group.

On 1 July 1945, the 102d with all attached units was attached to 85th Fighter Wing (Air Defense Command).

On 6 July 1945, the 94th AAA Group at Mindoro with all its attached units passed to control of the 32d Brigade.

To climax this constantly changing scene, Brigadier General Stuart departed for the United States on 17 July 1945 and two days later Brigadier General Homer Case assumed command.

There was no enemy air action in the areas under Brigade control during the period 15 March-15 August. Many red



The allocation of Brigade units to the defense of important installations in the vicinity of Manila.

alerts were ordered, however, but only at one time were planes identified as hostile. These planes never came within range.

Homing missions were conducted for friendly aircraft by searchlights of the 222d, 227th and 373d AAA Battalions. These missions occurred almost nightly at Clark Field and Nichols Airfield, and numerous other missions were conducted at Lingayen, San Marcelino, Porac and Florida Blanca Strips.

Batteries of two gun battalions acting as field artillery, fired numerous ground support missions for the 6th and 43d Infantry Divisions between 5 April and 25 April 1945. Battery "C" of the 507th, Batteries "A" and "B" of the 734th fired in the Ipo Dam area. Targets were Jap caves, troop concentrations and bivouacs, enemy artillery, and enemy vehicles. In addition, much harassing fire was conducted. These missions were performed with remarkable success, and the supported field artillery and infantry troops expressed great satisfaction with the conduct and effectiveness of fire and the dispatch with which fire missions were completed. These three batteries fired over 4000 rounds in this period.

Battery "C" of the 734th engaged enemy ground targets in the vicinity of Mabitac, 30 miles east of Manila, and later fired at Jap barges on Laguna de Bay. Battery "D" of the 734th was emplaced near Taytay and fired exclusively at Jap surface craft on Laguna de Bay. These latter batteries fired a total of approximately 700 rounds. 11 Jap barges were destroyed, 17 others hit and probably destroyed and numerous others engaged



"D" Battery of the Brigade's 210th AAA AW Battalion was used in direct fire missions against Jap positions on Luzon.

with undetermined success. While firing at these surface craft, complete AAA fire control equipment was used and all of this firing was conducted at night against unseen targets with the SCR 584 Radar. Attempts were made to use searchlights to illuminate these targets but the mist over the water at night precluded the penetration of the searchlight beam beyond a range of 3000 yards.

In the period 15 March-15 August 1945, troops of the 102d with small-arms fire killed 106 Japs, captured 23, and wounded 3. Many others were probably wounded and killed. Most of these engagements occurred near AAA positions. The following personnel of the Brigade Headquarters Battery in connection with other AAA troops participated in patrol action against a Jap position (manned mostly by officers) between Angeles and Porac: on the afternoon and evening of 30 March 1945: Captain Harry Hicks, Staff Sergeant William A. Rutherford, Tec 4 Benedict R. Jerszewski, Tec 5 Robert A. Richards, Tec 5 Rollie L. Buckallew, Pfc Archibald Diehl, Jr. and Pfc Ward M. Hathaway. The enemy was routed from its prepared position in a barrio and most of them were killed but unfortunately, S/Sgt Rutherford was killed in this action.

During the entire period in all the Brigade units, our own casualties resulting from enemy small-arms, grenade, mortar and field artillery fire, were 5 killed and 12 wounded.

On site training was carried on daily by all units in position and on about 1 June 1945, an intensive training program was instituted whereby complete batteries were removed from the defense for three weeks at a time. This afforded all fire units an opportunity to get together for centralized training and recreation. In this program, the batteries were established in areas where firing points could be set up. Automatic weapons were afforded the opportunity of firing against towed sleeve and rocket targets and against simulated enemy ground targets while gun batteries fired practices using field artillery methods.

It is of interest to note that when the Brigade assumed

the AA defense of Mindoro, in addition to all of Luzon, the total assigned strength of the command was over 12,000 officers and enlisted men. The total number of units was six groups, nineteen battalions, seven separate batteries and twenty-one miscellaneous detachments such as operations detachments, signal radar maintenance units, engineer searchlight maintenance detachments and ordnance service AA maintenance teams. The only staff augmentation was the addition (on temporary duty) of an Information and Education Officer who also supervised athletics, recreation and special service activities.

Soon after the acceptance by Japan of the Allied surrender terms, many units of the command were relieved of their tactical missions but the Brigade still maintained its defense of Clark Field and Manila, including Nichols and Nielson Fields.

At the end of August, only two AAA Groups remained under the Brigade. These were the 251st AAA Group in Manila and the 10th AAA Group at Clark Field. In addition, the 10th AAA Group was charged with providing homing searchlights at Laoag and Lingayen Airstrips.

During the period, searchlight units of this Brigade provided homing lights every night at Clark Field and on several occasions at Florida Blanca, Lingayen and Nichols Airstrips.

Through September, the Brigade and its attached units continued to provide anti-aircraft defense and homing lights in the Manila and Clark Field areas as well as at Laoag and Lingayen.

On 1 September 1945, the 51st Fighter Control Center and the Brigade information center closed in Angeles and opened at the Air Defense Command at Fort McKinley. At that time the 160th AAA Operations Detachment took over the operation of the information center, relieving the 156th AAA Operations Detachment.

On 18 October orders were received from Air Defense Command authorizing the withdrawal of all automatic

weapons and searchlights from tactical positions. Furthermore, at this time, radar surveillance and the requirement that operations rooms and tactical communications be manned were suspended. By the end of the month, only gun batteries remained in tactical positions. These were required, along with tactical communications and operations rooms, to be capable of being manned upon one hour's notice (although it was after V-J Day, GHQ feared Kamikaze attacks from Formosan airfields).

Schools were started in October for the Headquarters Battery and the 156th AAA Operations Detachment and courses of instruction were offered in Review Arithmetic, English, Small Business, Business Law, Physics, Electricity, Radio, Bookkeeping and Accounting. The classes were of one hour duration four times a week and were well attended.

The enlisted men opened their own club on the ground floor of a private home and that together with movies, volleyball, ping pong, badminton and horseshoes raised morale to the highest point in the past year.

General Case returned to the States 16 October 1945 and upon his departure Colonel Drowne assumed command.

Beginning in November, high point men were returned to the United States and the Brigade started to turn in all equipment in preparation for its departure to the States. Colonel Drowne left on 21 November 1945 and Colonel A. B. Barrett then commanded the unit from that time until deactivation.

After staging in Angeles, the 102d Headquarters boarded the U.S.A.T. *Brazil* at Manila 12 December 1945. The vessel sailed 13 December 1945 and arrived San Francisco 30 December 1945, whereupon the unit proceeded to Camp Stoneman for inactivation which was accomplished 1 January 1946.

The Brigade completed almost five years of active service and is now once more a part of the New York National Guard, having been reorganized and Federally recognized on 3 July 1947. Brigadier General William M. Hamilton, NYNG, commands the unit with Headquarters at Kingsbridge Armory, 29 West Kingsbridge Road, Bronx 63, New York.

It is interesting to note that 21 enlisted men of the original Headquarters Battery at induction were sent to OCS. Their records as officers are unfortunately not available but it is known that many of them had distinguished combat service and were recipients of various decorations. It is likewise regretted that of the 56 officers who were assigned at various times to the Brigade Headquarters & Headquarters Battery, there is no record of their achievements with other units.

This history would not be complete without paying special tribute to three of our members who passed on:

Lieutenant Colonel Robert D. Hausauer, CAC, Brigade S-3, who died at Walter Reed General Hospital on 30 January 1945.

Major Irving W. Lindlahr, CAC, Brigade S-4, who died at Hollandia, New Guinea, on 30 March 1945.

Staff Sergeant William A. Rutherford, Brigade Headquarters Battery, who was killed in action, Pampanga Province, Luzon, 30 March 1945.

Each of the above contributed wholeheartedly and unselfishly to whatever success the Brigade may have attained.

To our many splendid unit commanders who, with their regiments, groups, battalions or detachments, served under us, the Brigade expresses its deep appreciation for their support and hard work.

Last, but not least, our thanks should go to our American Red Cross workers who were attached to the Brigade: Mary (Dede) V. Rinaldi, Eleanor Rosenberg, Eleanor McBride and the others who organized the Club in Angeles and did such splendid work in the Clubmobile at our outlying gun and searchlight positions, many of which were dangerously close to enemy ground troops.

The following units were attached to the 102d Brigade during the course of its operations against the enemy:

- 6th AAA Group—Lt. Col. John L. Hitchings and Colonel Archibald B. Barrett
- 10th AAA Group—Lt. Col. Frederick N. Walker, Jr. and Colonel John L. Goff
- 14th AAA Group—Colonel John H. Pitzer
- 94th AAA Group—Colonel Dean Luce
- 120th AAA Group—Colonel Edward V. Garcia and Lt. Col. Laurance H. Brownlee
- 197th AAA Group—Colonel G. L. Carter
- 251st AAA Group—Colonel James B. Carroll
- 70th AAA Gun Battalion—Major J. T. Barrett
- 507th AAA Gun Battalion—Lt. Col. E. A. Hanson
- 508th AAA Gun Battalion—Lt. Col. J. M. Ogilvie, Jr.
- 513th AAA Gun Battalion—Lt. Col. Cahill
- 518th AAA Gun Battalion—Lt. Col. G. P. Eaton
- 734th AAA Gun Battalion—Lt. Col. A. S. Gamble
- 737th AAA Gun Battalion—Lt. Col. J. R. Murphy
- 101st AAA AW Battalion (A/T)—Lt. Col. W. R. Robinette
- 102d AAA AW Battalion—Lt. Col. O. B. Augspurger and Major Oliver Wood
- 205th AAA AW Battalion—Lt. Col. F. C. Buckley
- 210th AAA AW Battalion—Major D. A. McKeller
- 469th AAA AW Battalion—Lt. Col. L. J. Hillberg
- 470th AAA AW Battalion—Lt. Col. Nelson
- 471st AAA AW Battalion—Lt. Col. F. J. Lagasse
- 472d AAA AW Battalion—Lt. Col. A. S. Mills
- 950th AAA AW Battalion—Major J. D. Kimbrell
- 951st AAA AW Battalion—Major E. R. Edquist
- 222d AAA Slt Battalion (Hq & C only)—Major H. E. Daniels
- 227th AAA Slt Battalion (Btry C only)—Captain Gill
- 350th AAA Slt Battalion—Lt. Col. S. W. Foote
- 373d AAA Slt Battalion—Lt. Col. G. H. Frank and Major J. D. Van Zant
- 725th AAA Separate Slt Battery—*
- 673rd AAA Machine Gun Battery—*
- 707th AAA Machine Gun Battery—*
- 708th AAA Machine Gun Battery—*
- 156th AAA Operations Detachment—Major E. D. McCulloch
- 160th AAA Operations Detachment—*

*The author regrets that the names of these commanding officers are not available.

FROM AN EARLY RADAR DIARY

By Harold A. Zahl

During the middle of the prewar decade, a small group of scientists and engineers at Fort Monmouth, New Jersey labored under great secrecy developing a military weapon destined to play a major role in winning a global war. Midst a complacent, peace-loving United States, these pioneers worked in silence, desperately handicapped by lack of funds, facilities and assisting personnel. Driving, ever driving, inexorably striving toward a military objective of utmost importance were Major General (then Lt. Colonel) Roger B. Colton (formerly CAC), early laboratory director Colonel William R. Blair, and civilian engineer, the late Paul E. Watson, whose combined inspiring leadership seemed to convert normal engineers and physicists temporarily into composites of Newton, Maxwell and Einstein. From the efforts of this Army group, from a similar group in the U. S. Navy, in England, and later in the Office of Scientific Research and Development, rose the greatest of all electronic military weapons, the weapon to which victory attached her wings, a device which saluted the atomic bomb but did not bow to it . . . the fabulous scientific genie of World War II—RADAR.

It was radar and the magnificent skill and courage of the RAF which won the Battle of Britain in 1940. It was radar again, across the world, in a dismal though great technical success, warning of the impending Japanese attack on Pearl Harbor, albeit, in one of history's greatest tragedies, the warning was misunderstood. In the bloody years which followed, it was radar always in the vanguard, from the early stages of desperation and defeat, paving the way to victory . . . against the dreaded Nazi U-Boat, Goering's vaunted Luftwaffe, and the mighty Imperial Fleet and aircraft of the Japanese; all these were first fought to a standstill, pursued—and then finally destroyed!

In the vast panorama of radar literature, the pioneering period has been almost overlooked, since with the sudden onrush of war, acceleration in the field became so great that the early years were quickly dwarfed into apparent insignificance by the stupendous effort of ten thousand scientists and four billion dollars thrown into the radar war chest.

This narrative deals with an almost forgotten period in Army research when a few men sweated and created in the dark room of secrecy so that radar might be ready if war came. Yet, this is not a story of physics and engineering

except for its ever-present background. It is a tale of achievement by visionary men who both literally and figuratively had their sights aimed on the stars. It is a story of life, with rich comedy and near-tragedy—it is a tale of many failures, but of ultimate and glorious success.

Fort Monmouth, New Jersey—1935.

* * *

The 29th of July arrived as any other day for most of the civilian scientists and military personnel of that peaceful Army post, yet within a few, hearts beat more rapidly, for the day meant much to those within the inner circle of the "Detection Project." All through the day scientists and Army personnel inconspicuously shuttled back and forth between the laboratory and a point on the ocean's edge, ten miles away. By nightfall, all such activity ceased as though the day had ended and work was done.

In nearby Highlands, many unsuspecting residents were on the beach as the hour approached midnight, for July 29th had been exceptionally hot, and on the water's edge a slight breeze was ever-present, even though a few hundred yards inland the warm sultry air was motionless. The outline of people could be made out, some sitting on the sand, others lying on blankets. At the edge of the surf, the motionless silhouettes of fishermen could be discerned with long calcutta rods extended upward and toward the sea, patiently poised and waiting for hungry, unsuspecting striped bass.

The only noise was the soft murmur of gentle waves rhythmically breaking on the shore in the eternal cadence of the sea. To the north the brilliant lights of Coney Island flashed along the horizon, like jewels in a gigantic necklace. To the east all was black, except for the monotonous blinking of the lightships marking the channel entrance. Overhead, the shaft of Navesink Light intermittently flicked its time-honored message, that here was America.

At exactly midnight, the tranquil scene was suddenly interrupted when from the shadowy background a great light of dazzling and unearthly brilliancy flashed seaward with such suddenness that the beach occupants, for a moment, felt a surge of fear. Far out to sea at the end of the pencil-like beam stood the ghostly outline of a large ship—as though magically placed there by a supernatural force. No running lights were in evidence.

As suddenly as it appeared, the light vanished. Darkness again enveloped the phantom ship . . . utter oppressive, inky blackness; it could almost be felt.

From a vantage point of higher ground, a few men gathered and waited, too amazed for speech. Without warning the light again flashed its awesome illumination seaward, boring a hole through the night, its blinding glare instantly pointing out the ghost-like hull of the same vessel, now in a new position and swinging hard to port.

"My God," a fisherman softly swore, "it might as well be a sixteen-inch gun as a searchlight!"

For three hours the weird spectacle continued. The destroyer cruised over all the outer waters of New York Harbor, running without lights while the searchlight, with uncanny sense, intermittently flashed its light, and found the victim always squarely in the center of the beam.

Hours later, across the nation, headlines carried the story—"Mystery Ray 'Sees' 'Enemy' at 50 Miles," said the *New York Times*—"Army Mystery Ray Spots Ship 48 out of 51 Times," cried the local *Long Branch Record*—"We have a mystery ray," solemnly stated Arthur Brisbane, devoting most of his column to the amazing event.

Through a week of unsolicited publicity the Army remained sphynx-like in its silence, while an imaginative press built up stories, applying the "mystery ray" to high-flying airplanes and revolutionizing modern naval and aircraft warfare tactics. What the Army could have said, but didn't, was to verify that a new weapon of war had been born and that the imagination of the Press corresponded very closely with the truth. But the facts were kept secret for more than a decade. The new weapon had an appointment with destiny and the date was somewhat uncertain—like some 7th of December!

But let us turn the calendar back even further, and view the story from backstage.

In 1935, the Signal Corps completed an important phase of its harbor surveillance program for the Coast Artillery, then charged with all aspects of detecting marine and aerial targets for the Army. A detector, so sensitive that heat given

off could be picked up as a ship came over the horizon, was ready for demonstration. The places selected for the tests overlooked the approaches to New York Harbor. The tests were centered around the destroyer-type ship, the *Pontchartrain*, provided by the Coast Guard. Orders were to choose a random course outside of the harbor and to run without lights. The new equipment with a searchlight simulating a coast defense gun coupled to it would search for the vessel. If the invisible vessel could be found and directly illuminated without searching, a "hit" was to be scored.

In cooperation with the above plan, the Lighthouse Department of the Department of Commerce sent out the following brief notice to Mariners on July 16th:

"A searchlight will be used for experimental purposes at Navesink Lighthouse intermittently between 9:00 PM and 12:00 PM during the period between July 30th and August 9th, 1935. The searchlight will be used principally over an area extending some four miles south-eastward from Scotland Lightship."

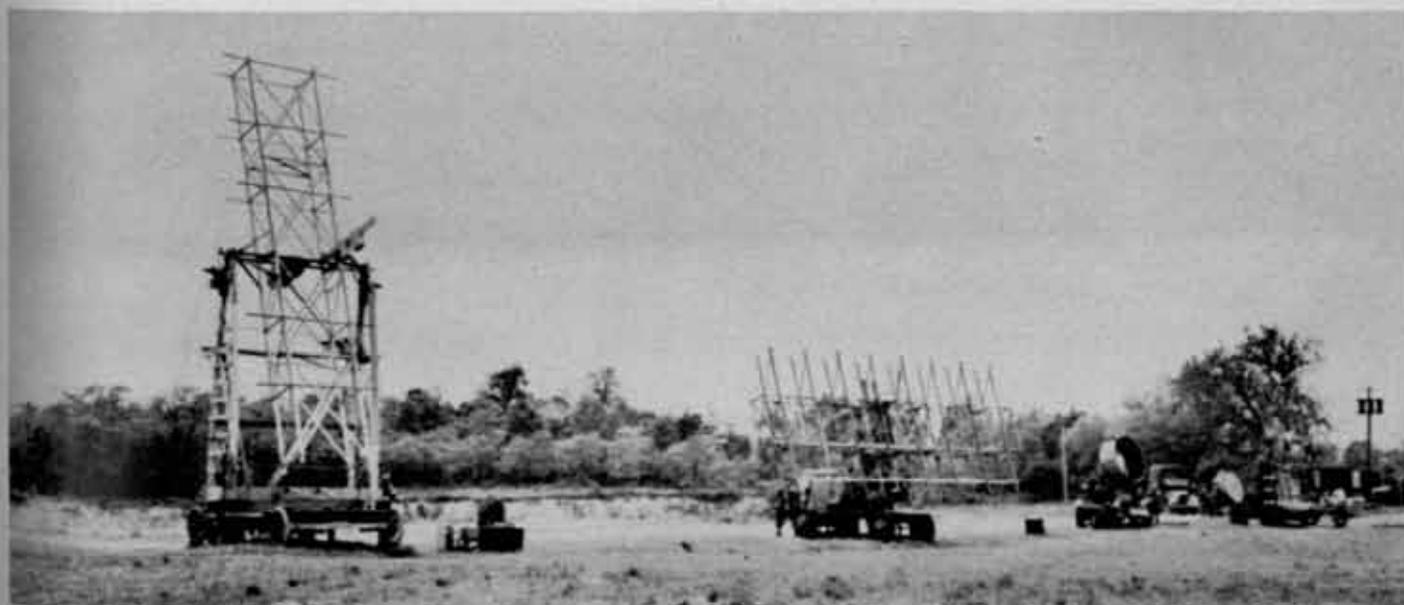
On seeing the above notice, a very alert and highly imaginative local reporter, sensing an important news item, submitted a story to a New York daily, surmising that the Army was going to make some very mysterious tests during the period indicated. His story was given front page space. Metropolitan reporters quickly came down to the scene and queried the Public Relations Officer of the Signal Corps for information.

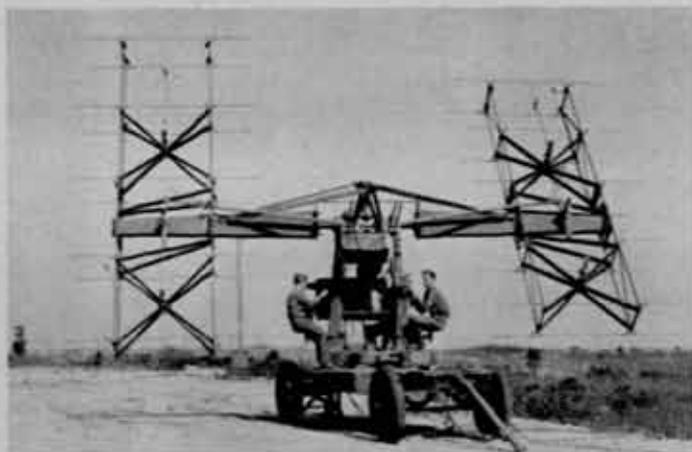
"Yes," said the Public Relations Officer pleasantly with his best smile, "there are certain tests contemplated, but nothing more can now be said—except that the area will be closed to visitors!"

The reporters left, extremely unhappy and dissatisfied. With sabres starting to rattle in Europe, anything pertaining to U. S. military activity was front page copy.

Later in the month, a cordon of military police was suddenly thrown around the Lighthouse grounds and the area restricted to only essential traffic. This leaked out to the press and naturally, they grew even more curious. They were now certain a big story was about to break at Nave-

First 110 Mc Test of Complete Radar System with Heat Detector. This is the first Radar System in which Azimuth, Elevation and Range were obtained from one equipment, Signal Corps Laboratory, May 1937, Fort Monmouth, N. J.





Early radar tracking device for giving the angle of elevation of target airplane. This particular photograph shows part of the equipment tested by the Coast Artillery in the first service test on U.S. Army Radar at Fort Monroe, Virginia in November 1938.

sink, but there they faced husky armed guards whose vocabulary appeared limited to the word "No!"

Not to be outdone, however, some reporters remained close to the restricted area enjoying the entertainment offered by the Jersey beaches in the vicinity. Some even took to night fishing. Of the ever-presence of the Press, the Signal Corps was well aware, for each day reporters called. As a ruse to avoid publicity, and following an honored military principle that surprise is the most powerful of all weapons, the Signal Corps quietly changed the starting time for the tests from 9:00 P.M. to midnight. It was reasoned that after midnight the shore inhabitants and possibly even reporters would be asleep. But such was not the habit of the Jersey folk on a hot summer night, let alone reporters.

So it came about that at midnight on 29 July, 1935, an 800,000,000-candle-power light lashed out in pursuit of the blacked-out destroyer; and the rest of the story has been told, or at least almost—

By wire and radio the story carried by the U. S. newspapers was flashed to all parts of the world. Far across the Pacific, the war lords of Japan read of the U. S. mystery ray in Japanese newspapers. Mystery rays and activities related thereto were particularly of interest to Japanese military and naval cliques of that period. Unfortunately they thought the news stories were too incomplete and did not appear to contain authentic technical information. Details were desperately desired. Perhaps they reasoned the good neighbor policy might be extended across the Pacific and the U. S. Army would be so kind and fill out the gaps—

So one morning in October 1935, a letter came to the Signal Corps asking with arrogant meekness for details of the recently completed tests. Captain Lawrence Clayton, who later transferred to the CAC, opened the letter, first blinked once or twice and then rushed for the Office of the Commanding Officer for the letter was on the official stationery of the House of Okura, and the Captain knew that the largest single stockholder of that Company was none other than His Imperial Highness, the Emperor of Japan!

The Army's reply to the request was, needless to say, a classic, even in military brevity and terseness.

Months followed . . .

The equipment tested at Highlands, New Jersey was taken to Fort Monroe, Virginia, for tests by the Coast Artillery Board and before members of the Army General Staff. From these tests came three decisions of great future significance: First, the use of infrared for detection of aircraft did not appear too promising, since the problems introduced by absorption of fog, clouds, snow and rain appeared basically unsolvable; second, other methods must be given greater emphasis, particularly the use of radio waves which penetrated all atmospheric variations; and third, the General Staff assigned full responsibility for the research on detection of aircraft and marine targets to the Signal Corps.

With the phenomenal success of the military airplane and with Goering's Luftwaffe already blackening the skies of Europe, it became increasingly obvious that the Army's most important defense problem was aircraft detection. But that meant detection for protection of only military targets for the year was 1936. Those were crape-hanging visionaries who predicted indiscriminate bombing of cities in future wars. The word "blitzkrieg" did not exist. In fact, nuclear physicists were even considered unimportant and regarded only as absent-minded professors wasting their time exploring an atomic dead-end street.

With the decision of the General Staff proudly tucked away, the Signal Corps scientists returned to Fort Monmouth for further research. Gradually infrared was displaced in importance, for of far greater significance were findings that radio pulses reflected from an aircraft produced distinct echoes which told precisely where the aircraft was, and what was equally important, these waves passed through all types of atmosphere without absorption.

Funds were now desperately needed, since new and expensive type of equipment was vital to the experiments. The question was "would the current breadboard model remain in satisfactory service for sixty consecutive minutes so a demonstration could be given before influential people who controlled the "military money bag"? An unsuccessful demonstration could do more harm than good. It was a great risk, but the decision jointly made by Colonel Blair and Colonel Colton was "the chance must be taken," based on the knowledge that when the equipment was working properly, positive detection of aircraft could be achieved as far as twelve miles—a most amazing accomplishment for that period and carrying almost guaranteed appropriations if successfully demonstrated.

Arrangements for the critical demonstration were scheduled for May 1937 by the Chief Signal Officer, Major General James B. Allison. General Allison had no trouble in obtaining top-flight dignitaries for the demonstration . . . such was the importance of the problem. In fact, never had Fort Monmouth played host to so much "brass." Included were Secretary of War Harry H. Woodring, Chief of Staff Malin Craig, members of the Congressional Military Affairs Committee, Chiefs of the Air Force, Coast Artillery, Signal Corps and other high-ranking military personages.

On the crucial night, a B-10 bomber, with lights turned off, was scheduled to attempt a "sneak raid" over Fort Monmouth; a simulated battle situation of antiaircraft guns against a bomber. Success for the new equipment would be measured by whether searchlights could be directed so as to illuminate the airplane in time for early effective anti-

aircraft artillery action, while failure would be registered if the bomber had time for a successful bombing run before detection. Little did anyone connected with the tests dream that only a few years later the same situation would occur a thousand times in a night—but with death-dealing bombs being dropped and with anti-aircraft fire thundering over all of England, filling the skies with steel—and London aflame!

The Secretary of War and his guests were particularly asked to watch one searchlight which was coupled to the radar equipment and which could automatically point in the direction indicated by the apparatus under test. Three other searchlights within a mile radius would add additional support for the radio-controlled light. When a target pickup was made by any of the four lights the other three would immediately swing over and cooperate to intensify the target illumination. The search area for the three supporting lights was to be in the vicinity of the tip of the beam of the radar-controlled pilot light.

Darkness came slowly that night, time appeared to drag . . .

Mitchel Field finally flashed a message stating that the bomber was en route and would approach Fort Monmouth at an altitude and direction of the pilot's own choosing, and with all running lights extinguished.

The search was underway. The distinguished guests stood around various pieces of equipment watching meters and other mysterious electronic devices which the Signal Corps said could detect airplanes.

Twenty long minutes passed . . .

The stillness of the night was broken suddenly by the loud staccato voice of sergeant Harry Belot shouting, "In action!"

Almost immediately the pilot searchlight pierced the low northerly sky. In quick succession the three companion lights appeared and their waving finger tips razzle-dazzled in the area pointed out by the light operating from radar data.

Seconds later, first one, and then several people were heard to cry, "There he is, in Number Two light . . .!"

Flying at about 10,000 feet, slant range about 6 miles, was a speck at the end of the pencil of light which looked like an iridescent fly. One by one, the supporting lights moved over to aid in the track and majestically, the airplane was escorted over his "bombing area"—a perfect target for anti-aircraft guns!

The visitors were impressed. The Signal Corps was delighted. But now for a few more runs—after all, a certain element of luck might have been present on the first test with fate smiling on the groundmen.

All searchlights were extinguished. The bomber was instructed to turn and fly north about twenty or thirty miles which was beyond the range of detection. He was then to turn and at any altitude he wished, fly in toward Fort Monmouth on any approach within the northern ninety degree sector. Until he signalled readiness the radar gear was to be idle.

About fifteen minutes later the pilot laconically messaged, "Am starting back. . ."

Again everyone on the ground became tense and alert. Some watched the equipment; others watched the sky; but

all listened, for if the muffled roar of a motor overhead could be heard, it would signify failure for the radar, for in war it would have meant "bombs away!"

Operating personnel suddenly pointed out a flickering vertical line on a cathode ray tube which they said corresponded to an echo from the target. From the motion and position of this and similar indications on adjacent devices, it was explained, it could be determined that the airplane was approaching Fort Monmouth 30 degrees west of north at 140 miles per hour, 10,000 feet altitude, and that its present range was 20,000 yards.

When the range indicated was 12,000 yards, which was within searchlight capabilities for visual detection, the Sergeant ordered, "In action," and the dramatic play of searchlights again started. Seconds later, one of the supporting lights made the "pickup" and again the searchlight crews triumphantly escorted the bomber over the area where theoretically, defending guns could have brought him down with ease. History was being made!

The performance was repeated several more times, and the distinguished guests left. They were more than satisfied that the Laboratory had produced a highly important, new weapon.

On June 2, 1937 the Secretary of War wrote to the Chief Signal Officer on the tests. . . . "It gave tangible evidence of the amazing scientific advances made by the Signal Corps in the development of technical equipment..."

Army radar thus successfully passed its first big hurdle. Congress would follow with a special appropriation. Research could go into high gear . . . but there remains a bit more to the story . . .

After the distinguished guests had departed, technical and military personnel responsible for the new equipment met for a short critique, combining a few beers with back-slapping and handshaking—everyone was happy. The results were about twice as good as had the most optimistic expected. "Strange though," said one of the engineers, John Hessel, "that most of the initial pickups were made by No. 2 light down by the coal pile."

Certainly it was strange, they all agreed, if true; but had that been the case? Probability would surely predict that the radar-controlled light show the most pickups. In the excitement, no one else had kept count. Hessel, however, was certain of his observations. Others thinking back began to confirm the statements. Members of the searchlight crew were certainly to be congratulated for their outstanding performance.

Several days later, one of the radar engineers met the Corporal whose searchlight had performed so spectacularly. The engineer commended the man, who replied:

"Thanks, but it was easy. Remember that low white cloud during the night of the test? Well, my eyes have pretty good night vision; as a matter of fact, better than the other fellows. The lights of Red Bank reflected against the cloud so that I could generally see the plane with my naked eye even before the searchlights were turned on. Couldn't help making a hit almost every time."

"But Corporal," the crimson-faced engineer broke in, "Don't you know . . ."

"On the other hand," the enthusiastically naive Corporal continued, "that new secret gadget is all right. Why



In contrast to the earlier sets, here is a picture of the Radar Antenna used by the Signal Corps in making first contact with the moon in January 1946.

every time you fellows turned on the control light, it was pretty close to the target. Almost as good as my eyes."

The engineer, in a split-second decision, swallowed his temper and chagrin, and in turning on his heel, said, "Congratulations, Corporal," for great was the engineer's faith in radar, and too, he recalled the never-ending feud between the men of the air and the men of the ground; for those were the days of the sound locator, and searchlight crews followed the normal competitive code of the day which was to illuminate the airplane as quickly as possible taking advantage of every break lest "they" get you first. They were soldiers, not scientists—who ever heard of ethics in a fox-hole?

A year passed and with a special appropriation of \$40,000, obtained partly through the efforts of the Chief of Coast Artillery, a completely new and far more reliable radar was designed and constructed. The device was additionally unique in that incorporated therein was a detector capable of indicating the heat from airplane motors or exhaust pipes on a rough television-like screen. Built around this device was the new radar equipment providing azimuth, elevation and range; the thermal unit with its intrinsically higher accuracy to be used only for short range work and in clear weather.

Arrangements were made for tests to be conducted for Service suitability by the Coast Artillery Board. Months had already been spent making final preparations in a heavily guarded and secluded area located at Fort Hancock, New Jersey. There were many unexpected last-minute difficulties. The antennas, which were of metal, did not function exactly as had been worked out in newly developed theory.

Errors were present which had to be eliminated in order to achieve the minimum accuracy for antiaircraft purposes.

While technical personnel labored feverishly in order to meet the scheduled summer date, fate again joined the radar staff, for winging its way northward from the Caribbean came the great hurricane of 1938, devastatingly sweeping up the Atlantic Coast and striking New Jersey with full impact. Winds reaching a maximum of 106 miles per hour passed over Fort Hancock where the new equipment was being assembled. The flimsy experimental antennas and their moorings were dashed about the beach and destroyed!

When the big wind subsided and the damage surveyed, many hearts were heavy. The entire schedule would be set back many months. Undaunted, however, everyone concerned flung himself into the race against time and worked day and night, taking only enough sleep to keep going. Wood was used in many places instead of metal to hasten the reconstruction. For reasons then not apparent even to the antenna engineer, Slattery, the new wooden antennas seemed superior to the old metal structures.

Hurried tests were made on the complete system. The results were most gratifying, for the reconstructed set was even better than the one battered about and destroyed by the hurricane. Fate indeed was kind. . . .

So it came about finally that early one cold November morning in 1938, Lieutenant A. F. Cassevant, CAC, belatedly left Fort Monmouth leading the convoy carrying the only radar in the U. S. Army. It was a grotesque conglomeration of vehicles. Never, except perhaps in a circus, had such a fantastic column taken to public roads. There were six trucks in all, with four specially constructed trailers, all weary veterans of World War I and seemingly always on their last mile. The big improvised trailers all had superstructures having the appearances of "design by Dali." Some of the projecting parts were covered with thin plywood, others were wrapped in canvas, loose ends of which flapped in the breeze. It would have been a clever espionage agent, indeed, to have looked at the caravan and guessed that the Army's most top-secret weapon was contained therein; although if Hitler had been fortunate enough to have the contents of that convoy he might even now be looking out of his window at Berchtesgaden.

For eighty uneventful miles the bizarre convoy rolled southward toward Pennsville, New Jersey, where the Delaware River was to be crossed by ferryboat. The ferry was waiting in its slip almost ready to leave.

"I can only take half of your trucks on this trip," bellowed the grizzled ferryboat Captain to the young Lieutenant.

"I can't split my convoy," shouted back the Lieutenant, well realizing that he, as the only officer with the convoy, was responsible for the safety of his precious cargo and that Army regulations were very plain on the subject.

"Okay, then wait!" came back not too pleasantly from the ferryboat bridge, "we'll be back in about an hour."

So they waited—and the ferry departed not quite loaded while horns from private vehicles in the narrow loading lane behind the convoy filled the air with long screams of protest.

Fifty minutes later the ferryboat re-entered the Jersey slip and loading started. All vehicles of the convoy were

placed together on the port side of the ship. The crossing was uneventful.

In Delaware, when unloading started, the ferryboat Captain strolled over to the Lieutenant and scowlingly said, "Since you Army guys made other people wait back on the Jersey side, now you take your turn. . . ."

One by one the civilian vehicles were allowed to leave the ferry while the Army convoy waited. What the ferryboat captain did not know was that the mysterious cargo, and particularly in the last truck, was largely made up of items employing many concealed tons of copper and steel. As the last civilian truck rolled off, a sound of tearing canvas came from the stern followed by a dull thud. A giant rectifier unit in the last truck had slipped to one side and fallen through the canvas, resting now partly on the truck and partly on the rail of the ferryboat. What was even worse, the angle of the boat was now so great, that even if the rectifier were righted and braced, it would have been foolhardy to attempt moving any of the trucks.

"Better load up the other side before we try moving off," dryly suggested the Lieutenant to the ferry Captain who seemed to immensely enjoy the situation.

With no obvious haste, waiting traffic was carefully placed on the high but empty starboard side of the ferry. When the last waiting vehicle was on board, balance was almost again achieved, the rectifier was righted and unloading of the Army vehicles proceeded slowly and safely.

One by one the trucks drove off and higher and higher rose the port side. When the last and heaviest vehicle left the boat, the ferry Captain's jaw suddenly sagged, for he did not anticipate quite the degree of reverse unbalance which followed. Now the port side rode so high that safe crossing was quite out of the question. It would be necessary to wait for additional traffic or shift the present cargo. The surly Captain had thrown a boomerang . . . there appeared to be no new traffic arriving and the drivers of the vehicles already loaded were showing signs of anger and disgust . . .

Feeling, however, this to be no problem of his, the Lieutenant chuckled to himself and waved his convoy into motion, southward toward Fort Monroe.

Two hours after crossing the Delaware the convoy reached the bridge stretching across the wide Susquehanna River into Havre de Grace, Maryland. The mile-long structure had given faithful service almost since the Civil War but was now definitely showing signs calling for retirement. Its construction was typical of the horse-and-buggy era in that each direction of traffic was confined to separate narrow tunnel-like lanes, one on top of the other which, while adequate for Civil War type carriages, hardly provided a minimum of horizontal and vertical clearances for 20th century motor vehicles. However, the exact clearance of the bridge, supposedly shown on a sign at the entrance, indicated over an inch to spare—and surely, reasoned the Lieutenant, the State Highway Commission would also allow another inch or two as a factor of safety.

Slowly and cautiously, the convoy advanced into the bridge tunnel, floor planks groaning under the heavy load. The five leading vehicles crossed into Havre de Grace without mishap and only a few hundred feet remained for the last truck when disaster struck . . .

With a harsh grating sound of metal torturing wood, the truck and its huge trailer came to an abrupt stop, jammed tightly between the floor and top of the bridge. The worst had happened—the weakly guarded and flimsily clad top-secret radar suddenly had become the focal point of most unwelcome public attention.

Southbound traffic quickly piled up with the inevitable crescendo of unfriendly automobile horns adding to the confusion. Almost immediately a State Trooper angrily buzzed down on the scene from the Havre de Grace side. The popularity of the Army fell lower and lower, hitting bottom when inspection showed that the sagging in the bridge grew much worse in the short distance remaining, and that the only solution was in deflating the tires and reversing the truck over the long mile back to the Delaware side.

Before the gathering crowd of irate civilians who had stepped from their automobiles to learn why southward passage was now blocked, the State Trooper could not resist a bit of theatrics. Pushing his hat back on his forehead, and placing one foot on the truck hub cap, he remarked in a blatant voice, "Lieutenant—you could ask any officer in the Japanese Army the exact clearance of this bridge and he could tell you immediately, or know where to look it up. But the U. S. Army? Oh no—in broad daylight and with not even a war for an excuse, they come along, and look what happens!"

