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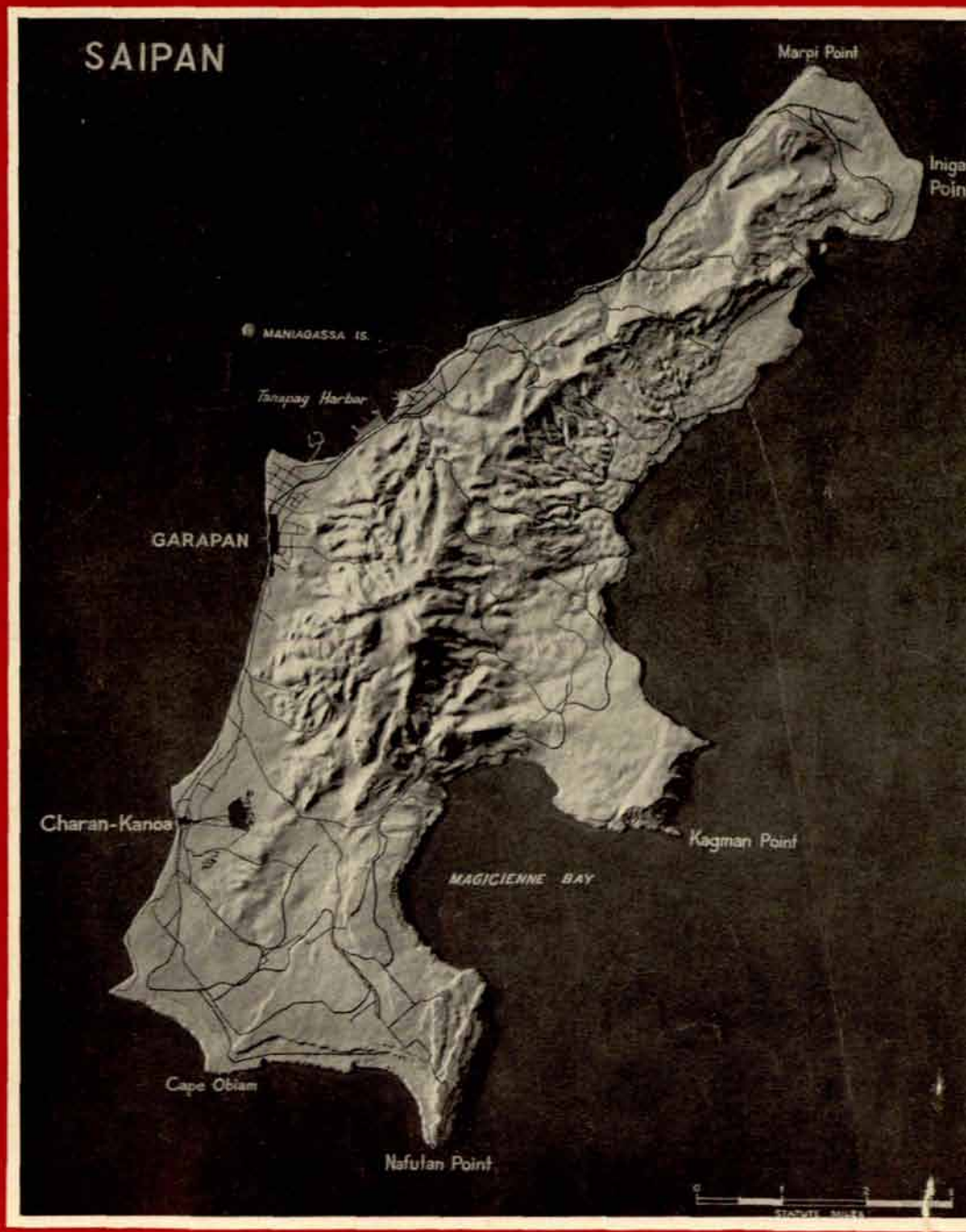

Featuring 59th AAA Brigade

To all members of
The Coast Artillery Corps:

On behalf of the officers and members of the Executive Council of the United States Coast Artillery Association, may I extend to all Coast Artillerymen throughout the world best wishes for a Merry Christmas and Happy New Year, and congratulations for maintaining the high standards and traditions of the Coast Artillery Corps in such an excellent manner during the past year.

Lieutenant General, USA
President, Coast Artillery Association

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Activities of The

59th AW Position.

59th AAA BRIGADE

By Colonel Edward Barber, USAF

HEADQUARTERS
WESTERN PACIFIC BASE COMMAND
APO 244

CITATION
FOR
MERITORIOUS SERVICE UNIT PLAQUE

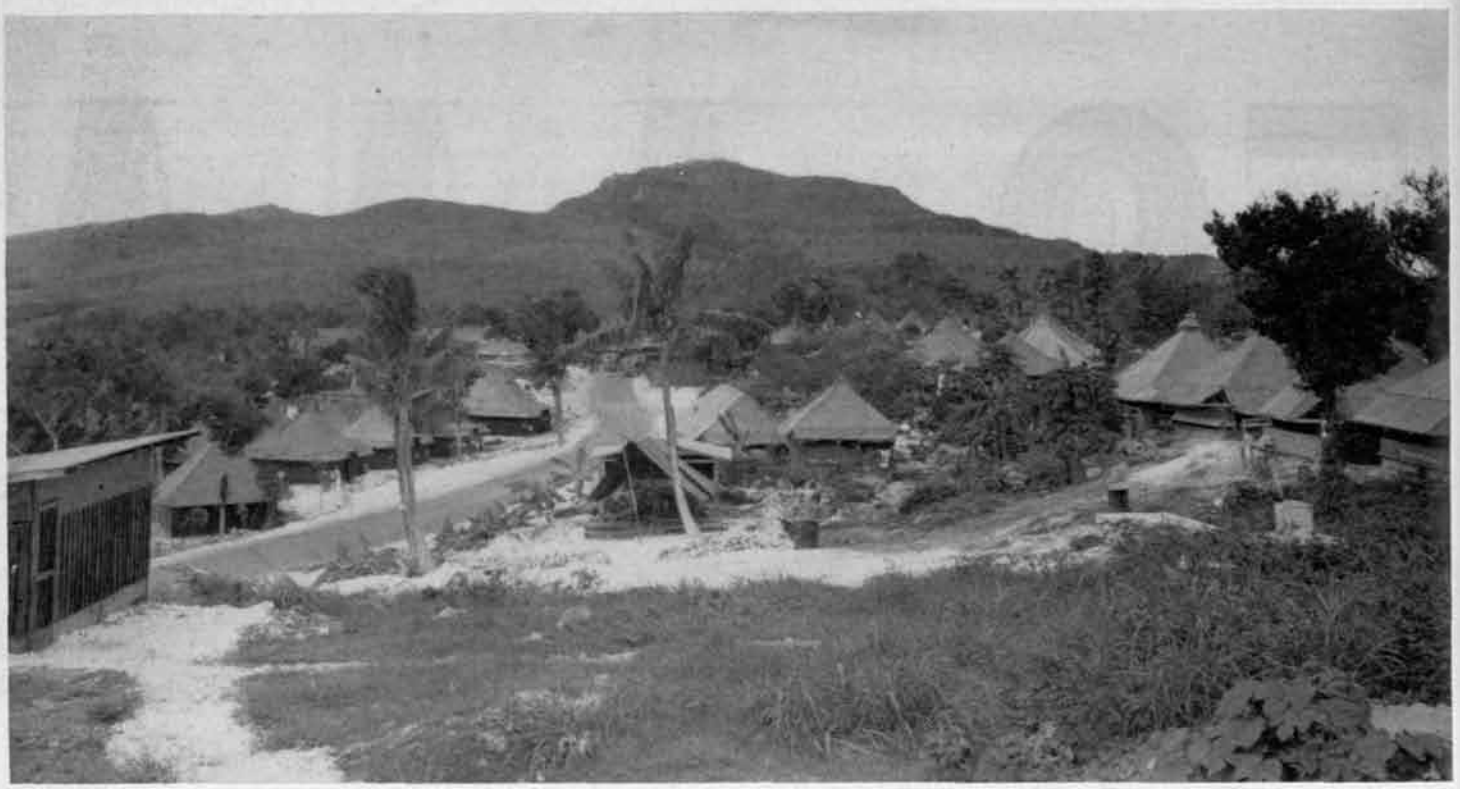
From 10 May 1943 to 2 September 1945, the members of Headquarters and Headquarters Battery, 59th AAA Brigade, served with distinction in support of important training AAA activities in the continental United States and later as AAA Brigade Headquarters on Saipan, Marianas Islands. Overcoming many problems arising from rapidly expanding activities and changes in assignment and on many occasions performing duties beyond those normally provided for in tables of organization, all personnel of the Unit maintained exemplary standards of military courtesy, discipline, loyalty, devotion to duty, and morale, thereby making contribution of great value to our nation's war effort.

(GO 1, Hq WPBC, 3 Jan 46)

The author of the foregoing citation, whoever he may be, has unquestioned mastery of the art of written expression for there, in a nutshell, is the complete history of the Headquarters and Headquarters Battery, 59th AAA Brigade. It is difficult to see how it could be improved upon as a historical document because all the essential facts are there. Accordingly, those scholars of history who are seeking nuggets of wisdom will do well to read no further.

What follows is the story of a small group of Americans who lived, ate, played, and fought together for over two and a half years, and in the process learned much about each other and the art of working together as a team in pursuit of a common goal, which was "to lick those SOB's and go home." It follows materially then that this story will hold real interest only for those who actually lived through the experience. It may hold some slight interest for others, but they are warned in the beginning to expect no hair-raising or exciting episodes of enemy airplanes destroyed, of enemies bayoneted or strangled with bare hands, of landings on hostile shores with plumes, sabers, and colors waving, or of receiving the surrender of vanquished foes. A few others may be reminded of pleasant or unpleasant associations with the 59th AAA Brigade, because although the story will deal mainly with the peregrinations of the Headquarters and Headquarters Battery, it is inextricably related to and must include mention of the AAA Groups and Battalions who served under the aegis of the 59th at various times. After all, the sole justification for an AAA Brigade Headquarters and Headquarters Battery lay in the existence of the Groups and Battalions under its banner.

The 59th AAA Brigade was born on 10 May 1945 at Camp Haan, California, the site of one of the large Antiaircraft Artillery Training Centers controlled by the Antiaircraft Command of the Army Ground Forces. There is no record for the date indicating that the birth was attended by any of the earth tremors occasionally noticed in Southern California, or that Hitler or Tojo figuratively trembled in their boots. However, it did portend for the little group of staff officers headed by Colonel Fred W. Bochman, Brigade Executive, and the cadre of enlisted men who had



Looking north from the 59th's CP toward Mt.Tapotchau, on Saipan.

been assembled for the occasion the activation meant—"only 18 weeks and we're on our way"—enough to stir hopes of finally getting actively into the shooting part of World War II.