Realizing the futility of suggesting to the Trooper that someone remeasure the clearance and change the sign at the entrance, the Lieutenant nodded in modest chagrin and then directed his men to deflate the tires. In the meantime the Trooper started the disagreeable task of backing up the mile-long column of civilian traffic to make way for the truck.

Shamefully, the Army behemoth crept slowly backward to the opposite side of the river followed meekly by the other five trucks of the convoy. Passage over the Susquehanna was finally accomplished over a more modern bridge many miles to the north—the entire incident costing a delay of one day in transit, not to mention four new giant tires and inner tubes.

On the evening before Thanksgiving, 1938, the tired, bedraggled radar convoy, wearily but proudly, rolled into Fort Monroe where the gear was placed in the custody of Colonel W. S. Bowen, President of the Coast Artillery Board. Lieutenant Cassevant and his men, after three hectic days and nights, relieved of their top-secret responsibility, were indeed, most adequately prepared to enter fully into Thanksgiving festivities.

During the weeks which followed, many exciting tests under controlled conditions were conducted. Airplanes were sent to record heights and detected. Long-range detection possibilities were demonstrated beyond question. Hedge-hopping planes were detected in time for hasty defense measures. Artillery bursts were found to register on the radar indicators suggesting coincidence methods for fire-control. The stupendous military potentialities of the equipment became more and more apparent with each succeeding test. Equipment failures which occurred from time to time, obviously could be corrected. Size could be reduced, efficiency could be increased—the sound locator of World

War I was now beyond question destined to become a museum piece!

When the Coast Artillery Board had gathered most of the data desired for evaluation purposes, arrangements were made for a demonstration of the equipment before a number of Air Corps officers stationed at nearby Langley Field. So it came about that one cold, cloudy, and windy night in December, 1938, an Army B-10 bomber streaked up into the darkness from Langley Field, Virginia, on a high altitude flight set up for the demonstration.

Little, however, did the Air Corps Captain piloting the big, twin-motored ship realize, that before the evening was over he and his crew would experience high adventure; the experience to be particularly unique in that the occupants of the airplane were to be initially, blissfully unaware of the danger lurking before them, while on the ground, a score of high-ranking Army officers were to spend a painful sixty minutes witnessing a life-or-death drama as a new page of history was being written for aerial navigation.

As the big bomber rose into the forbidding sky, the crew busied themselves preparing for a long evening of forced oxygen inhaling, for they were to fly that night where the air was thin and where man could not survive without adding to the natural atmosphere. Orders on the flying mission called for a series of simulated bombing runs over Fort Monroe, approaching from any angle within 180 degrees on the landward side at an altitude of 20,000 feet.

The radar operating crew were under instructions to report initial detection of the incoming airplane and to maintain a continuous track. When the airplane appeared to be within searchlight range, illumination by searchlight would be attempted, as in earlier tests, to give visual and positive proof of the equipment's effectiveness. All lights on the airplane were to be extinguished so as to fully simulate conditions of war.

According to instructions, the pilot flew upward to the ceiling of his ship, reporting a broken cloud layer at 10,000 feet which he said would require navigation partly by instruments; but he anticipated no difficulty in carrying out his mission. The forecast was for the clouds to break, so it was expected that weather satisfactory for searchlight operation would exist by the time the bomber was on course. At 20,000 feet the pilot leveled off and reported his position as about 30 miles west of Fort Monroe and said he was coming in on his first run.

The radar gear was placed into operation and the search began. The distinguished visitors from the Air Corps gathered around the various pieces of weird equipment watching and waiting for the operators to call out that detection had been accomplished and that radar tracking was underway. Many were even skeptical as to possible success—for radar was new, and to most of those present this was a first experience with the device, since airborne radar was then nonexistent.

Back and forth, up and down—the three great antennas of the radar combed the 180-degree sector looking for the "intruder" racing at them through the darkness. But something appeared to be wrong. The indicating instruments showing nothing which could be taken for an airplane even though the apparatus showed every indication of be-

ing in perfect operating condition.

A message came down from the pilot, "Now directly over Fort Monroe at 20,000 feet—unless there are other instructions, will turn and fly west 25 miles and repeat course."

There were no other instructions. The pilot appeared to be complying exactly with orders given earlier.

The visitors gathered in small groups and some shook their heads indicating grave doubt over the new invention. The operators and the Coast Artillery officers were perplexed. Why, they wondered, was tonight different from other nights when successful tests were made under similar conditions? Failure before the assembled flyers would add to their disbelief that ground targets could be protected against aircraft by ground-based artillery.

Again came the terse message from the bomber, "Am now about 25 miles west of Fort Monroe, will turn and again approach you within the prescribed sector at present altitude of 20,000 feet."

Once again the radar men strained every sense as their instruments combed the western sky from the north to the south and up to the zenith. The hoped for indication failed to appear on the oscilloscopes. The visitors were now noticeably showing signs of impatience. Said one general, "I think I'll leave and have them call me some other night when they get the equipment working. . . ."

He left!

A few minutes later a sardonic message came down from the sky. "Am now over Fort Monroe at 20,000 feet—where is that searchlight you fellows were talking about?"

Now, considerably alarmed, supervisory personnel met for a hurried discussion. Other visitors started to stroll toward their automobiles.

"I think," said the Signal Corps physicist in charge of technical operations, "it is imperative that we look to the east and see if by any chance he is off-course and over the ocean."

"Seems hardly necessary," said the Coast Artillery officer, Colonel Schuyler, directing the tests, "the pilot appears to know exactly where he is, and the boys at Langley do a lot of night flying."

"Well, let's try one more run, and then search eastward," said the physicist, and turned to supervise the operation of the equipment.

There was no difference. When the pilot reported his position as over Fort Monroe and when the radar again failed to find suggestion of a moving echo in from a westerly direction, obviously, either radar or aerial navigation were to blame. Unfortunately too, at 20,000 feet, airplane motors could not be heard as a check on either.

"OK," said Colonel Schuyler to the physicist, "try searching east, that's about all left for us to do. If we don't find him we might as well order the ship back to Langley and close up for the night and work over the equipment tomorrow. Can't see how he could be cast though, for his orders were to stay over land. Those boys know that night flying over water is dangerous—they might have to use parachutes, you know, in case of trouble."

The physicist quickly moved to the control equipment and gave the orders to reverse the search field. Slowly the three massive antennas and the attendant optical gear

turned through 180 degrees and pointed eastward over the black menacing waters of the stormy Atlantic Ocean.

Almost immediately, the three operators excitedly sang out, "Target . . . Target . . . Target!"

Radar tracking started!

The remaining visitors quickly returned to points of observation around the radar. At last there was something to see. . . .

"There he is," the range operator cried, pointing to a vertical deflection on the screen of the cathode ray tube.

"How do you know it's an airplane?" asked one of the visitors.

"Watch—tell the pilot we think we have him and ask him to bank his plane," shouted the physicist to the radio communications operator—"Keep your eye on the echo, General Andrews!"

Back went the message, "We think we have located you, bank your plane for identification."

"Roger," came back over the air.

Almost immediately, the "pips" on the indicating oscilloscopes bobbed up and down as the reflecting area of the airplane varied due to the turning motion. When the flight was again steady, the "pips" became stationary. Identification was positive!

Some calculations were hurriedly made. Colonel Schuyler, noting the seriousness of the findings, quickly took the microphone himself and transmitted to the pilot, "Captain, you are far off course—your position is 23 miles east of Fort Monroe. Turn and fly west. You are over water and moving off towards Europe at a high rate of speed!"

Again the radar "pips" bobbed as the big bomber banked and turned. Then slowly—very slowly, the radar started showing a decreasing range. The airplane was returning.

The control operator of the radar made a rapid calculation. From the movement of the "pip" he could calculate the ground speed of the airplane. The answer seemed incredible. The pilot appeared to be bucking a 120-mile per hour wind, and that meant his maximum forward progress could be only 20 miles per hour. It would take over an hour even before he would be overhead!

During that long uncertain hour the radar maintained

a continuous track. Messages were sent from time to time giving the pilot his position. Finally the radar showed the airplane to be at a distance of 12,000 yards which was within searchlight range. The radar-directed searchlight was turned on and a narrow pencil of light stabbed the black night, but futilely painted only a white disk on a cloud two miles above the earth. Two miles higher, above the cloud, radar said there was an airplane!

The white disk on the underside of the cloud slowly but continuously moved westward in synchronism with the radar data. Fate was kind for the track appeared to be in a direction of an opening in the cloud formation—stars could be seen through the approaching cloud break. The situation was becoming dramatic. Would there actually be an airplane in the searchlight beam when visibility became unlimited?

Now the disk of light on the cloud disappeared, and the rays of the searchlight beam were unobstructed. All eyes anxiously strained for the sight of glistening wings. Human life was at stake!

First to see the bomber were the experienced men of the searchlight crew. Then others saw it—soon everyone present could see the little fly-like speck which was an airplane flying 4 miles above the earth. In that airplane were four men who were pulled back from great danger to safety by a new invisible electronic force!

The remainder of the evening was highly successful. Other trials were made. At will the radar found the airplane and directed the searchlight beam with uncanny accuracy. Very convincing to the men who fired the anti-aircraft guns!

But the men with wings saw more than fire-direction or early warning. In radar they saw an answer to the flyer's greatest problems—navigation and blind landing! Acceptance was instantaneous! Airborne radar would surely follow through more research and engineering. Man had succeeded finally in extending his sense of direction and position incalculably over his natural powers. No longer was he to be limited by his human eyes and ears. Now, with the powers of mythical Zeus on Mount Olympus, the blackest of nights or the thickest of clouds could be swept away in accordance with his will.

Guided Missile And Radar Pamphlets

We are now negotiating in an effort to have all the JOURNAL guided missile articles compiled into pamphlet form. It is our plan that the articles will be arranged according to a logical study outline and the pamphlet will therefore be most suitable for study or instruction. Due to its length, approximately 76 pages, printing costs will necessitate that we sell them from sixty cents to one dollar, depending on the total of the estimate of quantities desired by the various units, organizations and individuals.

All our authors are outstanding authorities in their respective fields and no other one pamphlet or book covers the complete field of guided missiles as authentically or comprehensively as this one will do.

To assist us in planning we should very much like to hear from individuals and units interested in purchasing the pam-

phlet. The charge of \$1.00 is based on the sale of 700 copies. Unless we are assured of selling that many, it may be necessary for us to abandon this very worthwhile project, so please give us an estimate of the number you may wish to buy.

The complete series of radar articles which Lieutenant Colonel Leonard M. Orman has written for the JOURNAL during the past two years will be available for purchase in pamphlet form within the next two months.

This also is a most comprehensive piece of literature and will be of inestimable value to the instructor and student alike. It is in effect a complete course in Radar and, as our older readers know, all the articles are easily understandable to the layman but still very interesting to the technician.

Price of these pamphlets has not yet been established. They are being reproduced at the United States Military Academy.

THE PROBLEM OF THE STEP ROCKET

By Willy Ley

"Rocket theory is not a problem dealing with 'quantities of work,' but with 'quantities of motion.'"*

One of the most interesting problems in rocket theory is furnished by the type which is generally referred to as the "step rocket" and although the term is used frequently in books and articles dealing with rockets and missiles, remarkably little has been published about the problem itself.

As far as can be ascertained from published reports no true step rocket has been built yet, but the German Peenemünde group had what appears to be rather complete plans drawn up for such a missile. Its designation was "A-9 plus A-10," while the term "America Rocket" was also in use, for the simple reason that this project had the purpose of sending rockets across the Atlantic Ocean.

The part which was to arrive in America was a rocket of the A-9 type which may be described as a V-2 with short stubby wings. These wings were to increase its normal range of about 200 miles to 300 miles. This, of course, was not enough by far to span the Atlantic, therefore the A-9 rocket was to be carried off the ground and part of the way by another rocket designated as A-10 which would have had a take-off weight of 85 tons. It seems that the A-10 rocket was never actually built and it seems doubtful whether the Germans could have completed it in time, even if the European half of the war had lasted as long as its Far Eastern half.

To understand the problem of the step rocket one has to realize first of all that the range of a rocket is determined principally by the velocity which it ultimately attains. In that respect a rocket can be compared to a long range gun. For every gun there is a certain elevation which will result in maximum range. That elevation should theoretically be 45° but actually it may differ somewhat from that figure because of secondary factors such as air resistance. But once the gun has been elevated for maximum range, the range is determined only by the muzzle velocity. If you can get a higher muzzle velocity you'll get a longer range, and it matters not at all just which tricks of powder chemistry are employed to produce that higher muzzle velocity.

In the case of a rocket, its maximum velocity compares with the muzzle velocity of the gun. In a well designed

rocket this maximum velocity will occur at the time when the fuel supply is exhausted, or when it is shut off. To name this instant, the German word *Brennschluss* has been adopted. Translated, *Brennschluss* means "end-of-burning."

If the rocket, at the moment of *Brennschluss*, points upward with the angle for maximum range—which in very high altitudes is much closer to the theoretical 45° than on the ground—its range will be determined essentially by the velocity which it has at that instant. And, as in the case of the gun, it matters little what tricks are employed to make this velocity as high as possible. Of course there are some other factors present in the case of the rocket which influence the range. One of them is simply that the place of *Brennschluss* is high above the ground; this may be compared to a gun emplaced on top of a high mountain. The other is that the rocket, during the time interval between take-off and *Brennschluss* has already travelled some of the distance to the target.

Having realized why the range of a long range rocket is determined essentially by its maximum velocity we may progress to the next point. What determines the maximum velocity of a rocket? There are three major factors. One is the type of fuel used or more precisely, its exhaust velocity. The other is the amount of fuel available, properly speaking, the mass-ratio of the rocket. And the third is the relation between rocket velocity and air resistance. It is obvious that a rocket which takes off with a high acceleration and therefore acquires a high velocity when still in rather dense layers of the atmosphere near the ground will "waste" a great deal of its energy fighting air resistance. A rocket which takes off with a rather low acceleration, and does not attain high velocities until well up in attenuated stratosphere layers does much better in that respect. The main practical difficulty is that of stabilizing such a rocket but this problem is well on the way to solution.

As regards the exhaust velocity I have shown in an earlier article in the *COAST ARTILLERY JOURNAL* that the fuel/oxidizer combinations investigated so far are very much alike in that respect so that the exhaust velocity of the V-2 motor, 7000 feet per second, may be used for the present.

The main variable will be the mass-ratio, the ratio be-

* (Prof. Hermann Oberth and Dr. Franz von Hoefft, as paraphrased by Robert Esnault-Pelterie.)

tween take-off weight of the rocket with fuel load, and its weight without that load, i.e. its "empty" weight. It might be more interesting to introduce some actual figures at this point, using the V-2 rocket as an example. In round figures that rocket weighs 8000 lbs. and it carries a warhead weighing 2200 lbs. Its empty weight is, therefore, 10,200 lbs. The full fuel load of alcohol and liquid oxygen comes to 19,400 lbs. plus 400 lbs. for auxiliary fuels which drive the turbine that, in turn, drives the pumps which pump the main fuels from their tanks into the rocket motor. The take-off weight thus comes to 30,000 lbs., or about 15 tons.

30,000 divided by 10,200 is just short of 3, therefore this rocket has a mass ratio of very close to 3 : 1. Its exhaust velocity is 7000 feet per second, its maximum velocity slightly above 5000 feet per second. Now there is a formula that states that the maximum velocity of a rocket will become equal to its own exhaust velocity when the mass-ratio becomes equal to the figure "e" which is roughly 2.72. That the V-2, although it has a somewhat higher mass-ratio than "e," falls short of attaining its own exhaust velocity by not quite 2000 feet per second is explained by many facts.

One of them is that the formula is strictly valid only in an idealized environment where there is neither air resistance nor gravity present to interfere with the rocket's movement. That, of course, is the largest single factor. Then there is the drag of the graphite vanes in the exhaust blast. And finally we must keep in mind that the ratio of 3 : 1 is somewhat generous. The 400 lbs. of auxiliary fuels should not be counted, since they are not ejected with an exhaust velocity of 7000 feet per second. And if there is a delay in firing, some of the oxygen will evaporate so that some of the alcohol will be deprived of the oxygen it needs for combustion.

The effect of all this is that the actual mass-ratio of 3 : 1 produces a maximum velocity which, according to the formula mentioned, should be produced by a mass-ratio of 2.22 : 1. One might say that for this particular missile the mass-ratio of 3:1 is 75% effective under actual conditions, when compared to the purely mathematical derivation. But it will bring the 10,200 lbs. of empty rocket and warhead to an altitude of 115 miles. Or to a range of about 200 miles.

The only practical way in which we can hope to increase the maximum velocity of a rocket without waiting for the discovery of synthetic fuels is to increase its fuel load. It is probably possible by more refined design and by the employment of special alloys to increase the capacity of the fuel tanks without increasing their weight at the same rate. Elsewhere some dead weight might be eliminated so that the actual mass-ratio of such a missile might be increased to 4 : 1 or even 5 : 1. With a mass-ratio of 5 : 1 the maximum velocity of the rocket should be 2.66 times its exhaust velocity according to the formula. If we again assume that the actual mass-ratio is 75% effective, that would still mean that the rocket would attain twice its own exhaust velocity.

At first glance that may not sound like much, but it becomes more impressive if we estimate the maximum height and the maximum range of such a rocket. The maximum range would be about 800 miles, the maximum height if fired vertically would be around 400 miles. And all this

"merely" because the take-off weight was five times the remaining weight, instead of three times. But we could not progress indefinitely that way because there is bound to be a limit beyond which the best team of designers, stress analysts and fabricating experts could not possibly go.

Let's assume that the empty weight for this hypothetical 5 : 1 mass-ratio rocket were the same as that of V-2, namely 10,200 lbs. The take-off weight would be 51,000 lbs. But the thrust of the motor at sea level is "only" 60,000 lbs. It could just barely lift that rocket, the acceleration would be very, very low. In short, the whole rocket would not work efficiently, unless the thrust of the motor was also increased. But that could only be done by burning larger amounts of fuel per second (the figure for the V-2 motor is 265 lbs./sec.) which would mean a larger and heavier motor, larger and heavier fuel pumps, etc., etc. As can be easily seen, the rocket designer is steadily in danger of finding himself calculating in circles. First he increases the fuel capacity without increasing the dead weight of the rocket. Then he finds that the motor is not quite powerful enough to lift all that fuel efficiently. Therefore he has to increase the size of the motor which increases the dead weight. And so on.

But if we analyze the situation we find that the circle or, if you will, spiral, began because the motor did not have enough thrust. If we could temporarily supply a second motor which is then dropped when no longer required the train of thought could have been kept going in a straight line. In practice, that second motor (since it is to be dropped) would better be supplied with its own short duration fuel tanks which, of course, would be dropped along with the motor.

Such a device exists; it is known as the take-off booster or just booster. It has been used for the WAC Corporal and for the GAPA, while the Germans employed it on their experimental anti-aircraft rocket "Rheintochter" (Rhine Maiden). Its purpose is simply to assist the motor of the rocket proper as long as the fuel supply is so heavy that the motor could carry it only under difficulties and inefficiently. The booster units are usually solid fuel rockets, sometimes the same solid fuel JATO units that are used as take-off help for aircraft. They help to overcome the inertia of the rocket, they provide a better take-off acceleration and thereby improve both efficiency and stability. When their mission is completed, they just drop off. The energy which they impart to the rocket is carried along and shows itself in a higher maximum velocity, but the dead weight of the booster is left behind.

A booster for a rocket is not a lower step of a step rocket, but it is a bit difficult to draw a dividing line. If we imagine the booster to be getting larger and larger, it will finally attain a size where it may be referred to as a "first" or "lower" step. In practice the difference between a booster and a lower step is usually clear. Normally the booster will weigh less than the rocket or at most will have about the same weight as the rocket. In that case it is still a booster. But if the booster is so large that the rocket appears to be only the payload of the booster charge it is honored with the term lower step.

If, for example, the whole V-2 were only a "booster" for a rocket weighing the same as the V-2 warhead, 2200

pounds, we would have a true two-step rocket. And now we'll try to see what that would do for the maximum velocity of the upper rocket, the second step.

The 3 : 1 mass-ratio V-2 rocket attains, as we have seen, a maximum velocity of close to 0.8 of its exhaust velocity. Now if we imagine that the second step which has an overall weight of 2200 lbs. has the same mass-ratio, that second rocket will also attain a velocity of 0.8 of its exhaust velocity. Actually it will do better since it, unlike its first step, does not have to fight air resistance to the same extent, so that we might assume that it will attain a full 100 per cent of its exhaust velocity. But since 80 per cent of the exhaust velocity were imparted to it by the lower step before its motor even burned, the maximum velocity at "Brennschluss" of the second step will be 1.8 times exhaust velocity. In figures it will be 12,600 feet per second.

For greater clarity this may be repeated in the form of a two line tabulation:

| | <i>Weight:</i> | <i>Max. velocity:</i> |
|---------------------------------------------|----------------|-----------------------|
| V-2, empty | 10,200 lbs. | 5,600 ft/sec. |
| Upper step, one-ton rocket, empty | 733 lbs. | 12,600 ft/sec. |

We see that an apparently fantastic gain in velocity has been secured. However it has cost a much greater loss in hitting power, for the actual payload in the warhead of the second step can scarcely exceed 200 pounds—one-tenth that in the V-2.

One may ask at this point what the mass-ratio of a step rocket is or could be. It is a question of definition whether one replies with a figure to that question or with the statement that there is no such thing as an over-all mass-ratio for a step rocket. The best probable method is to approach the problem backward and to say that if we have more than one step, the maximum velocities of the various steps will add up. Hence the remaining mass of the final step will have a velocity which is the sum of the velocities of the various steps. Supposing now that one could build a single rocket which, burning the same fuel, attains the same velocity as the remaining mass of the upper step in the step rocket, the single rocket will have a certain mass-ratio. That such a single rocket could not actually be built is unimportant. It serves for purposes of comparison only. It is, so-to-speak, an "ideal" and for this reason the actually non-existent over-all mass-ratio of a step rocket is termed the "ideal mass-ratio." In our example it would be 9 : 1.

Now to return to the example of the one-ton rocket as an upper step for the V-2 rocket. The first question which comes to mind after finding a maximum velocity of over 12,000 feet per second is, of course, what the height in a vertical shot or the range in a 45° shot would be. A definite answer to that question could be given only if a specific missile, with all criteria established, were subjected to a careful performance calculation. But the result one could expect from this velocity should be on the order of slightly above 700 miles vertical and about 1400 to 1450 miles horizontal range.

Since the actual payload of the upper step could hardly exceed 200 lbs. such a missile would not be feasible as a weapon of war but would be a pure research instrument. If, however, the whole were suitably enlarged so that the

payload could be a fission bomb, it could serve as a long range weapon by virtue of the fission bomb. If only chemical explosives existed, the use of such a weapon would be futile since it could not possibly compete with piloted aircraft in economy of delivery, even if very effective enemy interception for the aircraft is assumed.

One final problem about step rockets which is likely to occur to the reader may be mentioned in conclusion. What would be the best time to ignite the upper step? Should it be ignited immediately after Brennschluss of the lower step or later? One might think that it might be advantageous, as far as range is concerned, to let the upper step proceed on inertia for some time and some distance before tapping its fuel supplies. Actually it would result in a loss because the efficiency of a rocket motor increases with velocity during its burning time. If one permitted the empty lower step and the upper step, or the upper step alone, to proceed on inertia for some time one would gain some range during that interval. But the velocity would go down since the rocket, still on an upward path, would be decelerated by the action of gravity. When the upper step is finally ignited, its motor would have to regain speed first and would not add as much to the total of the performance as it could otherwise. The desirable feature is to obtain a high velocity; that is accomplished best when the motor of the upper step goes to work the instant the fuel supply for the lower step has been exhausted.

There is a practical reason why the upper step would begin to work even a short interval of time prior to "Brennschluss" of the lower step.

At take-off and for some seconds immediately thereafter, a V-2 rocket is stabilized only by the graphite vanes in the exhaust blast. It is not until the rocket has reached a certain velocity that the large external fins can become effective. But when the rocket has reached an altitude of 10 miles or more the external fins lose effectiveness again because of rarefied atmosphere. For the last twenty seconds or so of the 65 seconds of powered ascent, the graphite vanes again carry the whole burden of the work. Now it seems to happen quite often that the last few gallons of fuel that get into the combustion chamber choose not to burn in the precise center of the motor. The result is that there is a lopsided exhaust in the last moment which imparts an off-center impulse to the rocket. Since the graphite vanes are no longer effective because of lack of an exhaust blast and since the external fins are no longer effective because of altitude there is nothing to check this off-center impulse. The result is that the missile tumbles end over end while traveling under inertia. This tumbling does not influence the altitude attained and probably has very little influence on the accuracy of the rocket in operational use. But it would be an awkward job indeed to release a second step in the right direction from a tumbling carrier.

It does not seem likely that a method can be found which will prevent such tumbling, unless one envisages a very large manned rocket where the pilot might be able to stop it by means of a small steering motor working from a separate fuel supply. But in unmanned rockets one will always have to count on possible tumbling. And therefore the higher step must get away under power before the tumbling sets in.

Psychological Warfare and Propaganda

By Colonel Robert J. Wood, CAC

It is the duty of every American to be alert to any subversive activity which threatens democracy, our way of life. Communism is such an activity. It may be disguised; it may hide behind "front" organizations; it may claim to support democracy. But the long-range aim of Communism is to seize control of existing anti-Communist governments, if possible by penetration and infiltration, but if necessary by force. Communism envisions the eventual creation of a stateless world society.

In 1917, the Bolsheviki, a political party based on Communist principles, forcibly seized the Russian government and has subsequently dominated that government and the governments of neighboring states. Communists do not claim that *pure* Communism has yet been established, even in the Soviet Union. This, they assert, is a period of "tutelage"—a necessary transitional phase. To us, it is a dictatorship to which we can foresee no voluntary end. A rose by any other name would smell as sweet.

A country's philosophy of government affects its foreign and domestic policies. Our philosophy of government is democratic—a government "of, by and for the people." In a democracy, as we understand the term, the people are the ultimate authority in determining its philosophy of government and therefore its policies.

It is obvious that decisions made by the people of a democracy—to be good decisions—depend upon an enlightened public opinion. Communist governments preach an "enlightenment" which follows a rigid "party line," a course designed to regiment the thoughts and actions of their people and convert the dissatisfied, the disillusioned and the unhappy everywhere to their beliefs. In this endeavor, Communism has embarked heavily in a campaign of psychological warfare.

The basic common sense of the American people, once they know the facts in the case, can always be depended upon. The armed forces of the United States are a part of and reflect the views of the American people. In this era of "ideological war"—which can be defined as a conflict of basic ideas, philosophies and policies—it behooves us to be informed, to know what we are talking about. It is vital that we recognize psychological warfare and propaganda and distinguish between Communist subversion and democratic ideals.

Let's start by a bit of research and definition. The word "psychological" comes from psychology, which is a recognized course in most universities and colleges and deals with the science of the mind. Both words go back to Psyche, the lovely maiden of Greek mythology who personified the soul, or immortality. Soul, mind, understanding—these were more or less synonymous to pagan peoples.

"Psychological," then, has to do primarily with the mind. A *psychological* fear is one induced in the mind of a person, usually by events or ideas which his normal senses cannot

explain away. A *psychological* moment is that occasion when any action or event or idea is most certain to have full effect on one's mind.

"Psychological warfare" does not normally involve the use of guns, tanks, airplanes, battleships or atomic bombs, though it may involve the *threat* of their use. It normally deals with *ideas* as influenced by the spoken and written word. It exemplifies that old truism: "The pen is mightier than the sword."

To be more specific, we can define psychological warfare to mean the use of measures, short of armed conflict, designed to influence the thought, morale or behavior of one nation in such a way as to support the accomplishment of the military and national aims of another nation.

Psychological warfare has been thought by some to be an invention of modern war. While it was certainly a potent weapon in World War II, it was not a creation of that war. In fact, psychological warfare is as old as war itself. The spreading of rumors through the camps of the enemy was a recognized method of undermining his morale long before the days of modern weapons. The threat of devastation, the use of ruses and stratagems, the night attack with torches and trumpets like that of Gideon in the Bible, the use of new or unusual weapons—these are all forms of psychological warfare. Hannibal undoubtedly got more psychological than tactical value out of his use of elephants against the Romans who had never seen such tremendous beasts.

Propaganda is a principal weapon of psychological warfare. The word "propaganda" is one of those which time and usage have somewhat perverted. Like many old Anglo-Saxon words, such as "wench" or "bitch" for example, it has fallen among thieves and been corrupted by association. Webster's Dictionary will tell you that "wench" originally meant a girl, a maiden; later, in Shakespeare's day, a maidservant. Both definitions vary considerably from today's commonly accepted interpretation. Animal husbandry may know "bitch" as the female of the canine species, the dog or the wolf, but its more scurrilous definition has almost banned it from polite society.

"Propaganda," in a way, partakes of similar taint. It is a Latin word and, in the early days of the Roman Catholic Church, meant a college at which priests were educated for missionary work. From this beginning, however, it was an easy step to the definition of *any* organization for spreading a particular doctrine or system; and subsequently, the doctrine itself which was thus taught or spread. Thus propaganda came to be known, perhaps euphemistically, as "organized non-violent persuasion." Today, an acceptable definition might be: the planned use of any form of communication designed to affect the minds and emotions of a group of people for a specific purpose.

Propaganda thus becomes a tool of psychological war-

fare directed by one country against another, or even to "indoctrinate" one's own people. Dr. Goebbels, the madman of the Reich, called his office the "Ministry of Propaganda and Public Enlightenment." It had the dual role of selling Naziism at home and abroad. We doubt that the Germans were "enlightened" in the western definition of the word; they were certainly "enlightened" insofar as Hitler desired them to be.

One form of propaganda is "manufactured news." A classic example is illustrated by the following clippings from European newspapers of November 1914:

Kölnische Zeitung (Germany): When the fall of Antwerp became known, the church bells were rung. (In Germany, to celebrate.)

Le Matin (France): According to the *Kölnische Zeitung*, the clergy of Antwerp were compelled to ring the church bells when the fortress was taken.

London Times: According to what *Le Matin* has heard from Cologne, the Belgian priests who refused to ring the church bells when Antwerp was taken have been driven from their places.

Corriere della Sera (Italy): According to what the *London Times* has heard from Cologne via Paris, the unfortunate Belgian priests who refused to ring the church bells when Antwerp was taken have been sentenced to hard labor.

Le Matin: According to information to the *Corriere della Sera* from Cologne via London, it is confirmed that the barbaric conquerors of Antwerp punished the unfortunate Belgian priests for their heroic refusal to ring the church bells by hanging them as living clappers to the bells with their heads down.

Propaganda, like psychological warfare itself, is as old as the hills, though perhaps not in its current definition. The Roman emperors certainly felt that Christianity was using propaganda to threaten their very existence when they were told of the Christian directive which has come down to us in the Book of Mark: "Go ye into all the world and preach the gospel to every living creature." Let us be certain that, in our opposition to Communism, we have a better case than did the Roman emperors.

Propaganda, of course, has been spread by force as well as by the written and spoken word. The sword was long the most effective agency of Islamic propaganda, and Christians were not adverse to wielding the "sword of the Lord." Witness the Crusaders and the Spanish Conquistadores.

Hitler and Stalin both spread their doctrines by force as well as by exhortation. Their greatest success, however, has been the "sale" of their armed prowess. Hitler did not convert, nor has Stalin converted, a single country except by arms or the threat of arms. It is worth noting that none of Hitler's converts were permanent ones.

But propaganda, as a tool of psychological warfare, may accomplish much without the use of force. It may cause dissension and unrest. It may divide a people on important questions. It may "soften" a nation until it becomes easy prey.

The Nazi theory was: the bigger the lie, the easier it is to sell. And in this, the Communists have been apt students. The Nazis developed world-wide written and spoken

propaganda to a fine art, ranging from the pronouncements of Hitler, von Ribbentrop and Goebbels themselves on the one hand to the broadcasts of "Lord Haw-Haw" and "Axis Sally" on the other. The Nazis exploited every possible dissension which would contribute to the weakness of an enemy or potential enemy. Their doctrine was flexible and imaginative: gentiles against Jews, Catholics against Communists, Communists against democracies, poor against rich, whites against negroes, British against Americans—anyone against anyone else as long as action against Germany was weakened or delayed.

It may be said that the Germans accomplished no less than four basic psychological warfare achievements:

(1) They made the most of their initially limited resources by fighting one country at a time and making each victim *seem to be the last*. As late as 1941, many Americans still believed that the United States could and would avoid war.

(2) They capitalized on their threat of overwhelming devastation, showing movies of their own blitzkrieg to governing groups and peoples of prospective victims in order to lower their morale.

(3) They succeeded in making large sections of the world's public opinion believe that the world's future was a choice between Communism and Fascism.

(4) They convinced themselves so thoroughly of their "divine mission" that they continued fighting for fully six months after the war was over and never did surrender as a nation.

The Germans, of course, were not alone in the field of psychological warfare during World War II. When we entered the war, the British had been in the business a long time and were already well organized. It took us a little longer. By order of the President, the Office of Strategic Services (the OSS) was established under the Joint Chiefs of Staff in June, 1942, and the Office of War Information (the OWI) with Mr. Elmer Davis at its head, in March, 1943. These two agencies directed U.S. effort in the psychological warfare field during the war with somewhat overlapping functions.

The psychological warfare of a democracy, however, must necessarily always differ from that of totalitarian states. We are not inclined to initiate a campaign designed to sell the advantages of our way of life, to propagate democracy. We are satisfied normally to let our standard of living, our opportunities for advancement speak for themselves. It is only when our good faith is questioned, our objectives assailed, when we are called "imperialists" and "capitalists," that we begin to strike back. Even then we do so reluctantly, because it seems a dirty business at best. We are therefore inclined to be *defensive*, to react to others' blows, rather than to initiate an offensive war of words ourselves.

At this point, it is worth while to look dispassionately at the *technical* aspects of propaganda. What kinds of propaganda are there? How was it disseminated during World War II?

Propaganda was divided into three "types" or two "categories." By *type*, it was either:

(1) Overt or "white"—that which was disseminated

and acknowledged by a government or an accredited agency thereof,

(2) Covert or "black"—that which had a concealed source or which purported to emanate from sources other than the true ones, or,

(3) "Gray"—which fell between white and black. Its source was not indicated one way or the other and it depended for its effectiveness on its contents and timing, not its sponsor.

By *category*, propaganda was either:

(1) Combat—which was tactical propaganda conducted in the forward areas and directed towards enemy troops and those relatively limited groups of the population immediately behind the enemy lines, or,

(2) Strategic—the function of which was to further long-term aims and which usually emanated from high levels.

Let us look now at the *media*, the means, of getting this written and spoken word which made up propaganda to the desired audience.

In its simplest form, psychological warfare, as an advertising man would say, is a vast operation in the field of publicity. Every possible medium was utilized during the war by both sides in order to achieve the broadest possible coverage. Fixed and mobile radio transmitters and public address vans were the principal "voice" disseminators. Leaflets dropped by aircraft, fired in artillery shells, or carried into enemy positions by patrols or agents, wall news bulletins and printed newspapers in enemy and other languages were the principal "written" disseminators. Moving pictures, of course, where it was possible to use them, were "visual" as well as voice disseminators.

The discussion thus far has concerned itself with definitions and with an historical background, particularly of World War II. The termination of hostilities, however, did not terminate the activities of *all* nations in the field of psychological warfare. Though the countries of the world have joined to form the United Nations, unfortunately it cannot be said that they have settled the differences which arise essentially from different concepts of government—western democratic ideals on the one hand and Communism on the other. Psychological warfare is in full force today. One expert has estimated that over 300 short wave radio transmitters in 41 countries are filling the ether with 2000 words per minute 24 hours a day. There are other activities—speeches, interviews, news stories, troop movements, rumors, restrictions—all evidence of psychological warfare. What does this situation mean to personnel of the armed forces of the United States?

Prime Minister Mackenzie King of Canada said recently in Ottawa: "Communism is no less a tyranny than Nazism. It aims at world conquest. . . . Its patterns of procedure are similar but they go further. They seek to create unrest in all quarters of the globe and, by devious underground and underhand methods, to penetrate and undermine the established social systems of many lands. . . ."

In a recent speech, General Eisenhower said: ". . . the Army exists not only to protect your homes, your lives, your territories, but it exists to protect your way of

life. Democracy, by whatever definition we give it, includes a concept of the dignity of the individual, his right to work for himself and keep for himself the products of his toil. . . . It includes a willingness to live by the will of the majority so that the nation can act wisely and in its own self-interest. Democracy must defend itself by virtue of its own institutions, or no Army of any kind can protect it for long. . . ."

What did General Eisenhower mean ". . . defend itself by virtue of its own institutions . . .?" It's a potent phrase. United States' policies are based on American institutions, American principles. Their virtue is obvious to us. The United States is traditionally dedicated to the establishment everywhere of conditions of peace, security, stability and prosperity. This country holds as self-evident the right of peoples and of nations to determine for themselves the forms of government under which they will live. It opposes only those governments whose foreign policies indicate aggressive tendencies which threaten the peace or the political integrity of other nations.

These traditional policies may be interpreted today as including:

(1) Full support for the principles of the United Nations but at the same time, maintenance of strong armed forces by the United States until the United Nations is able and willing to ensure world peace and security.

(2) The right of any country to have any government which it desires within its own territory, *but no further*.

(3) Assistance to those friendly peoples which are as yet unrecovered from the ravages of war and/or the consequent impairment of their national economics, and

(4) The creation of an international "climate" in which free and independent nations can exist and prosper.

The United States is today the only great nation of the world undamaged by war and therefore the only nation able and willing to take the lead in restoring world stability. It is to our vital interests to restore this stability. While so doing, we must be prepared to endure some sacrifice; we must also keep our own economy strong and healthy. A United States in the grip of depression or inflation will not only forfeit all hope of leading the world towards peace and prosperity but will in fact, descend to that level of confusion and uncertainty which Communism devoutly hopes for and confidently predicts.

The United States is engaged today in redressing world balance which has been upset in favor of a potential aggressor. This action requires a marshalling of forces in all fields, a build-up of counter-pressure to that of Communism. The United States aims at spreading President Roosevelt's "four freedoms" to all people, Communist or anti-Communist, at bettering the economic conditions of all nations, at preventing further infiltration of Communist doctrine, at helping free people to remain free and at freeing those now oppressed. It aims at strengthening weakened anti-Communist countries so that the bargaining power of western democracy is restored in world councils. It aims at doing all these things without resort to armed

force. There is no country in which Communism is more than a small minority. The appeal of democracy is directed towards the majority of thinking men and nations everywhere.

This process has been called the "Cold War." It is a "war" in which the basic principles of psychological warfare are eminently applicable. It is a war in which we should learn to recognize distortions and untruths and "the virtue of our own institutions." The Truman Doctrine, the European Recovery Plan, the Western Hemisphere Defense Arrangements, the Freedom and Friendship Trains, the Voice of America—these are all tangible aspects of the American side of the Cold War.

The discussion above has indicated certain basic policies which are fundamental in American democracy, which stem from our understanding and interpretation of the Constitution and the Declaration of Independence and which have their roots as far back in Anglo-Saxon history as the Magna Charta. Communism likes to trace its ancestry to the "Communist Manifesto," a document published in 1848 by two German Socialists, Karl Marx and Friedrich Engels, and interpreted in modern times by Lenin and Stalin. The Communists of 1948 will be missing a chance if they do not attempt this year, by "sensational" achievements, to celebrate the 100th anniversary of their basic doctrine.

What is the Communist theory? Communists declare that their ends can be attained only by overthrow of all existing social conditions. Capitalists (employers) and the "Proletariat" (workers) are, to Communism, natural enemies. As the old landed aristocracy of Europe gave way a century and a half ago to the bourgeoisie, so must capitalism give way to the masses and make way for the "dictatorship of the proletariat." Until the masses are educated to self-rule, an "enlightened few" (the high moguls of the Communist Party) must be entrusted with the responsibilities of government. This is temporary. When the masses are educated, states will "wither away" and everyone will live in a Utopian classless world society sharing equally in the fruits of production.

This is certainly propaganda of the highest order and its propagation is "party line" psychological warfare. Its amazing appeal however, even to certain highly educated individuals in the Western Hemisphere—scientists, professors, military and professional men—was attested in the Canadian spy trials.

Utopia is very nice, but getting there is something else again. A pertinent, down-to-earth, criterion might be the old ward heeler's query: "What's in it for Mrs. Murphy and the children?" We should not let ourselves be confused by Communist slogans and generalizations, which are the refuge of the illiterate and the intellectually lazy. American thinking of the "show me" type is required.

Basic differences between democracy and Communism include at least the following:

First, *freedom of speech*. In a democracy, a consciousness of part ownership by each individual, however humble, in his government permeates the entire nation. In the United States, freedom of speech has been considered, at least since 1776, as an inalienable right. Each individual possesses not only the right, but the duty, to raise his voice

and demand certain rights in no uncertain tones. In the Communist state, however, the individual, even a high government official, lives in the shadow of an all-powerful police force. His natural reaction is to give evasive answers and to search for hidden meanings behind any statements made to or questions asked of him.

Next, the *state versus the individual*. In a western democracy, laws are enacted to preserve the rights of the individual. In the Communist state, as in all totalitarian states, laws are promulgated to enable those in power to retain that power and subject the mass of the people to the will of the few. Under one system, the state exists for the people; under the other, the people exist for the state. Western democracies breed and rely on confidence; Communist states on fear.

A third point lies in that traditional foundation of Anglo-Saxon law—*an accused is innocent until proven guilty*. Those reared under a Communist form of Government find sovereignty lodged in the hands of an individual, or at the most, in the hands of a small group. Each individual may be called upon to defend himself against any charge, however fantastic. He is held to be guilty until he has proved himself innocent to the satisfaction of those in power.

Fourth is the *voice of the people*. In international discussions, the representatives of western democracies must look to their people for approval of their acts. They therefore consider treaties and contracts as binding instruments entered into by whole peoples and subject to fulfillment to the letter. In negotiating such agreements, they strive to reach reasonable solutions within the bounds of common sense, decency and equity. Representatives of Communist states have no such obligations. They are bound only by the whims of their masters whose orders they must follow or lose their heads. In the Communist mind, agreements are void whenever they become dangerously onerous or are "out of date."

It should not be overlooked that the leaders of the Soviet Union have not come into intimate or protracted contact with life in western democracies. They have no real knowledge of our standards or, if they have such knowledge, they ignore it, either by chance or design. Without a background which has in it some measures of similarity, different meanings become attached to ideas and actions, even to words themselves. "Revolution," to a Communist, means an attempted change from one autocratic form of government to another; to us it means the effort to gain freedom from oppression.

The United States is today in a period of ideological war, not a "hot" conflict of weapons, of guns and explosives, but a "cold" war fought with diplomatic, economic and psychological tools. In this last category, personnel of the armed forces have the responsibility, along with all other Americans, of recognizing, in the spoken and written word, distortions and untruths, and of realizing why such perversions are there. We need to apply our basic common sense and examine what we see, read and hear on the basis of whether or not service is being rendered to the greatest good of the greatest number of people. Eternal vigilance and active counter-arguments are the price for maintaining that strength which stems from, and is inherent in, the "virtue of our own institutions."

THE MOON ROCKET*

By Willy Ley

The definition of this term should come first. The term will be used for a rocket which is capable of ascending from the earth and of crossing the zone where the gravitational fields of the earth and the moon are of equal strength so that the rocket will not fall back to earth but will fall toward the moon and ultimately crash upon its surface.

It is unavoidable as it is logical that any mention of the moon rocket will remind readers or listeners of Jules Verne's moon gun. The idea of a moon gun is something we have to clear from our path first, a mental exercise which is all the more useful since it will provide us with a great deal of information for the case of the moon rocket.

When Jules Verne wrote his famous novel he based the proceedings on one concept only: the "velocity of liberation," also known as "parabolic velocity," "velocity of escape," or, shorter, "escape velocity." It is the velocity which forms the bottom figure in our table of impact velocities, reading 11.2 kilometers per second which happens to be almost precisely 7 miles per second. It is the velocity with which a body would strike the earth after a fall from infinity. It is the maximum that the gravitational field of our planet can produce.¹

If a body could be endowed with this velocity, earth's gravitational might could not call it back. The work required to do this, incidentally, is the same as if that body had to be lifted for the distance of one-half earth diameter from the surface through a gravitational field which remains at surface intensity throughout that distance.

The basic idea of Jules Verne's novel is to fire a projectile from an enormous gun vertically upward with a muzzle velocity of a little over 36,000 feet or about 7 miles per second. While the projectile ascends, gravity, pulling constantly, will reduce its velocity steadily. But the projectile would have the enormous velocity-wealth of 36,000 feet per second. Gravity would be able to demand a velocity-interest of 32 feet for every second at first. As the projectile recedes, that figure would drop to 31 feet per second, then to 30 feet per second, etc., becoming less and less all the time.

In spite of this steadily decreasing rate of velocity attrition the projectile would have expended virtually all its velocity-wealth after 300,000 seconds. But by that time it would also have reached the distance where the gravitational fields of earth and moon balance each other. If the projectile lacked only a few inches per second of velocity

at that point, it would still fall back to earth. But if it still had even a few inches per second of velocity left it would begin to fall toward the moon. After another 50,000 seconds it would crash on the moon, with an impact velocity of about 2 miles per second (the "escape velocity" of the moon) having needed 97 hours and 13 minutes or just about four days for the whole trip.

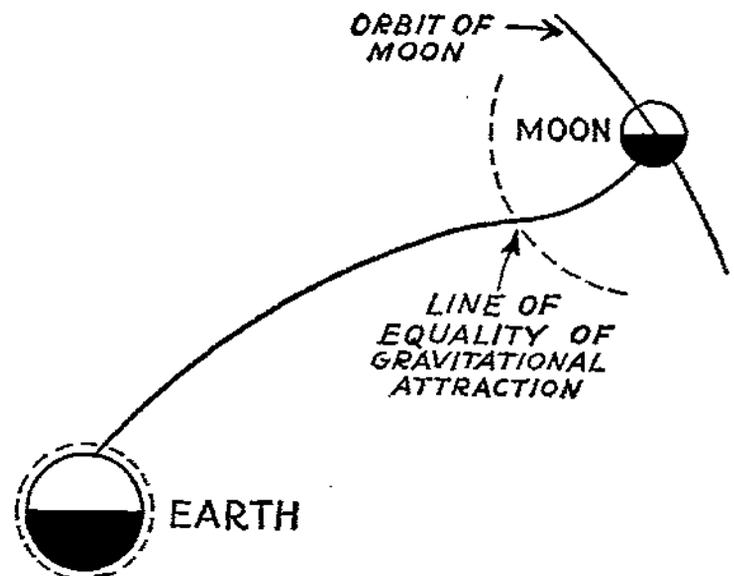
Because of that duration of four days Jules Verne pointed his gun at a point in the sky where the moon would be four days after the order "fire."

While this fundamental theme for Jules Verne's novel is very nearly correct, things began to go wrong when Jules Verne progressed to engineering detail.

The projectile to be fired at the moon is to be a ball 9 feet in diameter, under the erroneous assumption that a newly constructed telescope would be capable of following the path of a ball that size. Since a ball (later redesigned into a shell) of such size would be far too heavy if solid, it is decided to make it hollow, with walls 1 foot thick. The cannon required for such a projectile is, of course, too large to be built in the usual manner. The barrel, of the arbitrary length of 900 feet, is poured into a well dug for this purpose. Actually that barrel, which constitutes all of the cannon, is only the lining of a barrel with walls of indeterminate thickness, formed by the soil of Florida. An arbi-

ORBIT OF AN UNMANNED ROCKET TO THE MOON

The earth and the moon are drawn to scale but should be eight times as far apart. The orbit would then look like a straight line. The rocket would need close to one hundred hours for the trip but only seven or eight minutes would be under power.



*Extracted with permission of the Viking Press from Mr. Ley's book "Rockets and Space Travel."

¹Meteorites frequently enter the atmosphere of our planet with a higher velocity than that, but this is not due to attraction. The meteorites have a high velocity of their own which may be added to the orbital velocity of the earth when earth and meteorites run into each other. And the orbital velocity of the earth alone is much higher than the velocity of liberation, amounting to 18.5 miles per second.

trary amount of guncotton (400,000 pounds) is put into the barrel, filling about 200 feet of it. This is supposed to produce a muzzle velocity of 54,000 feet per second since the president of the Gun Club, or rather Jules Verne, expects to lose the difference to air resistance. All this, as may be expected, is somewhat vague. Elsewhere in the novel it is stated that air resistance will not be important because the projectile, with its high speed, will require only a few seconds to traverse the atmosphere.

The latter statement is like saying that a slab of armor plate 3 feet thick cannot very well be expected to stop a 16-inch shell since the shell traverses the distance of 1 yard in a thousandth of a second.

If the experiment had actually been made, the experimenters would have found, to their great surprise, that their ball would have landed 100 feet from the muzzle after rising not much higher. And the shell would have been flattened and partly volatilized. The reason is that Jules Verne, who did worry a little about air resistance in the open air, forgot to think of the resistance encountered in the 700 feet of gun barrel. This column of air, 700 feet high and 9 feet in diameter, could not possibly get out of the way of a projectile moving much faster than sound. It would have to be compressed, and the hollow ball or shell, as later redesigned in the novel, would have found itself between two very hot and enormously powerful pistons; the furiously expanding gases of the guncotton underneath and the column of air, heated by compression, above. The passengers, if everything had worked as Verne wanted it to work, would have been spread out into a thin film by the enormous acceleration of the projectile.

You cannot *shoot* into space through an atmosphere like the earth's and against a gravitational field like ours. The moon gun on the moon—it would then be an earth gun—working against a lesser gravity and without any perceptible atmosphere would be possible. On earth it cannot work.

While it appears quite impossible to build a moon gun, it is quite likely that a moon rocket could actually be built. In our investigation of the mass-ratio* problem we made one rather restraining assumption without specifically mentioning it. Bluntly speaking we assumed that the rocket would stay (and would have to stay) in one piece. Because of that we had to come to the conclusion that a mass-ratio of 10:1 is unlikely to be surpassed.

There are additional possibilities, possibilities which, when properly exploited, will permit still higher mass-ratios.

During the discussion of the meteorological rocket and during the description of the actual performance of V-2 we have seen that the natural combination of constant thrust and of diminishing rocket weight produces an increase of the acceleration with which the rocket climbs upward. That increase is not at all advantageous if it takes place too early or rather too near the earth where the density of the atmosphere is still considerable. But that increase in acceleration is a decided advantage if it takes place at a high altitude, say after the 10-mile level has been passed. If it were possible to help this increase along beyond the point

at which it occurs naturally we could gain a great deal.

That could be accomplished only by increasing the thrust of the rocket motor and since its exhaust velocity* is fixed (it increases by about 15 per cent in these high altitudes) the motor thrust could be increased only by burning a larger quantity of fuel every second.

This could be accomplished in more than one way. One solution would be to have a second set of fuel and oxygen lines from the tanks to the motor which would not begin to function until after a calculated number of seconds had elapsed. In a rocket with fuel pumps it might be possible to have the pumps run at a higher speed after some time. Or we might have several sets of fuel tanks in one rocket. The capacity of one such set might be such that it was exhausted when the rocket reached an altitude of 10 or 12 miles. After they were exhausted the motor would draw from the other set which would be equipped with wider fuel lines and larger valves.

It would be an additional improvement if the design could be arranged in such a manner that the first empty set of tanks was dropped when no longer required. (The tanks would, of course, be equipped with parachutes so that they would neither be damaged nor cause damage.) This would improve the mass-ratio further since the rocket would not have to carry the dead weight of the empty tanks all the way up.

The idea of dropping some empty tanks logically leads to the conception of dropping other parts which have become useless and finally to what has become known as "step rocket," a larger rocket serving as a "lower step" for a smaller rocket. This would be the non-miraculous method of transporting a rocket to an altitude of 20 miles. Peenemunde planned such a step rocket for the purpose of shooting to America, but Peenemunde did not invent the idea.

Both Goddard and Oberth had arrived at the principle of the step rocket in their first theoretical studies. Even then the idea was not new; a Belgian patent, granted to Dr. Andre Bing in 1911, described that invention. You can find pictures and descriptions of step rockets in books on fireworks dating back to 1700 and earlier. The fireworks makers did not do it to gain an especially high altitude, they did it to obtain an impressive display. But the idea was there.

Some reviewers, past and present, have thought that they could visualize the idea of the step rocket for themselves by merely thinking that the step principle is a method of building a rocket which is too large to be built in one piece. Well, it is not as simple as that, which is most fortunate indeed because the real truth is so much better. Nor is it simply a question of having the second step already at high altitude when it begins to work. To see what really takes place we need a specific example with figures.

For the purpose of our example we'll assume that we can build rockets with a mass-ratio of 10:1 and that we can build a rocket which weighs 1000 pounds when fueled and ready to take off. Without fuel its weight is assumed to be 100 pounds. Paying no attention to air resistance, we find that this rocket will attain a velocity of 2.3c (c equals exhaust velocity). This, of course would still be an ordinary rocket with a nice high mass-ratio. But then we build two rockets of this mass-ratio, one weighing 800 pounds (80

*For explanation of mass-ratio see bottom of page 15, this issue.

pounds when empty) and one weighing 200 pounds (20 pounds when empty). The larger rocket will carry the smaller one aloft. The total weight at the take-off is still 1000 pounds.

When the larger rocket which burns first is exhausted, it will have attained a velocity of 1.27c. The figure is less than the 2.3c mentioned because this rocket does not have the full weight ratio of 10.1. It has that weight ratio when considered alone, but it carries the smaller 200-pound rocket and, as far as the performance of the first rocket goes, these 200 pounds are additional dead weight.

To repeat: the larger rocket, carrying the small one but otherwise empty, has attained a velocity of about 1.27c. Now the smaller rocket starts burning while the empty hulk of the lower step is supposed to drop off. For our private amusement we'll assume first that something goes wrong and that the empty shell of the lower step does not drop off, which does not do too much harm since the whole design is such that the smaller rocket can function in spite of this handicap. Since both rockets together have the "over-all" mass-ratio of 10.1 the final result will again be 2.3c. The imagined mishap, in other words, left the whole performance unchanged so that we might as well have had just one rocket of that mass-ratio.

But then we remedy whatever went wrong and then we get something better. Unhampered by the empty hulk of the large rocket, the small rocket by itself can attain velocity of 2.3c. But when it began burning it already had a velocity of 1.27c from the efforts of the lower step. As a result its final velocity becomes 1.27 plus 2.3 equals 3.57c.

We see that the velocities add up. Whatever the lower step or steps could accomplish serves for the good of the upper step, a gradual amassing of velocity-fortune over the equivalent of generations.

A single rocket which could attain a velocity of 3.57c would have to have a mass-ratio of 30.1, something which probably cannot be built. But two rockets, each of a mass-ratio of 10.1, when used as upper and lower steps for each other, will produce what may be called an "ideal mass-ratio" of more than 30.1. And we might be able to add a third step.

Here we have a way of producing almost incredible mass-ratios. In order to make it effective the lower step of each rocket should be considerably larger than the sum of all the higher steps. In fact the term step rocket should be used only if this condition is fulfilled. If for some reason a lower step is smaller than the upper steps—if it should only be necessary to add a comparatively small amount of velocity to what the upper step can produce by itself—the lower step is no longer called by that name. In such a case Oberth called the lower step Schubrakete—Booster Rocket is a good English equivalent.

But the Germans did plan a true step rocket, their "America Rocket." It was a combination of A-9 plus A-10. A-9 was simply an A-4 rocket equipped with highly swept-back wings. These wings were not supposed to assist the ascent of the A-4 rocket to which they were attached, the idea was that they would convert the empty A-9 into a high-velocity glider. A-10 was a lower step for A-9, with a take-off weight of 85 tons! The empty A-10 was to be recovered by parachutes; it would have landed somewhere in

France or in Spain, while A-9 would have reached the mainland of North America about 20 minutes after take-off of the combined A-9 plus A-10.

If used alone A-9 would have had a range of about 300 miles, about a hundred miles more than A-4 without the wings.

Wings or not, an A-4 rocket, with an 85-ton A-10 rocket as a lower step, would have penetrated into interplanetary space, but it would have returned to earth eventually. Its path, whether it had departed vertically or at a lesser angle, would have varied in appearance, but it would always have been the same geometrical figure; it would always and invariably have been an ellipse, with the center of the earth in one of its two focal points.

Any space rocket departing from earth has no choice but to obey Kepler's laws with respect to the earth, as a planet obeys these laws with respect to the sun. The path is, therefore, referred to as a Keplerian ellipse. The rocket travels almost the whole of that Keplerian ellipse, except for the section below the surface of the earth. This same orbit, incidentally, applies to any artillery shell. The so-called trajectory of a projectile is simply the part of a very short Keplerian ellipse that is above ground. In this case it is only a very short section of the complete ellipse, not a parabola as most instruction booklets state for the sake of simplification.

Most of the ascending half of the Keplerian ellipse would be traversed in "free ascent" after a few minutes of burning time. The gravitation of the earth gradually kills the upward momentum of the rocket until it comes to a standstill. Then it begins to fall back.

If we imagine that ellipse to be more and more elongated, the point farthest from the earth—technically known as the apogee—may fall beyond that imaginary line where the gravitational influences of the earth and the moon are equal. If that happens, if the apogee falls beyond that line, the rocket will not return. It will fall toward the moon.

The path described by it is shown in the illustration; it is a curve shaped somewhat like a capital "S" which somebody tried to straighten out by pulling at both ends without very noticeable success. The curve consists of two sections of two different Keplerian ellipses joined together, one section belonging to an ellipse with its focal point in the center of the earth, the other section belonging to an ellipse with its focal point in the center of the moon.

That, then, would be the moon rocket.

Naturally it would crash on the moon and one of Dr. Goddard's early suggestions was to do just that, putting a "pay load" of flashlight powder into the nose of the rocket so as to create a flash which could be seen in a telescope and thus prove that the rocket actually did reach the moon.

But there are disadvantages to this idea. Oberth stated repeatedly that the only mistake he had been able to find in Dr. Goddard's first publication was the underestimation of the amount of flash powder required. I don't intend to mix into the discussion since I dislike the idea of a single flash that may be missed merely because the observatories that are favorably situated for the observation of the flash are having a period of bad weather or poor visibility.

If the rocket "crawled" across the line of equal gravitational attraction, it would strike the surface of the moon

with a velocity of just about 2 miles per second, the "velocity of liberation" for the moon. If it had some velocity left when crossing the line, its velocity of impact would be proportionately higher. At any event it would be considerable and cause the formation of a new small "crater." This tendency can be increased considerably if we substituted some 10 pounds of tetryl (which is more powerful than TNT) for the flashlight powder. That would cause a permanent marking which could be searched for at leisure.

It can be made even more conspicuous if only half a pound of tetryl were used (it would be set off by the impact) and if the other 9½ pounds were plaster of Paris or a similar fine white powder which would be scattered over a visible area by the explosion. Since the surface of the moon is rather dark, on the average as dark as darkish terrestrial rocks or lava, the white powder, no matter how thinly spread, would show in an unmistakable manner. It would look bright when seen from the earth even if it were so sparsely spread that it would be unnoticeable to a man walking over that area.

The mass-ratio required for the experiment would be high, as can be seen from the following table:

| Assumed Exhaust Velocity (feet per second) | Mass-ratio Required |
|-----------------------------------------------|---------------------|
| 10,000 | 237 |
| 13,100 | 60 |
| 16,400 | 26 |
| 33,000 | 5.5 |

Clearly only the last two figures of this table are debatable from the engineering point of view. Nobody could (or would) attempt a mass-ratio of 237:1 or 60:1, but 26:1 is within the realm of possibility for a two-step rocket and 5.5:1 could even be built as a single rocket.

But that implies an exhaust velocity of 33,000 feet per second. No known fuel could produce that exhaust velocity, unless monatomic hydrogen became feasible as a rocket fuel. Atomic energy, of course, could produce even more than that, once we had learned how to handle it for that purpose.

The space rocket which crashes on the moon is still just a space rocket. The space rocket which needs a human pilot because of the necessity of a few adjustments of velocity and direction—but mainly for the purpose of determining the need for these adjustments—is a spaceship.



ROCKET EXPERIMENTS AIM AT IMPROVING ACCURACY

Army scientists said recently that improved control devices tested on the German V-2 rocket eventually may enable guided missiles to be steered to within yards—instead of miles—of their targets.

During the war, the V-2's missed their mark by an average of six miles. For security reasons, the Ordnance Department would not say specifically how much, if any, improvement has been made.

It was stated, however, that scientists have made only the first step in a long chain of experiments necessary to improve the marksmanship of the rocket, and that it will be a long drawn-out process before controls are perfected.

Scientists at the White Sands proving grounds revealed recently that they had succeeded in controlling a V-2 rocket in flight for the first time. Actually, there are only about 60 seconds of flight during which the V-2 can be controlled—from the moment the rocket leaves the launching platform until the rocket motor is shut off.

The rocket cannot be controlled beyond the earth's atmosphere and its time in the atmosphere on its downward

plunge is too short for corrections to be applied.

The V-2 roars into the stratosphere at speeds up to 3400 miles an hour.

Outside the earth's layer of oxygen and other gases there is an almost complete vacuum. In this the V-2 rocket tumbles about crazily, although its center of gravity follows the calculated trajectory.

When it passes the peak of its flight through outer space, it comes down in a curve, drawn to earth by gravity. When it hits the earth's atmosphere again, it straightens out and plunges earthward as fast as it went up.

It isn't practical to keep the V-2 flight entirely within the earth's atmosphere because the drag of the atmosphere would greatly reduce the range. It "coasts" a great distance through outer space on the momentum from its flight through the atmosphere before the fuel is cut off.

It is improbable that the V-2 rocket in its present form will be used in another war. It is already obsolete in terms of newer American-designed rockets. But it is of great scientific value to us.

Accommodations Overseas For Dependents

The following information regarding living conditions at various foreign service posts has been obtained from the commands concerned specifically for this issue and revises the information of a similar nature published in the November-December 1946 and January-February 1947 issues of the JOURNAL.

Since reference throughout is made to the priority system, it is felt advisable to explain the system.

Priority lists for the movement of dependents are compiled by overseas commanders and submitted to the Department of the Army periodically. These lists contain the names of all families of Military personnel that the overseas commander can accommodate and are forwarded by him two months prior to the time when quarters will become available. Only personnel who volunteer or are scheduled to remain overseas for a period of one year from the date their families arrive in the command are eligible for the priority list. Relative priority is based on the greatest number of credits earned at the rate of one point for

each month of overseas service in previous tours of duty since 7 December 1941 and two points for each month of overseas service in the current tour. Months in any tour in which dependents were present overseas will not be counted in establishing credit.

At the present time, the American Occupied Zone in Europe is the only command where coordinated travel (dependents accompanying military personnel upon overseas assignment) is permitted although War Department Circular Number 215, dated 12 August 1947, states that upon receipt of orders to the Hawaiian area, officers, warrant officers, and enlisted men of the first three grades may submit application direct to the Commanding General, Army Ground Forces, Pacific, APO 958 c/o Postmaster, San Francisco, California, for movement of dependents, household goods, automobile and pets. At all other foreign service stations, no application for movement of dependents will be submitted until after the individual arrives at his overseas station.

European Command (Inc. Germany, Austria, and France)

Housing

In the Occupied Zones of Germany and Austria, military posts have been established to serve the various military installations scattered throughout the Zones. For the most part dependent communities are at, or in the near vicinity of, the military installations themselves. Military dependent communities have been established with due consideration to available German housing. Quarters made available for dependents going to the Occupied Zones of Germany and Austria are furnished from housing held on requisition or leased from the indigenous population.

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

The type of house a dependent will find in one of the Occupied Zones, will naturally vary in each community and within the communities themselves to include brick,

stucco, frame houses, etc., but they will be entirely adequate in accordance with normal standards for military personnel and their families. Heating is available; in many cases this is central heating, and in other cases, rooms are heated by individual stoves and heating units, but in all cases, heating will be provided. For the most part coal is the source of heat.

In the Occupied Zones of Germany and Austria, the bulk of the furniture will be the furniture within the homes themselves at the time of requisitioning, supplemented by furniture and equipment which is now being produced locally by Germany manufacturers. Furnishings will include stoves, refrigerators, kitchen utensils, porcelain, glass and silverware.

The stoves available in the Command should be adequate although they will not be as modern and advanced as the type normally used in the States. The icebox situation is still somewhat critical both in regular iceboxes and electric refrigerators; however, the situation is growing better and some type of cold storage for perishable food will be available.

China, glassware and flat silver are generally in fair supply, but the range of cooking utensils is limited. It is suggested that housewives bring double boilers and smaller types of saucepans. By all means bring kitchen tools—cooking spoons, colanders, strainers, egg beaters, and like items.

Table linens, dish towels, rugs, bath towels, face cloths

and sponges are not available in any great quantity. Sheets are obtainable, but only in single bed sizes; however, the single type bed is most prevalent in the Occupied Zones of Germany and Austria. Blankets, to a limited extent, may be drawn from Army sources.

Electric current varies from 110 AC to 220 DC and the use of American electrical equipment, such as toasters, waffle irons and the like, is more or less of a gamble on the current available. It is not recommended to bring electrical equipment with motors since the current here is 50-cycle as opposed to 60-cycle in the States and electric clocks for example, lose 10 minutes per hour.

Schools

The Dependent School Service, European Command, operates a superior school system (grades 1-12) for children of military and civilian personnel employed by the U.S. Army and its agencies in the European Command.

The schools are staffed by teachers from the U.S., carefully selected by representatives of the Dependent School Service. Kindergartens are established wherever there are a minimum of 10 children of kindergarten age in the community and a local qualified teacher (dependent) is available.

Home instruction courses are made available to those elementary grade students living in isolated communities who are unable to commute to and from already established schools in the Command.

Schools are accredited by the North Central Association. The program is devised to meet the needs and interests of the pupils and to provide schools as nearly like the better public schools in the U.S. as is possible.

Medical Care

Personnel coming to the European Command must be inoculated against smallpox within the year previous to their arrival in the Command; and either a booster shot or inoculation within the same time period is required against typhoid and paratyphoid fevers. Everyone 34 years of age and younger must be immunized against diphtheria or have a negative Shick reaction. These immunizations may be received at the Port of Embarkation or evidence must be presented that they have been administered within the stated period of time.

Dependents are entitled to medical service at Army hospitals. This service includes emergency care, hospitalization, and obstetrical service. The Dependents School Health Service looks after the health of the school age children. The School System employs full- and part-time registered nurses, either dependents or Department of the Army civilians, to care for the children.

The Veterinary Corps of the Medical Department inspects all fresh fruit and vegetables, meat, fish, and milk sold in the commissaries.

Since the incidence of disease (especially typhoid, and forms of diarrhea and diphtheria) is higher in the Occupied Zones than in the U.S., an active program of preventive medicine has been necessary. But with the immunization program and the regular inspection of food and drinking water sources, these diseases are being kept to a very low

minimum among occupation personnel and their dependents.

Food, Clothing and Other Supplies

All items of food, including most types of meat, are available through commissary sales services. Fresh milk, ice and fuel are available, all in adequate supply. Fresh vegetables are available in season through commissaries as well as many types of frozen foods and vegetables. Fresh fruits, including bananas, oranges, lemons, grapefruits and other fruits in season are available through EUCOM Exchange Service.

With regard to special baby foods, Exchange Service stocks certain items; however, it is suggested that dependents bring with them special items of baby food which may be prescribed for individual diets, at least in sufficient quantity to insure it will be available pending augmentation of command stocks. No food items are available from the local economy in the Occupied Zones.

Supply of civilian clothing through the Exchange System is limited with regard particularly to outer garments; however, it is anticipated that adequate stocks of materials will be on hand, also increased facilities for tailoring and dress-making. Dependents should, however, bring adequate clothing for approximately one year to be on the safe side. Shoes are generally available as are stockings, although there are recurring shortages in some sizes. This is particularly true of shoes in extremely narrow widths.

Toilet articles, cosmetics and preparations of all kinds are available in adequate quantities. Dependents who will require special types of shampoo, and lotions should bring them as there is not much variety here.

Laundry, dry cleaning, and shoe repair and similar services are available. Services averages around ten days.

Miscellaneous

Facilities have been established for the maintenance and the repair of automobiles through European Command Exchange System garages. Tires and other spare parts of standard make are also available for sale through the Exchange System. It is suggested, however, that all vehicles being shipped to the European Command be placed in first-class running condition including the replacements of all worn tires and parts to guard against any local or critical shortages which may develop.

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. Certain standard U.S. manufactured vehicles are available through the European Command Exchange System. These vehicles, however, are not available in large quantities and are sold by the Exchange System in accordance with an established waiting list.

Servants

In both Germany and Austria, janitorial, gardener, and fireman service, required to maintain dependents' quarters adequately is provided by the local government. In Germany, one maid is usually provided also, to maintain each

set of quarters. Maintenance personnel mentioned above are furnished at no cost to the individual.

In the Occupied Zones, additional personal servants, such as nurses, chauffeurs, butlers, cooks, etc. . . . may be hired at a cost of about \$15 a month for each additional

servant, at the present time and no increase is expected.

In areas outside the Occupation 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.

Hawaii

The Hawaiian Area consists of the Hawaiian Islands—Oahu, Hawaii, Kauai, Maui, Molokai, Kahoolawe, Lanai and Niihau, and the following outlying islands—Kwajalein, Johnston and Christmas. The majority of the dependents live on the Island of Oahu, the most densely populated island in the area. Its largest city, Honolulu, has a population of approximately 275,000 and is a modern city comparable to those on the Continental United States.

Housing

Commensurate with rank or grade and size of family, a limited number of adequate quarters are available for eligible military personnel. Although efforts are made to assign quarters on the post at which the person is stationed, it is possible for personnel with dependents to be quartered twenty or twenty-five miles from their duty station.

An acute shortage of government family-type quarters necessitates a waiting list; consequently, overseas travel of military personnel with their dependents is not authorized except for certain individuals who have had extensive previous overseas service. Prior to departure from the Zone of Interior, arrangements to last from three to twelve months should be made by military personnel concerned for interim housing for dependents until overseas movement can be authorized.

Transportation

Precedence in furnishing transportation and housing is determined by the priority system established by the Department of the Army as explained earlier in this article.

Government transportation to the Hawaiian Area is not authorized unless housing, either government quarters on a military reservation or quarters in the civilian community, are available. Admittedly, this causes some inconvenience to the individuals, but it is a wise precaution as the housing situation in Hawaii, like everywhere else, is very critical. Likewise, no family should be transported to Hawaii by commercial means unless housing is assured.

Housing

Dependents are brought overseas in accordance with instructions published by the Department of the Army, which sets up priorities. Once overseas, assignment of quarters is made by seniority, for both military and civilian personnel. Concurrent movement of officers with families may be authorized, for Japan only in 1948, if the housing situation permits.

The repair, rehabilitation and redecoration of requi-

Furniture For Quarters

Government quarters are partially furnished. Electric refrigerators or iceboxes, and water heaters are furnished; gas or electric stoves and dining room furniture may be supplied. Dishes, pots and pans, cots and bedding may be furnished for temporary use pending the arrival of the individual's furniture. A few Engineer-made easy chairs and lamps are sometimes available, but it is desirable to ship personally owned household goods as the quarters contain only the barest necessities.

Medical Care

Adequate hospital installations and facilities are maintained to provide medical care for dependents. Staffs include personnel qualified in obstetrics, gynecology and pediatrics.

Schools

Some posts have their own schools, and territorial schools, which are fully accredited on the mainland, are located near all Army posts on Oahu. There are also numerous private or parochial schools located in or near Honolulu. Usually school buses are provided by the Army.

Miscellaneous

It is desirable to have an automobile on Oahu although civilian buses serve all the posts, cities and towns on the Island. Automobiles must be insured with a responsible company, registered on the Army post, and with the City Treasurer's Office. A driver's license for the Territory of Hawaii is required. The present automobile insurance policy should be rewritten to cover car in the Territory of Hawaii and damage in transit.

If movement of a private automobile is desired prior to movement of dependents, the Commanding General, USARPAC, APO 958, should be promptly informed in order to expedite establishment of priority and subsequent publication of travel authorizations.

Japan

sitioned housing for use of American military and civilian personnel are almost complete. This type of housing includes apartment-hotels with or without kitchens, some of the housing being classified as temporary. In apartment or hotel type housing where no kitchen facilities are provided, there are central messes.

The permanent type housing, other than former Japanese buildings, is all new construction. This program is nearing completion. In general, these buildings are limited to nine

types with single family dwellings and two- to four-unit apartment houses for officers and enlisted men and civilian employees. All housing units are low-cost frame structures that, due to limitations on materials and labor, are below the standards for such housing in the United States.

Families without children may draw new-type housing or requisitioned housing, but most of these families have been provided quarters in renovated, but adequate, hotel-apartments.

Upon arrival in Yokohama, temporary housing will be provided dependents assigned to the Tokyo-Yokohama area or provisions made for temporary stay in Special Services Hotels. Those going to other parts of Japan may leave by special trains immediately upon arrival. Since there no longer exists a serious shortage of housing in areas other than the Tokyo-Yokohama and Nagoya areas, there is no delay in housing for new arrivals but those coming to the Tokyo-Yokohama and the Nagoya (Air Force) areas may be required to wait from two to eight weeks for their permanent quarters.

The new two- to four-family unit apartment houses are two-story structures with kitchen and dining room on the first floor, bedrooms and bath upstairs. These houses have adequate closet space. Each unit is completely furnished with all essentials including refrigerators (some have ice-boxes), heat, dishes, rugs of a sort, curtains and kitchen-ware.

It is well to keep in mind that electrical current in Japan is 100-volt, 50-cycle. That in the U. S. is 110-120-volt and 60-cycle. Practically all electric devices that are purchased in the United States will operate on this lower cycle. Vacuum cleaners, radios, refrigerators, electric irons, heating pads and lamps will work, but not as efficiently as they normally operate on the currents for which they are designed. American manufactured electric clocks and phonographs with synchronous motors will not work here. It is advisable that these items not be brought unless they are known to operate on 100-volt 50-cycle current.

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

Food and Clothing

Commissaries are established and are stocked with a variety of foodstuffs. The meats, fowl, eggs and fish are, of course, cold storage. There is a limited amount of frozen foodstuffs.

Post Exchanges are set up in every community, with the large central Post Exchange and those operated in units available to dependents.

Medical Care

Pending receipt of further information, all dependents over one year of age, moving to Japan, will be required to have initial inoculations and vaccinations as listed below:

Smallpox, typhoid, paratyphoid, typhus and cholera.

Certificates of immunization and WD AGO Form No. 8-117 (Immunization Register), or authenticated certificate by a civilian physician must be presented at the Port of Embarkation prior to departure. Dependents should be notified to accomplish necessary immunization within prescribed time limits.

Certain additional immunization, particularly diphtheria, whooping cough and tetanus are advisable for children. Encephalitis (Japanese B) inoculation is not compulsory for dependents either prior to or after arrival in the theater. However, dependents arriving in Japan during the mosquito period, 1 July-15 September, may request and obtain encephalitis inoculation.

Dependents are advised to get the maximum amount of dental care before going to Japan, because of the critical shortage of Dental Corps officers.

Food

Food will be available and will be procured only through Army sources. Powdered and evaporated milk, and other milk substitutes are provided in the ration scale. Baby food is now available in the commissaries. There are sufficient food supplies to provide an adequate diet for both children and adults. Occasionally frozen milk is shipped to Japan for sale in commissaries.

Water for drinking and cooking purposes must be chlorinated or boiled before using. This is generally handled centrally and is no longer a household task in many localities in Japan. Measures for protection from insects and rodents are provided, and rodent control teams operate in many areas.

The Theater continues to maintain adequate hospital facilities to provide care for dependents. In addition, dispensaries have been established in the large communities. Outpatient, optical repair and dental services are provided. Dental care is limited as described above.

Clothing and Other Supplies

Japan is going through a state of inflation. The prices of many articles purchased from Japanese shops are ten to twenty times the prices that existed immediately at the end of the war. The military rate of exchange in Japan is 50 yen to one American dollar. Many of the articles for sale are of low quality and of little artistic value and the prices are exorbitant. Shopkeepers, anticipating a revival of the tourist trade, are storing first-class merchandise such as woodprints, cloisonne, arts and jewelry and other sought-for souvenirs to be sold to the hoped-for tourist dollar trade. Perfumes, soaps and other toilet articles are available in the Post Exchange and are unobtainable from Japanese sources.

Since the climate in the areas where most people will live runs from the summer weather prevalent in the central section of the United States to the type of winter which prevails in the central section of the Northern Pacific Coastal region, a variety of weights of clothing will be needed. During about five months of the year, heavy overcoats, children's ski suits, etc., will be comfortable.