Enthusiasm and determination ran high, and the group busied themselves with preparing training schedules, preparing to receive the additional complement of personnel to gain full strength, and coping with all the usual problems of organization that attend the birth of a new military unit. By 30 May 1943, the Headquarters and Headquarters Battery had its full complement of personnel and sufficient equipment to begin its regular training schedule. On 1 June Colonel Edward Barber (the author), who had commanded previously for short periods the 35th AAA Group and the 36th AAA Group, was "assigned to command," and the 59th AAA Brigade was ready to roll.

The officers and enlisted men, approximately 85 in number, represented thirty-five states with at least two from each state represented. They came from all walks of life and many different trades and professions and, with one or two exceptions, became acquainted with each other only upon joining the Brigade. It is seriously doubted that in any other nation in the world such a heterogeneous group of people with such diversified backgrounds could be assembled into a closely knit group and begin pulling effectively together in a common course so quickly. Just being a part of this process is enough to confirm one's faith in our people and in our way of life. The eager interest in the task to be done, the friendly spirit of cooperation, the loyal attitude and willing subordination of self to the good of the whole —all these were present in ample measure at the very beginning and presaged success in future undertakings of the 59th AAA Brigade. Any doubts as to the quality of the men assigned were quickly dispelled while witnessing early in June the rescue of the crew of a burning B-24 Liberator which had crashed near the bivouac area of the 59th. The men of the 59th proved their mettle and their utter disregard of self when comrades' lives were endangered, and their bravery was recognized by the award of Soldier's Medals and several individual commendatory citations.

The first problem to be confronted was one presented by Major General "Barney" Oldfield who had succeeded to command of the Camp Haan AAATC very shortly before the 59th was activated. It had been the practice to consider that Brigade Headquarters and Headquarters Batteries were separate units to be given training under a special program with no other responsibilities. General Oldfield's concept proved to be that the mere execution of a unit training program at the level of Group and Brigade Headquarters was a rather inadequate and piecemeal expediency for developing commanders and staffs. Accordingly, on the eve of initiating its training program, the 59th AAA Brigade found itself charged with active command responsibility for some 25,000 AAA troops.

This was "on-the-job" training with a vengeance and put the Brigade into the first of a series of challenging situations which it encountered throughout its active life. The number of battalions and groups assigned to the 59th AAA Brigade continued to total approximately 25,000 troops during its stay at Camp Haan. The devisers of the table of organization for AAA Brigade Headquarters had never envisaged such a situation, and it is only fair to acknowledge that the assistance rendered by the AAATC in the form of inspector-instructor teams and in temporary reinforcement by attachments was of material aid in enabling the 59th to discharge its responsibilities. The high spot of the 59th's training period was the tour in charge of the Camp Irwin firing range on the Mojave Desert about 150 miles northeast of

Camp Haan. During the hottest months of the year, July and August, over 30 battalions of AAA troops were put through their schedule of firing and field exercise without a single fatality and without a single unit's being "set back" in its schedule. Here, the complexities of scheduling firing on a firing line 10 miles long with AAA guns figuratively hub-to-hub, and the conduct of field exercises without interruption to firing, presented most interesting problems in traffic control which kept the Brigade busy in working out successful solutions.

The 59th returned to Camp Haan 1 September with high hopes—"only a few more days and we'll be on our way"—only to encounter disappointment. During the stay at Camp Irwin, the AGF authorities had decreed an extension of the training program from 18 to 22 weeks and had established a requirement for 2 months' additional training on a joint basis with either AGF or AAF organizations. Although there was considerable chafing at the delay, the wisdom of this additional training was quickly recognized (the requirement had been there for many years but had been given only very belated recognition), so with only a momentary drop in spirits the 59th rolled up its sleeves and tackled these new requirements with renewed vigor and enthusiasm. It was during the period at Camp Haan, after the return from Camp Irwin, that the last remaining shortage in Brigade equipment was received, the Brigade Commander's Stars, which were duly installed and "wetted down" with appropriate ceremony by the staff.

As the end of the training period at Camp Haan approached and the 59th paused to review its accomplishments, some very striking statistics were revealed. While meeting the requirements of its own training program, the Brigade had been responsible for and had assumed an active command role and responsibility in the training of over 55,000 troops, equivalent in numbers to almost 4 Infantry Divisions. This number included only those AAA Groups and Battalions which had been assigned to the Brigade for a period of two months or more. If all units were included, such as those battalions assigned for shorter periods and for such specific tasks of responsibility as field exercises, special inspections, and POM processing, the total would have exceeded 65,000. Needless to say, the Brigade was fortunate in having a number of splendid Group and Battalion commanders without whose unflagging interest and outstandingly loyal support the task would never have been accomplished.

Unfortunately, the meager records available at this late date prevent a detailed listing of all individuals and units, and recollections of a period some five years ago are certain to be somewhat dimmed. However, with such Group Commanders as Parry Lewis, "Beanie" Ericson, Gene Conway, "Tige" Owens, O. D. McNeely, Eddie Kleinman, "Beanie" Young, and others; such Battalion Commanders as Cavallo, Frey, Wood, Ritchie, Gearhiser, Devlin, Lorimer, Maynard, "Art" Fuller, Naylor, Mitchell, and many others; and with the friendly assistance of the AAATC staff, Colonel "Johnny" Lindt, Lt. Colonel "Russ" Sharpe and his S-3 group, and Lt. Colonel Eddy and his S-4 group, almost any AAA Brigade could produce results.

On 1 December 1943 the Brigade proceeded to Hamilton Field, California, to relieve General W. L. Richardson's Brigade and to undergo combined AAF-AAA training in air defense and airdrome defense under the Fourth Air Force commanded by Major General W. E. Lynd. This began a new era in the life of the 59th and as usual presented many new and interesting problems. Instead of just merely undergoing combined training, the 59th found itself directing the combined training of thousands of troops, conceiving, planning, directing, and supervising a whole series of joint exercises involving all the various types of units employed in air defense and in airdrome defense. Fortunately, the atmosphere encountered in the Fourth Air Force was conducive to the development of a strong program, the attitude of all AAF commanders and their staffs being one of cooperation to the limit of their means. The directive was broad in nature and permitted the exercise of initiative and the introduction of realism and objectivity into the training, which was quite in contrast to what had been possible under the rigid, hour-by-hour, inflexible, closely supervised and regimented training provided in the AA Command of the AGF. Command supervision proved to be a real problem. The geographical dispersion of units throughout the entire state of California (a circuit of over 1200 miles air-line distance was required to visit all units) served to keep the Brigade staff on the road most of the time. However, it did provide the opportunity for delegation of authority to such fine group commanders as W. L. McCormick, Allison Jones, E. L. Supple, and others who had been with the Brigade at Camp Haan, all of whom welcomed the opportunities to exercise more or less independent command. The standard of Battalion Commanders continued on a high level with such men as Robbins, Mickelson, Burnham, Tanner, Hunnicut, and others.

The joint exercises with AAF units afforded in general the finest kind of training and permitted working out many problems in coordination of effort between AAF Signal Air Warning units and AAAIS, Fighter Control Groups and AAA Opns, and in employment against ground and air attack of all the various types of units that normally inhabit an airdrome. In this latter connection, Brigadier General Marcus Bell, of the 81st Infantry Division, was particularly helpful in assisting to work out realistic problems in defense against ground attacks. Four major joint exercises were staged in the Muroc and Santa Maria areas and two minor exercises in the Marysville area and the Ontario area. About 15,000 AAA troops were given at least two months of this training and over 20,000 troops of the other AAF and AGF arms and services participated in the joint exercises. It is no exaggeration to state that the AAA Battalions and Groups that participated in this joint training were far better prepared to carry out their missions in an overseas theater than any that had been dispatched previously. The close association with the Fourth Air Force provided opportunities for new friendships and closer understandings which were reflected in the wholehearted assistance rendered by the Fighter Wing Commanders and AAF Base Commanders.

In the meanwhile, the joint training period for the 59th AAA Brigade, a supposed two-month period in preparation for overseas movement, lengthened to six months, and hopes of active combat service began to grow dim. Orders to return to Camp Haan on 1 May 1944, accompanied by

A 40 on Aslito Airstrip, Saipan.

a rumor that the return was for POM processing, created a temporary rise in spirits, but these were soon dashed to the ground when the Brigade was intercepted en route with orders to proceed to Camp Irwin, the desert firing range, to supervise more routine training of the Camp Haan battalions. Upon arrival, about 9,000 AAA troops were found engaged in their routine 22-week training program under such Group Commanders as Hindle, Burgess, and "Glen" Newman. These AAA troops were the last of the "Mohicans," and Camp Haan already had initiated a deactivation program and instituted an Infantry Replacement Training Program. However, swallowing hard its disappointment, the 59th went to work. Most of the AAA units were ready for their field problems; accordingly, a two-sided joint exercise was staged for about ten days in which all the troops at Camp Irwin participated, including the station complement of the Service Command. With planes from the Fourth Air Force, and with a "hostile" ground force of some 3,000 of the Camp Haan Infantry trainees under "Tige" Owens, it was possible to inject a degree of realism into the training that heretofore had not been possible in our AAATC's.

The 59th returned to Camp Haan late in June 1944, shortly after the invasion of Normandy began, still wondering what the future held in store, but within a few days came the big event toward which every effort during the preceding twelve months had been directed—Orders! ! Glory Hallelujah! ! The 59th was headed overseas at last, scheduled to arrive on the Normandy Peninsula about the middle of August 1944! ! There followed a period of feverish activity, last-minute checks and inspection on personnel and equipment, packing and crating even to loading in a baggage car, last-minute farewells, and all the usual things prior to departure, when—Boom! All hopes were blown sky-high with the receipt of cancellation orders just 48 hours prior to scheduled departure from Camp Haan. However, by that time the 59th had come to expect disappointment as a routine thing, so many had befallen it before, and in a few days the pieces were picked up and life went on as usual.

The Brigade, to no one's surprise, actually did make a landing in the middle of August 1944, but not on the Normandy Peninsula. After two and a half long hot days on the Southern Pacific Railroad, the 59th detrained at Camp Beauregard in the heart of the Louisiana Maneuver Area, where the mission was given again to conduct joint AAF-AAA training in air defense and airdrome defense. Offhand, this looked to be more of the same thing we had encountered with the Fourth Air Force. However, closer analysis revealed a new situation for the Brigade. In the 4th AAF the defense of rear areas and communications zone facilities had been emphasized. In Louisiana, we were to work with the Third Tactical Air Command consisting of the 1st and 2d Tactical Air Divisions with their Tactical Control Groups and special Air Warning Units. These exercises were to emphasize operations in a combat zone with mobility and fluid situations, which presented new problems. Not the least of the problems presented was the fact that the Louisiana Maneuver Area had just about closed up; regular air and ground maneuvers had been completed, and no more were in prospect. The station complement personnel had stored all equipment and in most cases had been reduced in numbers almost to a caretaker status. Again the 59th rolled up its sleeves, and this time, with very little outside assistance, established and operated a comprehensive Army Supply Depot.