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

The big department-store-type Post Exchanges in Tokyo, Yokohama and Osaka, and other large central exchanges in

Kyoto, Kobe, etc., stock a variety of women's clothing, including latest styles in coats, suits, shoes, skirts, etc. Lingerie is also available in these exchanges. Occasionally, pearls and other jewelry on a first-come-first-served basis are put on sale. To accommodate dependents stationed in out-of-the-way areas, a Post Exchange train with a complete line of merchandise makes periodic tours of Japan.

Men's civilian clothing is also available in the Post Exchanges in the large cities but only for civilians. These items range from shoes to felt hats.

Sporting goods, and some household equipment, such as utensils are obtainable in the PX's in Japan. A limited number of electric (table type) sewing machines are offered for sale on a lottery basis. It is advisable to bring a sewing machine, either pedal or electric type, since material (silk, rayon, crepe) is made available by the PX quite frequently, and, therefore, there is much opportunity to make dresses, curtains, etc.

Automobiles

The highways in Japan are generally poor. However, short trips to nearby ocean and mountain areas can be made from the larger cities. Most streets in the cities are narrow, rough and present a problem to civilian type vehicles.

Nevertheless, dependents are permitted and are advised to bring private vehicles. The once critical problem of maintenance has been partially alleviated by the establishment of Post Exchange garages in various areas. Japanese repair shops, some highly equipped and staffed with competent mechanics, are springing up around areas where American families are located. However, many of these native shops are not of high caliber, and all of them perform limited maintenance only, since they do not have spare parts.

There has been no sale of surplus jeeps for quite some time and none is contemplated in the near future. It is possible to purchase a jeep from a person who is returning to the United States who would like to dispose of his vehicle in Japan.

The general outlook for the accommodation of dependents in Korea is not encouraging at the moment, nor is there any indication that the picture will brighten in the immediate future. Life in this area is not easy and there are many inconveniences which must be expected in a liberated country beset by turmoil. In addition it must be understood that there is always the element of danger due to the present international situation.

Housing

Dependents are brought to Korea in accordance with a priority list which is set up on a basis of the point system explained at the beginning of this article. Officers and enlisted men of the first three grades may apply for movement of their families immediately upon their own arrival in Korea but until adequate housing is available these families are not permitted to leave the United States.

The sale of new cars is conducted on a priority basis by the Eighth Army Exchange. These cars, Fords and Chevrolets, and occasionally Jeep Station-wagons, are not imported in large enough numbers to meet current demands in Japan. Opportunity to obtain one of these cars is based on the length of time the application has been in.

Schools

Education is provided almost entirely from appropriated funds for grades one through twelve. Kindergarten and pre-kindergarten are supported by tuition fees, since no funds are appropriated for these groups.

There are schools everywhere in Japan for grades one through six, and in most cases education facilities are provided through the eighth grade. High schools with high educational standards are established in localities where there are large concentrations of American personnel—Tokyo, Yokohama, Kobe, Osaka, etc. However, no high schools are available in remote or isolated areas. For this latter group, correspondence courses, augmented by foreign national and Japanese tutors, have become very popular.

The curriculum in the high schools is confined to college preparatory work designed to meet standards comparable to those in Class "A" high schools in the United States. Four times annually, at the American School in Tokyo, College Entrance Board examinations are given. The high schools have already graduated one class, and several of its members are now attending universities in the United States, including Harvard and U.C.L.A.

Competent, accredited instructors paid from appropriated and non-appropriated funds are provided for all grades. There are now approximately 4000 occupation children attending schools throughout Japan.

There are no provisions for college education here, since the Japanese universities and colleges are not suitable for the education of American undergraduates.

Some parochial schools in the lower grades have reopened, and are accepting occupation children. These schools are approved.

Korea

At present nearly 700 applications for dependents are on file, considerably more than the number of quarters available. Consequently it takes many months for dependents to arrive in this area.

Housing available for dependents in Korea is of several types, each complete with heat and sanitary facilities. Built by the Army "from the ground up" are standard AFPAC type dwellings of wood and stucco. These units accommodate one, two and four families and are one-story and two-story. Many dependents live in Japanese-type dwellings, converted to conform, to a certain degree, to Western standards. Rice straw floor mats and removable sliding doors and windows retain the Oriental atmosphere. Several large brick houses formerly used by Occidentals are now being utilized for dependent families.

Through the Quartermaster Corps, a satisfactory amount of essential furniture is supplied dependents, most of it

produced in Japanese factories specifically for occupation forces of the Far East Command. Linens, bedding, table ware and china are part of the regular issue. Dependents are advised to bring with them to Korea only items necessary to their personal comfort.

Due to the acute shortage of electric power, caused by overloaded circuits which necessitates conservation, electric stoves are prohibited and the use of electrical appliances kept at a minimum. Wood-burning and coal-burning stoves are now being installed to replace electric stoves previously supplied by the Army.

Heat, light and water shortages occur at times due to inadequate facilities, particularly those of Japanese and Korean design. Lack of proper materials and skilled labor in Korea aggravate these conditions.

Servants for dependents are obtained through a Korean employment office supervised by Military Government. Korean servants are immunized and given physical examinations as precautionary measures. They frequently live in the place where they work, eating their own food which is received through a Korea-wide ration distribution. Most servants are untrained in western methods and standards of living.

Food

Army commissaries are maintained for dependents in nine cities in South Korea. Purchase of food on Korean markets is prohibited to reserve all native food for the Korean people. The nine commissaries are comparable to modern, Stateside cash-and-carry stores, carrying complete stocks of staples, frozen meats, poultry, fresh frozen vegetables, ample baby foods and all dairy products except milk. Dependents stationed in outlying districts in numbers not large enough to warrant a commissary do their marketing once a week at the nearest commissary, on a community basis. Refrigeration is provided either by regular ice deliveries or through the issue of electric refrigerators.

Schools

Because of the language barrier, no Korean schools are suitable for the education of American children. Neither are missionary schools available, due to deteriorated equipment and lack of teachers, who were removed from Korea by the Japanese during the war.

Eleven schools for American children have been set up by the Army in South Korea's nine provinces. Unusually high educational standards are maintained in each by a well-trained and experienced teaching staff. Schooling for dependent children begins with kindergarten and ends with the completion of a four-year high school course. No college courses for dependents are available in Korea.

Transportation is provided to and from each of the schools and at two schools hot lunches are served at noon. Since a fund drive last summer netted ample non-appropriated funds, no tuition is charged at any of the American schools in Korea and in addition, textbooks and other necessary materials are supplied free of charge. Lunches are the only cost. Each of the schools is located near a medical installation in the interest of the children's health.

Athletic equipment has recently arrived from the United States, purchased with funds collected during the cam-

paign last summer, and athletic activities for boys and girls will soon become part of the curricula.

Army Exchange Service

Services offered through the Army Exchange Service in Korea include a Main Post Exchange in Seoul that compares favorably with small department stores in the States, small Post Exchanges in other cities, and a Post Exchange Train which makes periodic trips to outlying sections.

Seoul's Main Post Exchange stocks virtually all essential items in the line of tobacco, candy, drugs, cosmetics, housewares, hardware, clothing and shoes for men, women and children. Also included are an ever-increasing number of souvenir items from Japan and China, such as silks, brocades, pearls, jewelry, kimonos and other wearing apparel. From time to time Korean-made souvenir items also are available. Tobacco, candy and soap are rationed to insure equitable distribution.

Also available to dependents through the Army Exchange Service are shoe and watch repair services, tailoring shops and beauty parlors. Laundry and dry cleaning facilities are offered by the Quartermaster Corps.

Medical Care

Excellent medical care is offered dependents in Korea through Army facilities. These include the 12th Medical General Dispensary, the 377th Station Hospital and the 34th General Hospital in Seoul itself, in addition to five station hospitals and numerous dispensaries located in other sections of Korea. A small dispensary is maintained by the Seventh Infantry Division in Seoul, located near the Seoul American School, for dependents and children.

The 12th Medical General Dispensary, which houses a dental clinic, offers complete outpatient medical service, including laboratory and X-Ray. Here immunizations are given at stated intervals against smallpox, typhoid, tetanus, influenza, cholera, typhus, and encephalitis.

Obstetrical service is available at the 34th General Hospital in Seoul and at the five station hospitals outside the Seoul area.

Miscellaneous

Unlike Japan, Korea offers nothing in the way of resort hotels or ocean or mountain resorts, and to compensate, heads of families are allowed to take their families to Japan. The lack of adequate roads and limited maintenance facilities in Korea question the advisability of bringing Stateside autos to this area, although they are not prohibited. It is essential that private autos shipped to Korea be in first-class running condition, accompanied by those extra spare parts which deteriorate most rapidly.

Service stations for privately-owned autos and jeeps are maintained in all areas, although gasoline is rationed at 15 gallons per week. This amount is reduced occasionally when stocks from the States are delayed. At intervals, as available, jeeps and autos are placed on sale for military and civilian personnel by the Army Exchange Service, on a priority basis.

Dependents desiring employment after coming to Korea will find many opportunities open to them, according to the USAFIK Office of Civilian Personnel. These openings

are for qualified telephone switchboard operators, clerks, typists, and stenographers, as well as in Army libraries operated through the Special Services Section. Full and part-time employment is offered by the Army Exchange Service. Teachers will find their services welcomed at schools maintained by the Army and in the Department of Education, United States Military Government in Korea.

For recreation, Korea offers as fine a hunting area as can be found almost anywhere. Duck, geese, pheasant, dove, brant, deer, and boar are abundant. The countryside is quite rugged and picturesque. Other forms of entertainment consist of movies, clubs, sports (other than golf) and swimming at a few beaches, although beaches are not located so as to be in close proximity to all troop units.

Marianas Bonins Command

Housing

Married personnel assigned to Guam are advised that there is an acute housing shortage. Although the interim housing construction program has been completed, there are still eight hundred fifty-eight applications for dependent travel and quarters on file over and above the number of houses completed and occupied. A total of one hundred seventy-four permanent type N.C.O. family type quarters are now under construction with completion date estimated as September 1948.

Based on present rate of construction, availability of funds, material, and skilled labor, it has been determined that incoming personnel face the possibility of serving at least twenty months on Guam before the arrival of dependents.

In general, the houses completed and those under construction are of several types: converted quonsets, prefabricated or wood constructed, and permanent type houses. In addition to articles authorized by Table of Allowance No. 21, each house is furnished with a refrigerator, an electric range, and an electric hot water heater. However, it would be advisable to bring items such as washing machine, kitchen utensils, easy chairs, divans, double beds, and any other furniture not authorized in Table of Allowance No. 21, if complete comfort is desired.

The water supply on Guam is limited but adequate. New wells with permanent type equipment are being installed and will be in operation in the near future.

Medical Care

The climate in the Marianas Islands is conducive to good health. An efficient, well-staffed station hospital is located

on Guam which adequately cares for all dependents. In cases of extreme emergency, patients are returned to the United States by military aircraft.

Miscellaneous

Fresh fruits, vegetables, meats, and other perishables in addition to canned and packaged foods and supplies, are provided for dependents through Army and Navy commissaries. The Post Exchanges carry a wide variety of items, including house dresses, linens, children's wear, and a limited amount of household appliances. Women are advised to bring washable formal evening wear and dress shoes since most of the clothing on hand is for everyday wear.

Domestic help is limited. Some Filipino contract laborers can be hired as houseboys and gardeners.

The Quartermaster Laundry accepts a limited amount of laundry. There are no dry cleaning facilities provided in the Army Ground Force or Department of the Air Force areas.

Automobiles

Guam has an excellent and well-maintained road network. Officers and enlisted men of the first three grades are advised to bring automobiles or other privately owned conveyance since transportation on Guam is limited. Delivery of the automobile to the Port will be at owner's expense. Necessary transportation arrangements may be made with Port authorities.

Schools

Grammar and high schools are available. There are no facilities for advanced schooling beyond the twelfth grade.

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. At the time of this writing, 24 February 1948, 209 NCO's and 156 Officers were on the waiting list for military family quarters.

Private quarters are available in limited quantities in the Republic of Panama many of which are unfurnished, at rentals of from \$75.00 to \$300.00 per month. Few quarters in the Republic of Panama are provided with hot water. Medical inspection by the Army is required prior to occu-

pancy. Arrangements for these quarters must be made by the individual concerned subsequent to arrival in 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. Each 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 Colon Hospital is located at Colon on the Atlantic Side.

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 but 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 Junior College is a member of the American Association of Junior Colleges.

| | |
|-----------------------|-------------------------------------|
| The Elementary School | Kindergarten to 6th grade inclusive |
| Junior High | 7th and 8th grades |
| Senior | 9th and 12th grades inclusive |
| Junior College | 13th and 14th grades |

(Extension division classes are offered on both sides of the Isthmus at night and are open to members of the armed forces and their dependents for a nominal fee.)

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 Quartermaster operates two large commissaries, one at Fort Gulick for personnel stationed on the 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 in some cases less than the prices in Panama Canal Commissaries. There are no charge ac-

counts and cards must be obtained before purchase can be made by dependents.

The Panama Railroad operates a number of excellent commissaries similar to the so-called General Stores. They carry a complete stock of staple groceries, fresh meats, poultry and dairy products, fruits, and vegetables, some clothing, and a considerable portion of the more essential household items, sporting goods, a limited stock of imported china, a fair stock of proprietary drugs, cosmetics, and tobaccos. The prices are very reasonable and in general are below prevailing prices in the United States. Fresh and frozen milk is obtained through these commissaries. The available supply of fresh milk is limited and is controlled by medical officers' prescriptions. Officers above the grade of Captain are authorized charge accounts. Captains and below must pay cash.

Electrical appliances procured or brought along should be able to be operated on 25-cycle 110V as well as 60-cycle 110V electrical current as a considerable portion of the Canal Zone residences are furnished with 25-cycle current.

Army sub-commissaries are located on most of the Posts where basic items may be obtained to supplement purchases from the large commissaries at Fort Gulick and the Post of Corozal.

Some fresh vegetables may be obtained from the Chinese gardens in the Canal Zone. The gardens are under the supervision of the Health Department of the Panama Canal. Native fruits are obtainable from native markets and roadside stands and although native markets are available in Panama City and Colon, they are not generally patronized by residents of the Canal Zone.

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

Several of the Post Exchanges carry stocks of clothing for dependents and the Quartermaster operates a sales store at Fort Clayton for the Pacific Side and at Fort Davis for the Atlantic Side at which issue clothing can be obtained. All posts have tailor shops which are capable of making uniforms. Native dressmakers are generally satisfactory and their charge for making dependents' clothing is usually quite reasonable.

Gasoline may be purchased through the Post Exchange garages and the Panama Canal Service Stations at prices far below States prices.

The Philippines

Housing

There is a vast difference between housing for dependents in conquered and liberated countries. In conquered territories, the best housing available at suitable locations may be requisitioned for the use of dependents, while in liberated countries requisitioning of private homes must be avoided whenever possible except in cases of extreme emergency in the initial stages of liberation. Thus, home life in the Philippines for dependents cannot be luxurious at the present time, for practically all requisitioned homes already have been returned to the owners because of the

critical need for housing which exists locally, and the small remainder will be vacated by 1 July 1948. Therefore, all housing available for dependents in the Philippines must be of temporary construction for interim use while awaiting the building of more permanent structures at old bases or newly negotiated permanent bases.

Dependent housing now under construction conforms to a standard design but varies locally in structural arrangement. All are of a bungalow type of prefabricated wood. Some are individual home units while others are of the nature of a duplex, being divided in the middle for the ac-

accommodation of two families. All are similar in that they contain a living room, bathroom and kitchen, but the number of bedrooms vary according to the sizes of the families. Old-timers may recognize some similarity between this type of housing and that made available at non-permanent United States stations following World War I. Roofs are of corrugated tin and the floors are of boards of various widths of plywood. Some of the houses have siding of native sawali, or plywood while others are so constructed as to use no siding at all other than screening, with corrugated iron flanges attached at an angle to provide some protection from the sun, but mostly to prevent entry of driving tropical rains. Sawali and ply board are also used for interior siding in some cases, although much of the housing has no such finish, consisting only of open studding. Sawali is a closely woven matting of bamboo strips used principally for interior partitions and ceilings although, as mentioned before, it is occasionally used as outside siding. It is more suitable than regular wallboard in this type of construction because it is lighter and offers better ventilation. In short, much of the housing is open framework closed in by screening, either plastic filled or open mesh. All doors and windows are screened and are reasonably waterproof except in the case of unusually severe storms.

Considerable effort has been made by the Army to supply the minimum furnishings. The availability of local materials, such as rattan, has solved the living room problem satisfactorily, but kitchens and bedrooms have not fared so well. Yet all houses are furnished so as to contribute a reasonable degree of satisfactory living if one but keeps in mind that the whole situation is of an interim and temporary nature. Health and protection from the elements is cared for adequately. The exercise of a little effort and ingenuity in the use of gay chintz drapes, cushion covers, arrangement of furniture, bric-a-brac, etc., helps to relieve the severity and crudity of this type of housing and makes them really quite attractive and livable. Though the houses and furnishings are monotonously alike, there are as many differently attractive homes as there are residents.

While dependents find it necessary to use local rattan beds or army cots, unless they have provided and brought their own beds, the lack of kitchen equipment has been the critical and most troublesome. This problem is now solved for the most part or nearing solution in the foreseeable future. A sufficient number of refrigerators to supply all needs are on hand or will have been received by the time this is published. Hot water heaters are in plentiful supply and are in the process of being installed in all homes. Electric stoves or ranges are still in short supply, and many will find it necessary to get along on inadequate makeshift cooking arrangements until July at least, so far as can be determined at this time. During this waiting period, the normal cooking equipment consists of a two-burner Coleman gasoline stove supplemented by a standard field range or a hot plate.

Food

Foodstuffs may be purchased in the commissary and, while rationed to conform generally in amount to that issued troops, the supply is adequate. Fresh fruits and vegetables and meats constitute a considerable problem and are at times in short supply, especially as to varieties and

kinds. However, there is a plentiful supply of canned fruits and vegetables and these can be further supplemented by purchases from outside sources of Stateside vegetables and fruits at a somewhat higher cost. To sum up the food situation, most dependent families have no cause to worry at any time about the availability of an adequate and healthful diet of an appetizing variety of food items. The commissary also keeps in stock a good supply of special baby foods.

To relieve the prospective dependents of some of the worries and concern as to what articles to bring and which to leave behind while planning to come to the Philippines, the following suggestions developed by dependents already on the ground are offered:

Electrical household appliances

These items are rationed and remain in critical short supply. While Manila merchants stock many of these items at the present time, such appliances are not suitable on Army posts since they are built to use a different voltage. The dependent is likely to be pleased at having brought an electric iron and a two-plate electric stove fitted for 110-volt power. It is well to bring along a few extra 110-volt elements in case the originals burn out, for they are virtually impossible to obtain in Manila, which uses 220 voltage power.

Rugs and Furniture

These items, except for very small pieces, should not be brought along since the present temporary construction of quarters does not offer sufficient protection and the climate causes rapid deterioration. All glued, veneered, and laminated furniture should be stored at home. Native type rugs and floor mats and such furniture as is supplied here is entirely adequate though not too luxurious.

Linens

A moderate supply of linen is issued by the Army, but it is inadequate except for the smallest family. It is advisable for comfort and convenience to bring extra pieces. While towelling can be purchased in post exchanges, any on hand will prove useful.

Raincoats

Many dependents do not realize the severity and duration of the rainy season in the Philippines, nor are they aware of the type of rainfall. During the rainy season, it may rain daily and several times daily in short bursts of tropical downpour. Durable raincoats are an essential item, and most prefer the plastic type rather than cloth. These are completely waterproof while cloth coats usually absorb some of the moisture and may mildew if careful attention is not given to drying them out daily.

Yard Goods

Markets in the Manila area are well stocked with cotton and fine dress goods, most of which are reasonably priced.

Shoes

Shoes are scarce especially in small sizes. Choices of styles are not too wide and prices are high.

Automobiles

An automobile is a great convenience because of the shortage of government transportation and the irregularity of schedules of public transportation. The roads are rough and dusty for the most part, and some are in a bad state of repair, so the maintenance of automobiles proves to be a somewhat worrisome problem. PX service stations in limited numbers have been established in the Manila area and others will be established, but the maintenance problem is not as yet fully solved. There are plenty of private garages and shops, but the prices of replacement parts are high, and often the quality of repair workmanship is questionable.

General

The tried and true advice of the seasoned traveller and camper, "Pack only the barest essentials and then remove half of that," is applicable to planning for life as a dependent in the Philippines. With the exceptions noted above most of luxury and necessity items and odd pieces of bric-a-brac can be obtained either on Army posts or from merchants in the Manila area. Other possessions that a family may have which it does not wish to dispose of by sale upon departure should be stored Stateside. Secure waterproof dry storage is not available here. Dry locker space provided for in most quarters is inadequate for the storage and maintenance of more than the clothing which will be in daily use in this climate.

The assignment of quarters to an officer, enlisted man, or civil service employee is not determined by his branch of service or employment. An attempt is made to assign living quarters in the most convenient location, although at times the mere availability of vacant housing is the determining factor. As yet insufficient numbers of temporary

housing sets have been built to accommodate all applicants for dependent housing. Construction is continuing, but completion scarcely keeps pace with demand, and in many cases the carpenter hardly has time to gather his tools and depart before the dependent family moves in.

To help dependents in the initial stages of preparation for the journey and to prepare them to some extent for what may be expected, PHILRYCOM mails a booklet entitled "Traveling Aid" to their Stateside addresses. This book covers all the details relative to transportation, passports, orders, packing and crating, personal baggage, medical requirements, legal advice and arrangements, and a few facts about local living conditions, etc. Upon arrival, the dependents are issued another booklet entitled "You're in Manila Now," which goes into more detail on the local situation. The best source of information, however, is those early arrivals who have by now become seasoned veteran dependents.

It should be remembered that conditions in the Philippines have changed greatly from prewar days in that destruction and damage have greatly altered both the outward appearance and economic conditions. Old-timers may be somewhat surprised and shocked at these changes, particularly in Manila. Life for dependents is not as easy and well-ordered as before, and inconveniences must be expected. The best mental approach towards a happy and contented life as a dependent in the Philippines is to fully recognize that housing conditions here are not of the best by stateside standards, that it is constructed on a temporary basis until permanent housing can be provided at newly negotiated permanent bases, and that it is really safe and comfortable and quite appropriate to the climate. When permanent quarters are built, and only then, dependent housing such as was provided in prewar days will become a reality.



Largest Ram Jet Flies At Supersonic Speed

The largest supersonic ram jet engine ever flown attained a speed far into the supersonic range in its first test flight recently at the Naval Ordnance Test Station, Inyokern, California, according to Rear Admiral A. G. Noble, U.S.N., Chief of the Bureau of Ordnance.

Pound for pound of engine weight, this large ram jet, popularly known as the "flying stovepipe," delivered about 25 times the power available from the best aircraft reciprocating engines. By comparison, the power developed by this simple engine was considerably in excess of the combined horsepower of the largest four-engine planes.

The ram jet was developed by the Applied Physics Laboratory of Johns Hopkins University, Silver Spring, Maryland, and a group of associated universities and industrial organizations, as the propulsion unit for a guided missile program sponsored by the Navy Bureau of Ordnance.

The success in this first trial of a large model was largely due to the application of knowledge gained in the earlier

flights of a small ram jet, and from an extended series of laboratory tests in the Navy's newly developed testing facility at Daingerfield, Texas.

In the summer of 1945 when it became evident that the ram jet principle could be made to work, plans were made for the establishment of a laboratory in which flight conditions could be simulated. To obtain the large air supply necessary for intensive combustion tests, a portion of an idle blast furnace at Daingerfield, Texas, was leased by the Navy and converted into a burner laboratory. This laboratory is operated for the Navy by the Consolidated-Vultee Aircraft Corporation under the supervision of the Applied Physics Laboratory.

At the Daingerfield laboratory flight conditions are closely matched by placing a model in front of a supersonic stream of air to simulate the air intake. Knowledge gained from these tests made it possible to design a model which operated successfully on the first trial flight.

Operation Cloudburst*

By Lieutenant Colonel E. A. Salet, Infantry

Colonel Salet presents, in this imaginary account of a military operation of the future, some of the many problems which future commanders may encounter in warfare involving vast distances, air transportation of armies, long-range missions, and fighting in Polar regions.—THE EDITORS, Military Review.

The following account of Operation Cloudburst is based on notes from the personal diary of Lieutenant General Jet Turbo, Commanding General, III Corps (Airtransported). The diary was first published in 1962, on the second anniversary of this memorable operation. That portion of the operation executed by III Corps (Airtransported) is emphasized in this particular account.

PREFACE BY AUTHOR

The years 1959-1960 will always be remembered by Americans as marking one of the greatest crises in our history as a nation. It was during this period that the Labonnite hordes overran the whole of Europe and Eurasia, secured the Mediterranean Coast of North Africa, and strangled the British Isles in the process.

Coincident with the downfall of our European friends, the Labonnites succeeded, during September of 1960, in establishing a base in the state of Alaska in the immediate vicinity of Fairbanks.

With one foot in the door, the Labonnites, being predominantly a land power, worked feverishly during the next month to develop their Alaskan base in preparation for an all-out land and air campaign against Canada and the United States.

During the month of October 1960, the ominous rumble of guided missiles came out of the north. These attacks, the first of a planned "softening up" process, fell over the cities of Detroit, Pontiac, Chicago, Cleveland, Buffalo, and New York. These initial attacks, while creating consternation among the populace in the target areas, inflicted negligible damage on the industrial heart of America. This was due primarily to the inability of the Labonnite missiliers to pinpoint their targets.

To retrace our steps for a moment, we find that the United States had not been idle during the rush of the Labonnite tidal wave over Europe in 1959. The Labonnites, banking on our usual lethargy in matters of this kind, were not prepared for the violent reaction their overt acts caused in this country. In November of 1959, the Congress declared a total mobilization of our industrial and manpower might. The First Airborne Army, born

and nurtured through our farsighted universal military training program, was mobilized, and by the Spring of 1960 was ready for sustained operations. This force was composed of two corps of four divisions each. The II Corps (Abn) was composed of four airborne divisions; the 81st, 82d, 83d and 84th. The III Corps (Airtransported) was composed of four infantry divisions trained in airlanded and arctic operations; the 1st, 2d, 3d and 4th Infantry Divisions. As of 1 March 1960, all units of the First Airborne Army were located as follows: II Corps (Abn) in Minnesota and Michigan; III Corps (Airtransported) in Montana and North Dakota. Both Corps had just completed extensive winter maneuvers under conditions of extreme cold.

From the foregoing brief account, it is evident that immediate and decisive action was required on the part of the United States if the Labonnite lodgement area in the state of Alaska, and the guided missile sites therein, were to be eliminated before the Labonnites were so firmly entrenched that Canada and the industrial heart of the United States were placed in acute jeopardy.

How this was accomplished is well illustrated in the following pertinent excerpts from General Turbo's diary.

15 September 1960. Have just returned to my headquarters from a lengthy conference in Washington. The conference was conducted by the Secretary of Defense, the Honorable A. N. Nairmy. Those attending were General Doughy, Army Chief of Staff; General Fuslage, Chief of Staff, Air Forces; the Honorable J. W. Armour, Secretary of the Army; the Honorable D. S. Cruisy, Secretary of the Navy; the Honorable L. M. Propulsor, Secretary of Air; General Wingie, Commanding General, Air Defense Command; General Boeing, Commanding General, First Airborne Army; General Glichute, Commanding General, II Corps (Abn); General Carrgo, Commanding General, VI Air Force (Troop Carrier); General Airllon, Commanding General, Strategic Air Command; General Getto, Commanding General, 1st Tactical Air Force; and their principal staff officers.

Admiral Holmes, Director, Central Intelligence Group, reviewed the present world-wide situation and pointed out that with open revolts spreading throughout Europe and Eurasia the Labonnites were being forced to keep fifty per cent of their combat strength tied up in occupation duty alone; and that another twenty-five per cent were dispersed along vulnerable coast-line areas against a possible amphibious threat by the United States. As yet the Labonnites have not moved against China and India. They are evidently finding that their logistical problems are becoming increasingly complicated. Mr. Nairmy informed the conference

*Reprinted from February, 1948 *Military Review*.

that the First Airborne Army would be employed against the Labonnites in their Alaskan lodgement area. General Boeing was instructed to prepare plans and submit recommendations by 15 October for the employment of his command to cover the following:

1. Seize by airborne assault an airhead in the present Labonnite lodgement area.
2. Destroy the guided missile sites therein and cover the airlanding of the remainder of the First Airborne Army.
3. Upon airlanding of the remainder of his command, assume the offensive and destroy the Labonnite forces in the Fairbanks area.
4. Be prepared to maintain his command completely by air. General Doughy assured General Boeing that sufficient service troops to furnish necessary logistical support would be attached to the First Airborne Army no later than D-30.

17 September 1960. Upon instructions from General Boeing, have moved my planning staff to Minnesota where a joint planning group has been established. This appears to be a good plan and will resolve many problems of liaison and coordination. VI Air Force (Troop Carrier), Strategic Air Command and 1st Tactical Air Force (which will support First Airborne Army) are also represented in the planning group.

18 September 1960. Detroit received another guided missile attack today. Considerable damage was done to the business district. The Labonnites undoubtedly are "gunning" for the Ford Rouge River works but have been unsuccessful to date. Our antiaircraft "homing" projectiles have brought down a number of the guided missiles, but too many are getting through. The Navy reported the sinking of one of the Labonnites' super submarines off the coast of New England. The submarine was caught on the surface in the act of launching a guided missile attack on New York.

20 September 1960. Buffalo received a particularly heavy guided missile attack this morning. Several direct hits were registered on the Bethlehem Steel plant causing considerable damage; especially to the blast furnace rooms.

Talked to Airrlon (Strategic Air Command) regarding strikes by our "heavies" on the Labonnite guided missile installations. As yet no apparent damage has been done. Evidently they are too well camouflaged for accurate identification, or else they have been rendered completely bombproof. However, our air strikes have been causing the enemy considerable difficulty in maintaining his supply routes (air, rivers and land) from the north.

25 September 1960. Received a thorough briefing on weather conditions in the objective area during conference at Headquarters First Airborne Army today. In this particular operation, weather will be our greatest enemy. The problem of visibility in the Arctic is extremely complex. The air is very transparent, and the records are replete with accounts of the extremes of visibility. Limitations to visibility in Arctic regions are primarily fogs, blowing snow, and local smoke. Local smoke is serious only in the vicinity of the larger towns. Blowing snow constitutes quite a hazard to flying at certain times of the year, and coupled with high winds, all traffic becomes impossible. An analysis of winter conditions in our objective area for the period 1954-59 in-

dicates that when the temperature falls to -45° F or lower, the visibility will be very poor. When the temperature rises above the freezing point in winter, the visibility will be very good. In analyzing fog conditions in the objective area, the spring and summer months offer the least number of foggy days, but of course, ground conditions are such during this period that land operations would be extremely difficult due to the "boggy" condition of the earth. A complete analysis of weather conditions for each month indicates that the winter months offer the best combination of temperature, visibility, least precipitation, and snowfall. Of the winter months, November and December appear to be the best months for us to initiate our operations. With ground conditions extremely poor during the summer, the enemy has had to depend primarily upon airtransport and river traffic for maintenance of his base. Our definite air superiority has made this very costly for him. Therefore, we must strike as early as possible during the winter months before the enemy can increase his build-up by his overland routes.

28 September 1960. New York City and Washington both received heavy guided missile attacks last night. The water-front section of New York received several direct hits, while in Washington the Senate Office Building was almost completely destroyed. Fortunately the building was almost empty at the time or we would have suffered severe losses among our legislators.

29 September 1960. Our Strategic Air Command laid on their heaviest raid to date in the Labonnite lodgement area. Heavy flak was encountered, but results were good. For the first time our own mobile guided missile batteries on the Canadian border went into action in a counterbattery action against the enemy installations. Photographs taken from our robot piloted, radio controlled reconnaissance plane revealed no direct hits on the Labonnite installations, but when our missiliers get "ranged in" we can expect better results.

4 October 1960. No guided missile attacks for three days. Our bomber strikes have definitely slowed down the enemy in this respect. He is also definitely short in long-range fighter aircraft, as witness the total lack of heavy bomber attacks against us to date.

10 October 1960. General Boeing outlined the First Airborne Army plan today to Glichute (CG II Corps Abn) and myself. Generals Cargo, Airrlon, and Getto were also present. The plan in brief is as follows:

1. To have II Corps (Abn) landing by parachute, beginning at H-hour, D-day, destroy the guided missile sites now in operation, seize the four airfields in the Labonnite lodgement area, establish an airhead and protect the airlanding of III Corps (Airtransported).
2. To have III Corps (Airtransported) upon arrival in the airhead, advance rapidly and destroy the Labonnite lines of communications from the north and liquidate the remainder of the enemy forces now in that portion of the state of Alaska.
3. To have all units of First Airborne Army transported by VI Air Force (Troop Carrier) and all close air support furnished by First Tactical Air Force.
4. To have the force in the objective area by D+6.

5. To have D-day tentatively set for 16 November.
6. The code name of the operation will be *Cloudburst*.

G-2, First Airborne Army, briefed us on the enemy situation within the airhead essentially as follows:

1. Enemy ground forces in the Alaskan lodgement area comprise four infantry (Arctic) divisions, each at a strength of approximately 15,000 men. These divisions are reinforced by antiaircraft artillery units, air force units, and miscellaneous service units.

2. There are at least two guided missile installations in the vicinity of Fairbanks operating now, with completion of two more sites possible by December. There are also at least two mobile units in operation. (This probably accounts for our inability to silence these attacks by our bomber raids.)

3. Enemy air in the lodgement area cannot prevent a large-scale airborne effort on our part. Labonnite fighter aircraft are definitely inferior to ours both in range and design. At present the enemy has an estimated two groups of 200 fighters each in the Fairbanks area.

4. There is no indication that the Labonnites will not continue to observe the United Nations agreement, reached in 1952, outlawing the use of atomic bombs, other radioactive materials, and biological warfare.

5. With their present troop commitments throughout Europe, Eurasia, and North Africa, and attendant logistical difficulties, added to the fact that the Arctic area will not sustain ground movement until winter, the Labonnites cannot increase their build-up of troops in the lodgement area sufficiently for an all-out land offensive against Canada and the United States any earlier than February of 1961.

It has been concluded that the Cloudburst force would have adequate security against enemy ground forces; and that once established in the area, the enemy lines of communications, both land and air, can be completely severed. General Carrigo pointed out that unless the enemy flak was neutralized the effect might be disastrous to our aircraft. General Airrion said that enemy flak could be reduced by two-thirds by D-day. He also assured us of overwhelming fighter protection. General Carrigo also warned against air congestion in the objective area. To avoid this, flights will have to be carefully spaced, and effective ground control established. The plan also envisages construction of five additional landing grounds by four battalions of aviation engineers (airborne). The completion of these fields within five days (as envisaged) will depend on the amount of damage done to the four existing fields now in the area. General Boeing pointed out that the plan was logistically feasible, but that several conditions must be accepted, namely:

1. That no alternate lines of communication to the objective area will be available. Since the Labonnites have succeeded in cutting the one railroad into Anchorage and since the Alcan Highway into Fairbanks is completely unreliable being blocked by snow and landslides much of the time, we will have to depend on aerial resupply alone for the support of the Cloudburst force.

2. We will be relying on an administrative organization as yet untried on such a scale.

After discussing other aspects of the operation the conference was adjourned until tomorrow.

11 October 1960. Conference continued at Army Headquarters. Commanding General, VI Air Force (Troop Carrier) announced that the C-199 would be used exclusively for transport of both parachute and airdropped echelons, and for all aerial resupply missions. This aircraft is capable of flying a 50,000-pound payload a distance of 6,000 miles. I questioned the ability of destination fields to handle aircraft of this size, but was assured that all four fields in the objective area were capable of handling the C-199. New principles of jet-retardation and track landing gear construction have made it possible to land an aircraft of this size on almost any type of field. The CG-116 Glider has been designed to fulfill all glider requirements. The operation will be mounted from departure fields in Montana, North Dakota, Minnesota, and Michigan. Considerable dispersion is necessary. A guided missile attack against "All our eggs in one basket" would be catastrophic.

16 October 1960. Held a conference with my planning group today. Several problems have arisen between III Corps and VI Air Force (Troop Carrier) as to responsibility for planning. Informed my G-3 that we are responsible for the following in *our* planning:

1. Movement of troops, equipment and supplies to departure fields.
2. Control of troops while at the departure fields.
3. Loading of all troops, equipment and supplies.
4. Unloading at the objective area and proper evacuation of the destination fields.
5. Assembly and regaining of command control at the objective area.
6. Proper employment of the command to accomplish our assigned missions.

I added that I was certain the VI Air Force (Troop Carrier) understood their responsibilities to be essentially as follows:

1. Make available to us at departure bases, the facilities for the air movement.
2. Assist in loading.
3. Safely deposit all troops in the objective area.
4. Assist in clearing of landing fields of all troops, supplies and equipment.

I reiterated to my staff that in order to prevent duplication, delay, and misunderstanding we must understand our planning responsibilities, and respect the prerogatives of the planning groups of associated units, both air and ground.

21 October 1960. Inspected training exercises in 3d Division area today. All units seem to be fit and morale is high. Was particularly interested in several schools where company grade officers and noncommissioned officers were receiving additional instruction in the following:

1. Computation of safe loads.
2. Lashing of equipment.
3. Use of safety devices.
4. Practical work in loading and unloading of equipment.

Regimental staff officers were checking general capacities of several type aircraft, flight stability of these aircraft, and becoming familiar with proper usage of flight forms.

23 October 1960. Held a conference with my own planning staff at which Tracgear (Corps G-3) briefed all concerned on progress of planning for "Cloudburst." We will need approximately 1,100 C-199s to move the personnel and equipment of the four infantry divisions and 300 to move that of the corps troops in one lift. Tracgear pointed out that we will have 1,000 C-199s available to us for movement of the entire corps. This means that we cannot move the entire corps into the objective area in one day, although the airfields there could handle the traffic (each of the four fields can accommodate 500 C-199s per day). Consequently, I checked Tracgear's priority of movement table very carefully and found it satisfactory. We will land three infantry divisions and a portion of corps troops on the first day and complete the movement by "turn around aircraft" on the second day. We are using no gliders except fifteen CG-116 Gliders which will be utilized to send in advance parties of key units on D+1 or D+2. I questioned Tracgear closely on contemplated methods of regaining command control at the destination fields. The plan is essentially as follows:

1. Insure, through coordination with the VI Air Force (Troop Carrier) on landing plans, that the integrity of tactical units is preserved in flight and on landing to the greatest extent possible.

2. Require submission to Corps of the landing and unloading plans to be used at destination airports.

3. Insure control of troops and rapid clearing of landing fields within the airhead by sending forward on D+1 or D+2 a control party consisting of an officer and a sufficient number of assistants for each of the four airports upon which the corps is to be landed. This control officer will establish a small command post on each airport. This command post will also serve as a report center to which personnel may report for information concerning any phase of the assembly. The control officer will work in conjunction with the air control officer present at the destination airfields, and will be responsible for the following:

- a. Rapid and orderly unloading of all planes, and the prompt clearing of the field of men, equipment and supplies.

- b. Posting of guides to the assembly area. (Divisional assembly areas to be assigned by corps.)

4. Each division headquarters will send forward by glider on D+1 or D+2 an assault command post echelon with sufficient personnel to have the command post in operational order upon arrival of the bulk of the division.

I emphasized that all troops should be made thoroughly familiar upon enplaning with assembly areas, markings to be used to identify the area, the common challenge and countersign designated for the operation, and any other details that might be utilized to facilitate quick resumption of command control.

24 October 1960. Visited 1st Infantry Division today. New equipment, particularly clothing for Arctic conditions, is arriving and it looks good. The insulated, electrically heated suits for individual wear will reduce considerably

the bulk of clothing heretofore needed. The new insulated "F" ration containers have solved the problem of food freezing before it can be eaten. Was particularly interested in the electrically heated sleeping bags and new type tentage. Both of these will aid considerably in protecting casualties from the extreme cold.

25 October 1960. Observed the 2d Division's tank battalion in a training exercise. They are now equipped with the new thirty-ton Arctic tank. The tank is completely insulated, and the temperature inside can be adjusted to counteract temperatures as low as -80° F. The carbon monoxide hazard has been reduced by the use of a secret chemical agent that combines with carbon monoxide and renders it harmless.

26 October 1960. Bombers of the Strategic Air Command carried on extensive raids over the Fairbanks area yesterday. Direct hits were observed on several enemy supply areas. Flak encountered ranged from moderate to light. Enemy fighters were not very effective. It appears the Labonnites may be stretching their available fighter strength quite thinly.

27 October 1960. Our bomber attacks have not silenced the enemy's guided missile installations. Detroit received a particularly severe attack this afternoon. Considerable damage has been reported. Our intelligence is satisfied that at least two of the Labonnite missile launching establishments are mobile. Direct hits by our bombers have been made in locations reported through radar location sets, but the missile attacks continue unabated.

28 October 1960. Have just returned from a busy day at Washington. First Airborne Army's plan for Cloudburst has been approved, and D-day has been changed to 3 December. Our weather experts feel that November might find ground conditions still unsatisfactory in the event of a delayed freeze. Our engineers are also planning on frozen ground to furnish the foundation for the additional air strips they are constructing. General Airilon (Strategic Air Command) has assured General Boeing that continuous demolition bombing operations will be conducted up to the last possible moment before H-hour. Particular emphasis will be placed on reducing the enemy anti-aircraft installations in the objective area. II Corps (Abn) plan calls for all four fields in the objective area to be captured by D+3. III Corps (Airtransported) will initiate airtransported operations on D+3 if fields are seized intact; or as soon thereafter as possible. The aviation engineer battalions will go in by glider on D+1 and D+2 with II Corps (Abn). The four infantry divisions of III Corps will marshal in departure fields 1 to 12. Conferred with Glichute (CG II Corps Abn) and agreed to land all corps artillery units early. Instructed my G-3 to revise his priority table accordingly.

14 November 1960. Have spent the last two weeks inspecting all III Corps units. The troops are in excellent condition and their morale is high. Observed training exercises of II Corps (Abn) units. These troops are superb and in a "fighting mood" also.

16 November 1960. Detroit, Cleveland, Buffalo, and Chicago were hit simultaneously at 1400 today. It's high time Cloudburst was on the way. The enemy missiles are becoming more accurate, and Detroit in particular suffered

severe damage. The General Motors assembly plant was completely demolished. We cannot afford much of this sort of treatment. Toronto, Ottawa, and Quebec also received quite a "pasting." Our guided missile units are retaliating, but finding isolated targets is much more difficult than hitting large cities.

23 November 1960. Seattle took the brunt of the enemy's guided missile attack today. Our bomber attacks have slowed up the enemy, but as yet they have been unable to silence him. Our intelligence agencies have definitely established four guided missile sites as being in operation now in the Fairbanks area, of which two are definitely mobile. A refugee Eskimo picked up by patrols of the First Canadian Army has reported considerable enemy activity in the vicinity of Fort Yukon. He believes that the enemy is constructing another "big boom place" there. A report was received at 1600 that a formation of fifty enemy bombers attacked Duluth at 1530. This is the first bomber attack attempted by the enemy. Results were negligible and twenty of the enemy aircraft were shot down.

28 November 1960. All plans are completely "buttoned up" and units are marshalling at their respective airfields. Strategic Air Command is on a "round the clock" bombing schedule. Numerous direct hits in enemy flak installations have been observed. Our troops are glad to be getting into action.

3 December 1960, *D-day, Operation Cloudburst*. Went to departure fields L, M, and O to witness the departure of the 81st, 82d, and 83d Airborne Divisions. Upon their departure I took off in my own plane to witness the landing. The C-199s converged at assembly points over Canada and then split into two trains for the approach to the objective area. Both columns reached their objectives on schedule. Our air support was magnificent. The bombing plan was executed as follows: First, 1,000 radio controlled flying bombs were sent over the area to reduce enemy anti-aircraft installations. This is the first time these flying bombs have been used in mass. Many were exploded in the air over the objective area by the enemy's "homing" anti-aircraft projectiles, but their total effect on the anti-aircraft emplacements was disastrous. This attack was followed by a barrage of 20,000 guided missiles from our mobile guided missile units. The guided missile attacks were followed by 2,000 bombers which concentrated on the enemy's troop installations and guided missile sites. The C-199 columns were protected by 1,000 Mercury jet propelled fighters from the 1st Tactical Air Force. Complete surprise was achieved, and by darkness of *D-day*, the two mobile guided missile installations were captured, as were two of the four airfields.

D+1, 4 December 1960. Bitter fighting is raging in the objective area. The enemy is clinging tenaciously to the remaining two airfields and as yet II Corps has been unable to pierce the defenses surrounding the two fixed guided missile sites. Two battalions of engineers have landed in the objective area and are working feverishly to place the fields in operational condition as soon as possible. II Corps is in dire need of medium artillery and armor. Our air is in complete command of the skies and can keep the enemy's artillery fairly quiet during daylight hours.

D+2, 5 December 1960. II Corps has reported the cap-

ture of the third airfield. Though our initial air attacks destroyed many of the enemy, he has brought in two divisions from the Nenana area and is counterattacking in strength. II Corps casualties are mounting steadily as a result.

D+3, 6 December 1960. Arrived in the objective area with first echelons of III Corps units. We are bringing in all corps artillery and the organic tank battalions of the infantry divisions first. Destination fields are still receiving spasmodic long-range artillery fire, but our operations are proceeding according to schedule.

D+4, 7 December 1960. The 84th Division launched its attack against the last guided missile site at daylight this morning. By noon they had pierced the enemy's defenses, but the going was slow. At 1300 today, General Glichute (CG II Corps) committed the 1st Infantry Division on the 84th's left, and by 1600 the combined assault of the two divisions succeeded in capturing the objective.

D+5, 8 December 1960. All four fields are now operational, and work is progressing on the five additional landing strips.

D+6, 9 December 1960. The good weather is still holding. Held a staff conference with my division commanders and checked all plans for the offensive from the airhead. We will be dependent completely on air supply, but believe we can complete the operations against Nenana and Livengood by *D+45*. Our intelligence indicates the Labonnites are holding Nenana with one division reinforced and Livengood with two regiments reinforced. With the capture of these two bases we will have severed his lines of communications from the north and eliminated him completely from the Fairbanks area. Completely equipped as we are for Arctic warfare, and with our complete air superiority, we should experience no unsurmountable difficulties in the performance of this mission. The developments in aircraft and equipment since World War II have enabled us to transport all of our weapons and equipment intact. Our rear echelon no longer includes medium artillery, tanks and other vital pieces of equipment that must be reunited with parent units at a later date by sea or land transport.

EPILOGUE

The remainder of General Turbo's diary is concerned with the movements of his corps from *D+7* until *D+35* upon which date they completed the destruction of the Labonnite forces in Central Alaska. As General Turbo so forcibly points out, the problems confronting the commander of an airlanded infantry corps are no different than those confronting the commander of a normal infantry corps once they are on the ground. The airlanded corps simply utilizes a different mode of transportation. With the advent of aircraft, of the type used in Operation Cloudburst, the problems of transporting vital pieces of equipment such as heavy artillery, tanks, and prime movers have been solved. Troops are transported as units and, upon reaching the objective area, are capable of fighting as a team with all of their supporting weapons. Like the normal infantry corps commander, the airlanded corps commander influences the action by attainment of surprise, maintaining close contact with his divisions, by use of his corps ar-

tillery, by the employment of his corps reserve, and by co-ordinated air-ground action.

In marshalling for an air movement, the airlanded corps goes through essentially the same planning phases as would a corps being moved by sea, rail, or motor. They marshal at airfields instead of ports. They load in aircraft instead of ships. Both must have plans to regain command control at destination fields or ports. Their ground action is dictated by the same principles of warfare. Operation Cloudburst presented different problems of equipment, clothing, and training in that it was executed in Arctic regions, but the tactical principles remained the same.

In comparing the actions of the airborne corps commander and those of the airlanded corps commander we find several striking contrasts in problems involved. Although the airborne corps commander has the same type of tools with which to work, they are less in quantity dur-

ing the assault phase of the operation. He, too, influences the action of his corps by the same methods as described for the airlanded corps commander, but initially his artillery, antitank, and armored means are in much lesser quantity. His freedom of movement is generally much more restricted. The size of his corps reserve is generally limited due to restrictions imposed by availability of airlift and by the necessity of using the bulk of his forces over a wide front to secure the airhead.

Operation Cloudburst marked the first time that an air operation of this size and scope had ever been attempted. A new front was opened and maintained completely by air. It proved that such operations are entirely feasible, provided air superiority can be maintained; and that with movement over Arctic land masses so difficult and hazardous, airborne and airlanded troops provide the most successful means of Arctic warfare.



ABOUT OUR AUTHORS

Brigadier General H. Russell Drowne, Jr., was Executive of the 102d Brigade from the time it was inducted into Federal service in February 1941 until his return to the States in November 1945. General Drowne now commands the 305th AAA Brigade of the Organized Reserves in New York. (Page 2)

Harold A. Zahl is a physicist with a doctorate degree and has been with the Signal Corps in research and development since 1931 and was a pioneer in the Army Radar program. During the war he was a lieutenant colonel in charge of radar developments for the Signal Corps Laboratories. This is his second article for the JOURNAL, the first one entitled "Electron Tubes" appeared in our May-June 1947 issue. (Page 8)

Willy Ley is well known to our regular readers as one of the foremost rocket authorities in the world. He is at pres-

ent a research engineer with the Washington Institute of Technology but fortunately for us finds time to favor us with articles quite regularly. (Pages 16 and 23)

Colonel Robert J. Wood returns to our pages after an unduly long interval mostly attributable to the war. After a tour of duty in Africa and Italy he joined the OPD of the War Department General Staff but left last August to attend the current class at the National War College. (Page 19)

Lieutenant Colonel E. A. Salet is an instructor at the Command and General Staff College, Fort Leavenworth and it is from that institution's "Military Review" that we reprinted his article. (Page 37)

Carl H. Jonas was a Medical Corps major during the war and his article is a result of his experience and research during his service. (Page 43)

Leadership As A Health Factor^{*}

By Carl H. Jonas, M. D.

"We lived in hope. The guys who gave up hope died." In so many words one repatriated American soldier after another explained what he considered was the deciding factor in keeping him sane and alive through those long years from early 1942 till late 1945 while he was a prisoner of the Japanese.

Man after man, the account followed the same theme: "I knew we'd be rescued if we could just hold on long enough. I never gave up hope that I'd be home again." These men who survived had no doubt in their mind that they would be rescued. Through all those years of gradual starvation, disease infested living conditions and exhausting days of labor, their steady faith and hope played a major role in maintaining life. These men offered their own observations to support their contentions. They listed examples of fellow soldiers who had the same body weight and lived under the same conditions who gradually gave up hope that they would be rescued. In a short time, these men ceased talking about home and withdrew from the comradeship of the group. In seclusion they rapidly weakened physically and died. The repatriates pointed out that the changes leading to death in many cases started with a despairing attitude that rescue would never come, that they had been abandoned by their countrymen.

Such reports as these have been a source of interest to astute observers and medical men for centuries. They are reports which are difficult to interpret in terms of physical science. Probably because of this difficulty scientific observers are prone to dismiss them too easily as belonging to the realm of metaphysics instead of science.

However, the claims of these repatriates, the claims of Rickenbacker and his crew mates, twenty-four days adrift in the Pacific, and countless similar experiences in this past war and the years before have accumulated too much evidence that attitudes and motivation do have a physical effect on an individual's resistance to disease and death. Lending further emphasis to this concept were the experiences of almost every medical officer in the service who provided treatment for injured or ailing servicemen. In spite of the most skillful surgical and medical care there was still an unaccountably high percentage of cases which failed to produce satisfactory results when compared with their peacetime equivalents. With this increase in the incidence of therapeutic bankruptcy, more and more medical men became interested in investigating the motivation factors as a preventive against illness and injury and as an ally to the medical officer once illness or injury occurred. Investigation by both medical and nonmedical observers removed much of the mysticism from the high casualty and illness rates in certain military units and brought the study of the sustaining power of good motivation into the realm of

physical science to a degree never seen before its inception.

The investigations indicated that the role of the officer in protecting the mental and physical health of the soldier demands a lot more of him than merely teaching the principles of first aid and the location of the nearest aid station. To a large extent, the prevention of casualties and illness within the command depends on each officer in that command. Even the rate of recovery, or failure to recover from an illness or injury is in part a measure of the quality of the line officers as well as it is a measure of the skill of the medical officers. The interpretation of this apparent paradox lies in the individual's motivation.

Although there are certainly many complex factors which serve to strengthen a man's determination to live through and overcome what are ordinarily classed as overwhelming threats and obstacles, a few of these factors have been identified and their connection with casualty prevention has been demonstrated.

PERSONALITY OF THE LEADER

One of these factors is the personality of the man in authority. The emotional maturity of the leaders has been proved to be of tremendous importance in warding off casualties in the soldiers of all ranks who are exposed to these leaders. This conclusion which has been carefully investigated is by no means strange to military men but the qualities of good leadership have not been so clearly defined before. One of these qualities is the ability to recognize that as officers we have an effect on every one with whom we come in contact. We must have the ability to identify quickly the effect we are producing and be able to get the one we desire. This is more generally referred to as inspirational leadership. Because of our education, social position, rank and authority, we are in a position to do great benefit or harm to the mental attitudes of our colleagues and our subordinates.

We have all seen an officer who has in a grievous way failed to fulfill these requirements of his position by continuous ridicule of military strategy, by passive insubordination to his own superiors, by sceditious innuendoes about the cause of the war, by tardiness and by subtle or flagrant disregard for cooperation. We have all seen an officer who is himself so poorly motivated for giving service to his country that he tries to deny his weakness and bolster his own flagging emotions by cruel and unwarranted discipline of soldiers who come to him with complaints originating from the same failing spirit. In using cruel or obviously unjust measures the officer may temporarily keep his own weakness in check, but in so doing he has weakened the morale of all those who witnessed the episode or who may later hear about it by rumor. We have all seen varying degrees of behavior of this type in officers who are unaware of

^{*}Reprinted from March 1948 issue of *Military Review*.

the fact that they are spraying venom for those around them to absorb. These officers may be technically skilled and admired, but the good they do in a tactical way is overbalanced by the insidious decay they leave in their wake in terms of dissension, doubt and despair. These emotions engendered by a poorly integrated and motivated officer can become extremely dangerous under the stress and strain of isolation and combat and produce more casualties than tactical skill of the commander can save.

So it may be said that the first factor in the role of an officer as the protector of the mental and physical health of the soldier is the attitude of the officer himself. He must learn the requirements of good leadership and adapt his own behavior so that it lends itself to the formation of a strong ideal in his subordinates and his associates. If he fails to do this, he will in some degree destroy in his subordinates the will to do, the hope of survival and the strength to resist the avenues of disease.

BELIEF IN YOUR CAUSE

After looking to our own hygiene, we may look to the other factors which increase resistance to disease in the Army. There is the matter of belief in your cause. If the soldier is to have the fullest possible protection against the undermining feelings of fear, separation and privation which are bound to be associated with any type of military service, men must have the protection of the deep inner belief in the cause for which they suffer these painful onslaughts. Fear, separation and privation tend to destroy hope, cause carelessness and apathy. Out of these feelings come accidents and disease. A belief in the cause for which we fight makes the pains and risks of war purposeful and worthy of endurance. Out of these feelings come incentive, determination and hope. There is no need to develop this point any further. Historians and militarists alike have seen the value of a belief in the cause and how it actually saved lives by making a band of a few hundred soldiers capable of vanquishing a thousand otherwise equally matched soldiers who were without a belief in their cause. The line officer has as his responsibility the detection of the absence of belief or the failing of belief in the cause for which we fight, and should seek to correct this loss by proper indoctrination and example, or by seeking the advice and assistance of properly designated authorities. For it has been learned that an increase in illness and injury may be related to the decline in motivation.

GROUP IDENTITY

Another factor which has been found to play an important role in the prevention of disease in the soldier has been the ability to identify himself with the group. Group identification can be developed by plan and forethought on the part of the leaders in the group. It is a beneficial trait in the prevention of disease and death because it is the force which makes a man rely on his fellow men, trust them,

and gain physical and emotional support from their presence. It is one of the motivations which enables a man to live courageously and generously because he wishes to keep the esteem and confidence of his fellows. This factor in motivation has been widely reported by psychiatrists and observers of all types. It has been recounted that our American soldiers in this past war had no strong belief in the cause for which they fought and that their courage and sustaining power was almost entirely maintained by group motivation. False inferences have been drawn from this knowledge to the effect that group loyalty is the most potent of the motivating forces. To draw this inference is to be akin to a man who deduces that since he can see very well with only one eye, the other eye must be superfluous. It is essential in any fighting force that we use all the factors available to reduce casualties and protect the health of the group. In this last factor, group loyalty, the officer again must recognize a new responsibility. He must keep the men under him closely knit as a team, properly informed of the important role they play for the bigger group. They must be given the opportunity and the knowledge necessary to take pride in their work. The officer must take pride in his work and show his pride in his speech and in the manner of executing his duties. The safety of the men is dependent upon it.

RELIGION

There are other factors which are less clearly understood and still more which are yet to be discovered. One of the factors protecting the health of the soldier is religion, although just how it works is not understood medically. Yet thousands of soldiers get strength out of their religion and because of it are better able to withstand the otherwise apparent hopelessness of war. The officer is obliged to accept the value of religion for those who gain protection through it. He is only defeating his assigned duties if he ridicules or belittles the religious belief of others. To decry the beliefs of others by pseudo-intellectual remarks helps to increase the casualty rate. Even the Russians learned this, and during the war made every concession to the religious inclinations of its citizenry and Army.

Four factors then have been enumerated and discussed. They all play an important part in the health and welfare of the soldier. There is much more to learn about those factors before they and others like them can be fully utilized by the officer to develop the best physical and mental health in the soldier. These factors at first appear to be unrelated to military science, but when we see that without them casualty rates increase enormously, and the problem of getting enough replacements alone actually threatens a military strategy, brilliantly conceived and executed, then we know these factors are in the realm of military science. We must learn to work with these factors if we are to execute the duties of our position to the best that our knowledge will allow.



A Strong America is A Peaceful America

Career Management Group Makes Officer Assignments

Many officers, particularly those who have recently entered the Regular Army, doubtless wonder where their assignment orders originate, and whether there is any intelligent basis for the manner in which individuals are shifted from one station to another. Assignment orders of officers of the Combat Arms, including orders for overseas theaters, generally have their inception in the Arms Sections of the Combat Arms Branch of the Career Management Group of the Personnel and Administration Division of the Department of the Army General Staff. These Sections, located in the Pentagon Building, Washington, D. C., are the lineal descendants of the Personnel Sections of the Officers of the Chiefs of Cavalry, Coast Artillery, Field Artillery and Infantry. Until December 1947, these Sections functioned within the Officers Division, G-1 Section, Army Ground Forces. The functions of the offices, however, have remained essentially the same since 1918. Each of the four Combat Arms Sections is headed by a senior officer of the Arm concerned, and includes in it such officers and other personnel as necessary. Each Section maintains detailed records of all Regular officers and all Non-Regular officers of its Arm on extended active duty, and is responsible for the detailed execution of all personnel policies affecting officers of its Arm.

Though the name has changed, a genuine effort is made to preserve much of the tradition of the old Chief's Office. In spite of the fact that the number of officers, both Regular and Non-Regular, is much greater than before World War II, every effort is made to give full and sympathetic consideration to the assignment of each individual officer, and to assure that his own desires and personal problems are given the maximum attention. Many officers occasionally write informally to these offices in connection with questions which seem inappropriate for official channels. Visitors in Washington are always welcome in their Arm's Personnel Office. The personnel on duty there are anxious to become better acquainted with officers of their arm, with a view to raising the Section's work above the level of an impersonal machine.

It is realized that many officers are moved much more frequently than is desirable from any point of view. This is partly the heritage of the war, stabilization not having yet been fully attained. The necessity of keeping the overseas theaters filled has been another factor in producing too-frequent shifts of individuals, though this condition should gradually be alleviated. Among other causes for the lack of stabilization are the heavy requirements of the military education program and the career guidance policies designed to broaden the individual's background by means of rotation through various types of duty.

In making assignments, the Combat Arms Sections give

full consideration to the officers' expressed preferences. The cynical belief of many officers that the reverse is true can be explained in part by the obvious fact that vacancies do not always coincide with desires. For example, a returnee from overseas may have asked to be assigned to the Sixth Army area, yet at that particular time there are no "openings" in that area. The officer cannot be held indefinitely at the port, so he is assigned elsewhere, as nearly in accordance with his desires as the exigencies of the service permit. With respect to overseas assignments, approximately two-thirds of the officers assigned in 1947 were necessarily sent to the Far East, although the majority of officers expressed a preference for other theaters. Naturally the needs of the Army must be given first consideration, but every reasonable effort is made to avoid making assignments in an arbitrary manner. The Sections are always alert to secure data useful in making long-range plans for career management.

The offices of the Combat Arms Section are the repositories of one (1) copy of the officer's efficiency report, his Form 66, and sundry correspondence not included in the official 201 file in the office of The Adjutant General. These latter papers generally consist of informal correspondence relating to assignments.

The Arms Sections maintain lists of officers who are eligible to attend the various service schools. They make final selections of officers to attend the Basic and Advanced Course of the respective Arms. Final selection of candidates for the general service schools is made by higher authority upon the recommendation of the Section Chiefs. In this connection, it is entirely unnecessary for officers to submit applications to attend the Basic or Advanced Course, the C&GSC, the AFSC, the ICAF, or the NWC. Applications are appropriate, however, from officers who desire to pursue graduate studies at civilian schools, foreign military schools, or schools conducted by other components of the Armed Forces or by branches or services other than their own.

The present Chiefs of the Sections are:

Infantry—Colonel LeGrande A. Diller, Infantry
FA—Colonel Wilbur S. Nye, FA
Cavalry—Colonel Walter Burnside, CAV
CAC—Colonel Perry McC. Smith, CAC

Informal correspondence may be directed to the above individuals, or to the Chief of Section concerned as for example:

Chief, Coast Artillery Section, CMG
P&A Division, GSUSA
The Pentagon
Washington 25, D. C.

Proposed Revision Of FM 44-8

The following recommendations for the revision of Field Manual 44-8 (Antiaircraft Operations Room and Antiaircraft Intelligence Service) have been extracted from Air Force recommendations

Although these recommendations have no official concurrence nor approval, they are reproduced here in an effort to stimulate interest and provoke discussion.

Written comments may be addressed to the Editor of the JOURNAL and are earnestly solicited.

Additional recommendations will be printed on the same basis in future issues.

Operations Detachments

a. It is recommended that operations detachments be allocated to a theater, an air defense, or an area on the basis of the estimated number and size of AAOR's required for the particular theater, air defense, or area, in the same manner as other AA units are allocated. Operations detachments in excess of the one per brigade will be required in a Theater.

b. It is recommended that a small operations detachment consisting of four officers and twenty enlisted men be authorized in the T/O for each automatic weapons battalion, augmenting the operations and intelligence section of battalion headquarters. An automatic weapons battalion under normal conditions may defend one or more small objectives. The automatic weapons battalion must operate and maintain an AAOR at each defended area.

c. It is recommended that no operations detachment be authorized for antiaircraft gun battalions other than the present operations and intelligence section, since this is the primary mission of the normal operations detachment. The authorization of an operations detachment for gun battalions would lead to an uneconomical use of personnel because six or more gun battalions may be deployed about a single objective.

Operation of an AAOR. An AAOR is normally organized and operated in each antiaircraft defended area by the highest AAA headquarters in the defense. In large defended areas, an AA operations detachment may be provided to operate the AAOR. An AAOR is normally organized and operated in each defended area. If there are more than two separate defended areas under one command, a separate AAOR will be operated within each area. It is usually undesirable to attempt to operate one central AAOR for two or more widely separated areas, or to operate an AAOR far from the center of communications of a defended area. When an AAOR detachment is not provided, the principles and procedures are the same, but the operating personnel and equipment are drawn from the units of the defense.

Location of AAOR. The AAOR is located at or near the center of communications of the defended area so that the length of telephone lines and radio nets between AAOR and elements of the defense are as short as possible. AAOR's for the defense of airfields should be located with or near the flying control. In defenses employing only antiaircraft

artillery, security of the AAOR may be more important than mere geographical location. Possible damage to the AAOR and its communications as a result of air attack on the defended area must be considered in selecting the AAOR location. In small defenses, it may be desirable to locate the AAOR outside the defended area for this reason. Existing shelter is used when available and is camouflaged and revetted as soon as practicable after the AAOR is established and operating. When possible the AAOR should be "dug in" and all communication installations must be well protected.

Situation Board. In large defenses, it may be necessary to use an additional board to plot all warning information on friendly, hostile, or unidentified aircraft received from sources other than local AAAIS, when such aircraft are outside the area covered by the operations board. This additional board is called the situation board. When aircraft come within the area of the operations board, the plots are transferred to or initially plotted on the operations board. The situation board is similar to the operations board in that the same basic grid is used. It uses a smaller scale and is normally mounted vertically. The situation board includes the area covered by the early warning agencies furnishing information to the AAOR. If the agencies furnishing early warning information use grid systems other than that used by the AA defense, these grids are also shown. Plots received in coordinates of other than the basic grid are converted. Distinctive colors are used for the grid lines to avoid confusion in plotting. Important terrain features, the defended area, AA installations, and other pertinent information may be shown on the situation board also.

Liaison. Effective liaison must be established with AAOR's in adjacent areas and with Air Force control centers. This liaison is necessary to coordinate the AAA defenses of adjacent areas, to receive early warning information available from air force installations, and to prevent AAA fire on friendly aircraft. One AAA liaison section, furnished by the antiaircraft defense commander of the area, at each control center will normally furnish necessary information by wire and radio to all AAOR's in the area controlled by the control center.

Fire Direction.

a. It may be necessary for the AAOR to exercise fire direction over one or more of the units in the selection of targets, and the distribution of fire. In no case, however, should technical fire control be attempted from the AAOR. The final responsibility for the decision to engage any particular target must rest with the unit commander at the gun or automatic weapon position except when fire has been restricted. The fact that any other position has or has not engaged the target does not relieve each separate commander from making his own decision.

b. It may be necessary for the operations officer to exercise fire direction as follows:

(1) Restrict or limit fire as ordered by control center.

- (2) Select targets for various portions of the defense in the case of large mass attacks, multiple attacks in various sectors, or attacks in successive waves.
- (3) Order some prearranged type of predicted concentration or barrage fire.

c. It is impossible to prescribe the fire direction necessary for all situations. The operations officer must weigh each situation and take the logical course of action. He must try to prevent the commitment of the fire of the defense on some feint or subsidiary attack, while the main effort remains unengaged. He must see that fire is distributed so that all aircraft threatening the defended area receive a proportionate share of the fire. He insures that surveillance is continuous, and if necessary, orders particular radars to search particular sectors.

AAOR AND AAAIS FOR AUTOMATIC WEAPONS

GENERAL: This discussion pertains specifically to an area defended by one automatic weapons battalion. If more or less than one automatic weapons battalion is employed in a defense, the principles and procedures are the same but the highest headquarters (or the senior commander in the absence of a higher headquarters) coordinates the activities and organizes and operates the AAOR and AAAIS.

The AAOR for a small automatic weapons defense is an operations room in its simplest form. Its establishment and operation is the responsibility of the battalion commander.

Equipment:

a. General. The equipment in the AAOR may include the following: an operations board, a situation board, a status board, a switchboard, radio sets, and such miscellaneous equipment as head and chest sets, telephones, and journal forms.

b. AA operations board. This board is erected horizontally and of such size as to permit the display of early warning plots. A board four feet square with a scale not smaller than 1:100,000 should suffice. Fire units, OP's and their code names, and important terrain features should be shown. A grid is shown so that reports from OP's and other intelligence agencies may be plotted. A covering of transparent plastic or acetate may be used to protect the board. Plots are made using cardboard or plastic arrows or with grease pencil.

c. Situation board. A situation board may be used in some defenses. The board is 4 feet square or less and gridded. The scale must be small enough to show the defended area in the center and sufficient area outside so that early warning from other warning agencies may be plotted. A scale of 1 inch equals 5 miles is suggested. The board is covered with transparent material to protect it and facilitate erasure. Plots of early warning data are made using cardboard or plastic arrows or with a grease pencil.

d. Status board. The operating status of all fire units and OP's is posted on this board. It is mounted vertically and is large enough to be easily read from all parts of the AAOR.

Personnel:

a. AA operations officer. The AAOO, as the representative of the defense commander, supervises the AAOR during his tour of duty. He determines the state of readiness

in the defense. He evaluates all intelligence received in the AAOR. He relays to the fire units all pertinent orders and instructions from higher headquarters. He restricts or releases fire as necessary, based on information from AAAIS higher headquarters, or an appropriate Air Force control center. He assigns targets to search radar. He issues orders for the direction and coordination of fire in all cases not covered by SOP.

b. Plot observer. He is the senior noncommissioned officer on duty in the AAOR and is the assistant to the AAOO, relieving the latter of as many duties as practicable. He is responsible for insuring that the status board is up-to-date. He records in the AAOR operations journal all actions, changes of status of alert, and all orders received or issued by the AAOO. He supervises all checks made on the communications nets.

c. Radio operators. They are responsible for the proper tuning, operation, and maintenance of the radios. Each carries out hourly schedules of checks with the other stations in his net. Each monitors his net and enforces strict radio discipline. They execute such other duties as directed by the AAOO.

d. Switchboard operator. He is responsible for installation, operations, and maintenance of the switchboard.

e. Plotters. An OP radar plotter is stationed at the operations board to plot the location of targets as received from early warning sources, visual OP's and battalion radar set. During periods of great aerial activity an additional plotter is at the situation board to plot early warning information.

f. Monitors. Each battery and OP "hot loop" is run to the AAOR. Monitoring personnel, wearing head and chest sets, listen to these loops 24 hours a day to insure that intelligence information is relayed to all fire units and CP's. The messages may be relayed by the monitors using their head and chest sets, or preferably by amplifiers to transmit incoming messages from one "hot loop" to all the other "hot loops" simultaneously. The monitors may manipulate the switches that control the amplifiers.

AAAIS

General:

a. The defense AAAIS personnel includes all anti-aircraft observers and radar personnel that are in communication with the AAOR. A sufficient number of OP's are established to provide adequate warning. (Elsewhere, one radar set was recommended for each AW Battalion—Ed.)

b. The battalion S-2 designates the position for the OP's and warning radar set and assigns code names to them. The positions are selected after ground reconnaissance.

OP's: The personnel manning the OP will occupy the position designated by the battalion S-2. The prominent terrain features are sketched upon a direction board and the distance to these features is measured or estimated and the coordinates are entered on the board. The observers maintain a constant search of the surrounding air and terrain for serial flights, ground vehicles, personnel, or other enemy activity. When warning is received from the AAOR that a hostile or unidentified aircraft is approaching the vital area, the observers will search in that area until the aircraft is identified, or a reasonable time has elapsed to

allow the aircraft to pass out of range. Upon observing any activity, they immediately transmit it by telephone or radio to an operations board plotter in the AAOR. The message is recorded at the OP on a flash message AAAIS form.

Radar: The battalion warning radar set will normally be sited so as to give best all around coverage and be as near the AAOR as possible to facilitate communication. Aircraft plots received from radar are converted from polar coordinates to grid coordinates on a direction board at the radar site, transmitted to the AAOR, and thence to OP's over the intelligence line. If the aircraft comes within visual range of the OP's, the OP's alert the fire units. Hostile and unidentified plots received from early warning will be sent to the radar set by AAOR. Radars will track all targets that threaten the vital area.

Communications for automatic weapons battalion:

a. Wire Nets.

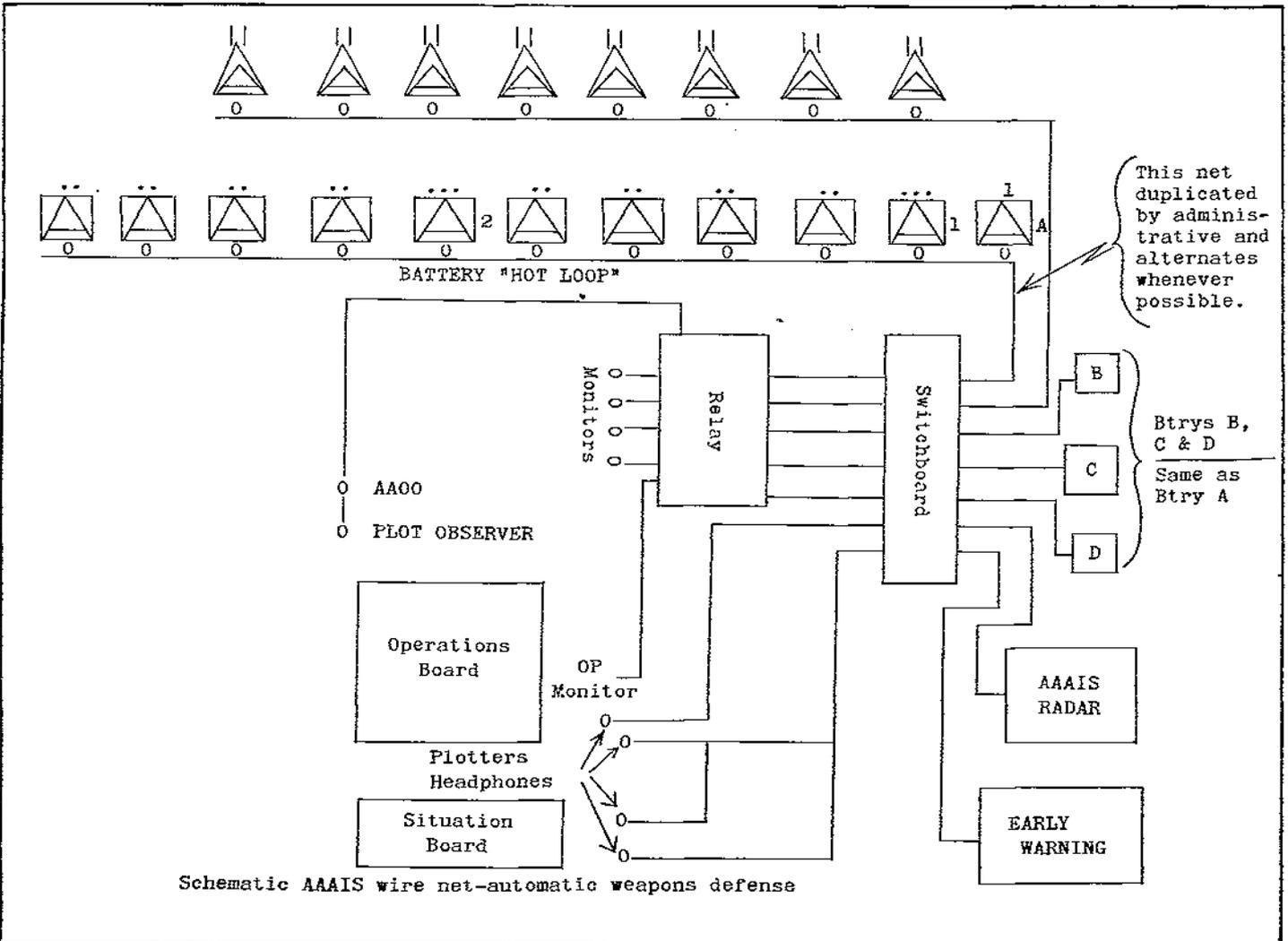
(1) A separate wire "hot loop" is run from the AAOR to each battery. These "hot loops" include the battery and platoon CP's and the fire units. These telephones are manned 24 hours a day so that communications between them are instantaneous without the necessity of ringing. A monitor in the AAOR is provided for each battery "hot loop." See figure.

(2) A wire "hot loop" connecting each OP is run to the AAOR. Because of the large number of phones on one line and the length of the line, it is necessary to use amplifiers or several "hot loops." Information is relayed from the OP's, battalion radar, and early warning sources to the fire units either by monitors or amplifiers at AAOR.

b. Wire Radio Nets. It may be desirable under some conditions to use radio wire nets combined. The OP's transmit flash messages on the AAAIS frequency using SCR 543 transmitters and the AAOR monitors repeat the warning to the fire units over the wire "hot loop." The radio receiver at the AAOR may be connected to all of the wire "hot loop" through an amplifier.

c. Radio nets. The OP's transmit intelligence on the AAAIS channel and it is immediately received at all the fire units and by the plotter at the operations board in the AAOR. OP's not equipped with radios are connected by wire to the nearest site equipped with radio transmitter. Flash messages originating at a telephone OP are promptly relayed by radio.

d. Preferences. Wire nets are usually preferred to radio for AAAIS nets. Enemy jamming or unintentional interference may prevent the use of radio nets. Radio nets are used as a temporary expedient until wire or wire radio nets can be established.