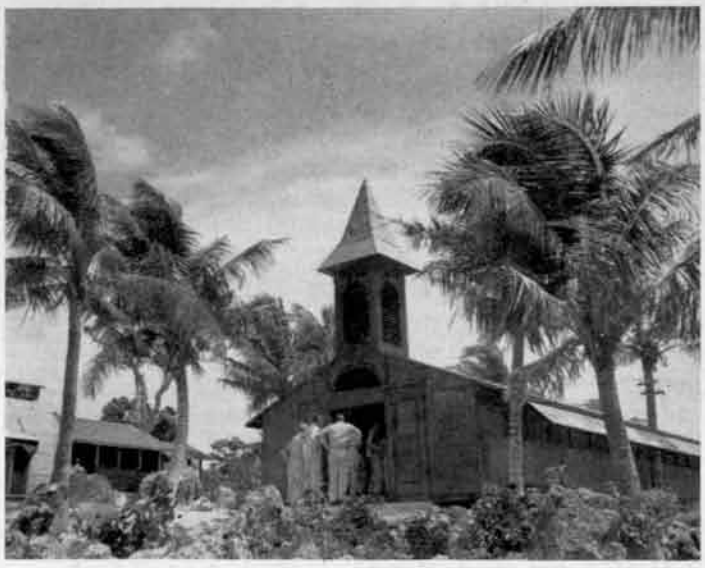
The joint AAF-AAA program, according to advance information, was to be a rather ambitious one, but actually only two Group Hqs and four AAA Battalions arrived at staggered intervals, which made combined exercises rather difficult. However, it was possible to work out many interesting problems, particularly in coordinating AAAIS with AAF Tactical Control Groups and in working out methods of coping with multiple aircraft attacks and with multiple direction attacks. Valuable data was secured on radar and radio operation, and sound procedures were worked out for aircraft operating from bases defended by AAA weapons. In all, about 3,000 AAA troops were prepared better to fulfill their combat mission, and about 2,000 AAF troops became acquainted with AAA problems. The AA units included the 95th and 202d AAA Groups and the 234th, 235th, 530th, and 580th AAA Battalions. The cooperation given so wholeheartedly by the AAF Commanders and the AAF Base Commanders, as well as the loyal support of such AAA Commanders as Dawes, Platt, and others, made it possible to derive much benefit from this training period despite the fact that the Louisiana "wars" were practically ended. By 13 November 1944 all units had cleared out, and the 59th AAA Brigade accompanied by the 161st Opn Det was moved to Ft. Bliss, Texas, to await an uncertain future.

A few days after arrival at Ft. Bliss, the Brigade was alerted for movement to the Asiatic-Pacific Theater. Naturally, spirits were raised but not quite as high as previously —the cry had been heard too often—but as the days went by, the conviction grew that maybe this was the real thing at last. And so it turned out to be. With the dawn of the year 1945, the 59th Brigade entrained for a coded destination via the Seattle Port of Embarkation. At last we were on the way. At Ft. Bliss, the 69th AAA Group commanded by "Mac" McFadden joined the Brigade. This fine organization was the remnant of the old 69th CA Regt (AA) and brought with it much of the tradition and spirit of the old organization, including the Regimental Colors, which "Mac" swore he would plant personally on the Palace in Tokyo. Only a few days at Seattle, where we marvelled at

the smooth-running efficiency of the Port, and we were on our way, in a new Navy APA-type attack transport, in charge of a miscellaneous assortment of 1500 troops. It is safe to say that no other AAA Brigade left the shores of United States as thoroughly and as completely prepared for its mission as the 59th.

As we cleared the Straits of Juan de Fucca, the ship bumped head on into a North Pacific storm with the inevitable result—the 1500 troops and three-fourths of the Navy crew made for their bunks and there they stayed—500 really sick, 500 not sick but fearful that they might be, and 500 healthy who knew that if they left their bunks they'd have to go to work looking after the others. Four days later the sky was blue, the sea was calm, and the sun was bright, and an interest in submarines that was strangely lacking during the first four days, became manifest. We discovered, via the "grapevine," that the ship was unescorted and headed for Honolulu, and that the 59th was headed for Saipan, an island which in map outline resembled a left-handed monkey wrench upside down. This began to look like our long-awaited opportunity for action. Eight days after leaving Seattle the ship entered the harbor of Honolulu, and the Brigade disembarked for another delay awaiting transshipment to Saipan. After a few days of briefing by ComGen POA and his staff, whose friendly welcome and keen interest in our organization stimulated and sharpened our desire to "have at 'em," the Brigade Commander and an advance party of 6 officers and enlisted men proceeded by air to Saipan, leaving the remainder to follow by transport under the Brigade Executive. The advance party arrived at Saipan on 28 January 1945, twenty hours and 3200 miles from Hickam Field, with stops at Johnson Island and Kwajalein. The remainder of the 59th Hq and Hq Btry and the 69th AAA Group arrived on 12 February 1945 after a hot but uneventful transport voyage.

Saipan had been subjected to hostile air raids during November and December 1944, which had effected considerable damage to the B-29 airplanes on Isley Field. The Aircraft Warning installations had not been completed at that time, and hostile "on-the-deck" air attacks had been meeting with considerable success in approaching their targets undetected. High-altitude attacks were not particularly effective and had been limited to the full-moon phases of each month. There had been one hostile air attack early in January. Most attacks had been delivered from the Jap-held base at Iwo Jima. When the 59th arrived on Saipan, the invasion forces for our Iwo Jima operation were being mounted, and the island itself was being heavily bombed by the 7th Bomber Command and bombarded by elements of the fleet. The arrival of the 59th happened to coincide with the beginning of a full-moon phase just prior to the invasion of Iwo Jima and as a result the situation was found to be rather tense. There were several "alerts" for the AAA troops during February and early March, but there were no more hostile raids on Saipan after the arrival of the 59th, as the capture of Iwo Jima late in February 1945 limited the hostile air capabilities to "one-way" kamikaze attacks from Kyushu, Marcus and Truk. Naval intelligence reports were received frequently, indicating the possibilities of this type of air attack, and on at least two occasions, the entire AAA Command was placed in a full "alert" status; one in May 1945 being of almost 3 weeks duration, and another in early August which alerted the AAA defenses of Isley Field, the B-29 Base, for almost two weeks. Early in March, the AAA Standing Operating Procedures were revised so as to avoid alerting the entire command for every single unidentified airplane, but the command was always held in readiness for action against possible "snoopers" during the return of the B-29's from their raids on the Japanese homeland.



The 59th's Chapel on Hill 500, Saipan. The EM Club shows on the left.

On 1 March 1945, a reorganization into an "area" defense was effected which grouped units as follows:

59th AAA Brigade
- 69th AAA Group
  - 206th AAA Aw Bn (less Btries C & D)
  - 738th AAA Gun Bn
  - 865th AAA Aw Bn
  - Btry B, 230th AAA Slt Bn
  - 33d CA Bn (155mm)
  - 44th CA Bn (155mm)
- 86th AAA Group
  - 501st AAA Gun Bn
  - 751st AAA Gun Bn (less Btries C & D)
  - 752d AAA Gun Bn (120mm)
  - 864th AAA Aw Bn
  - Btries B & C, 857th AAA Aw Bn

Each AAA Group was given defense responsibilities for specific areas, the 86th defending the B-29 Base, and the 69th defending the fighter base, the dock area and miscellaneous Island installations. This organization generally remained unchanged throughout the remainder of the war, except for arrivals and departures of such units as the 234th AAA Gun Bn which arrived 10 June and was assigned to the 86th Group.

In the latter part of April 1945, directives were received "alerting" the following units for operations in the Nansei Shoto, scheduled as part of the Okinawa operations:

59th AAA Brigade
- 69th AAA Group

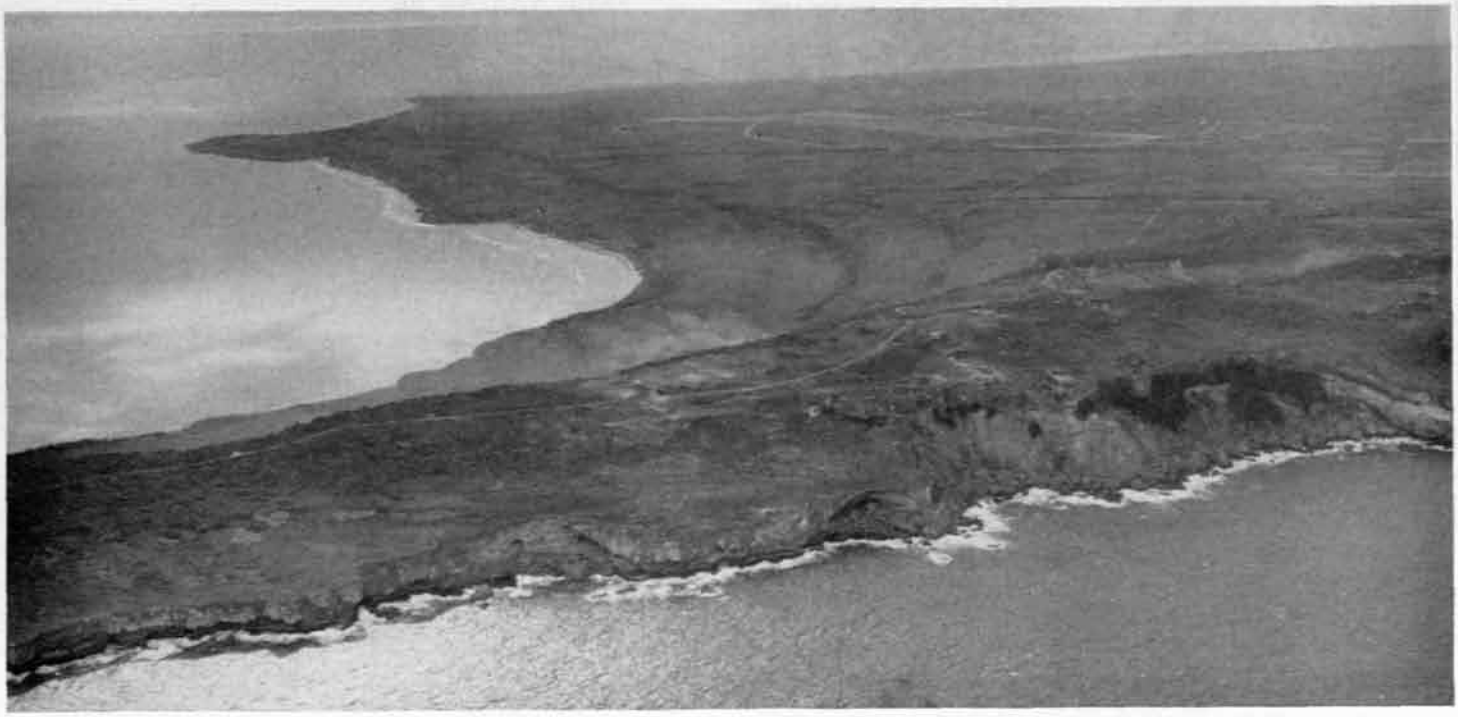
206th AAA Aw Bn (less 2 Btries)
738th AAA Gun Bn
865th AAA Aw Bn
Btry B, 230th AAA Slt Bn

This operation known as "IIIc" was subsequently canceled, and part of the units were set up for Operation "IIId." Then IIId was canceled, and all units were alerted for assignment to Tenth Army on Okinawa in August. This was canceled later, and the 206th was dispatched to Iwo Jima. Late in August, all units except the 59th were alerted for movement on 1 October to join the Sixth Army occupation forces on Honshu, but even this movement was canceled on 21 September. In every case, all units had been thoroughly POM'd, packed, inspected, refresher-trained and made completely ready for the prospective movement, but Fate decreed that Saipan was to be the end of the road for most of them, including the 59th.

During the month of July, the 59th AAA Brigade was designated by Admiral Whiting, the Island Commander, as the Saipan Pacification Force relieving the 24th Infantry Regiment in this role, but as an assignment in addition to maintaining the high-priority AAA defenses on the island. The mopping-up operation was assigned to the 69th AAA Group, while the 86th continued to maintain the AAA defenses for Isley Field. Operations were begun immediately and conducted vigorously throughout the entire month of July with excellent results, making the second highest "bag" of Japs on record since Saipan had been captured the year before. The success obtained in adapting AAA troops and weapons to jungle and cave fighting reflected great credit on "Mac" McFadden and his 69th Group, and was commented upon most favorably by higher commanders. The AAA searchlights were employed nightly with particularly effective results. Casualties of 1 dead and 10 wounded were received while accounting for over 130 killed and captured enemy. The morale and esprit of the troops engaged in this operation were outstanding. It was during this period that the 59th Headquarters Battery could no longer be denied its chance for action. Accordingly, the Battery personnel were relieved temporarily from their various headquarters duties and attached to the 69th Group as a provisional infantry company. After several days of fairly rugged jungle prowling and cave exploring, the Battery was credited officially with killing one Jap who very foolishly tried to shoot his way through the cordon. If memory serves correctly, the "kill" was made by Corporal Bacon after an exchange of shots with the Jap, but after these operations the entire 59th Hq Btry seemed to step with a little firmer tread and with the slight swagger of combat veterans.

Throughout the entire period, the construction and improvising ability of the AAA troops was little short of astounding. Little, if any, assistance was received from Engineer construction troops, except for the occasional loan of items of Engineer equipment (usually during hours of darkness when not in use by the Engineers), and this in return for other concessions. Coral access roads, gun parks, motor parks, cement hard-stands, water systems, sewage systems, athletic fields, buildings, and all types of other construction were accomplished in workmanlike fashion and usually with dunnage and scrap lumber and salvaged and abandoned materials. The AAA troops also played an important role in the development of Saipan as a base. In the first 8 months of 1945 the "detail" records show that over 200,000 man-days were contributed as the AAA Troops' share in Island Command construction projects. In the same period much was done to improve morale, some of the major projects being:

(1) The completion of an AAA Enlisted Men's Club. The facilities included a main club, with snack bar, staffed by the American Red Cross; a separate recreation building and hobby shop with photo-developing and printing facili-



Southern end of the island showing Aslito Airstrip.

ties; a Special Service branch library; and a separate Post Exchange store and beer garden with barber shop and pool room.

(2) Inauguration of American Red Cross Clubmobile Service, visiting all isolated AAA positions with refreshments, recreational and amusement supplies.

(3) Organization of an AAA dance band, which steadily improved to become one of the best in whole WPBC area.

(4) Publication of the "AAA Album of APO 244," a souvenir memento given to each enlisted man, containing over 125 Signal Corps photos of Saipan and AAA activities.

(5) Organization of a "metropolitan" delivery service for the Island Command daily newspaper, whereby each edition was delivered to the remotest AAA position in time for breakfast.

(6) Completion of the best-equipped chapel on Saipan, adjacent to the AAA Enlisted Men's Club.

A listing of these projects makes rather dull and uninteresting reading about what might appear at first glance to be nothing more than a routine performance, but the casual reader may be assured that there are few words in the English vocabulary that can describe adequately the effort and ingenious improvisation, with which the American soldier is amply provided, that must go into such projects on a barren Pacific island at the end of a 6,000-mile supply line. While the 59th can rightfully claim that it had the highest morale and best discipline of any command under the control of the Western Pacific Base Command, it was the presence of such Group Commanders as "Pat" Flannigen, "Mac" McFadden, Carl Green, and their battalion Commanders like Jaap, Pohl, Harrison, Shumate, Smith, de Jarnette, and others, and a splendid group of American soldiers that insured that any performance of duty would be of the highest quality.

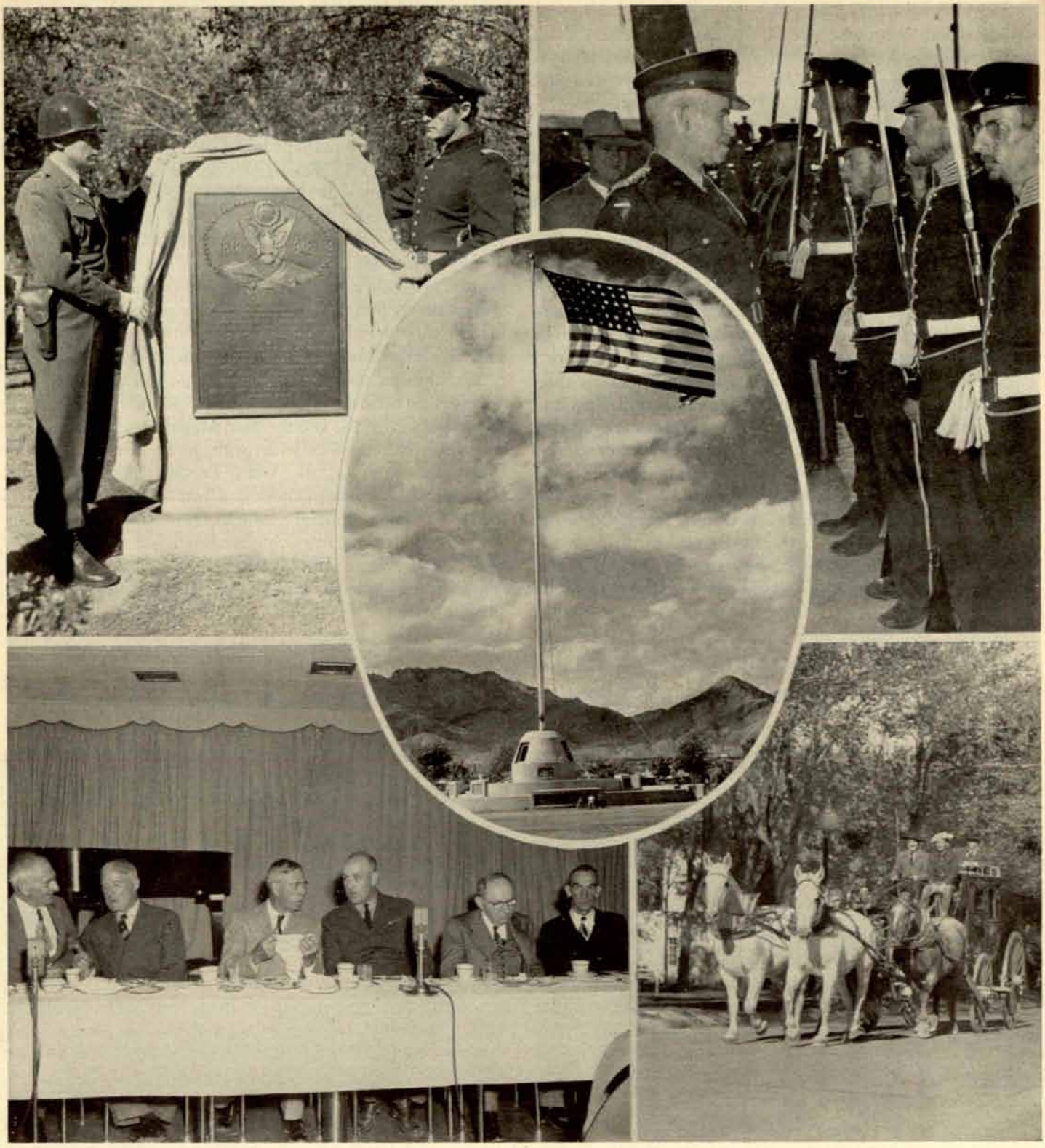
V-J Day brought an end to World War II, and although there were a few twinges of regret (the 59th had struggled long and earnestly learning to play "that big bull-fiddle" and had carried it with us wherever we went, but nobody ever asked us to play), there was genuine relief that it was over and the need was ended for the final invasion of the Jap homeland, which could have been terribly costly. The long trek homeward began, but due to the "point system," the 59th was not to come home as a unit with bands playing and banners waving. Each officer and enlisted man was to wend his way homeward as best he could, no longer sustained by the rest of the team, and for most of us it was a pretty lonely trip. The Headquarters and Headquarters Battery, 59th AAA Brigade, came to the end of its official life through deactivation on Saipan on 15 January 1946, and passed from the picture in much the same way it had appeared, with no more than a ripple on the maelstrom of confusion which attended our demoralizing demobilization. It never fell to our lot to realize our ambition of shooting down thousands of enemy planes. The task of the 59th was for the most part the undistinguished drudgery of training, training, and more training, the constant preparation for the chance that was always just around the corner but never materialized. We had to console ourselves with the thought that this labor perhaps was vital in preparing others to engage in combat successfully. However, the 59th derives deep pride and satisfaction in the knowledge that many of "our" fine battalions acquitted themselves most creditably in combat; that the officers and men who served with and under us were perhaps better soldiers for having served with the 59th AAA Brigade, as many of "our" men who fought as Infantry in the Battle of the Bulge may testify.

During its active life of thirty-two months the 59th provided the command echelon for over 90,000 troops, no small attainment in itself. It is certain that the Brigade gave its best to every task that was assigned, and these tasks were widely diversified in nature, and each presented new problems. Everyone who served in the 59th can share in that inner feeling which derives ample reward from the knowledge that every task was performed and every assigned mission was carried out. The 59th wears proudly its sprinkling of Soldier's Medals, Bronze Star Medals, and Commendation Ribbons; it points with pride to its Unit Plaque for Meritorious Service, its Asiatic-Pacific ribbon with one battle star, and its commendations from Lieutenant General McNair, Major General Oldfield, and Admiral Whiting. The 59th salutes its many higher commanders—all military men of the highest caliber whose firm backing and kindly and friendly guidance contributed so much to our service. The 59th salutes also the Group and Battalions commanders who served with us, and all the fine American soldiers whose cooperative spirit and loyal attitude made all tasks seem easy to carry out. And, finally, the Brigade Commander's salute to the 59th Hq staff, Colonel Fred Bachman, Lieutenant Colonel Teglund; Majors Slay, Darden, Bennett; Captains Smith, Ledbetter, Linton; Lieutenants Thompson, Ryerson, Berger, Peterson; and others who served for shorter periods: Colonel Doug Pamplin, Lieutenant Colonel Jack Lansing; Majors Val Smith, Earl Smith, Crockett; Captains Bob Foor, John Steedley, Ponder, Harrell; Lieutenants Burns, Brockoven, Campbell, Fuller, Bradley; and the enlisted men of Headquarters Battery: 1st Sergeant Blomberg, Supply Sergeant Paterno, Mess Sergeant Danley, Sergeant Major Rye, Cullen, Loehnis, Syracuse, and all the others too numerous to mention here individually. No other AAA Brigade Commander was privileged to serve with any finer group of men, and their friendship will be cherished and remembered always. As long as wars must be fought, they are men to have on our side, all fine Americans who will never be licked by anybody!!