Schematic AAAIS wire net-automatic weapons defense

AAOR:

a. An operations board plotter in the AAOR receives the position of a target as reported by early warning sources. He passes this information to the battalion radar operators. When the aircraft's position is received from the battalion radar or an OP he instantly plots it on the operations board. He continues to plot the course of this flight and other flights as additional messages come in. After each flight has left the area, he connects the plots of each flight by drawing a line with his grease pencil and noting thereon the number and kind of planes, the time the flight passed over the area, and the altitude. This information is left on the board so that the enemy action may be studied and analyzed. The board is cleared at the direction of the AAOO.

b. The AAOO alerts firing batteries, the radar crews and visual observers and other agencies when intelligence reports indicate that hostile or unidentified targets are approaching the defense. He does not attempt to exercise fire direction except when it becomes necessary to restrict fire in coordinated action with friendly air forces, or when it becomes necessary to order a barrage. He returns units to their normal operating status when the threat has passed. When the plots are no longer useful, he orders the operations and situation board plotters to clear their boards. He insures that all pertinent intelligence and action reports are relayed to higher headquarters.

c. The plot observer assists the AAOO. He records in the AAOR operations journal all orders and intelligence received or issued by the AAOO.

Radar: When no specific plots are reported to the radar crew, a continuous surveillance is maintained, reporting to AAOR targets which are within a specified area.

When the assistant radar operator receives intelligence information (in the form of grid coordinates) that hostile aircraft are operating within range of the radar set, he converts the data to polar coordinates and passes the information to the radar operator. The radar operator will search in the general area indicated, and track suspected targets.

On picking up a target, plots will be passed to the AAOR. The operator will continue to track a hostile target until ordered to do otherwise by the AAOO.

SPEECH AMPLIFIERS

1. The following are suggested methods of connecting SCR 593's as speech amplifiers.

a. *General.* The objective of all these methods is the amplification of weak voice signals. Since noise signals are amplified equally, they can be used successfully only on lines with a low noise level. The amount of amplification which can be obtained will be limited by the amount of distortion acceptable and the point at which oscillation or "howling" (due to stray pickup) occurs.

Pickup of voice and keying noise from near-by radio transmitters through the RD section can be avoided by disconnecting the output of the detector stage from the input to the first audio stage.

b. *Use as a Transmitter Amplifier.* The SCR 593 is connected in the transmitter circuit of a EE 8A telephone.

c. *Use as an Audio Amplifier.* The SCR 593 is connected to the telephone line.

d. *Use as Relaying Amplifier.* The SCR 593's are con-

nected on the input side. The output is taken from the telephone jack on the SCR 593's. With this system it is necessary to install a control panel. The panel is placed in front of hot loop monitors and mounts one double pole, double throw toggle switch and one phone jack for each hot loop terminating in the AAOR. The operation of the system is as follows:

(1) Each switch has a broadcast and a receive position. When the switch of any command loop is in the receive position, the monitor and all sites on the loop may talk to each other without overhearing or being overheard by the sites on any other loop switched to receive. When the switch of any loop is thrown to the broadcast position, a message from any phone on that loop is amplified and broadcast to all loops with switches in the receive position.

(2) In normal operations, all loops except the OP loop are switched to receive, and the OP loop is switched to broadcast. Thus, any flash message originating at any OP goes instantaneously to every site in the defense without action by AAOR personnel. If any site other than an OP should be the first to sight an enemy aircraft and sends a flash message, the monitor on the loop, upon hearing the word flash, throws the switch for his loop to broadcast and the OP loop to receive. The message is then heard at all sites, including the OP's. Information from gun and searchlight radars may similarly be passed directly to all sites.

(3) By plugging his phone into the selected jack on the panel, the AAOO may listen directly to all sites on that loop, with the switch set at receive. By throwing the switch to broadcast, he may broadcast to all sites simultaneously.

(4) This system has successfully eliminated the time delay caused when information was relayed from the AAOR to the sites.

e. *SCR 593 Power Supply.* In all cases the principal disadvantage in the use of the SCR 593 lies in the power supply. Each set should be supplied with two six-volt storage batteries and sufficient charging equipment provided to maintain batteries at full charge.

AAOR and AAAIS FOR GUN DEFENSE**Equipment:**

a. AA operations board. It is suggested that the operations board be a table approximately 8 by 8 feet. For convenience in transporting, this can be broken down to four tables. A map or sheet of drafting paper is spread on the table and the defended area is indicated. Gun positions, observation posts, the grid in use, and the most prominent terrain features are also shown. A scale of 1:100,000 is suggested. This will permit plotting targets to the maximum range of the radar. The table is covered with transparent plastic or acetate.

b. Situation board. The situation board is smaller, is hung vertically, and is used to display early warning information. The situation board has a smaller scale and covers more area than the operations board. It should extend the radius from the center of the defended area to the limit of the early warning range.

c. Status board. The operating status of all units in the AA defense is posted on the status board. The use and design of the board depends upon the individual requirements of the particular AAOR. The board can be read from all parts of the operations room.

d. Platform. A platform about 4 feet square and 30 inches high is required for the use of the AAOR and plot observer. The stand should be equipped with a writing desk.

e. Communications. Communication equipment includes switchboards, amplifiers, radios, and the necessary telephones and head chest sets.

f. Miscellaneous. Miscellaneous equipment includes: Radar clutter diagrams, radar line of sight diagrams, chairs, lights, AAOR operations journal, display stands, arrows, grease pencils, and tabs to display information about the targets.

Personnel:

a. AA operations officer. The AAOR is the representative of the commanding officer, and supervises the operations in the AAOR during his tour of duty. He evaluates all information received in the AAOR. He orders changes in the state of readiness. He controls the surveillance radar and coordinates the radar surveillance schedules so as to maintain a 24-hour watch. He insures that all batteries receive prompt warning of any attack. He restricts or releases fire as necessary based on information from the AAAS, higher headquarters, or appropriate air force control center. He issues orders for the direction and coordination of the fire of the entire defense in all cases not covered by SOP.

b. Plot observer. The plot observer, assistant to the AAOR, is the senior noncommissioned officer on duty. He alerts the batteries and directs changes in the state of readiness as ordered by the AAOR. He relieves the AAOR of as

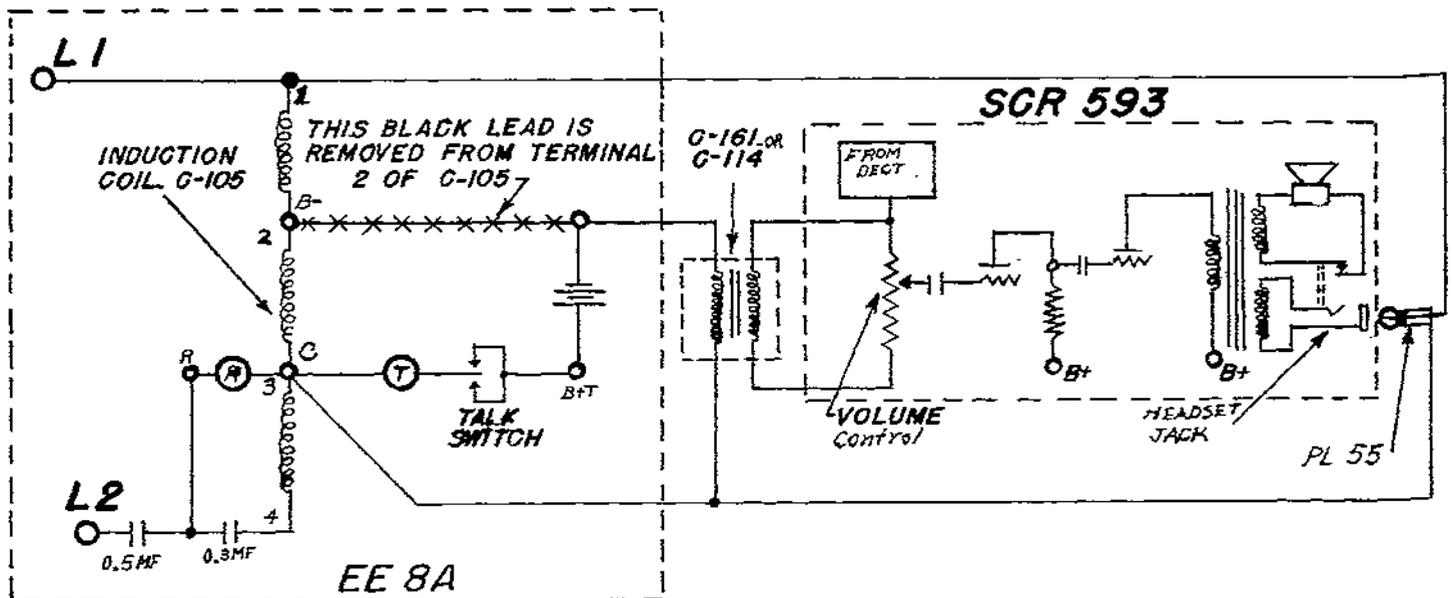
many as possible of the routine duties required to insure execution of his orders. He is responsible for the status board being posted. He records in the AAOR operations journal all actions, changes of state of readiness, and all orders received or issued by the AAOR. He supervises all checks made on the communications nets. He reads grid coordinates of hostile plots over the command and intelligence line for the information of batteries. He relays all information to the batteries concerning the presence of window, dropping of bombs, flares, etc., and on radar jamming.

c. Plotters. Two or more plotters (one early warning plotter, and battalion radar plotters) at the boards, plot the locations of targets as they are reported to them from early warning sources, the radars or the OP's. They erect stands displaying information about the targets they are plotting, or plot the targets' course with a china pencil.

OP's: The radars of the defense are supplemented when necessary by outlying OP's to form the battalion AAAS. The personnel to man the OP's are taken from the various batteries. The OP's are connected by a wire "hot loop" to the AAOR. If the establishment of wire lines is impossible, radio may be used. It is very desirable that the radios remain with the battalions and batteries but if the need for OP's is urgent, shifting of equipment may be necessary.

Radars:

a. The radars send reports to AAOR on all targets in terms of grid coordinates. Azimuth, angular height, elevation and slant range are read from the remote data indicator in the battery CP, plotted on a battery plotting board, converted to grid coordinates and transmitted to the AAOR. Plots are read as rapidly as practicable or at intervals as requested by the AAOR. An altitude reading is given approximately every fifth plot by gun battery radars. If no remote



**SCHEMATIC DIAGRAM
USE OF SCR 593 as TELEPHONE
TRANSMITTER AMPLIFIER**

data indicators are available, the grid coordinates may be obtained from a gridded PPI tube, or by conversion of PPI data at the battery plotting board.

b. The radar operators report to AAOR the presence of window radar jamming; the dropping of bombs, flares or parachutes; or any unusual events that they detect on the scope.

c. It is usually advantageous to use the automatic search features of the radar and scan through 6400 mils. If sector scan units are employed, they should be used only when searching for particular targets. Primary search sectors will be assigned to each radar, and all targets detected in that area will be reported. SOP must state whether radars will report targets "picked up" outside of assigned sectors. The normal procedure will be for radars to report all targets to AAOR until directed by the AAOO to discontinue reports on specific flights or in specific sectors.

Grids for PPI scopes:

If PPI grids are used, the PPI scope of the SCR 584 is gridded each time the radar position is changed. The PPI scope of the radar assigned to a gun battery is gridded for the 35,000-yard scan. The PPI scope of the battalion headquarters battery radar is gridded for the 70,000-yard scan.

The use of remote data indicators, to convert and obtain grid coordinates from radar data is in general more rapid and more accurate than the use of gridded PPI tube. However, if remote data indicators are not available, gridded PPI scopes may be used.

Conversion Board:

a. A conversion board is constructed for use at each radar using a PPI grid to determine plots. Grids for both the 35,000-yard and the 70,000-yard scans are superimposed on the board using distinctive colors.

b. This board is used at the radar to convert plots read from the PPI scope to true grid coordinates. For example, if the radar is being used on a 70,000-yard scan and its PPI scope is gridded for the 35,000-yard scan, the plot is transferred to the conversion board by reference to the 35,000-yard grid. The correct coordinates are read from the board by reference to the 70,000-yard grid.

Remote Data Indicator:

a. Present position data are read from the remote data indicator in the battery CP. The data are plotted on a battery plotting board and converted to grid coordinates for transmission to the AAOR. This method of obtaining and reporting data is also used during early stages of an operation until such time as the PPI scope can be gridded.

b. If the battery is issued no remote data indicator, but spare selsyns are available, a remote data indicator is constructed, capable of receiving coarse azimuth, angular height, elevation, and slant range. To permit the proper employment of this indicator, a modification is made at the radar. This consists of the attachment of a 19-conductor receptacle to the data transmission system of the radar, so that coarse azimuth, angular height, elevation, and slant range can be transmitted over one cable while data are being transmitted to the normal fire control instruments of the battery. See TB SIG 38 for details of construction. The dials are graduated in 10-mil divisions for both azimuth and elevation and 100-yard divisions for slant range. If a remote data indicator is not employed, it will be necessary for

A₀, E₀, and D₀ readers to transmit data over telephone lines from the radar to a battery plotting board.

Reports from Radars:

a. Using remote data indicator. Present position data are read from the selsyns in the battery CP on all targets tracked by the battery radar. The data are plotted on a battery plotting board, converted to grid coordinates, and transmitted to the AAOR. Reports are made as frequently as practicable or as directed. The reports are made as in b below:

b. Using gridded PPI.

(1) When the radar is on surveillance, reports are made on each target appearing on the PPI scope. Assume that the radar is searching using PPI scan with the range selector switch set for the maximum range of 70,000 yards. The PPI operator reports:

"Baker Able" (code name of position).

"Target 10" (estimate of number of planes).

"26-44" (grid coordinates of the target).

"IFF Clear" ("IFF Unknown," "No IFF").

(2) If a battery radar is being used for surveillance, the initial reports on targets beyond 35,000 yards are converted to grid coordinates using the conversion board.

(3) When gun battery radars are tracking targets with the 70,000 yard scan, the coordinates are converted using the conversion board. When the target comes within 35,000 yards, the PPI scan is switched to the 35,000-yard scan and grid coordinates are read directly without reference to the conversion board.

(4) Gun battery radars tracking targets report coordinates to the AAOR at intervals as directed. Altitudes are transmitted every fifth plot minute.

(5) Gun battery radars tracking targets give initial report as in (1) above. Subsequent reports consist only of coordinates and altitudes.

c. If no remote data indicators are available, slant range and azimuth may be transmitted from radar to CP by telephone. Present slant range from the range scope and present azimuth read from the PPI scope are converted in the CP to grid coordinates.

d. If the surveillance radar is not part of a battery fire control system, it will furnish altitudes when requested by the AAOR. If a gun battery radar is on surveillance, altitudes will be furnished by the battery CP, when requested.

Communication for Static Defense:

a. Primary nets.

(1) Two wire lines are laid to each battery and to the site of any individual surveillance radar. The first line, a *data line* running from the radar to the AAOR switchboard, may run to the CP if grid coordinates are read there. At the switchboard it is connected to form a "hot loop" with the battery plotters. The second line is the *command and intelligence line*. (This line will probably have to be used for administrative purposes during slack periods.) This *command and intelligence* net is a "hot loop" from the AAOR to every battery and to any individual surveillance

radar. The phones are manned 24 hours a day so that connection between them is instantaneous without the necessity of ringing. When time permits and the additional necessary wire is available, the command and intelligence lines are run directly to the AAOR and the "hot loop" is established by cord connections at the switchboard. If sufficient drops are available, the data lines are run through the switchboard to add to the flexibility of the system.

(2) Communication to OP's is by wire "hot loop" or radio.

b. Secondary net. In the event of failure of wire communications, the radio nets must be used. Intelligence is broadcast over the AAAIS net with reception at the batteries by the SCR-593's. Data from the batteries must of necessity flow over the command radio net to the AAOR. Command and administrative messages may be transmitted over either the AAAIS net or the command net. The radio set at the

AAOR is the net control station. Strict radio discipline must be enforced.

Action when target is identified as hostile:

a. When targets have appeared on the situation or operations board, and a raid seems likely, the AAOO alerts all batteries, using the command and intelligence net. He gives them the location of the target or targets, in grid coordinates, and any pertinent information about the target which is already available. All radars go "on-the-air" upon receipt of this warning. If necessary, while the battery radars are getting "on target," the plot observer gives them subsequent reports in grid coordinates. The batteries plot this information on a plotting board.

b. As soon as a battery radar is on target, the AAOO orders the radar to pass plots. If more than one battery is on the same target, the AAOO or plotter orders the battery least favorably sited to cease passing plots. If two or more radars are each on a different target, the batteries pass plots in rotation, upon instructions from the plotter.



Recommended Training Films On AAA- And Guided Missiles

16mm with sound—All unclassified.

No. 219—V-2 Rocket—Assembling and Launching (White Sands, New Mexico) 20 minutes.

No. M1286—Defense of Antwerp Against the V-1. 20 minutes.

TF 1-3785, GUIDED MISSILES—Orientation of past developments showing V-1, V-2 (Peenemunde), surface to air and air to ground missiles. 27 minutes.

No. 219 and M1286 are Signal Corps films and TF 1-3785 is an Air Force film.

These films are furnished to Reserve, National Guard and Regular Army units and organizations upon request. Requests for the three films should be submitted to the Central Film Library at the Headquarters of the Army in which the organization or individual is located. Letters should be addressed to the Commanding General of the Army, Attention: Signal Officer. The following list shows the addresses of the Armies:

First Army—Governors Island, New York 4, New York.

Second Army—Baltimore 19, Maryland.

Third Army—Atlanta 3, Georgia.

Fourth Army—Fort Sam Houston, Texas.

Fifth Army—Fort Sheridan, Illinois.

Sixth Army—Presidio of San Francisco, California.

Military District of Washington—Fort Myer, Virginia.

In the event the guided missile film is not available at an Army Central Film Library, it may be obtained from one of the following Air Force Control Film Libraries:

Hq. Air Matériel Area, Olmsted Field, Middletown, Pa.

Hq. Mobile Air Matériel Area, Brookley Field, Ala.

Hq. Ogden Air Matériel Area, Hill Field, Ogden, Utah.

Hq. Oklahoma City Air Matériel Area, Tinker Field, Oklahoma City, Okla.

Hq. Sacramento Air Matériel Area, McClellan Field, Sacramento, California.

Hq. San Antonio Air Matériel Area, Kelly Field, San Antonio, Texas.

Hq. Warner Robins Air Matériel Area, Robins Field, Georgia.

Letters should be addressed to the Public Relations Officer at one of the Air Matériel Areas.

AAA MUST EXPAND —

AN EDITORIAL

In these troubled times, much public concern is being shown over the state of our defenses. Great stress is being laid upon immediate restoration of our air power to a strength that will give pause to any potential aggressor.

It seems appropriate at this time, therefore, to suggest for consideration the need for a great expansion of the AAA to meet the requirements for Air Defense of the United States and its defensive outposts.

By the fundamental precepts of our form of government, we shall never cast ourselves in the role of an aggressor nation. It therefore follows that we must either be prepared to absorb, neutralize or thwart the initial acts of aggression which an enemy directs against us before we shall be able to retaliate.

It is with the neutralization or thwarting action that we as Coast Artillerymen are really concerned.

The enemy will choose his own time, weather and place of attack and we must be capable of meeting this attack under conditions dictated by him.

Experience in the past war amply demonstrated that, even with overwhelming air superiority, we were not immune to small-scale air attacks. With the advent of the atomic bomb, the damage that can be inflicted by only a small number of airplanes which succeed in penetrating our defenses is painfully obvious. Unfortunately, air power alone, in its present state of development, cannot by itself provide an airtight defense. With adequate warning and under favorable conditions, it may be able to intercept and destroy enemy aircraft before they are able to reach the target areas. The AAA in World War II was the secondary line of defense and, often, the only defense when, due to bad conditions of weather, communications and terrain, the Air Force was unable to intervene effectively. The critical five-day period during the "Battle of the Bulge" provided an excellent example of this. In that instance, bad weather did not just constitute an unfortunate coincidence; the enemy carefully calculated his attack to conform to weather conditions favorable to himself and unfavorable to us.

Why was American antiaircraft used in the British Sector for the defense of Antwerp, designated by SHAEF as number one priority for defense? Why did the RAF desire AAA for the defense of this objective? Because the RAF knew it couldn't cope with the buzz bombs during periods of darkness and inclement weather. Why was American AAA chosen instead of British AAA? The answer is contained in the following extract from an official ETO document: "The decision to deploy U. S. battalions in the V-1 defense of ANTWERP was based upon the demonstrated superiority of the SCR 584—M9 Director—Automatic laying 90mm gun combination against flying bombs."

Our Air Force is second to none in the world, but it has its limitations. All Air Forces have the same limitations on the defense—they are unable to combat successfully mass attack during periods of inclement weather and darkness. Night fighters are effective but their operations are limited to the number that can be controlled from ground control intercept radars.

The answer obviously lies in the expansion of antiaircraft artillery. We now have the equipment to cope with any known aerial targets under all weather conditions.

As far as the future is concerned, we feel that present and progressive developments, such as the surface-to-air guided missile, will permit us to cope with targets of the future. Until we have newer and better weapons than were developed for World War II, we can and should have at hand and ready for use the best existent weapons for this purpose; especially since years may elapse before new weapons are mass produced and distributed to operating units trained in their use. Considerable quantities of antiaircraft equipment now in storage could be made available and distributed to units of the civilian components located in the vital areas of the country, for the relatively small cost of its rehabilitation and transportation thereto. While such a step would still not provide the airtight air defense we should like to have, it would, none the less, serve to materially improve our present situation.

Coast Artillery Journal

Fifty-seventh Year of Publication

COLONEL W. L. BRADY, Editor

LT. COL. DONALD MAC GRAIN, Associate Editor

DR. ANCEL ST. JOHN, Technical Adviser

M/Sgt. Fred P. Presnell, Business Manager

T/3 Beauford Z. Jones, Cir. Mgr.

S/Sgt. Bernice F. Carr, Bookkeeper

T/3 Leo. A. Donelon, Order Dept. Clerk



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.

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

The United States Coast Artillery Association

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

News and Comment

Infantry Association Proposes Merger

In a letter from General Haislip, President of the Infantry Association, to General Lutes, President of the Coast Artillery Association, a merger of our Association and JOURNAL with that of the Infantry was proposed. The Armored Cavalry and Field Artillery Associations received the same proposal for consideration.

The motivating factor behind the merger is the unification of the various associations and journals of the combat arms into one association and journal to increase the prestige and influence of the combat arms and to enable them to meet on the same level with the associations of the Navy and Air Force.

The proposal indicated that an enlarged monthly magazine would be provided subscribers in place of their regular branch magazine. The new journal would contain articles of general interest as well as articles pertaining to the particular branches.

This proposal was discussed by the Executive Council at the annual Executive Council meeting on 15 March 1948.

After a study of the proposal, it was decided that before presenting it to all our Association members for a vote, a letter should be written requesting clarification of certain phases and further explanation regarding assurance that the new journal would adequately meet our obligations to our subscribers.

After the terms of the proposal have been clarified to the satisfaction of the Executive Council, a circular letter will be sent to all Association members requesting a vote on the question. That letter would include complete details of the proposal and how it would affect our Association and subscribers.

Further details will be published in the next issue of the JOURNAL.

Provisional G.M. Battalion Activated

TO THE EDITOR:

I have activated a provisional guided missile battalion within my composite group and recently the commanding officer of the battalion and I made a trip to Fort Bliss to obtain additional information as to what facilities were available to us and what cooperation we could expect from the school. We received every consideration at the school as well as the Army Ground Forces Board Number 4 and the Proving Grounds at White Sands and were encouraged in every way to follow out with our provisional battalion. The officers at Bliss advised us that any and all of their facilities were available to us and went all out in their efforts to show us what they had and how it might work in with our plans.

Sincerely,

WILBURN V. LUNN,
Colonel, CA Res.

This Issue's Cover

The cover for this issue shows the Roosevelt Memorial Chapel designed and built by members of the 513th AAA Gun Battalion in Grace Park, Manila.

Since this issue is being published during the Easter season and since the 513th was attached to the 102d AAA Brigade being featured in this issue, the cover has a double significance.

CA Association Plaque Returned to 59th

A treasured possession of the old 59th Coast Artillery Regiment, a plaque presented to the unit in 1937 by the Coast Artillery Association, came home again on February 13, when it was presented to the reactivated 59th Antiaircraft Automatic Weapons Battalion at Fort Bliss.



Awarded to the 59th for outstanding performance in the Coast Artillery, the plaque was one of the unit's treasures on Corregidor. It was captured by the Japanese in 1942 and re-captured by United States troops in 1945.

Appropriately enough, the presentation ceremony came as one of the high points of the formal review with which Fort Bliss observed Veterans' Day of Rededication Week, preceding the visit of the Freedom Train to El Paso, Texas, adjacent to the Post.

Appropriately, too, the man who received the plaque on behalf of the 59th from Brigadier General Charles E. Hart, acting Commander of Fort Bliss, was Tec Sgt. Donald B. Bobb, veteran of service with the Regiment on Corregidor.

The 59th fought as Seacoast Artillery, Antiaircraft Artillery, and finally as Infantry, during the defense of the Philippines. In the end, its entire personnel was either killed or captured by the Japanese.

Inactivated in April, 1946, the unit was reactivated at Fort Bliss on January 1, 1948, as the 59th Antiaircraft Automatic Weapons Battalion. A General Reserve Unit, it is assigned to the Fourth Army and attached to the Antiaircraft and Guided Missiles Branch of The Artillery School at Fort Bliss as part of the 267th Antiaircraft Artillery Group. Lieutenant Colonel Charles F. Heasty is Battalion Commander.

Music for the review was furnished by the 62nd Army Ground Forces Band.

Participating troops included those of the 267th Group and the 29th Signal Light Construction Battalion.

To the Editor

I am very much pleased with the quotation you made on the reprint of guided missile articles.* At this time I could not make a definite estimate of the number that this office could sell. I feel sure that with publication of this information throughout the area of El Paso that we could easily take care of 200 copies with possibilities of selling more than that. I also believe that it is more than the Reserve Officer should have to pay.

I am anxious to see the above reprint as it will certainly be number one prerequisite for study by all personnel that are going to take and maintain an active interest in the guided missile battalions here. It is slowly building up and many requests are coming in for additional information. We are reluctant to make too large a jump initially along highly technical lines and therefore recommend that the reprint above be made at an early date as our first and most important steppingstone in the right direction. No other source of information as well written and understandable can be found at the present time.

This information will be sent to every officer and enlisted Reservist we have in the El Paso area and I also will ask The Senior State Instructor to relay the above information to all within the state.

I have made a request for ten selected officers to make the initial tour of California Institute of Technology and Inyokern, California, as indicated on the attached letter request. It includes tentative dates which were set back to take into consideration the abilities of the officers selected to arrange their civilian work in order that they can avail themselves of this opportunity. This is part of the unit training we planned for this summer as called for by Army Ground Forces.

I have three OR Instructors that I will send information to on your reprints; one in Chicago, two in Louisiana. How about the Instructors in Pittsburgh? Attached is a copy of a letter of request for information with a possible outlet for many of your reprints. I hope this will assist you in your planning and certainly wish to commend you on your tremendous boost to our morale in our period of blind flying.

Without the CAC JOURNAL we would have been many months further away from our present organization.

Sincerely,

t/W. L. SANDERS,
s/W. L. Sanders,
Lt. Col., Cav.,
Instructor.

*The writer refers to a project which we are contemplating covering the compilation of all JOURNAL guided missiles articles into a 76-page booklet. If this is done, it will be necessary to sell it at \$1.00 per copy to cover expenses.—See page 52.—Ed.

House Passes Bill to Pay Reserves

Legislation aimed at bolstering the Nation's Army and Air Force Reserves—now largely a "paper" force—into a

ready-to-go outfit nearly a million strong has been passed by the House.

Approved by unanimous voice vote was a Senate bill authorizing the reservists to be paid for weekly or biweekly drills on the same basis as National Guardsmen and Naval Reservists.

Three types of Reserves will be set up by the bill. "Class A," ground and air units, with full complements of officers and enlisted men, are provided, and should be ready for mobilization at the same time as the National Guard.

Members will spend one night a week in training and be paid a day's pay for the two-hour or more training period. They'd also take two weeks active duty each summer.

"Class B" units, with full officer complement and a skeletonized enlisted contingent, will train one night every two weeks with pay and go to summer camp once every three years. "Class C" units, composed of officers only, will be trained and paid on the same basis as the "B" organizations.

In addition, some pilots, radar technicians and other specialists also will be allowed inactive duty training pay under standards to be set by the Army and Air Force.

The House Armed Services Committee said that 66,808 Army and Air Force officers and enlisted men now are training two nights a month or more without receiving pay. By 1953, it is hoped that a force of 926,216 officers and men will be enrolled and taking the part-time training.

Annual Financial Report

In accordance with the constitution of the Coast Artillery Association, the following annual statements of the Association and JOURNAL are published for the information of all Association members and JOURNAL subscribers:

COAST ARTILLERY JOURNAL BALANCE SHEET—DECEMBER 31, 1947

ASSETS

CURRENT ASSETS:

| | | |
|-----------------------------------|--------------------|----------|
| Cash on deposit | \$ 7,005.76 | |
| Petty cash fund | 25.00 | |
| Accounts receivable: | | |
| Merchandise accounts | \$ 2,994.09 | |
| Subscriptions | 1,232.55 | |
| Army Times | 580.00 | |
| | <u>\$ 4,806.64</u> | |
| Less allowance for bad debts | 500.00 | 4,306.64 |

| | | |
|--------------------------|--|--------|
| Inventory of books | | 223.66 |
|--------------------------|--|--------|

| | | |
|---------------------------------|--|---------------------------|
| TOTAL CURRENT ASSETS ... | | <u>\$11,561.06</u> |
|---------------------------------|--|---------------------------|

FIXED ASSETS:

| | | |
|-------------------------------------|-------------|----------|
| Office furniture and equipment | \$ 8,208.66 | |
| Less allowance for depreciation .. | 5,732.36 | 2,476.30 |

DEFERRED CHARGES AND OTHER ASSETS:

| | | |
|--------------------------------------------------------|-----------|----------|
| Inventory of office supplies | \$ 941.47 | |
| Deposit with U. S. Government | | |
| Printing Office | 131.47 | |
| Deposit with Military Service Publishing Company | 2.09 | 1,075.03 |

| | | |
|---------------------------|--|---------------------------|
| TOTAL ASSETS | | <u>\$15,112.39</u> |
|---------------------------|--|---------------------------|

LIABILITIES AND NET WORTH

CURRENT LIABILITIES:

| | |
|------------------------|-------------|
| Accounts payable | \$ 1,796.31 |
|------------------------|-------------|

| | |
|-------------------------------------------------|---------------------------|
| Accrued excise tax payable | 18.49 |
| Credit balances, accounts receivable | <u>346.98</u> |
| TOTAL CURRENT LIABILITIES... | \$ 2,161.78 |
| DEFERRED INCOME | 5,607.02 |
| NET WORTH: | |
| Surplus balance, January 1, 1947 .. | \$11,202.17 |
| Add transfer of funds from CA Association | 7,000.00 |
| | <u>\$18,202.17</u> |
| Less net loss for the year ended | |
| 31 Dec 47 | <u>10,858.58</u> |
| Balance, December 31, 1947 | <u>7,343.59</u> |
| TOTAL LIABILITIES AND NET WORTH | <u>\$15,112.39</u> |

UNITED STATES COAST ARTILLERY ASSOCIATION BALANCE SHEET AS OF DECEMBER 31, 1947

ASSETS

| | |
|------------------------------------------|---------------------------|
| Cash in bank | \$ 1,709.42 |
| Accrued interest receivable | 450.00 |
| Investments: | |
| U. S. Government bonds, Schedule 1 | \$68,719.14 |
| Common stock | 160.00 |
| | <u>68,879.13</u> |
| TOTAL ASSETS | <u>\$71,038.55</u> |

NET WORTH

| | |
|-------------------------------------------|---------------------------|
| Surplus balance, January 1, 1947 | \$79,265.02 |
| Less: | |
| Transfer of funds to CA JOURNAL .. | \$ 7,000.00 |
| Excess of expenditures over receipts | 1,226.47 |
| | <u>8,226.47</u> |
| SURPLUS BALANCE, DECEMBER 31, 1947 | <u>\$71,038.55</u> |

The foregoing statements were accepted by the Executive Council of the Association at the annual meeting held 15 March 1948.

Although the JOURNAL statements shows a \$10,858.58 loss for the year 1947, a considerable portion of this was intentional. By this we mean that it would have been possible to publish articles by lesser known authors and authorities thereby decreasing the amount of remuneration paid for articles which particular expenditure represents about 30% of the publication cost.

The decision was made to obtain the best authors by paying them adequately for their efforts. Therefore part of the deficit actually represents a return of some of the accumulated assets to the subscribers who have kept faith with the JOURNAL during this critical period of reorganization of the Army.

This policy has paid dividends not only from the standpoint of subscriber satisfaction but has been instrumental in increasing the circulation approximately 25% during the past year.

With the increase in circulation, book and engraving business in addition to various economy measures, it should be possible to publish a JOURNAL of the same caliber during the coming year at a considerably less deficit and this deficit should become decreasingly smaller until within a very few years the JOURNAL should become self-sustaining

CAC Officer Promoted to General in the Reserve

H. Russell Drowne, Jr., was recently confirmed by Congress as a Brigadier General in the Organized Reserves in his capacity as Commanding General of the 305th AAA Brigade of New York.



General Drowne first entered the Army in 1918 as a private but graduated from the Fourth Officers' Training Camp and saw service as a first lieutenant with the 810th Pioneer Infantry and later aboard the U.S.S. *Zeppelin*.

At the conclusion of World War I, he completed his schooling at Princeton and then enlisted in the New York National Guard.

During the next twenty years he rose to the rank of Colonel and became Chief of Staff of the later deactivated 21st Cavalry Division (NYNG).

As Executive Officer of the 102d AAA Brigade, he entered Federal Service with that unit in February 1941 and served with it in New Guinea and Luzon.

Separated from the Service in March of 1946, General Drowne returned to his insurance business in New York but it wasn't long until his interest in the Coast Artillery made itself evident and in the fall of 1946 he organized and assumed command of his present unit, the 305th AAA Brigade (ORC).

Ski Paratroopers Reach 5.6 Miles Per Hour Speed

Skiing paratroopers at "Exercise Snowdrop" turned in speeds up to 5.6 miles per hour in an eight-mile cross-country ski race held at Pine Camp, New York.

The eight-mile race, part of a winter field meet, was part of the conditioning program for airborne troops. The winner, Corporal George A. Fanning, of Auburn, Washington, completed the course in eighty-three minutes.

Average speed for the fifty officers and men participating in the race was 4.25 miles per hour.

Other events in the winter field meet included a 200-yard 75-millimeter howitzer pull by five-man teams.

Personnel Director Enlarges on Extended Active Duty Cut

Lieutenant General Willard S. Paul, Director of the Personnel and Administration Division, Army General Staff, has elaborated on a recent announcement by the Department of the Army that non-Regular officers on extended active duty must meet certain age-in-grade requirements.

Numerous applications have been received from officers for exceptions on their behalf, General Paul said, but added, "It is necessary that we reduce the total commissioned personnel of the Army. This will be accomplished in two phases; first, by reducing the number of non-Regular officers on extended active duty, and secondly, by application of the Officer Personnel Act of 1947, to reduce the number of Regular officers on the active list.

"We believe the program published to be not only in the best interests of the service, but also the fairest to those concerned," General Paul said. "The several thousand officers on extended active duty who must be subtracted are identified by being over-age in grade. The ages applied to ranks are identical with those for the Regular service, insofar as those now on extended active duty are concerned. The ages applicable to those who in the future elect to accept extended active duty are the same or older than those which apply to the Regular establishment under the Personnel Act.

"The question has arisen as to whether an officer on extended active duty holding a Reserve commission higher than the grade in which he is serving on extended active duty, may use that higher age to his preferential treatment in remaining on active duty. In order to accomplish the required reduction without detriment to officers on extended active duty who are within the age limits and without penalizing those who have elected the military as a career, it is necessary that the individual be treated in accordance with the rank in which he is now serving on extended active duty."

Journal Used as G.M. Text

TO THE EDITOR:

Again I feel the urge to congratulate the JOURNAL on its superior articles and especially those pertaining to the subject of guided missiles.

In my present assignment as senior instructor of CAC units in the Chicago Area, I have an urgent need for the back issues of the JOURNAL in which guided missiles articles have already appeared. By placing some of these in the hands of our instructors who have been selected from the ORC units, it is felt that we are supplying them with the material needed to prepare their talks and at the same time introducing CAC officers to their Service JOURNAL.

I am trusting that I will be at one address long enough to receive my personal copy to be sent to me at the address shown following my signature.

I will remit for the extra copies and one year subscription when you advise me of the amount.

Sincerely,

t/CHARLES E. HOWARD,
s/Charles E. Howard,
Lt. Colonel, CAC.

Kenneth C. Townson Confirmed as Reserve General

Kenneth C. Townson was recently confirmed by Congress as a Brigadier General and has been assigned as Commanding General of the 98th Infantry Division.



General Townson began his Army career in 1916 as a private in the New York Guard Cavalry. During the first World War, served in the 310th Cavalry and 58th Field Artillery and was attending Officers' Candidate School when the war ended.

He enlisted in the New York National Guard in 1919 and rose to the rank of Colonel, commanding the 121st Cavalry. After being out of the service for several years, he was chosen to organize and recruit the newly activated 209th Coast Artillery (AA) in Western New York during the fall of 1940. The Regiment entered Federal Service in February 1941 and saw service in Northern Ireland, North Africa and Italy. General Townson commanded the Regiment, later the 209th AAA Group, throughout its entire service and was separated from the Service in January 1946. In addition to commanding the 209th AAA Group, he served as AA Officer on the staffs of 1st Armored Division, II Corps and Fifth Army.

General Townson returned to the stock brokerage business in Rochester, N. Y. and during 1947 organized and assumed command of the 98th Infantry Division (O.R.C.).

U.S. Hotel Thayer Available for Conventions

The United States Military Academy announces the completion of the new addition to the U. S. Hotel Thayer, located on the reservation near the South Gate.

The U. S. Hotel Thayer is owned and operated by the government. With the increased accommodations, excellent facilities are available for military or patriotic groups to hold their meetings and conventions. Organizations of World War II will find the Thayer a splendid location for their reunions. For information, write to the Resident Manager, U. S. Hotel Thayer, West Point, N. Y.

Recapitulation of Articles on Guided Missiles Which Have Already Appeared up to 29 February 1948, in the Coast Artillery Journal.