* * *

Leadership in a democratic army means firmness, not harshness; understanding, not weakness; justice, not license; humaneness, not intolerance; generosity, not selfishness; pride, not egotism.—General Omar Bradley.

FORT BLISS HO



CENTENNIAL HIGHLIGHTS: *Upper left:* Representatives of 1948 and 1848 officers unveil "First Encampment Tablet"; *upper right:* Gen. Bradley inspects 1848 guard, accompanied by El Paso's Mayor Ponder; *center:* Memorial Circle, in commemoration of the 100th Anniversary of Fort Bliss, the 200th CA Regiment, and War dead; *lower left:* Table of honor at luncheon honoring past post commanders. *Left to right:* Col. M. H. Thomlinson, Maj. Gen. Innis P. Swift, Gen. Ben Lear, Maj. Gen. J. L. Homer, present post commander; Mr. Maurice Schwartz, chairman of the Centennial; and Brig. Gen. F. L. Wittaker; *lower right:* The coach that escorted General and Mrs. Bradley, and Maj. Gen. and Mrs. Homer to the Replica.

DS CENTENNIAL

A fitting climax to the great Fort Bliss Centennial celebration was the spectacular pyrotechnic display in El Paso set off by Secretary of the Army Kenneth C. Royall from his office in Washington, D. C. Secretary Royall's order took four seconds to be executed, a contrast to the ten months required for the War Department general activating order to reach El Paso in 1848.

The first half of the program was carried on a national radio hookup, on which Governor Beauford H. Jester of Texas replied to Secretary Royall.

The passing parade of one hundred years' history was telescoped into an impressive half-hour ceremony Friday afternoon as the Fort Bliss 100th Anniversary Tablet was dedicated. Climax of the ceremony was reached when two enlisted men, one garbed in the 1848 uniform and the other in modern dress, symbolized the meeting of the first and the present garrisons as they unveiled the commemorative plaque.

More than 2,000 interested spectators thronged to the Replica of Old Fort Bliss, after Maj. Gen. John L. Homer, post commander, welcomed El Pasoans in a brief but impressive ceremony. Maurice Schwartz, chairman of the Centennial executive committee, was the first speaker. With Lt. Robert D. Marmaduke playing the role of the commander of the first El Paso military post, command of the Fort Bliss Replica was transferred to 1948. El Paso's Mayor Dan Ponder accepted the gift from the past and immediately restored it to the "capable Army of 1948."

In accepting the Replica on behalf of the post he commands, General Homer expressed the appreciation of the garrison for the gift, and emphasized the close spirit of cooperation that has always existed between Fort Bliss and El Paso.

General Omar N. Bradley addressed troops of the Fort Bliss garrison Saturday afternoon.

"The troops today present a splendid appearance and reflect a high standard of training," he said after inspecting the troops.

He emphasized that "the serviceman has many problems, caused by frequent transfers and the shortage of housing," but added that "we hope to make the American people understand these problems and help us to solve them."

In one hundred years, Fort Bliss has never seen another day like Sunday. The El Paso Southwest moved to Fort Bliss, as 25,000 people flocked to the Centennial. The program was designed to interest everyone, and the weather was perfect for the celebration.

Replica of the Original Fort Bliss, presented by the citizens of El Paso. Constructed for the Centennial, it will remain as a permanent museum at the post.

The Aerodynamics of Guided Missiles

By H. J. Stewart

For the first thirty years of the development of the airplane, aeronautical engineers used freely and confidently the hydraulic rule that the forces and moments on a body moving through a fluid varied with the square of the speed of the body and linearly with the density of the fluid. This rule was usually applied through the use of dimensionless coefficients; for example the drag of an airplane was usually

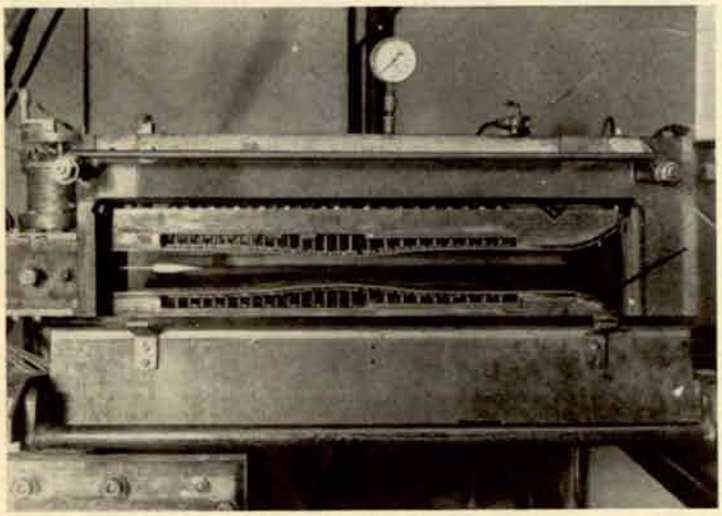


Figure 1—Side view of the 2½" Wind Tunnel with a Flexible Nozzle.

expressed in terms of the drag coefficient which varied directly as the drag and inversely as one-half the product of the air density, area (usually the wing area), and the square of the flight speed.

This dimensionless coefficient was generally found to be nearly independent of the size of the airplane and of the flight conditions; it varied only with the shape of the airplane and its attitude with respect to the air. This fact is the basis of model testing techniques, and wind tunnel tests of models quickly became the primary experimental tool of aerodynamicists.

The theoretical analysis of the air forces by the methods of dimensional analysis showed that the drag coefficient and other force and moment coefficients must also depend upon the Reynolds number and the Mach number. The Reynolds number varies directly as the product of the air density, flight speed, length (usually taken as the wing chord) and inversely as the viscosity coefficient. The Mach number is the ratio of the air speed to the speed of sound (about 750 mph). The Reynolds number represented the effect of the viscosity of the air, and the Mach number represented the effect of the compressibility of the air. Careful experiments in wind tunnels showed that the viscous effects (Reynolds number) were very important for determining the lift of airplanes in the landing condition and, to a lesser extent, the drag for all flight conditions. The viscous effects were found to be relatively unimportant for most of the other aerodynamic characteristics. On the other hand the compressibility effects (Mach number) were found to be quite unimportant for the flight speeds of less than 300 mph which were then being used. For most aerodynamic testing purposes it was thus possible to use relatively small models in simple low-speed wind tunnels. For more precise tests in which full scale Reynolds numbers were desirable, large (even full scale) wind tunnels or compressed air wind tunnels were used.

By the beginning of World War II airplane flight speeds were approaching 400 mph, and new phenomena associated with the compressibility of the air were encountered. It appears that the first airplane to encounter compressibility troubles was the German Me 109. When this airplane was placed in a high speed dive, air forces were created which tended to steepen the dive and made it difficult for the pilot to pull out. By a fortunate accident the British Spitfire was much less subject to this difficulty. By the end of World War II the development of the jet engine had pushed flight speeds up above 500 mph, and compressibility effects were found to be so large that aerodynamic tests at low speeds (low Mach numbers) were practically valueless for the high speed flight conditions.

As a result of the experience with guided missiles during World War II it was found that such missiles, in order to be reasonably free from interception, must operate at supersonic speeds, i.e., at speeds greater than the speed of sound. For example the German V-1 which flew at nearly 400 mph was very effective when it was first used; however in a very short time antiaircraft fire with radar fire con-

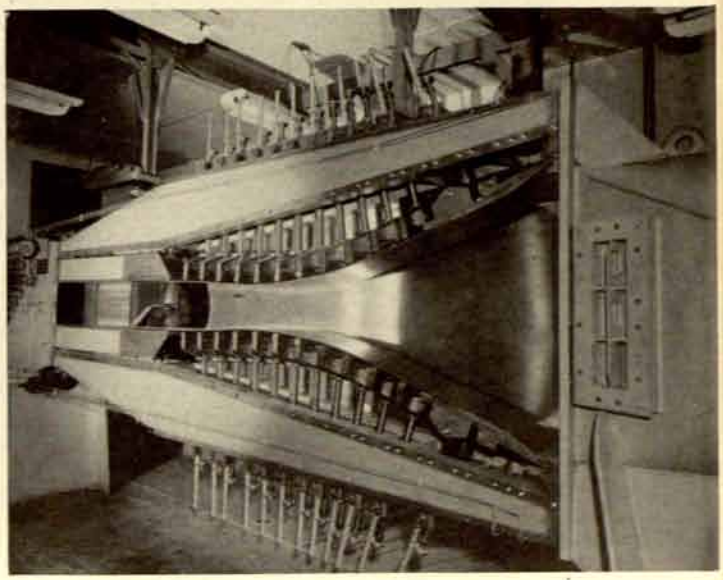


Figure 2—Flexible Nozzle of the Jet Propulsion Laboratory 12" Wind Tunnel.

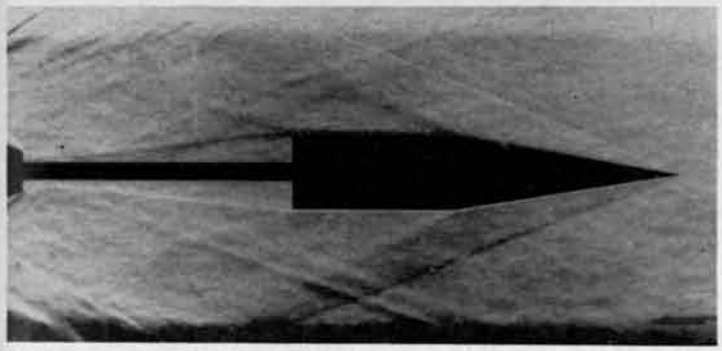


Figure 3—Schlieren Photograph of a 9°33′ Half Angle Cone at M = 3.06.

trol systems and proximity fuze ammunition provided very effective defense. During the last few days of the V-1 attacks on Antwerp only an infinitesimal portion of the V-1's escaped interception. On the other hand the V-2, which had a maximum speed of over 3000 mph and an impact speed of about 1500 mph, was completely invulnerable to interception. Because practically all guided missiles must thus be designed for supersonic flight speeds, the compressibility effects are of primary importance in nearly all aerodynamic considerations.

Since 1938 the aerodynamic theory of flight at high subsonic and supersonic speeds has been studied intensively, and much progress has been made. In many respects the theory of supersonic aerodynamics is now more highly developed than the theory of flight at low speeds where compressibility is not important. It now appears to be practical to carry out the aerodynamic design of supersonic missiles. Experience with low speed aircraft has shown that while operating aircraft could be built on the basis of purely theoretical aerodynamic designs, good aircraft could be built only after careful wind tunnel checking of the design so that minor "bugs" could be eliminated. Similar results must be expected for supersonic missile designs. It is thus necessary that supersonic wind tunnels be available for use in the development of guided missiles so that the most important aerodynamic parameter, the Mach number, can be duplicated.

The need for precise aerodynamic data at supersonic speeds was first encountered in ballistic applications since artillery projectiles have had muzzle velocities higher than the speed of sound for many years. For this reason the first relatively large supersonic wind tunnel built in the United States for development purposes was sponsored by the Ordnance Department. In the fall of 1940 the California Institute of Technology started the development of a very small supersonic wind tunnel with a 2½ in. by 2½ in. working section. This small wind tunnel was built under a National Defense Research Committee contract and was used, primarily, to investigate problems of design of a large supersonic wind tunnel. Later these data were used to design the 15 in. by 20 in. supersonic wind tunnel which was built at the Army's Aberdeen Proving Ground. The Aberdeen wind tunnel was placed in operation in 1944, and it has, since that time, carried the major part of the load of development testing of guided missiles. Since 1944 several new supersonic wind tunnels have been completed and many others are now under construction.

Both the small 2½ in. wind tunnel and the Aberdeen wind tunnel are capable of operation at speeds as high as four times the speed of sound (a Mach number of 4). Practically all of the development tests at Aberdeen have been made at Mach numbers of 1.73 or less since the special nozzle shapes for higher Mach numbers have not been available until very recently. One of the problems of supersonic wind tunnels arises because the nozzle through which the air flows into the working section must be carefully shaped in order to produce a uniform air stream and the required nozzle shape is different for each Mach number. If it is desired to make tests at different supersonic speeds, it is thus necessary to use either replaceable nozzles or a single flexible nozzle for which the shape is suitably adjusted for each speed. In many ways, the second solution is the more desirable. Fig. 1 shows a side view of the 2½ in. wind tunnel with a flexible nozzle and with a conical nose projectile in the working section. Fig 2 shows the flexible nozzle of the new 12 in. supersonic wind tunnel at the Jet Propulsion Laboratory, California Institute of Technology, with one side plate removed so that the nozzle structure can be seen. The recent Aberdeen tests at a Mach number of 4 have also been carried out with a flexible nozzle.

In addition to force or pressure measuring equipment most supersonic wind tunnels are equipped with some optical means of flow visualization. The most useful optical system is the "schlieren" system. In a schlieren photograph the light intensity is a measure of the density gradient in the fluid flow. The schlieren equipment is usually adjusted to show either the cross-stream or the down-stream density gradient. The uniform flow is a uniform grey, and a density change produces either a brightening or darkening of the field. A strong bright (or dark) line thus corresponds to a region where the density is changing rapidly. Figs. 3 and 4 are schlieren photographs taken in the 2½ in. wind tunnel. Fig. 3 shows the flow past a 9°33′ half angle cone at a Mach number of 3.06, and Fig. 4 shows the flow past a sphere at a Mach number of 1.24. Fig. 5 shows a schlieren photograph of a complete model in the 12 in. Jet Propulsion Laboratory wind tunnel at a Mach number of 1.77.

The characteristics of air flow at supersonic speeds are quite different from those at low speeds. The most important qualitative characteristics of supersonic flow have been summarized by von Kármán in his three rules of supersonic aerodynamics. The first rule is the rule of forbidden signals. Small pressure changes are propagated through the air at the speed of sound. Thus a body which is moving faster than the speed of sound cannot produce effects in the region ahead of the body. If the body is moving at subsonic speeds, the motion of the body can affect the entire fluid mass.

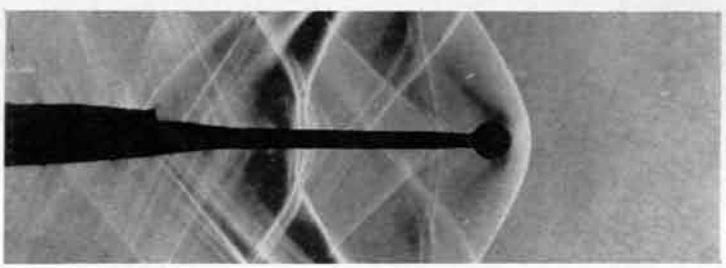


Figure 4—Schlieren Photograph of a Sphere at M = 1.24.

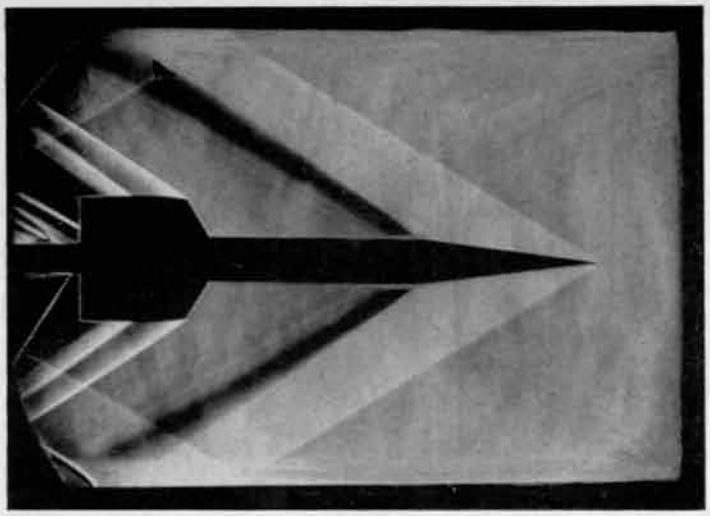


Figure 5—Schlieren Photograph of a Missile Model at M = 1.77.

There is thus a fundamental difference between supersonic and subsonic motions.

If a body is moving faster than the speed of sound, any small disturbance which is propagated laterally is also carried to the rear by the motion of the air. The influence of the body is thus restricted to a wedge shaped region to the rear of the body. At high supersonic speeds the wedge is very narrow; at low supersonic speeds the wedge is blunt. This illustrates von Kármán's second rule, the rule of the zone of influence and the zone of silence. This effect can be seen clearly in Fig. 3 where the conical wave attached to the nose of the cone separates the zone of influence to the rear from the forward zone of silence.

Strong compression waves, such as the blast wave from an explosion, are usually called shock waves and are propagated at speeds higher than the speed of sound. If a body is so shaped that a strong wave is produced, the zone of influence may be slightly increased. A blunt nosed body such as the sphere of Fig. 4 produces a strong nose wave, and the strength of this wave automatically adjusts itself so that the wave propagates at the speed of the body. The zone of influence in this case includes a small region ahead of the body. The strength of the wave diminishes laterally so the typical wedge shaped zone of influence is also produced even in this case. A detached shock wave pattern like Fig. 4 is produced by any blunt body and also by a sharp nosed body at a very low supersonic speed.

Von Kármán's third rule of supersonic aerodynamics is the rule of concentrated action. Those disturbances which are propagated laterally and forward with respect to the air are concentrated on the boundary of the zone of influence. The boundary of the zone of influence is thus usually a region having a large density gradient and is strongly marked in a schlieren photograph. This effect is clearly shown in Fig. 3 and, even more clearly, in Fig. 4.

Report on AAA Expansion

The plan to activate certain AAA units at Camp Cooke, California, has been changed. Third priority units, formerly scheduled for this post will now be activated in increments at Fort Bliss beginning in May 1949. They will remain at Fort Bliss for three or four months after which they will be sent to other antiaircraft firing points within the United States to complete firings and unit training. (Priorities of activation were described in the July-August issue of the JOURNAL.)

A plan is now under study to utilize these units in training ROTC, National Guard, and Reserve units in summer camps.

The following units have been activated at Fort Bliss, or will be activated there in the near future:

31st AAA Brigade
34th AAA Brigade
35th AAA Brigade
5th AAA Group
68th AAA Group
267th AAA Group
15th AAA AW Bn (SP)
30th AAA AW Bn (SP)
59th AAA AW Bn (SP)
213th AAA AW Bn (SP) (Recently transferred from Orlando, Florida, will be reorganized and filled at a date to be determined later.)
60th AAA AW Bn (Mbl)
450th AAA AW Bn (Mbl)
68th AAA Gun Bn (90mm)
384th AAA Gun Bn (90mm)
504th AAA Gun Bn (90mm)
502nd AAA Gun Bn (120mm)
526th AAA Gun Bn (120mm) (Recently transferred from Orlando, Florida, and will be reorganized at a date to be determined later.)

Here Is Your Atomic Energy

By Lieutenant Colonel David B. Parker, GSC

Part I

"It is the duty of every citizen, and particularly of every soldier, to understand what atomic energy is and how it is being harnessed by man."

Last spring when Joint Task Force Seven conducted the full-scale tests of improved atomic weapons at Eniwetok, the Task Force Commander found that many of his staff were amazingly ignorant of the basic facts of atomic energy. These facts have been publicized many times in many different forms, but the average soldier and citizen still does not have a grasp of the meaning of such terms as "atomic pile," "fissionable material," or "U-235." His general conception is that, first, the atomic bomb is a weapon which can destroy most of the world at one stroke, and, second, if we can prevent such a catastrophe, the "discovery" of atomic energy will completely revolutionize the modern world. Both of these conceptions are wrong. Yet the recent development of atomic energy *is* extremely important, and of all its applications, its military application is the *most* important. It is the duty of every citizen, and particularly of every soldier, to understand what atomic energy is and how it is being harnessed by man.

We may expect that in the near future, many publications, both those officially issued by government agencies and those written by competent experts in the field, will endeavor to correct the misconceptions which are now widespread. In particular, efforts will be made to counteract the hysteria promoted by "scare" articles and the unwarranted optimism about development of atomic power. Every reader will have an opportunity to assess the real significance of atomic energy; but in order to do so, he must first understand clearly the simple facts which are presented below.

In the discussion which follows, we have summarized most of the important steps that led to the discovery of how to release atomic energy, instead of jumping right into a description of the art in its present state. Such a chronological account is longer than a description of the final result, but it is necessary in order for the reader to fix clearly in his mind just what is meant by atom-splitting. The story is an exciting one. Time and time again, the most brilliant and inspired guesswork, as well as actual laboratory research, accounted for an important milestone on the road to the atom bomb. To understand, even as superficially as this article must describe, this constantly accelerating development is to appreciate more than by any other means the magnificent growth of the human mind.

By this time, everybody knows what atoms are. They are

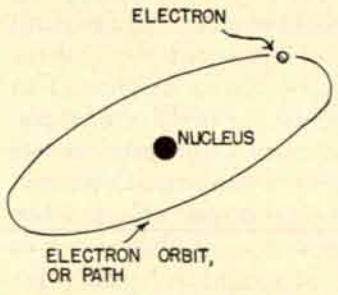


Fig. 1—Hydrogen Atom

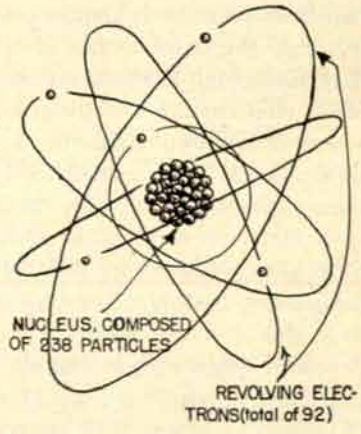


Fig. 2—Uranium Atom

usually depicted as in Figure 1, which shows the simplest possible atom consisting of a one-piece nucleus around which revolves at high speed a much smaller particle called an electron. The path of the revolving electron is called its orbit and it is quite similar to the orbit of the earth around the sun. Figure 2 is a similarly simplified sketch of the biggest and most complex atom found in nature, the uranium atom. We shall soon see that no atom is quite this simple, but this conception will do for a starting point.