1. Launching.

(The Launching of Guided Missiles by Dr. R. E. Gibson and Dr. A. Kossiakoff, March-April 47.)

2. Propulsion.

(Jet Propulsion Devices by Captain G. H. Drewry and Dr. A. St. John, November-December 46.)

(Jet Propulsion—Past, Present and Future by Captain C. R. Tosti and Mr. J. B. Tuzen, May-June 47 and July-August 47.)

A. Rockets.

(Rocket Propulsion by Dr. L. G. Dunn, July-August 47.)

(Rockets & Space Travel by Mr. W. Ley, September-October 47.)

(Rockets and Their Fuels by Mr. W. Ley, November-December 47 and January-February 48.)

B. Jets.

(1) Mechanical.

(Jet Propulsion—Past, Present and Future by Captain C. R. Tosti and Mr. J. B. Tuzen, May-June 47.)

(2) Thermal.

a. Pulse Jet.

(The Pulse Jet by Mr. E. J. Manganiello, January-February 48.)

b. Ramjet.

(The Flying Stovepipe—How It Works by Major J. P. D'Arezzo and Major W. B. Sigley, January-February 47.)

c. Turbo-jet.

(The Turbo-jet by Mr. E. S. Thompson, July-August 47.)

3. Guidance and Control.

(Stabilization and Control of Rockets by Dr. G. E. White, July-August 46.)

(Guidance for Missiles by Dr. G. E. White, November-December 46.)

4. Warheads.

(Warheads for German AA Guided Missiles by Mr. W. H. Wallace, March-April 47.)

(Warheads for Guided Missiles by Colonel H. S. Morton, November-December 47.)

5. Aerodynamics.

(Article by Colonel P. Dane, Aircraft Laboratory, Wright Field, Dayton, Ohio, will appear in a future issue.)

Four States Complete Organization of National Guard Antiaircraft Units

Four States have completed organization of all their assigned National Guard antiaircraft artillery units. They are Rhode Island, Maine, Alabama and Texas.

Federal recognition of its Medical Detachment, located at Providence, completed organization of Rhode Island's 705th AAA Gun Battalion. Previously, the 243rd AAA Automatic Weapons Battalion had completed organization. Headquarters for both battalions are in Providence.

Texas was the first State to complete organization of her antiaircraft artillery allotment, the 696th AAA Automatic Weapons Battalion, with headquarters in El Paso.

The Alabama units are the 711th AAA Gun Battalion, of Talladega; the 464th AAA Automatic Weapons Battalion, of Mobile and the 104th AAA Automatic Weapons Battalion, of Florence.

Maine's units are the 703rd AAA Gun Battalion of Portland and the 314th AAA Automatic Weapons Battalion of Bangor.

Most of the network of 123 antiaircraft battalions that cover the Nation have part of their assigned units already organized. The average AAA Battalion has six component units including its Medical Detachment.

* * *

Additional National Guard Units

The following National Guard Coast Artillery Corps units have been Federally recognized since the last issue of the JOURNAL:

California:

Battery "A," 681st AAA AW Battalion, Redwood City.
Battery "D," 682d AAA AW Battalion, Norwalk.

Connecticut:

238th AAA Gun Battalion, New London.
Battery "A," 745th AAA Gun Battalion, Norwich.
712th Ordnance Maintenance Company, AA, Windsor Locks.

District of Columbia:

Battery "B," 260th AAA Gun Battalion, Washington.
Battery "C," 260th AAA Gun Battalion, Washington.
Battery "C," 380th AAA AW Battalion, Washington.
Medical Detachment, 380th AAA AW Battalion, Washington.

Georgia:

Battery "C," 101st AAA Gun Battalion, Swainsboro.

Massachusetts:

Headquarters & Headquarters Battery, 104th AAA Brigade, Boston.
Headquarters & Headquarters Battery, 211th AAA Group, Boston.
Headquarters & Headquarters Battery, 220th AAA Group, Fall River.
Headquarters & Headquarters Battery, 324th AAA Gun Battalion, New Bedford.
Battery "B," 685th AAA AW Battalion, Plymouth.
Battery "C," 685th AAA AW Battalion, Falmouth.
Battery "D," 685th AAA AW Battalion, Hyannis.
Medical Detachment, 685th AAA AW Battalion, Plymouth.

Headquarters & Headquarters Battery, 704th AAA Gun Battalion, Boston.

Headquarters & Headquarters Battery, 747th AAA AW Battalion, Fall River.

Minnesota:

Battery "D," 598th AAA Gun Battalion, Duluth.
Battery "A," 257th AAA AW Battalion, Cloquet.

New Hampshire:

Battery "A," 210th AAA AW Battalion, Berlin.
Medical Detachment, 210th AAA AW Battalion, Berlin.

New Jersey:

Headquarters & Headquarters Battery, 122nd AAA Gun Battalion, Camden.
Medical Detachment, 309th AAA AW Battalion, Jersey City.
Battery "C," 311th AAA AW Battalion, Jersey City.

New York:

Battery "B," 245th AAA Gun Battalion, Brooklyn.
Battery "D," 245th AAA Gun Battalion, Brooklyn.
Battery "A," 336th AAA AW Battalion, Utica.
Medical Detachment, 870th AAA AW Battalion, New York City.
812th Coast Artillery Battery (HD), New York City.
985th Coast Artillery Battery, AMTD, 90mm, New York City.

Nevada:

Headquarters & Headquarters Battery, 421st AAA Gun Battalion, Las Vegas.
Medical Detachment, 421st AAA Gun Battalion, Las Vegas.

North Carolina:

Headquarters & Headquarters Battery, 252d AAA Group, Wilmington.

Pennsylvania:

Battery "A," 337th AAA Gun Battalion, Reading.
Battery "B," 416th AAA AW Battalion, Philadelphia.
Battery "B," 688th AAA AW Battalion, Allentown.
Headquarters & Headquarters Battery, 708th AAA Gun Battalion, Pittsburgh.
Medical Detachment, 708th AAA Gun Battalion, Pittsburgh.
Battery "D," 709th AAA Gun Battalion, Philadelphia.
Battery "B," 899th AAA AW Battalion, Lancaster.

Rhode Island:

Medical Detachment, 705th AAA Gun Battalion, Providence.

Virginia:

Battery "A," 710th AAA Gun Battalion, Newport News

* * *

"Exercise Yukon" Completes Largest Air-Ground Problem

In the largest joint Air-Ground problem held since unification of the Armed Forces, giant cargo planes of the Twelfth Air Force Troop Carrier Group, McChord Field, Washington, transported infantrymen of "Yukon 'D'" from Fort Lewis, Washington, to Nome, Alaska.

This 3,000-mile air lift—the longest airborne problem to date—was accomplished with intermediate stops at Great Falls, Montana, and Big Delta, Alaska.

This problem was executed in connection with "Exercise Yukon," which consists of 250 officers and men under the command of Lieutenant Colonel William Preston, engaged in developing tactics for a winterized, airborne infantry near an airport in Western Alaska. "Exercise Yukon" also served as an air indoctrination course for the men of the 2d Infantry Division, Fort Lewis, Washington, and supplemented other tests conducted by Army Ground Forces of men and matériel under extreme climatic conditions.

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Headquarters, AGF, Redesignated Office, Chief, Army Field Forces

Headquarters, Army Ground Forces, has been redesignated Office, Chief, Army Field Forces. The change involves not only the name but also the functions of the organization.

The new office will be the field operating agency of the Department of the Army within the continental United States. It will have general supervision, coordination and inspection of all matters pertaining to the training of all individuals and units utilized in a field army. This will include Army combat, service and administrative units, Organized Reserve Corps units and Reserve Officers' Training Corps units.

Supervisory and coordinating functions of the new Office, Chief, Army Field Forces will include the training and inspection of all Army units of the National Guard, the training aspects of the National Security Training Program, all aspects of training affecting the field armies at all schools, the preparation of all literature pertaining to the training of individuals and units utilized in a field army, and the supervision of such boards as are necessary to insure continued research and development of items of equipment in which units assigned to a field army have a primary interest and initiate requirements for those items.

The six Armies of the United States formerly commanded by Army Ground Forces, will now be directly responsible to the Chief of Staff, United States Army. The Commanding General of each of the Armies and the Military District of Washington will command all units and installations within their area except those under the control of a chief of a service or another Department of the Army agency.

The Office, Chief, Army Field Forces, will remain at Fort Monroe, Virginia, where the headquarters of Army Ground Forces is located at the present time. General Jacob L. Devers will continue as Chief, Army Field Forces.

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National Guard Commissions Open To Former Enlisted Men

Major General Kenneth F. Cramer, Chief of the National Guard Bureau, has announced a new policy on the direct appointment of second lieutenants to the National Guard that materially increases the number of former enlisted men who can now qualify for commissions.

Former enlisted men of all grades having a minimum of six months service in the Army of the United States between December 7, 1941, and June 30, 1947, are now eligible for direct appointment as second lieutenants in

the National Guard if they meet the following requirements:

(1) They are graduates of an accredited college or university where no advanced Reserve Officers Training Course was given or, if it was given, their period in school before graduation was too short to permit them to complete the ROTC course.

(2) They are 21 years old and have not passed their 28th birthday at the time of appointment in the Guard.

Commissions as second lieutenants in the National Guard are also open to advanced ROTC graduates without previous military service.

Hitherto, direct appointment as second lieutenants was limited to eligible warrant officers and enlisted men of the first three grades whose war record attested their professional fitness.

/ / /

House Passes Reserve and R.A. Retirement

The House of Representatives has passed and sent to the Senate the bill to provide for retirement of Regular Army and Regular Air Forces Officers and to set up a retirement system for all reserve components.

Passage came after two hours' debate and acceptance of 20 or 30 clarifying technical amendments, with the amended title to the measure to read:

"To provide for the elimination of Regular Army and Regular Air Force Officers and for the retirement of officers, warrant officers, and enlisted men of the Regular Army and the Regular Air Force, and to provide retirement benefits for members of the Reserve components of the Army of the United States, the Air Force of the United States, United States Navy and Marine Corps, and Coast Guard."

As finally passed, the measure provides for Army and Air Force retirements in highest rank and a system of forced elimination for the Army and Air Force and creates a system of non-disability retirements for personnel of the National Guard and the reserve components of all the Armed Services.

No serious opposition developed at any time during the debate, but Representative Walt Horan (R.-Wash.) did bring up estimated cost of the retirement system provided in the bill.

Representative Johnson said that \$51,000 would be enough during the first year the law was in effect, and would run up to as much as \$11,000,000 a year within 10 years, and perhaps to \$33,000,000 a year within 30 years.

"Considering the astronomical figures of the cost of national defense, these costs are rather nominal," he said. This reply laid to rest any further objections from the cost angle.

At no time during the debate was there any serious opposition voiced, and except for the delay of clarifying amendments, the measure moved smoothly through to a resounding passage by voice vote.

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Our Apologies to "The Military Engineer"

In the January-February issue of the JOURNAL, we neglected to mention that the article, "German Underground Installations" by Major General C. F. Robinson, was reprinted from the November 1947 issue of "The Military Engineer" and that the pictures accompanying the article were likewise provided by "The Military Engineer."

Coast Artillery Newsletters



ANTIAIRCRAFT SECTION, GHQ, FEC

TOKYO, JAPAN, APO 500

MAJOR GENERAL WILLIAM F. MARQUAT, *Antiaircraft Officer*

The first group of AAA technical instruction teams have nearly completed their courses of instruction and will soon be integrated into the AAA units. The next contingent of instruction teams is due to arrive in the Far East Command in May 1948. These teams will be assigned to AAA units in Japan and on Okinawa. Each six months thereafter new instruction teams are scheduled to be shipped from the ZI automatically.

Information has been furnished the Department of the Army on the station location and the number of OQ aerial power driven radio controlled airplane target units in the Far East Command. Department of the Army requested this information so that a station location file of all OQ target units could be established. This will facilitate replacement of targets expended on training missions and enable the Department of the Army to advise using agencies of latest maintenance and engineering data concerning the use of this equipment.

The Administrative History of the Antiaircraft Section

as a Special Staff section of General Headquarters, United States Army Forces in the Pacific, has been completed and submitted to the Historical Section, GHQ, FEC. This covers the period from 6 April 1945 when GHQ, AFPAC, was established to 31 December 1946 when GHQ, AFPAC, was redesignated GHQ, Far East Command. The history will eventually find a resting place in the historical archives of the Department of the Army.

Major General Marquat received his permanent promotion to Brigadier General, Regular Army, and temporary promotion to Major General, AUS, on 24 January 1948.

Replacements have not yet been received for Lieutenant Colonels R. C. Leslie and R. T. Cassidy, who departed for the US in July 47. The Section has an authorized officer strength of 1 general officer, 1 colonel, 1 lieutenant colonel, and 1 chief warrant officer. Presently assigned to the section are Major General Marquat and CWO Robert P. Gilmore.



Editor's Note: As a result of suggestions that we abolish the Newsletter section, a canvas was made of certain officers concerned and it was the almost unanimous opinion of those contacted that this section be abolished at least as far as Regular Army units are concerned. Therefore in conformity with our policy to concede to the wishes of our subscribers this is the last issue in which newsletters of Regular Army units will be published. However as an aid to recruiting and morale we shall continue to publish letters pertaining to Reserve and National Guard units.



138TH ANTI-AIRCRAFT ARTILLERY GROUP

YOKOHAMA, JAPAN, APO 503

LIEUTENANT COLONEL ARTHUR L. FULLER,

Commanding

The officers and men of the 138th AAA Group joined in wishing a "Bon Voyage" to Lieutenant Colonel Alvin D. Robbins, Executive Officer of the Group, Major Victor E. Matteson, Commanding Officer of the 933rd AAA Auto Wpns Battalion and Major Lee B. Bolton, Executive Officer of the 76th AAA Auto Wpns Battalion, who, after completion of their tour of duty in this theater, have been reassigned to stateside duty. Major Thomas R. Lea will replace Lieutenant Colonel Robbins as Executive Officer of the Group. Major Harold L. Freshwater will command the 933rd in place of Major Matteson and the new Executive Officer of the 76th will be Captain Fred C. Evans.

Training is still the main objective within the Group and although security guard is the main duty, all battalions have maintained one battery on full-time intensified training during this period. This situation is becoming increasingly difficult, however, due to the heavy security guard requirements and the severe shortage of enlisted personnel. Every effort is being made to continue this training policy and to bring all anti-aircraft units in Japan up to the high standard of proficiency which is required of them. A request has been submitted for a new firing point and plans have been formulated whereby all units may fire a service and record practice during the coming year.

A Department of the Army technical instruction team (Gun) and one of the AAAIS-AAOR instruction teams continued to function within this command. The gun team has completed a series of two-week courses for the officers of the gun battalion and is now conducting a similar school for noncommissioned officers. The AAAIS-AAOR team has returned from Korea, where it conducted a school for the 865th AAA AW Battalion (SP), and is now engaged in AAAIS instruction for the two Automatic Weapons battalions here in Japan. The remainder of the instruction teams formerly assigned to the Group have been absorbed by this and other commands. The instruction given by these teams aided considerably in raising the technical knowledge of all officers and men who received the instruction.

Officer's schools, as prescribed by WDTC No. 5, 1947, are nearing completion within the Group. It is anticipated that all officers, unless otherwise excused, will have completed the prescribed courses by 15 March 1948. Instruc-

tion has been excellent throughout, especially in the Military Government and Intelligence sub-courses where the appropriate section officers from Headquarters Eighth Army conducted the courses. Many policies, practices and actual experiences, which could not have been found in any field manual were brought out by the instructors.

The group now has three first lieutenants on competitive tours for RA appointments. They are: First Lieutenant Kenneth G. Ring—76th AAA Automatic Weapons Battalion (SP), First Lieutenant Michael J. Malone—753rd AAA Gun Battalion and First Lieutenant Lawrence K. Hannon—933rd AAA Automatic Weapons Battalion.

Tec 5 Robert B. Amerson, 753rd AAA Gun Battalion departed on 13 January 1948 to attend the West Point Preparatory School.

Technical Sergeant James Heard, Btry C, 933rd AAA Auto Wpns Battalion was awarded a ten-day naval cruise in the waters of the Far East. Sergeant Heard was selected as the outstanding soldier of the year by the officers and men of the 933rd, and further selected by the Group commander from several other applicants from the other units in the Group as worthy of this trip.

The following arrivals and assignments of officers occurred during this period:

753rd AAA Gun Battalion—First Lieutenant Michael J. Malone.

933rd AAA Automatic Weapons Battalion—First Lieutenant Lawrence K. Hannon and CWO Martin E. Pollard.

76th AAA Automatic Weapons Battalion (SP)—Captain (chaplain) Beverly M. Ward, First Lieutenant Myron Feld and CWO Walter L. Ward.

The following officers departed from the 138th AAA Group during this period:

For return to the Zone of the Interior: Lieutenant Colonel Alvin D. Robbins, Major Lee B. Bolton, Major Victor E. Matteson, Captain Lawrence Lane, Captain Mitchell Kohn Jr., First Lieutenant Albert C. Johnson, First Lieutenant Travis T. Bryan Jr., First Lieutenant William B. Ogg, First Lieutenant Robert L. Dunn, First Lieutenant Edward J. Skaggs.

For reassignment within Japan: Captain Harold F. Via, First Lieutenant Jack Way, First Lieutenant Christopher F. Stroman, First Lieutenant Joseph J. Carr, WOJG George McDonald.

The following officers have been promoted from second lieutenant to first lieutenant:

| | |
|-----------------------|------------------------|
| Alvin Ash | Stanley J. Lane |
| Shirley S. Ashton | Daniel R. Moriarity |
| Rennie C. Coleman Jr. | Alexander J. Papatones |
| Elmo C. Cunningham | William R. Parker |
| Horace F. Derrick | Ernest A. Pepin |
| John W. Dwyer III | Eugene V. Pfauth |
| James S. Elliot | Howard E. Pleuss |
| Philip A. Ferris | George J. Porter |
| John C. Geary | Thomas G. Provenzano |
| Meridith W. Ghrist | Robert I. Rush |
| Daniel W. Hickey II | Dudley S. Stark |
| Thomas V. Hirshberg | Blucher S. Tharp Jr. |
| Harold W. Horne | Samuel H. Title |
| Henry V. Ingham II | Prentice E. Whitlock |
| Robert J. Kane | John S. Wieringer |



OKINAWA, APO 331

COLONEL SHUEY E. WOLFE, *Commanding*

The Ryukyus Command has been blessed with the services of a quantity of AAA officers and is now making a strong bid for the new title, "The Post War Crossroads For AAA." This Group, however, has a number of vacancies and we are always happy to greet newcomers to our midst. Among the late arrivals on the island is our new Commanding Officer, Colonel Shuey E. Wolfe, who assumed command of the 87th AAA Group (PS) on the 12th

of January for his third tour in the Pacific.

1st Lt. Roy L. Wood, who commanded Battery C, 511th AAA AW Bn (PS) departed this command recently to begin a competitive tour of duty in Japan for integration into the Regular Army.

Training within the Group is continuing for the headquarters batteries and one line battery from each of the 532d AAA Gun Battalion (PS) and the 511th AAA AW Battalion (PS), the other line batteries being utilized on service and security missions. During recent months, the battalions have each constructed a skeet range and the 532d recently completed a new 1000-inch rifle range to assist the training effort. Plans are well under way for the scheduled firing of both 120mm guns and Automatic Weapons by the training batteries in April. It is anticipated that both PQ and OQ targets will be available for use during this firing.

The Special Services and Information and Education Programs play an important part in the lives of members of the Armed Forces on our remote little island, in that they must provide all the entertainment and recreational facilities that can be made available here. Quotas are allotted for six-day leaves at the Rest Center in Japan, a leave program is in effect for Philippine Scouts personnel to take leave in the Philippine Islands, and the Ryukyus Command maintains two Rest Centers here on the island. In line with the development of recreational facilities, the 511th at Kuba-Saki recently completed a 35mm theater in a large Butler Building and are now attracting large crowds to their scheduled showings.



102D ANTI-AIRCRAFT ARTILLERY BRIGADE

NEW YORK NATIONAL GUARD

COLONEL WILLIAM H. HAMILTON, *Commanding*

1. Units within the Brigade have continued during the past weeks in their respective recruiting drives with results more than satisfactory. Brigade Headquarters Battery had initiated a new all-out effort, and inducements in the form of a completely refurbished battery parlor and a soon-to-be-installed television set give promise and indication of the attaining of maximum strength in the very near future.

2. The 212th AAA Group, containing the 212th AAA AW Battalion & the 773d AAA Gun Battalion, are continuing their training per schedule. On 26 February 1948 a Recruit School was begun by the 212th for the explicit purpose of "facilitating and expediting training." Monthly recruiting contests have been inaugurated with cash prizes to be awarded to the top three recruiters. A total of forty recruits in the first three weeks of February augurs well for the future. As a further incentive, an EM dance, to which

prospective recruits were invited, proved a huge success on 23 February 1948.

3. The 223d AAA Group, comprised of both the 245th and 715th AAA Gun Battalions, has arrived at that stage of organization where a final recruiting effort will result in the attainment of maximum strength.

Two batteries of the 223rd received Federal recognition on the evening of 15 January 1948, and Headquarters Battery reports only a few empty spaces in its T/O chart. Coincident with these activities is the birth of "The Cannon Roar," a new monthly publication of 223rd activities.

4. The 369th AAA Gun Battalion, the 870th AAA AW Battalion, & the 369th Radar Maintenance Unit, all comprising the 369th AAA Group, conducted the Indoor Track Meet on 12 March 1948 which was mentioned in our newsletter. Further information indicates that this Meet, run under 369th auspices by the New York Pioneer Club and the Boys of Yesteryear, Inc., provided a fitting conclusion for the Metropolitan New York Indoor Season.

The publicity which the Group and its units received as a result of this Meet cannot fail to materially aid in recruiting and other activities.



51ST AAA BRIGADE

PENNSYLVANIA NATIONAL GUARD

MAJOR GENERAL CHARLES C. CURTIS, *Commanding*

Pennsylvania's 51st AAA Brigade commanded by Major General Charles C. Curtis, has received notification from the Department of the Army to begin the conversion of all searchlight battalions into mobile Automatic Weapons and Gun battalions respectively. The elimination of searchlight battalions from the tables of organization of antiaircraft artillery is primarily due to the application of radar in all types of antiaircraft gunnery under normal circumstances. To date, the new battalions have not received gun equipment but it is expected that in the very near future, the necessary items of equipment will be received. Personnel changes to comply to the new unit strength have already been effected. The 337th and the 724th AAA Searchlight Battalions have been converted to Gun Battalions according to the recent changes.

In addition, further changes have been effected to increase the mobility of antiaircraft units. All semi-mobile units have been changed to mobile units which will require additional personnel and equipment to effect the change.

The 73rd, 707th, 708th, and 709th AAA Gun Battalions and the 416th, and 899th AAA Automatic Weapons Battalions have been converted from semi-mobile to fully mobile units.

The 213th AAA Group, commanded by Colonel Harry A. Markle, is making preparations for the observation of First Defenders Day on 18 April 1948. The history and traditions of the regiment are such that they can be justly proud.

Among the first troops to report for service in the Continental Army were two of the original units of the "First Defenders." Both organizations became famous for their action and were given considerable mention in Thatcher's *Journal of the Revolution*. General Washington, in General Orders, thanked them for gallantry in the skirmish at Lerchmeres Point, near Boston.

During the War of 1812 the Regiment again offered its services and garrisoned the defenses of the Delaware River which protected the city of Philadelphia.

The Mexican War saw it fighting side by side with Scott's Army from the siege of Vera Cruz to the occupation of Mexico City.

The Civil War again called into service the First Defenders. They were the first troops to respond to the call of President Lincoln and to reach Washington after passing through the mob at Baltimore. They reached the capital at 7:00 o'clock in the evening of 18 April 1861. President Lincoln went to the Capitol to personally thank them and

shook the hand of each soldier after stating that he had not come to make a speech but to give his personal thanks and extend the thanks of the nation to its First Defenders. Congress voted Congressional Medals and thanks in the following resolution:

37th Congress of the United States

July 22, 1861.

Resolved, That the thanks of this House is due and hereby tendered to the 530 soldiers from Pennsylvania, who passed through the mob of Baltimore, and reached Washington on the eighteenth of April last for the defense of the national Capital.

Signed,

GALUSHA A. GROW.

Speaker of the House of Representatives.

Upon the declaration of war with Spain the First Defenders were again mustered into Federal service.

During World War I the Fourth Regiment Infantry, Pennsylvania Guard, the new designation of the First Defenders was split between the 42nd and 28th Divisions of the A.E.F.

In 1919, the First Defenders were reorganized as the First, Second and Third Separate Battalions Infantry, Pennsylvania National Guard. In 1921, these battalions were organized into the First Provisional Infantry Regiment and finally, on 1 May 1922 they were designated by the War Department as the 213th Artillery Antiaircraft and on 1 August 1924 as the 213th Coast Artillery (antiaircraft).

The First Defenders, on 16 September 1940 were inducted into Federal service by Presidential Order. The regiment, commanded by Colonel Charles C. Curtis, undertook an intensive training program at Camp Pendleton, Virginia Beach, Virginia, and Camp Stewart, Georgia. Within hours after the Pearl Harbor attack it was sent to the protection of New York City. In 1942 the First Defenders were among the first troops to make the initial landings in Africa. The Regiment participated in campaigns in Africa, Italy and Southern France.

In 1945, the 213th was again reorganized as the 213th AAA Group, a component of the 51st AAA Brigade, commanded by Major General Charles C. Curtis, the former regimental commander. Since its reorganization under the command of Colonel Harry A. Markle, the 213th AAA Group will again undergo intensive training and preparation in readiness to answer its country's call to arms.

The facts contained in the above history have been embodied in the heraldic design of the regimental coat-of-arms embroidered on the regimental standard, the shield of which is worn by members of the 213th AAA Group as a distinctive badge.



74TH AAA BRIGADE, ORC

CHICAGO, ILLINOIS

COLONEL THOMAS F. MULLANEY, JR., *Commanding*

Since the first of the year, activities of the 74th AAA Brigade, Chicago, have been focused as closely as possible on matters having a direct bearing on unit training. In line with this policy, the Brigade is now conducting its own monthly meetings with the attached 168th Operations Detachment, instead of meeting jointly with 564th AAA Composite Group and 383rd AAA AW Battalion (SP), as formerly. The new arrangement, it is felt, is better suited to the more advanced training now being conducted by all units.

Training of 74th Brigade will be further augmented by the fact that the unit has recently been assigned permanent

headquarters space in the Organized Reserve Sub-Office building at 226 West Jackson Boulevard, Chicago and thus is now in a position to draw such items of T/E equipment as are currently available to reserve units. Sectional training of Headquarters and Headquarters Battery personnel will be begun at the earliest possible date.

Headquarters, 5th Army has indicated that 74th AAA Brigade will be ordered to two weeks active duty training at Fort Riley, Kansas this coming summer, probably the first two weeks in August. The Brigade was formally recognized by the War Department as a Class "B" reserve unit 9 September, 1947.

Another AAA unit now meeting regularly in Chicago is 441st AAA AW Battalion, activated last September. Commanding the new unit is Lieutenant Colonel Jesse L. Butler, formerly attached to Hq, 74th AAA Brigade as Assistant S-3.

**197TH AAA GROUP**

NEW HAMPSHIRE NATIONAL GUARD

COLONEL ALBERT S. BAKER, *Commanding*

Antiaircraft Artillery units which comprise the 197th Antiaircraft Artillery Group, New Hampshire National Guard, have rung up three "firsts" in the drive to organize and train the new National Guard since the beginning of the calendar year.

With federal recognition of Battery A, 210th Antiaircraft Artillery Battalion of Berlin, on 28 January, the Group became the first in New Hampshire to complete federal organization of its presently authorized firing units. The Group now has attached to it the 210th AAA AW Battalion, less two firing batteries, and the 744th AAA Gun Battalion, less two firing batteries. Lack of armories is preventing organization of the other firing batteries for the time being.

Since the first of the year, the organized units have gained 20 per cent in aggregate strength.

On 9 February, Headquarters and Headquarters Battery, 197th AAA Group became the first National Guard organization in New Hampshire to submit to the annual Federal armory inspection since World War II and came out with flying colors.

Inspecting officers were Colonel Arthur L. Lavery, Senior Instructor for Organized Reserve Activities in New Hampshire, and Major K. A. Noseck, from Headquarters First Service Command. The official report of the inspection commended the organization for its excellent records and

standards of administration. The annual State inspection was conducted at the same time and was made by Captain Lloyd T. Olmstead, IGD, attached to the Office of the New Hampshire Adjutant General.

On 6-7 March, Colonel Albert S. Baker assembled the staffs of the Group, the 210th and 744th for the first Command Post Exercise conducted in New Hampshire under the auspices of First Army.

In his critique at the conclusion of the exercise, Colonel Baker congratulated the commissioned and enlisted participants on the spirit and enthusiasm with which they entered the problem and their demonstrated capacity to grasp the problem and effect the required solutions.

This exercise was supervised by Colonel Carroll A. Bagby, Senior Army Ground Force Instructor, Colonel Ola A. Nelson, his Executive Officer, and Colonel William G. Holder, 197th Group Unit Instructor.

Battalion commanders participating in the exercise were Captain Paul Jacobs of the 210th and Major Arnold D. Cutting of the 744th. In all, 16 officers and 21 enlisted men participated.

Purpose of the problem was to develop staff procedures and illustrate the flow of information and orders between Antiaircraft Artillery units. The problem involved a theoretical force of 1600 troops and was set up to acquaint the members of the newly formed staffs, many of whom have had no AAA combat experience, with their various duties in connection with mobilization, concentration and movement of troops from home stations to a defended area.

Brigadier General Charles F. Bowen, The Adjutant General, observed the Federal Armory Inspection and the CPX.

105th Antiaircraft Artillery Brigade

NEW YORK NATIONAL GUARD

BRIGADIER GENERAL KARL F. HAUSAUER, *Commanding*

The 105th AAA Brigade, Buffalo, N. Y., to which anti-aircraft artillery units of the New York National Guard outside the New York Metropolitan area are assigned has been Federalized since 8 July 47. The major Federalized commands assigned to the 105th AAA Brigade are the 207th AAA Group, Colonel William L. Immer, Commanding, Albany, N. Y., and the 209th AAA Group, Colonel Alfred H. Doud, Commanding, Rochester, N. Y. These units as well as those assigned to them have reported satisfactory recruiting.

Located with Brigade Headquarters in the Delavan Armory, Buffalo, N. Y., are Headquarters Battery, 105th AAA Brigade, Captain William E. Francisco, Command-

ing; 105th AAA Operations Detachment, Major Charles H. Henne, Commanding; and the 421st Signal Radar Maintenance Unit, First Lieutenant James G. Cook, Commanding. Each of these units obtained its assigned quota of recruits in the recent, nation-wide, National Guard recruiting campaign known as Operation 88,888. In training the units at Brigade Headquarters have almost completed the first three months of the six-year National Guard Training Program.

At a recent meeting in the Armory, officers of Brigade Headquarters together with members of the Buffalo Army Advisory Committee were treated to an interesting program consisting of several movies and a talk by Dr. Will Duke of Cornell Aeronautical Laboratory, Buffalo, N. Y., on guided missiles. It is hoped that by contacting some of the many industrial and educational establishments in upstate New York programs of a similar nature will be presented in the future.

**315TH COAST ARTILLERY REGIMENT (HD), ORC**

BROOKLYN, NEW YORK

COLONEL ROWLAND K. BENNETT, *Commanding*

During the interim period, the members of the 315th CA (HD) have been able to become better acquainted with each other and consequently better able to coordinate our activities for the coming summer regimental active duty training. A great deal was learned from the 3-day CPX last December at Fort Tilden and we are looking forward to future CPX's to develop our skill and efficiency.

The 315th CA (HD) Regiment has been fortunate in obtaining excellent speakers for its meetings both from within its own ranks and from guests. Colonel Harry

Fowler CA-Ret. delivered an illuminating talk on the "UNITED NATIONS" and will address the Regiment again in March on the topic Combat Teamwork—Seacoast Artillery as a part of the Tactical Team with the Ground Forces at Guadalcanal, a subject he is well qualified to speak on by virtue of his active service in the area.

A most informative discussion was held in January by Colonel Andrew W. Clement CA-Res. of Bell Laboratories on the research and the development of surveillance, observation, and fire control radar. Lieutenant Colonel Leonard S. Allen CA-Res., Executive Officer of the Regiment and formerly of General MacArthur's Staff discussed operations in the SWP, and Captain A. J. Maier Jr. at the February meeting spoke on underwater protection and organization of mine defenses with a discussion of tactics and matériel.

**267TH ANTI-AIRCRAFT ARTILLERY GROUP**

FORT BLISS, TEXAS

COLONEL WILLIAM H. HENNIG, *Commanding*

On 5 February 1948, Colonel William H. Hennig assumed command of the 267th Antiaircraft Artillery Group, succeeding Colonel Granger Anderson, who left for duty with Headquarters Antiaircraft Artillery and Guided Missile Center. Colonel Hennig joined the Group after a tour of duty at the Armed Forces Staff College. The new Executive Officer, Lieutenant Colonel Wilbur C. Boyce, Jr., had previously joined the Group in December.

The 267th Antiaircraft Artillery Group is composed of Headquarters and Headquarters Battery, the 59th AAA Automatic Weapons Battalion (SP) (successor to the famed 59th of Corregidor), the 384th AAA Gun Battalion, the 2nd Field Artillery Rocket Battalion, the 165th Anti-

aircraft Operations Detachment and the 337th Signal Radar Maintenance Unit. All units are currently engaged in an intensive training program in preparation for nation-wide commitments this summer. This training is in addition to the demonstrations required almost daily by the Antiaircraft Artillery School at this station.

Two ceremonies highlighted Group activities thus far in 1948. One was a review and inspection for the commander of the Mexican Garrison at Juarez, Mexico, General Enrique Diaz Gonzalez. The second was a review and presentation of colors and awards on 13 February. On this occasion, Brigadier General Charles E. Hart, acting Post Commander, presented a bronze plaque to T/Sgt. Donald B. Bob, Sergeant Major of the 59th. This plaque had been presented to the old 59th Coast Artillery in 1938, captured by the Japanese in 1942, and recovered by American forces in 1945. The complete story of this presentation is carried elsewhere in this issue of the JOURNAL.

Southern Sector Command

FORT RUGER, T. H. APO 956

BRIGADIER GENERAL JAMES E. MOORE, *Commanding*

1 March 1948 marked the first anniversary of the organization of South Sector Command. To celebrate the occasion, all units of the command passed in review before the Commanding General and his staff at the parade grounds of Fort DeRussy. Lieutenant General John E. Hull, Commanding General United States Army, Pacific, was the Reviewing Officer.

In his anniversary message, published in the first edition of the unit newspaper, General Moore commented upon the tremendous task assigned to units of the command, with the care of large areas and property surpluses as an

aftermath of war, and rapid demobilization. With the re-establishment of peacetime operating conditions, he stressed the need and importance for the coming year of devoting primary attention and energy to tactical training.

Training of personnel of South Sector units, comprising the second battalion of the USARPAC Provisional Regiment, continued as scheduled with special emphasis upon tactical exercises for the platoon and company. This regiment is an island-wide organization intended to provide the area with necessary troops for defense in event of emergency.

98TH ANTI-AIRCRAFT ARTILLERY GROUP

FORT KAMEHAMEHA, T. H. APO 956

COLONEL EDGAR W. KING, *Commanding*

On 13 December 1947, Colonel Edgar W. King assumed command of the 98th AAA Group, succeeding Colonel John Harry, who left this station for duty with the New York State National Guard.

The first phase of a three-phase training program is nearing completion. A course in gunnery for officers and key noncommissioned officers will be completed by the time this letter is published.

A special Communications School has been completed, graduating 2 officers and 30 enlisted men. The School was conducted by a special team of instructors from the AAA

Guided Missiles Branch of the Artillery School.

On 15 March 1948, the 97th AAA Gun Battalion began a target practice, using 120mm guns, and the latest methods taught by the WD Instruction Team from Ft. Bliss, Texas.

The 867th AAA AW Battalion stationed at Fort Ruger started tracking missions 10 March 1948 and conducted trial fire on the 25th of March. Machine-gun firing will be held early in April and OQ firing with the 40mm will be conducted about 20 April.

The 88th S/L Battery, stationed at Schofield Barracks, is maintaining equipment and accomplishing required DA training.

The 31st AAA Operations Detachment at Fort Kamehameha is presently training record section personnel.

35TH COAST ARTILLERY MAINTENANCE DETACHMENT

FORT RUGER, T. H. APO 956

COLONEL DONALD C. HAWLEY, *Commanding*

Many eyes have been focused on the experiment with strippable film for storage of Seacoast Artillery Matériel. One question has been on many lips: Will this experiment prove successful and provide a valuable supplement to limited manpower available for maintenance?

We now have the answer. The experiment was terminated on 2 January 1948 and although this termination is approximately three weeks short of one year, it does not affect the validity of the test.

Upon removal of the strippable film envelope, the initial inspection revealed that the hygrometer was un-serviceable and a study of the humidity and temperature curves indicates that this condition has existed since approximately 1 May 1947.

More than three times the required quantity of silica gel was installed in the envelope at the beginning of the test but this desiccant has been inactivated by moisture introduced into the envelope through the strippable film and the concrete walls of the pit. The high and comparatively constant moisture content of the atmosphere within the envelope has caused much corrosion and fungus growth at numerous points on the gun and carriage. Almost complete

failure of paint has been encountered on certain portions of the top carriage, and the external surfaces of the gun tube. At the start of the test, these surfaces were painted with rust-inhibiting enamel which is authorized for application to older painted surfaces if still in good condition such as these were in January 1947. It is possible that the surfaces were not properly prepared for application of the pre-test paint coat but improper preparation does not normally result in the failure encountered in this test.

The recoil slide has developed several patches of rust, the recoil piston rod is etched at the point of contact with the stuffing box due to its stationary position, and the controller box and other electrical components have been attacked by fungus growth. Roller paths, rollers, traversing mechanisms, and oil gears have not been adversely affected.

The labor expenditure for this experiment has been much greater than that required for maintenance by conventional methods. The initial preparation required 428 man-hours, inspection during the course of the experiment 47 man-hours, and rehabilitation and re-preservation at gun and mount 960 man-hours for a total of 1435 man-hours. During this same test period, 556 man-hours were required for maintenance of gun No. 1 by conventional methods.

This experiment shows that the strippable film method of storage is not feasible under field conditions and its use has been discontinued here.