Atoms are the tiny building blocks of which all matter is composed. There are many simple evidences of the truth that all matter is indeed made up of vast numbers of these tiny parts. Sugar dissolves in water, showing that small bits of the sugar find space between small bits of the water—in other words, the water is not a *continuous* liquid. A quart of alcohol when mixed with a quart of water produces a mixture of less than two quarts, showing that part of the water has worked its way into holes, too small to be seen, in the alcohol, and vice versa. The same phenomenon can be observed in solids and gases, as well as liquids.

Since all substances are composed of atoms, it was first thought that all atoms are similar, and that different substances result from different arrangements and concentrations of atoms. As a matter of fact, over a hundred thousand substances which occur naturally have been very carefully analyzed by chemists, and at least an equal number of different ones have been created artificially in labora-

tories. But it was found that almost all of these substances could be broken up into simpler substances; all of them could be proved to be combinations of two or more other materials—*except for some 92 substances which could not be broken down further.* These 92 materials were called elements, and many years of painstaking chemical work showed that everything in the universe was built up from these 92 basic materials. All atoms were not, therefore, similar, but there appeared to be only 92 different types of atoms.

Today we know, however, that although it is true there are only approximately 92 elements (we have found 4 more in recent years, so we know of 96, to be exact), there are actually about 600 different types of atoms. The reason for there being so many more types of atoms than there are elements will appear in a moment; the discovery of this fact is one of the most breath-taking achievements of all science —without it we should never have made the atom bomb.

Early in the 19th century, after a number of the elements had been identified, Dalton proposed an atomic theory that is one of the cornerstones of atomic physics. He suggested that, since each element is composed of atoms, all the atoms of an element are exactly alike. He asserted also that the atoms of different elements have different weights. This theory immediately accounted for the law of definite proportions, which had already been noted—whenever two or more elements combine to make up a compound substance, they always do so in definite proportions. Thus, when oxygen and hydrogen combine to form water, they always do so in the ratio of 8 parts oxygen by weight to 1 part hydrogen; and when carbon dioxide is formed by the burning of coal, the compound is always formed in the ratio of 3 pounds of carbon to 8 pounds of oxygen.

At first it was not possible to find the actual weight of any atom, but by noting the weights of various elements which combined with other elements to form compounds, it was easy to find the *ratio* of atomic weights one to another. By assigning the weight 1 to the atom of the lightest element, hydrogen, a table of relative weights could be built thus:

Hydrogen	1
Lithium	7
Beryllium	9
Boron	11
Carbon	12
Nitrogen	14
Oxygen	16
Sodium	23

Actually, even the earlier measurements of relative atomic weights showed that the table was not such a neat arrangement of whole numbers. If oxygen were given the exact value 16.00, the table, as calculated by the pioneer chemists, looked like this:

Hydrogen	1.01
Lithium	6.94
Beryllium	9.02
Boron	10.82
Carbon	12.01
Nitrogen	14.01
Oxygen	16.00
Sodium	23.00

The weights shown above are almost, but not quite, whole numbers. At first it was thought that the discrepancies were due to inaccurate measurements, but it was soon proved beyond all doubt that the measurements were accurate enough to show conclusively that the relative weights were not, generally, whole numbers. This fact disposed at once of the theory that all elements were composed of hydrogen atoms—if they were, the weight of each would be an integral multiple of the weight of hydrogen.

The next step was to show that the atoms themselves are not homogeneous, like billiard balls, but are composed of several types of particles, arranged in the most ingenious ways. One of the first notable experiments was that performed by Thompson with a simple cathode tube, as shown in Figure 3. A glass tube, from which most of the air has been evacuated, contains two metal plates, or electrodes, each of which is connected to a terminal of an electric current source such as a battery. It was found that a current

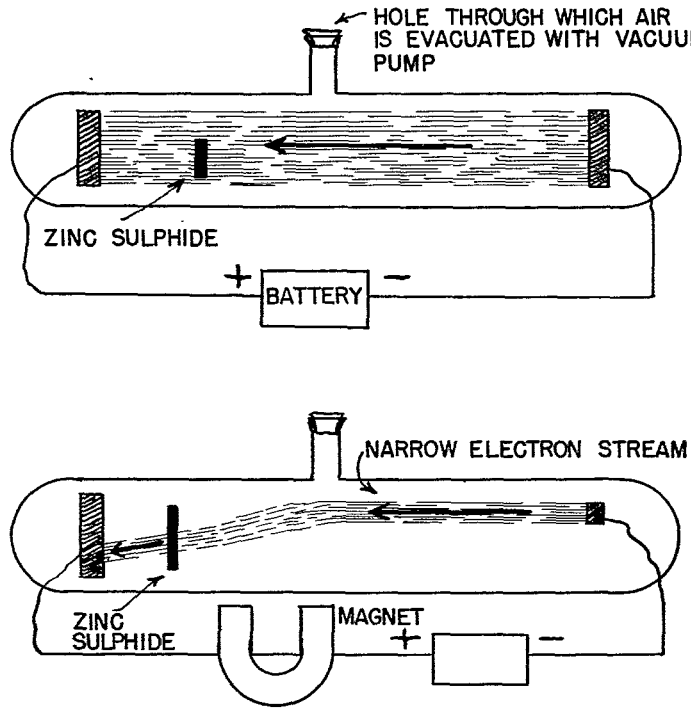


Fig. 3—"Cathode tubes"

could actually flow from one electrode to the other; in other words, *something*—called electricity—moves from one plate to the other. If a piece of glass coated with zinc sulphide is placed in the current stream, the zinc sulphide lights up —*fluoresces*—whenever the current flows. By holding a magnet near the tube, one can see that the current stream, which is seen to be composed of a great number of small particles of equal size, is deflected in a way that proves the current particles have a *negative electric charge.* Thompson actually weighed these tiny particles, by noting how much magnetic strength was needed to deflect them, and found that they were lighter than anything previously known; they weighed only 1/1840th as much as the lightest atom (hydrogen). Thompson found that these particles are the smallest unit of (negative) electricity, and he dubbed them electrons.

Other experiments showed that electrons are normally parts of atoms; they do not exist by themselves, normally. Also, when two elements combine to form a compound substance, they do so by a mingling of the electrons of one atom

with those of another. The combination of sodium and chlorine, to form sodium chloride or common salt, is a good example; here the sodium atom loses an electron to the chlorine atom. When salt is dissolved in water, the sodium and chlorine atoms fall apart, and the sodium atom, having lost an electron, has become positively charged. As in Figure 4, when two electrodes, connected to a battery, are placed in a salt-water solution, the negatively charged electrode, having an excess of electrons, attracts the positively charged

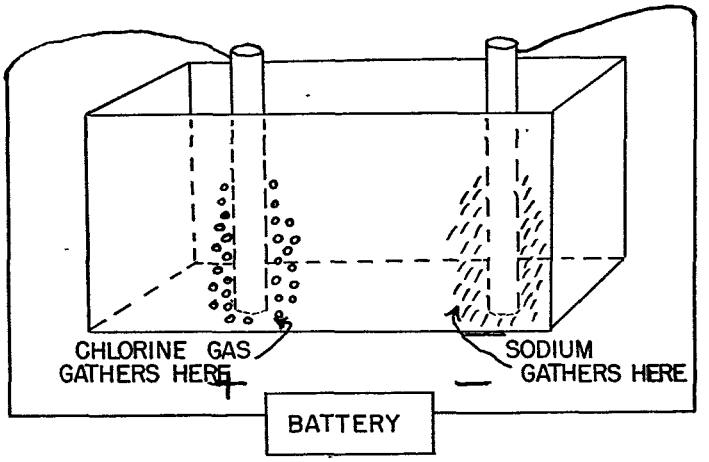


Fig. 4—Salt water solution

sodium atoms (opposite electric charges *attract*, like charges *repel*); the atom, or *ion*, as it is called, when it has lost or gained an electron, picks up an electron from the electrode and is deposited there as pure sodium.

Next, Rutherford showed that atoms not only have electrons, some of which are easily detached, but they have a definite nucleus. Rutherford directed a stream of tiny particles called alpha particles toward a thin gold leaf as shown in Figure 5. He found that some of the alpha particles were slightly deflected in passing through the leaf, some were reflected sharply backwards, but *most* of them went straight

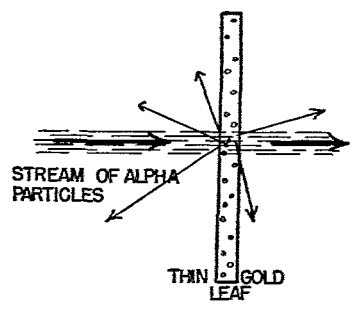


Fig. 5—Alpha particles bounce

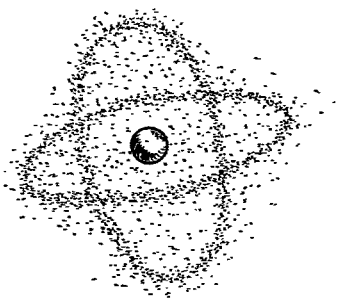


Fig. 6—Cloud pattern

through. This last fact showed that the gold atoms consisted mostly of empty space. The sharp rebound of some of the particles further showed that the weight of the gold atoms was concentrated in a very small space, for it would take most of the atom's mass to cause such sharp rebounds. These observations, coupled with others, led to the conclusion that an atom's weight is concentrated in the center of the atom, while the electrons are scattered around a large space at considerable distance from the nucleus. Actually, if the atom were enlarged until the nucleus became the size of an orange, the electrons would be only pinheads at a distance of almost a mile away.

The fact that almost all the weight of an atom is concentrated in such a tiny fraction of the atom's volume leads to some interesting conclusions about the density of the nucleus itself. If atoms were solid, without any empty space, their density would be so great that a lump the size of a pat of butter would weigh well over a hundred million tons!

The conventional picture of an atom, like Figure 1 or Figure 2, implies that the electrons, separated by a great distance from the nucleus, move in regular orbits around the nucleus. They move in a number of different orbits, however, in various directions and at various—but always very high—speeds. In fact their small size and the speed of their travel prohibit precise location being determined at any given instant by ordinary physical means. The best we can do is state the *probability* of an electron being at a certain spot; study of this fact has developed a completely new—and to the layman highly complicated—physical theory known as Wave Mechanics. We now know that the best way to picture the electrons around an atom nucleus is in the form of a cloud pattern, as shown in Figure 6. Any material, therefore, made up of millions of atoms should be regarded as a continuous electron cloud in which an occasional small nucleus appears.