65TH ANTI-AIRCRAFT ARTILLERY GROUP

FORT AMADOR, CANAL ZONE

COLONEL PAUL B. NELSON, *Commanding*

15 January 1948 was a significant date for the 65th AAA Group. This date marked the First Anniversary of the organization's most recent reactivation. The Group history dates back to 1923 when it was first activated as the 65th Coast Artillery (AA) Regiment. Since that time it has been deactivated twice and reactivated on three occasions, taking its present designation when it replaced the undesignated Antiaircraft Artillery Group, Panama Canal Department, in 1947.

In a special ceremony at Fort Davis, C. Z., on 31 January, the Group Commander, Colonel Nelson, presented a new Battalion Standard to the 764th AAA Gun Battalion, the Group's composite battalion in the Atlantic Sector, commanded by Lieutenant Colonel John F. Ballentine.

Training proceeded normally during the first two months of 1948, certain units entering Phase II of the training cycle. Plans for two events of significance presently occupy much of the time and attention of most group units. First, scheduled on or about 20 March, the 903d AAA AW Battalion, responsible for AA defense of the Canal Zone on the Pacific side, plans an Antiaircraft Field Day at Fort Clayton, C. Z. Lieutenant Colonel T. W. Lowrie, Commanding Officer of the 903d, starts a series of battery eliminations during the second week in March calculated to groom men and matériel for the final competition between winning gun sections on March 20. This final phase will take place on the Artillery Quadrangle in front of the 903d at Fort Clayton. The public will be invited.

The second event to occupy the preparatory attention of the Group is the observance of Army Day, 6 April 1948, in connection with special demonstrations to be held by both the Atlantic and Pacific Sectors of the United States Army, Caribbean. All phases of the AAA mission will be represented, and selected matériel will be on view. Emphasis will be placed on the part antiaircraft artillery plays in the defense of the Canal Zone. The public will be invited and all former member of the Corps who may be in Panama are urged to attend. While no actual firing will take place the preliminaries will be demonstrated and the mission explained.

One of the planned exhibits in the Army Day AAA observance will be the Radio Controlled Aerial Target Plane, designated as the OQ. This versatile performer in

AA training will demonstrate the excellent use made of it to provide firing missions. It offers tracking advantages only offered by full-size planes and gives a target illusion never achieved by towing missions. In conjunction with this type of target the Group has also used skeet shooting to develop lead perception and co-ordination.

CHANGES IN OFFICER PERSONNEL**ARRIVALS**

First Lieutenant Clarence P. Lines, Btry "B," 903d AAA AW Battalion.

First Lieutenant Paul L. Worthely.

First Lieutenant Daniel G. Campbell, Btry "C," 903d AAA AW Battalion.

First Lieutenant William G. Tinkler, Hq., 65th AAA Group.

Warrant Officer Junior Grade Clifford Shaw, 903d AAA AW Battalion.

DEPARTURES

First Lieutenant Harold C. Dolstead, to USA.

First Lieutenant William R. Nichols, Jr., to USA.

First Lieutenant Emil E. Lloyd, Jr., to USA.

Captain John C. Cole, from 764th AAA Gun Bn., to Finance Officer, USARCARIB.

REASSIGNMENTS

Captain Edward F. Higgins, from Latin American Ground School to Headquarters 65th Group.

First Lieutenant Lawrence J. Howard, from 903d AAA AW Battalion to Headquarters, 65th Group.

First Lieutenant Gillespie, 903d AAA AW Battalion to Headquarters, 65th Group.

Captain John L. David, 65th Group to 764th AAA Gun Battalion.

Lieutenant Colonel Charles B. Bottoms, 65th Group to Exec. O., 903d AAA AW Battalion.

Major Raymond C. Woodes, 903d AAA AW Battalion to 764th AAA Gun Battalion.

Major Adrian Bourdon, 764th AAA Gun Battalion to 903d AAA AW Battalion.

First Lieutenant Richard Nitsche, 903d AAA AW Battalion to 764th AAA Gun Battalion.

Captain Lucius G. Hill, Jr., 65th Group to 903d AAA AW Battalion.

Captain Lucius G. Hill, Jr., and First Lieutenant Evert C. Youngs entered on competitive tours for Regular Army commissions during this period.





The Seacoast Branch, The Artillery School

BRIGADIER GENERAL WILLIAM S. LAWTON,
Officer in Charge

The Naval Harbor Defense School is now traveling under full sail at Fort Winfield Scott. This unique, jointly operated service school has as its purpose the training of Army and Navy officers for duty as planners on the staffs of higher commanders in harbor entrance control work. But joint Army-Navy training operations are not new in Coast Artillery School operations. In past years, at the Coast Artillery School, Fort Monroe, Virginia, one of the most important developments in the Coast Artillery was the increased cooperation apparent between the Coast Artillery Corps and the Navy and Air Corps. Here was one of the first efforts toward unification of the services. Many opportunities were afforded Coast Artillery School instructors and students to witness navy matériel and gunnery methods. Each year a series of lectures was given to the School by Navy officers from the Fifth Naval District. For several years the Navy and Coast Artillery School held joint battle practices at the Virginia Capes and student officers of the School were invited by the Navy to Guantanamo, Cuba to observe the Navy battle practices held there. Today this policy continues in effect with the established operation of the first United States Navy School of Har-

bor Defense at the Seacoast Artillery School, Fort Scott.

The U. S. Army Mine Planter *Spurgin* is serving as a floating laboratory for training exercises in submarine mine cable work for Navy harbor defense classes. It has become a common sight now to see as many Navy hands as soldiers aboard the *Spurgin* as she works in the San Francisco harbor entrance.

The Department of Engineering will lose its Director, Lieutenant Colonel Alexander Grendon soon when he leaves the Seacoast Branch of The Artillery School to take a course in Radiological Safety. Highlight of Lieutenant Colonel Grendon's studies will be a one-year postgraduate course at the United States Naval Academy, Annapolis, Maryland.

Instructors and students in the Department of Engineering are anticipating with interest the firing of Battery Townsley, 16" coastal defense gun of the Harbor Defenses of San Francisco, in the latter part of April. The Artillery Detachment of the School, augmented by members of the Mine Detachment, will fire the battery in an operation conducted by and for the Seacoast Service Test Section. One of the objects of this operation will be to test the feasibility of adapting radar and electronic fire control systems to 16" coast defense batteries.

The Army Mine Planter *Spurgin*, work horse of the Harbor Defense *Flotilla* and floating laboratory for the School, will act as towing vessel for the 16" firing.

The third Reserve and National Guard Officers Indocination Class of the 1948 series is now in session at the School. These officers observed a sub-caliber firing of the 16" battery in a practice exercise preliminary to the big shoot during the last of March.

The following changes in officer assignments have occurred since the last issue of the JOURNAL:

ARRIVALS

Major Donald E. Twyon assigned as student.
Captain Richard D. Fuller assigned as instructor.

DEPARTURE

Captain John E. Cave to European Command, Bremerhaven.



A STRONG AMERICA

IS A PEACEFUL AMERICA

COAST ARTILLERY ORDERS

WD and AGF Special Orders covering the period 17 December 1947 through February 1948. Promotions and Demotions are not included.

COLONELS

Adams, Edward F., Office US Military Attache, Havana, Cuba, for dy as Asst Mil Attache.
Campbell, Alexander H., Office Joint Chiefs of Staff, Washington, D. C. for dy w/Joint Staff.
Cotter, Clarence E., HQ, Fifth Army, Chicago, Illinois.
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Denson, Lee A., Detailed as member GSC & asgd to Gen Staff US Army.
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Hoge, Daniel H., Retired.
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Birch, Wilson H., Office Joint Chiefs of Staff, Washington, D. C.
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Twyon, Donald E., Seacoast Br Arty Sch, Ft Winfield Scott, Calif for dy w/Staff & Faculty.

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 Watson, Gale A., Detailed at 2476th ASU ROTC Xavier University, Cincinnati, Ohio.
 Wood, William E., Jr., Detailed in Sp S.

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 Baker, Roy L., Stu Det Army Language Sch, Presidio of Monterey, Calif.

Bailey, Jack Stephens, 1st GM Bn, Ft Bliss, Texas.
 Barnard, Bruce M., 59th AAA AW Bn, Ft Bliss, Texas.
 Beckett, James E., 284th AAA AW Bn, Ft. Bliss, Texas.
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 Fons, August M., Detailed in Special Service.
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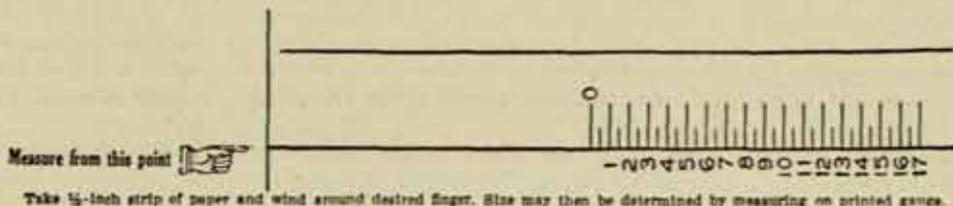
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BOOK REVIEWS

Excellent History

THE MARINES' WAR. By Fletcher Pratt. William Sloane Associates. 456 Pages; Index; Maps; \$5.00.

I am not alone in being partial to Mr. Pratt's historical writing, and this is a first-rate example of it. He recognizes, far more fully than most historians who write of campaign and battle, the obligation of the writer to help the reader read his book. Help him by placing the facts in logical order. Help him by dramatic emphasis where such emphasis is due. Above all, help him by stating the facts in the clearest possible language.

The Marines' War, I think, is the best short history of a single Service in World War II yet to appear. It deserves commendation not only for its eminent readability but also for the author's handling of each Marine campaign, both from the American and Japanese viewpoints.

The Marines' War, of course, is a book about the Marines exclusively and not a book about the Army. The chief emphasis is on the Marines and on no one else, which of course is the way Mr. Pratt intended to write. There is the usual disclaimer that the book is not an official volume, but it is also true, as the author says in his foreword, that "a great many official records were placed at the author's disposal" and that "he was allowed to interview eyewitnesses to his heart's content, often subjecting them to highly personal forms of cross-examination." Officers of the Navy and the Marines also "read the manuscript in various stages and checked it for accuracy as to statement of event," though no one checked it for opinion. . . . "This," continues Mr. Pratt, "was the arrangement made when the book was undertaken, and it seemed so incredible to a former war correspondent (the author) that any organization would permit such a thing that in the first version of some of

the earlier chapters he deliberately introduced some criticisms that were pretty harsh and more than a little unfair—just to see what would happen. The Marines to whom they were submitted blinked and took it like the good soldiers they were, even when the points made concerned them personally." There was no censorship. The Marines were willing to stand on the record.

Well, it was a good record, a splendid record. Even if the Marine and the Army views of it sometimes differed, no Army man ever thought of saying that Marines in general fought anything but hard and well. If it needed any proof, Mr. Pratt proves it plainly, proves it not only in his forceful story of the battles but out of the mouths and the record of action of the Japanese enemy.

Mr. Pratt gives the Marine side of the more acute Marine-Army differences. As more and more records come to light, from all the Services and the enemy as well, it becomes plain that no one service has all the facts and that the different viewpoints need some day to be studied together in order to come nearer the whole truth. The way the Marine Corps believes these things happened is a valuable part of the evidence.

In *The Marines' War* I like particularly, also, the ease with which its writer coordinates air, naval, and Marine action. This is one of the hardest tasks of the military historians.

I have sometimes wondered, in fact, which Mr. Pratt does best, naval or military history. He is so good at both it is hard to choose. But after all, though the seas are wider I think there is more variety of human action in war on land. Sea warfare tends to be told as the action of ships. And glorious though such action has often been, and though Mr. Pratt makes it appear full glorious, I prefer his accounts of the land campaigns and battles

where commanders have more, many more, factors of warfare to deal with. In *The Marines' War* you have both kinds, side by side, well told indeed.—G.V.

The Foreign Service

THE AMERICAN FOREIGN SERVICE. By J. Rives Childs. Henry Holt and Company. 261 Pages; Appendix; Index; \$4.00.

Here is an excellent book on the history, organization, and operations of our Foreign Service. The author, now Minister to Saudi Arabia, has served his country overseas and in the Department of State for more than a quarter of a century. His principal case study is the Paris Embassy. Mr. Childs has given his readers a realistic, graphic picture of the diversified activities carried on by the three hundred officials and employees of the Embassy in 1947.

The author is at his best in his analysis of the development and present function of the world-wide diplomatic corps. His discussion of the economic operations of the Foreign Service is less satisfactory. There are minor discrepancies in the description of the organization of the Department of Commerce, excusable on the part of a Foreign Service officer who has apparently never had a tour of duty in this Department. He professes an inability to understand why the Commerce, Agriculture, Interior, and Treasury Departments found it necessary to set up their own overseas organization of economists and engineers. The reasons were obvious enough in Washington: diplomatic and consular agencies could not provide the other government departments with the technical information and representation they needed overseas.

The author describes the several classes of Foreign Service personnel—Foreign Service officers, Foreign Service reserve

Foreign Service staff, consular agents, auxiliary service, and alien personnel. Apparently Mr. Childs does not believe that rigid compartmentalization of officers and employees has a deleterious effect on the morale and efficiency of the lower classes who lack the privileges and rights of Foreign Service officers.

The book will be most valuable to students and teachers in colleges and universities. It is of interest also to the personnel of the military services whose work often complements that of the Foreign Service. —COLONEL PHELPS W. MELTON.

Vivid Description

RUSSIA AND THE RUSSIANS. By Edward Crankshaw. Viking Press. 223 Pages; \$3.00.

I have not read all the books on modern Russia but I've read a good many. I recall no other that shows the Russian people and their nation as vividly as this book does. Mr. Crankshaw believes we cannot deal with Russia until we know it—know the bad and know the good—until we face all of its vastness and the life within it.

Mr. Crankshaw's is a tough-minded presentation. The people who are going to hit this book hardest are those who blindly idealize all things Russian, this despite the fact that the author is an Englishman and very apparently a socialist, and that his thesis is that nothing but a friendly, even a charitable, approach can gain a permanent peace between the Russian and the non-Russian worlds. But, thinks Mr. Crankshaw, you cannot extend Christian love to a nation and gain it in return, unless you face and understand its faults as well as its virtues. It is Mr. Crankshaw's outline of the Russian "faults" and virtues which is the superbly realistic part of his book and which makes it a vital book for the military reader.

I doubt that many readers who have some acquaintance with Russia's potential for making war will accept in full the author's conclusions. Indeed it appears to me, on one chief count at least, that he is badly confused. He thinks that those who see much danger of Russia as an aggressor any time soon "cry out of a depth of imbecility or ignorance, or unimaginativeness. . . ." Yet a few pages further along he seems to offer that very possibility himself when he says that Russia "will one day be stronger than any nation in the history of mankind"; and that we have to realize it now: "What happens," he asks, "when all these (Russian) millions of sleepers awake."

"Russia," thinks Mr. Crankshaw, "is one more fact of life, and a decisive one." It seems to him that "the vitality of our western culture will receive its great test in the use it makes of this new fact of life, as real as an earthquake. We can ignore it: it will overwhelm us. We can seek to destroy it: we shall destroy ourselves. We can throw ourselves into its arms: it will absorb us with scarcely a trace. Thus, the

only answer, as it seems to me, is that our conception of society, of the way in which human beings live together, will have to be remodelled to allow for this new and unprecedented fact."

Mr. Crankshaw, I would say, sets up a tough job for the Western nations and he looks for its solution as a strongly anti-Marxist socialist would. He sees no possibility of "any restraint or objectivity from the Russian Marxists, whose possession by dogma is complete." And he continues, "the burden must be ours, because it is we, not the Russians, who believe that we have something worth preserving."

Mr. Crankshaw's conclusions have value in showing us the manner of thought of a forthright socialist of today's England. But for the American military reader, the greater value of his book is his acute and accurate description of the "grey masses" of Russia and their government. I say "accurate," not of my own knowledge, but because I have asked others who have greater familiarity with the Russian nation.

The author agrees with those who consider Russian communism a religion—a religion with an absolute discipline. He thinks commissars continue to exist in the Russian forces in some form. The young people, he believes, those under forty, are those who count chiefly in today's Russia, are those from whom the drive comes. And these he divides into "the intelligent and politically minded (a minority) on the one hand, and the unquestioning peasant and day-laborer on the other." The Russian "has neither equality nor freedom nor . . . a firmly bedded hierarchy of privilege and duties," but Russia is moving "slowly, blundering, tortuously, but with a gathering momentum towards the state when those will flourish side by side." "There are thousands, hundreds of thousands, millions, of Russians who think the Moscow Underground, with its escalators, is the only underground in the world. . . ." "Unless you are prepared to think in terms of moods, or simply to let yourself feel, Russia will remain a country without meaning. . . ." These are brief hints of the author's description, the excellence of his writing. Whatever you may think of the author's outlook, *Russia and the Russians* is a civilized and dramatic attempt to show the Soviet Nation.—G.V.

Strong on Moods, Weak in Facts

THE REVOLT OF ASIA. By Robert Payne. The John Day Company. 305 Pages; Index; \$3.50.

Robert Payne writes a tremendously effective kind of English. He possesses the novelist's eye for telling detail, the poet's sensitiveness to significant moods. He has written diaries of his life in wartime China which preserve forever the intimate feel of life in Yunnan and Szechwan. But with all his talents, he was willing to accept the outré post of "Professor of English Poetry and Lecturer in Naval Architecture" at Southwest Associated Universities in Kun-

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ming. Either end of the job would have been a formidably dignified post for a Westerner to hold on a Chinese faculty, but the combination of them would have spread even a Leonardo da Vinci pretty thin. Somewhat comparably in this book, Payne goes into postwar Asia to present a poet's view of power-political strategy. He punishes the Japanese by leaving them out of consideration. China depresses him. India and Indonesia stir his imagination so profoundly that he predicts tremendous real power for them in the future. He holds that a thousand million Asiatics have awakened and that their strength will be unpredictable: "In the most complete sense, the West [he means U.S.A., U.S.S.R., and all the others put together] will be at their mercy unless it cooperates with them hardily, now and in the future." If the Joint Chiefs of Staff had nothing more to worry about than Asia's awakening, they would be able to reduce their planning functions. It would appear that Mr. Payne has made a brilliant overstatement of his case. The book is strong on moods and weak on facts. It is valuable for occasional insights, not for its main premise which the half-forgotten books of Lothrop Stoddard and Patrick Gallagher adumbrated many years ago. Incidentally, the book is so studded with minor errors of spelling, of dates and of facts that the reader's pleasure is impaired; it deserved more careful publishing.—PAUL M. A. LINERARGER.

Secret Agent

MEMOIRS OF A SECRET AGENT OF FREE FRANCE. Volume 1—The Silent Company. By Rémy. Whittlesey House, McGraw-Hill Book Company. 406 Pages; Index; \$4.00.

Among the many enthralling books on the tragic fate of France under the occupation this is outstanding. It is first probably the most illuminating description yet penned of the growth of the French Resistance movement and the appalling difficulties of its clandestine work. The author, in private life Colonel G. Renault-Roulier, who had escaped to England at the time of the collapse, volunteered to go back by way of Spain as an intelligence agent for the Free French. How he managed to slip back, and how from the smallest beginnings he succeeded in building up a network which in its heyday covered the whole of French territory and did more excellent work than almost any other, he himself must tell. A born observer and writer, as skillful in catching with his pen even the most fleeting of his conspiratorial moods, as he is modest in the indication of his prudence, Rémy unfolds the whole heroic as well as sordid world of the French underground. Through his pages wander the most diverse of men who came together in his organization to further, or, at times, to wreck its purpose: the jolly country squire scoring by his imperturbable aplomb and gaining victory after vic-

tory over the hated French police, even in their concentration camp; the naval officer joining in with zest despite his allegiance to Vichy; the captain of pilots, deposed by the Germans but indispensable to them and thus invaluable to the network; the specialists in airfields, radar stations; the typists; and, most endangered of all, the radio operators in their constant cat-and-mouse play with German radio-detector vans. All ages, all regions, all shades of character, from the burning patriot, the zestful adventurer and the somewhat shady and none too inspiring occasional stop-gap, down to the rarest but most significant of types, the traitor, dragging whole batches of his former comrades to their doom.

Around this innermost circle of the network, allied groups and their enemies, Rémy finds still time to observe, and reflect upon, the broad masses of the "neutrals": the many of his countrymen, who in the beginning and, as he frankly admits, until the occupation of the whole of France, rallied themselves behind Petain and tried in vain to ignore both the war and the conqueror. In the glimpses of the different representatives of this vast grey neutral mass, and particularly in the systematic analysis of its components and their motives, Rémy's story widens out beyond that of the Resistance to a panorama of France under the occupation. And whether he intended it or not, or knew it or not, Rémy has captured something of the eternal spirit that makes France what she is, *la douce France*, the sweet France as her children revere her. Not her pride and her glory, not her intellect, not her art, but something infinitely more intimate, her very way of life, the taste of her food, the bouquet of her wines, the closeness of French family life. Perhaps this is because the author, in addition to being a civil hero, reveals himself in his pages also as a gastronome. He considers appreciation of good food not the least authentic expression of the French genius. And he dwells with relish upon the fact that in London the rate of enlistment with the Free French Forces went rapidly up the day General de Gaulle secured for his Hotel the services of Monsieur Ruette, the famous chef.—DR. HERBERT ROSINSKI.

Crockett, Bowie and Travis

THE ALAMO. By John Myers Myers. E. P. Dutton & Company. 240 Pages; Maps; Bibliography; \$3.00.

It's well nigh incredible but both the author and publisher assert that this is the first published book that "seeks to present the story of the historic structure in full." Incredible because the Alamo is an American landmark as cherished as Bunker Hill, Gettysburg or Pearl Harbor. And we have already had a rash of books on Pearl Harbor, though none of them is the final, definitive story.

Nor is this book the final story of the

Alamo. Myers has attempted to sketch in the background of the Alamo itself and to recreate the lives of the principal figures of the battle—Crockett, Bowie, Travis and Santa Anna—as well as to describe the details of the siege, the final assault and its bloody results. It's a great story, one that "writes itself" as reporters say, but Myers has failed to do it full justice. The failure can be laid, I think, to the fact that he tries to serve two masters. His attempt to combine zest, wit and color with historical accuracy doesn't come off. And it's too bad. Our popular histories should be more accurate, and our studious histories ought to have more zest. But Myers's wit too often becomes a wisecrack and his studied conclusions flippant observations.

If the reader can disregard these objectionable literary efforts he'll find *The Alamo* an informative work, based on secondary sources.—TEE FOUR.

Manila Bay

ADMIRAL DEWEY AND THE MANILA CAMPAIGN. Compiled by Commander Nathan Sargent, USN. USN Naval Historical Foundation. 128 Pages; Appendices; Index; \$3.00.

This book is the closest approach history makes to an "official" account of the Battle of Manila Bay, and the events before and after it. The manuscript was begun by Admiral Dewey's order, completed and approved by him in 1904, and then sealed with instructions that it should not be published until after his death. It was recently turned over to the Naval Historical Foundation by his only son, Mr. George G. Dewey, and published.

Thoroughly documented, the book throws a great deal of light on the Battle of Manila Bay as such, and the subsequent blockade of Manila by Admiral Dewey's squadron until American troops could be brought in to seize the city. It also reveals the Admiral as an accomplished diplomat who exhibited great ability and tact in his dealings with the Filipino rebel, Aguinaldo; the surrendered Spanish forces; and the German squadron which arrived at Manila apparently determined to provoke hostilities with the Americans. The "German incident" is undoubtedly covered in greater detail here than in any other history, since Admiral Dewey handled the whole matter himself, without recourse to Washington.

Of interest primarily to naval historians and secondarily to historians at large, the story of the Manila Campaign might still be of interest to the average military reader as a glimpse of the etiquette of warfare circa 1898, when wars were still fought between armies and navies, and civilians were only interested spectators, to be respected by the combatants and moved out of harm's way before the battle. Man has progressed wonderfully in the art of war in fifty years, but one wonders in which direction.—O. C. S.

Doctors in the Revolution

EAGLE IN THE SKY. By F. Van Wyck Mason. J. B. Lippincott Company. 500 Pages; \$3.00.

Colonel Mason's facile typewriter has poured forth another of his smooth historical novels. In the tradition of *Rivers of Glory*, *Three Harbours*, etc., he has used a judiciously compounded potion of history, sex, love and adventure to give us a readable novel, this time of three young surgeons who served the Colonists' cause in the critical years 1780-1781.

The three received their Bachelor of Medicine degree and right to practice from the same Boston surgeon on the same New Year's Eve. Peter Burnham served with privateers, Ada Peabody with the patriot forces at Yorktown, and Lucius Devoe first with General Arnold at West Point and later with the British and Tories at Yorktown. All three had much use for their skills, and all served the cause of medicine to the best of their ability and with burning ambition. Devoe's personal ethics did not come close to matching his professional ethics, but Peabody and Burnham were upstanding patriots, citizens, and surgeons.

Much of the interest of the book lies in the descriptions of medical practices of the late eighteenth century; Colonel Mason has been as meticulous in his medical-historical research as in his research into military and political history. The lay reader today wonders how anybody lived after his case was turned over to a doctor in those rough-and-ready days. Some of the descriptions of surgery as performed during the war would chill the spine of a butcher. A lead bullet to hold between the teeth was the substitute for anesthesia; instruments were sterilized in hot brandy if they were sterilized at all, and suturing needles were placed in the surgeon's lapel for convenience of access.—A. S.

African Republic

LIBERIA, 1847-1947. By Charles Morrow Wilson. William Sloan Associates. 226 Pages; Index; Illustrated; \$3.75.

Since the founding of its government on the tropical coast of Africa, Liberia has developed into the only republic on a continent of subject colonies. It is an experiment in democracy which has worked.

As a haven for former American slaves, Liberia found, last year, that after a hundred years of existence it had made great technical and social advances—in spite of epidemics, marauding slave traders, and territorial and economic imperialism. Thus although nine-tenths of its people are tribe members, all of them have legal citizenship in the Liberian state; all are able to vote in free elections.

The story of Liberia is the story of rubber. The Firestone Rubber Company was quick to establish plantations on the lush, untilled soil when it saw that the Far East rubber supplies were in danger of being isolated. But at the same time that the

company was planting rubber trees and experimenting with new and improved strains, they were also building roads through the hitherto trackless jungles and instructing the natives in health and scientific measures which would improve their own livelihoods. Pursuing such a course, Firestone assumed a major share in the successful realization of this Negro republic.

Liberia's importance to the United States is seen in the fact that during the war the port of Monrovia was used as a principal port in the extended supply lines of the south Atlantic. The United States was fortunate again in having a friendly rubber-producing country such as Liberia which annually grows 17 per cent of the world's supply of raw rubber. Until our synthetic industries could get a foothold, we purchased her entire rubber output.

This is a thorough and up-to-date account. It indicates the economic wealth which lies hidden in the remainder of the African continent. It is a lesson in successful government. Mr. Wilson states the case well.—V. R.

Compact History

THE DIXIE FRONTIER. By Everett Dick. Alfred A. Knopf, Inc. 399 Pages; Illustrated; Index; Bibliography; \$4.50.

It is probably poor form for a conscientious reviewer to subscribe to the sentiments of the anonymous soul who ground out the jacket copy for this book, since the jacket writer is presumably interested primarily in causing people to buy the book. In this case, the sales promotion department could afford to be honest when they say, "Altogether, *The Dixie Frontier* is one of the richest, most complete, and most entertaining treatments of pioneer life ever written."

Without resorting to census figures, it is probably a safe bet that only a small proportion of our present population descended from the rugged and unfettered characters who inhabited our lower frontier in the late 1700s and early 1800s. The feeling and spirit that bubbled on the border in those days have come down to our own time, diluted surprisingly little by immigration and years. While we fight the battle of the caste system, it is refreshing to read of how the militia was organized after the Revolution—disorganized is a better word. There was no caste system on the border then, and lives and wealth were the forfeit. The soldier who threatens to wreak physical violence on his captain when both are out of uniform would find many a kindred soul on the Kentucky border in the 1820s. Country justice, at the hands of the crossroads squire, is little different today than then, except that appeals are probably easier.

Professor Dick writes in almost telegraphic style; he often packs as many as ten incidents and descriptions in one short paragraph. The reader at times finds him-

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By HAMILTON FISH ARMSTRONG
The editor of *Foreign Affairs* proposes a solution to the deadlock between the USSR and the rest of the world.

In *THE CALCULATED RISK* he outlines a scheme by which democratic nations, working within the framework of the UN can establish a democratic program and go ahead with it, without Russia.

"All military men need a grasp of this plan, for it may well become the procedure we shall be following.—*The Infantry Journal*.

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self wishing that the book had been longer and the writing fuller. The author tells so many stories that illustrate his point, and then breaks them off just when the reader is wondering what happened next.

With true professorial organization, the book is divided into thirty-two chapters, with such titles as "The Squatter," "Land Greed," "The Slave as a Pioneer," "Good Times," "Schools," "Frontier Military Life," and "Frontier Speech." Surprisingly, there is little overlapping in the chapters, and the whole paints a picture, photographically clear, of the pioneer and his problems, his food, his life, his children and practically everything else about him that would indicate how he shaped his life and how his life shaped him. This is a book to help the average American learn to like and respect American history, and to help the student understand it.—A. S.

Era of Good-Fellowship

THE SILENT PEOPLE SPEAK. By Robert St. John. Doubleday & Company. 397 Pages; \$4.00.

Wandering through Yugoslavia's back country and through eighty-seven chapters of sentimental interviews with hundreds of Marshal Tito's comrades, the author found the attitudes of the American State Department toward this progressive nation quite disappointing. He also reports the American local correspondents frustrated at their editors' failure to print the truth about the Yugoslavs. An era of good-fellowship, he says, has been inaugurated under Tito's beneficent leadership, an era characterized by free speech, a free press, and free education, with full employment, leisure, and social security for all.

An efficient peoples' army built around the heroic partisan guerrilla bands, the writer discovered, has replaced the former reactionary army dominated by a corrupt nobility. The brave partisans have forgiven their wartime opponents. Evidence of their forgiveness he saw in the kind treatment given to orphans of Chetniks who, with the support of the United States and Great Britain, fought against the partisans. In the orphanages there were even some children of the Croatian Utasi guerrillas who fought on the side of the Germans. Mr. St. John notes that the partisans and their families are now moving into the deserted villages of the Schwabians, Yugoslavs of German descent who also fought with the Germans against the partisans. Since the author does not report that he saw any Schwabian children, it would appear that the partisans' forgiveness did not extend to Schwabians. Mr. St. John does imply, however, that the German prisoners of war laboring in Yugoslavia were receiving good treatment from their masters. (He does not actually say that they are treated well, but he implies they are.) It is evident that since Chetniks, Utasi, Schwabians and other discordant elements have been eliminated, the writer considers the Yugoslavs

united, kindly, good-hearted, generous and most industrious.

Even the Serbs, he says, do not now oppress minority groups. Prewar Yugoslavs live in peace and amity with the people of the several territories annexed since the war from Yugoslavia's neighboring countries and with the people of Montenegro which was formerly an independent nation. Altogether Mr. St. John is an admirer of Tito's comrades and regrets the American propaganda-inspired misunderstanding of their merits.

In the foreword of his book Mr. St. John cautions the potential reader about his Yugoslav adventure, "I may not be able to put it down so it will make any sense to you." He is overly modest; it made sense all right to this reviewer. However, another American traveler who visited Yugoslavia in 1947, William Z. Foster of the Communist Party, also wrote a travelogue. Mr. Foster made no mention of his fellow traveler but the views expressed by the two writers about Yugoslavia's political economy are not dissimilar.—COLONEL PRESLEY W. MELTON.

Synthetic Rubber

BUNA RUBBER: THE BIRTH OF AN INDUSTRY. By Frank A. Howard. D. Van Nostrand Company. 307 Pages; \$3.75.

The factual story of the birth of the synthetic rubber industry, written by a former Standard Oil official, illustrates "the way in which our American society actually operated in peace and war to create new industries and advance old ones."

At the end of the first World War, the German oil industry, reduced to the minimum of its prewar output, resorted to chemistry to strengthen its position. During the first World War the German rubber industry, with no source of crude rubber, had come to a grinding stop. This was the genesis of the synthetic rubber industry. The oil industry assigned its chemical engineers to work on the development of synthetic rubber. In 1919 the first semi-useful synthetic rubber was produced in Germany. One of the representatives of Standard Oil of New Jersey sent in a sample to the U. S. office and thus began the interchange of patents and processing rights between Standard of New Jersey and the German oil industry, later the I. G. Farben. During the few years of peace that followed, research and experimentation continuously progressed and when war again exploded in 1939, an advance stage of synthetic rubber production had been attained in Germany. Yet by this time, agreements on patents and production rights between I. G. Farben and Standard had become very involved. It appeared that, should the need arise for production of synthetic rubber in the United States, numerous legal bottlenecks would tie our hands hopelessly. In 1939 Standard reached an agreement on the full use of the patents controlling the produc-

tion of Buna rubber. This cleared the way for the full-scale development of the synthetic-rubber industry in the United States.

The second phase of the story started with the recommendation by Standard to buffer the possible loss of the crude rubber supply in case of war by setting up a large production program of synthetic rubber. Clearance with the Munitions Board was the first step. An advisory Buna commission was the next batting ground. After overcoming strenuous opposition along the line, an adequate program was finally mapped out. Production on a scale to meet the demand was attained eighteen months after Pearl Harbor.

At present the United States is equipped with a new important industry which will carry us over during the period when crude rubber will remain in short supply. But what is this new industry's economic future once crude rubber will again be plentiful?

Early in 1937, when German Buna was introduced in the American market, its selling price was from \$1.00 to \$1.20 a pound, while natural rubber was pegged at 15 cents a pound. It was estimated that to build a plant capacity of 100,000 tons, in 1942, the initial investment would be at least from \$1,000,000,000 to \$1,500,000,000. Yet when the entire synthetic-rubber program of fifty-one primary plants had been completed in 1944 the total direct cost borne by the government was only \$700,000,000, although very large indirect costs were borne by private industry. Using Canadian statistics of synthetic production, the author estimates the total cost at less than one-half of one per cent of the United States national income during the two-year period of construction. On a fifteen-year life basis for the plants this means that to provide and replace the plant used would require one-fifteenth or one per cent of the national income.

In terms of relative production costs, the author looks into the Buna future with confidence. The actual f.o.b. New York price for natural rubber has been as low as 2 cents and as high as \$1.15 per pound. However, since the International Rubber Agreement in 1934, the price of natural rubber fell as low as 9.9 cents as the minimum point, and oscillates around 27 cents as the postwar average price.

The estimated peacetime cost of Buna is in the range of 15 to 20 cents per pound. Provided that the industry will be able to produce synthetic rubber at this price level and that the price of crude rubber will remain within the limitations of the International Rubber Agreement, it may be assumed that the Buna industry will be able to compete with crude rubber. In the realm of dollar economics, the future of the new industry appears assured. This is undoubtedly an encouraging sign for the future of the synthetic-oil industry which sooner or later must be set up to overcome the growing oil shortage in the United States.

In presenting his story of Buna rubber in the United States, it is regrettable that the author sometimes became involved in documentation which instead of clarifying the picture, cuts the flow of thought and makes the narration fragmentary.—LESLIE ROSENZWEIG.

Brief Reviews

FALLEN SUN: A REPORT ON JAPAN. By Noel F. Busch. Appleton-Century-Crofts, Inc. 258 Pages; Index; \$2.50. A senior writer for *Life* reports on the American occupation of Japan under General MacArthur.

THE CASE OF RUDOLF HESS. Edited by J. R. Rees, M.D. W. W. Norton & Company, Inc. 224 Pages; \$3.00. A psychiatric study of Hitler's former No. 1 assistant.

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MIRABEAU. By Antonina Vallentin. The Viking Press. 542 Pages; Illustrated; Index; \$5.00. A biography of the eighteenth-century French writer and statesman whose influence on the French Revolution was decisive.

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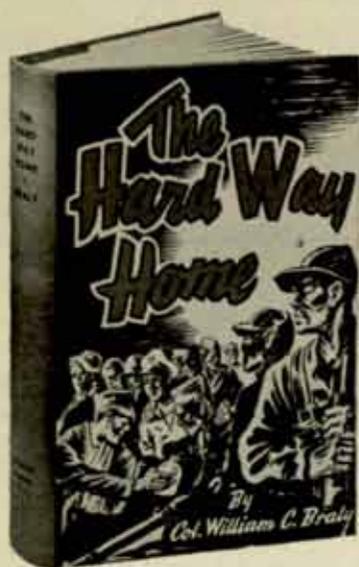
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COMPANY COMMANDER

By Charles B. MacDonald

Charles B. MacDonald came to the 2d Infantry Division as a replacement company commander in September, 1944—and stayed with an infantry company (with time out for a wound and evacuation) for the rest of the war. COMPANY COMMANDER is his story—and by the time you've finished it, the men of Company I and Company G will be your friends, and winter warfare an old experience of your own. But MacDonald can tell about his own story. In his preface, he says . . .

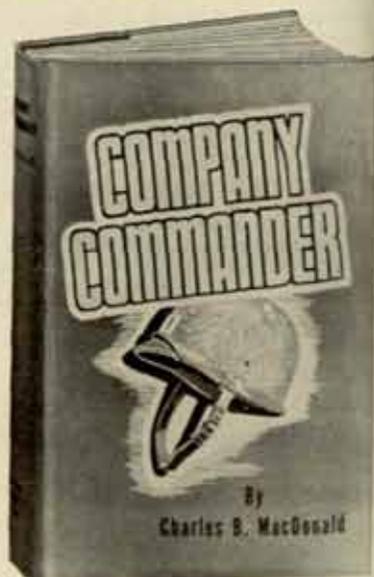
"The characters in this story are not pretty characters. They are not even heroic, if lack of fear is a requisite for heroism. They are cold, dirty, rough, frightened, miserable characters; GIs, Johnny Doughboys, dogfaces, footsloggers, poor bloody infantry, or as they like to call themselves, combat infantrymen. But they win wars.

"They are men from Companies I and G, 23d Infantry, but they might be men from Companies A and K, 16th Infantry, or they might be men from Companies C and E, 254th Infantry. For their stories are relatively the same. Some may have fought the Germans longer than others, or some may have fought the Germans less. For all it was an eternity.

"The characters in my story are not fictional, and any similarity between them and persons living or dead is intentional, and some of them are dead.

"... I am not the hero of my story.

"The heroes are the men from Companies I and G—the lead scouts, the riflemen, the machine gunners, the messengers, the mortar-men. Companies I and G are called rifle companies . . . and when you call a company a rifle company, you are speaking of the men who actually fight wars."



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