Since an electron is so small that it can never be seen, and moves at such a high speed, it would seem impossible to determine exactly how many electrons there are in any particular atom. But the problem has been solved in a most ingenious way. We know that a dense dust cloud, or fog, scatters a beam of light very rapidly, so the beam cannot penetrate very far. The same principle can be applied to the electron cloud, except that we cannot use a beam of ordinary light—for light waves are many times larger than electrons and are not scattered by them. But x-rays, whose waves are thousands of times smaller than light waves, can be directed through an electron cloud, and the number of electrons determined by the scattering, or loss of intensity, of the x-ray beam. By this method, the number of electrons in the atoms of each element has been determined precisely.

In describing Rutherford's gold leaf experiment, we mentioned the term alpha particle. The alpha particle will be as familiar to anyone who understands atomic energy as an atom or electron, so we shall digress at this point to show what an alpha particle is and how it came to be discovered.

One day in 1896 a Frenchman named Becquerel noticed that some of his photographic plates had been fogged (exposed to light of some sort) although they were carefully wrapped in dark paper and kept in a lightproof drawer. He found that the fogging was due to some minerals which he had stored near the photo plates. Only those minerals which contained uranium (then the heaviest known element, number 92 in the table of elements) caused the fogging, and the amount of fogging was proportional to the uranium content of the mineral. Becquerel did not know why uranium produced this effect; but he applied the term *radioactive* to those uranium-bearing minerals which fogged his plates. Note that the fogging occurred in the absence of visible light, and that the rays from the uranium were able to penetrate the wrappings of the plates, as well as complete darkness, to expose the photo emulsion.

Later, the famous Curies discovered that two other elements besides uranium were radioactive. These were thorium and some unknown substance contained in pitchblende. The great work of the Curies was the isolation of this second substance, by a very elaborate treatment of the pitchblende. After many years, they were able to produce a small amount of this substance, which they called radium. Its radioactivity was much stronger than that of uranium.

There was not much radium to work with, for it was very expensive to produce. Up to 1945, the total world's production of radium was less than ten pounds, although we have long known that it is very valuable in several fields, particularly medicine.

The emanations, or rays, which come from radium atoms are very penetrating and very powerful. They were investigated by means of the arrangement shown in Figure 7. The lead container has a single narrow hole through which the rays could escape in a small, concentrated stream; in other

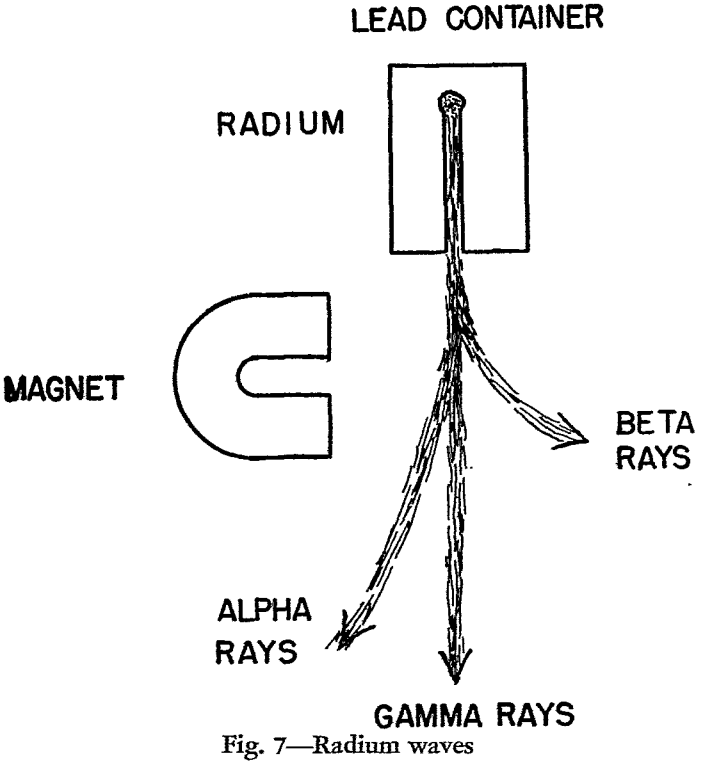


Fig. 7—Radium waves

directions, the lead cut off, or shielded, the rays effectively. As soon as a magnet was brought near the ray stream, one could see that the rays were of at least three different types; for some of the rays were unaffected by the magnet, while others were bent to the right and still others were bent to the left. Those which were not bent by the magnet obviously had no electrical charge. They were later found to be a form of electromagnetic vibration, just like visible light, except that the vibration was much faster and the rays therefore much more powerful and penetrating. To understand the connection between these rays and ordinary light waves, take a look at Figure 8. Here is the complete spectrum of electromagnetic waves. Beginning with the longer (slower-vibrating) waves, we find radio waves, infrared rays, visible light, ultraviolet, x-rays, then gamma, and finally cosmic rays. They are all the same in characteristics, varying only in wave length and frequency of vibration.

The three types of rays coming from radium were dubbed alpha, beta, and gamma (Greek for a, b, and c). The gamma rays are those shown in the spectrum of Figure 8. These waves are not particles, of course, but only vibrations of the ether which are still not completely understood. The alpha and beta rays are different. Their bending in the magnetic field shows that they have electric charges, and they are also found to have a definite mass; they are *not* electromagnetic vibrations. The alphas are positively, and the betas negatively charged. Further investigation proved that the alphas have a mass of 4, in our atomic mass scale, and a positive charge of 2. The alpha turns out to be exactly the same

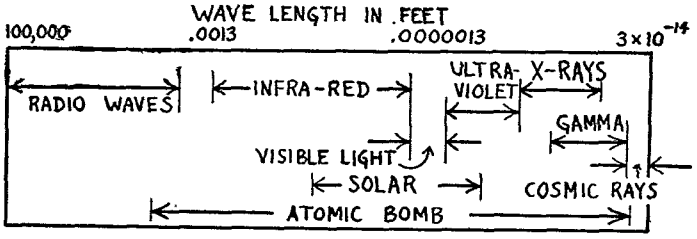


Fig. 8—"Electro-magnetic spectrum"

as the nuclei of the helium atom. The beta, on the other hand, has a negative charge of 1, and a mass of only 1/1840; it is therefore an electron.

One must keep in mind these facts about the radiations from a radioactive element:

1. They come from the interior of the atom, the nucleus, not from the outer electron cloud.
2. They come spontaneously; neither heat, light, nor chemical action has any effect on the rate of radiation, or type of power.
3. The radiations have great energy. The particles travel fast, and, having mass, have considerable momentum. The gamma rays do not have mass, but they are very penetrating and energetic—we shall see that a gamma ray has the power to push a solid mass (something which visible light is not observed to do).
4. This energy does not come from an outside source; it is locked up inside the atom, is part of the original property of the atom.

One thing more of interest concerning these nuclear radiations is the *rate* at which they come. How many alpha particles per second does radium emit, for example? These rates are easily measurable; they vary for each type of atom. The best way to define the rate is by the term *half-life;* this is the time required for half of any group of atoms to complete their radiations. Thus, the half-life of radium is 1590 years, meaning that in that time one half of all the atoms in a lump of radium will have completed their radiations, so only half of the radium atoms remain.

Any single atom, of course, does not continue its radiations indefinitely; as soon as it has emitted a particle, it becomes another type of atom; this new type may emit another particle, until finally the instability of the atom is settled, and the atom assumes its permanent, stable form. Radium, for example, after several emissions and changes, finally becomes lead. So do uranium and thorium, although in each case the resultant lead atoms are slightly different, a

phenomenon which we shall understand after we have learned about isotopes. The half-lives of various substances, incidentally, vary greatly—some are fractions of a second, some are billions of years.

We have now found that an electron is a single unit of electricity, and that there are varying numbers of such units in the electron cloud of each atom. But we also know that atoms as a whole are not charged—they are balanced electrically. There must, therefore, be a positive charge in the nucleus which balances the negative charge of the electron cloud. This fact was verified by the gold leaf experiment already discussed and illustrated in Figure 5. The alpha particles which were shot through the leaf were, as we saw in our study of radium, charged with two units of positive electricity each. Since electric charges which have the same sign repel each other, it was expected that the positively charged nucleus would repel the positively charged alpha particle when it came close. This event did occur, and by noting the amount of deflection of an alpha particle which had been repelled by a nucleus, the physicists could calculate the charge on the nucleus—for the force of repulsion is proportional to the charge.

The next step was to find out what the atomic nucleus is made of. It is far too small to examine with a microscope, so Rutherford developed another method. Using fast-moving alpha particles again, he bombarded the nuclei of several atoms, beginning with hydrogen. The collisions of the alpha particles with the hydrogen nuclei were comparatively massive encounters, but Rutherford was never able to break up the hydrogen nucleus into a smaller particle. However, when he bombarded the centers of heavier atoms, he succeeded in breaking up the nuclei quite easily. The smallest parts of the smashed nuclei turned out to be hydrogen nuclei, so it looked as though the *hydrogen nucleus* is the fundamental, indivisible building block of nuclear structure. It was given the special name *proton.*

The proton obviously has an electric charge which is positive and equal to one unit; for the hydrogen atom has a single negative electron in its outer shell or cloud which must be balanced by the charge on the nucleus. But the very next atom in the atomic table presented a puzzle. Helium had been found to have two electrons in its cloud, and therefore, to keep the electric balance, must have two protons in the nucleus. But the mass of helium had been accurately measured, and found to be 4 units. Therefore there were two mass units in the helium nucleus which had not been accounted for. The other atoms all posed the same problem. Uranium, for example, has 92 electrons in its cloud, and therefore 92 protons in its nucleus; but its mass is 238, leaving an unidentified weight of 146.

An easy answer was first advanced: that, in the case of uranium for example, there were actually 238 protons in the nucleus, but that the charge of 146 of them was neutralized by 146 electrons *within the nucleus* (in addition to the 92 in the outer cloud). This theory was accepted, until Chadwick discovered the neutron in 1932.

In the interim before the neutron was identified, the fascinating study of atomic weights led to some important discoveries. We have already described why the original theory that all elements were made up of hydrogen atoms had to be abandoned because the other atomic weights were definitely not multiples of the weight of hydrogen. By 1900 the atomic weights had been measured with the greatest precision to the fourth decimal place, and did not approach integral multiple values. After the proton and the electron had been identified, weighed, and located in the atom, however, a new explanation of atomic weights immediately presented itself. Since all atoms were composed of protons and electrons, would not their atomic weights equal integral multiples of these two component parts? Unfortunately, the atomic weights did not fit even this theory. Another explanation had to be found.

About 1910, several physicists independently found the answer. It turned out that two or more substances could be chemically identical and yet have different atomic weights. We have already said that 92 elements had been identified and weighed. They were called elements because each was unique chemically and could not be further broken down, as could compounds. Take the case of common lead, with an atomic weight of 207.2. Before 1910, all lead had been found to be the same—its chemical characteristics never varied, nor did its atomic weight. It was always the same color, had the same melting point, and combined with other elements in the same way. But suddenly physicists found two other substances which looked like lead, behaved like lead, and, when mixed with lead, could not possibly be separated again. The only difference between all three of these substances, lead and the two new discoveries, was that they had slightly different atomic weights. The natural lead was 207.2; one of the others was 207.9, and the third, 206.1.

The answer is fairly simple. Since all three of these lead-like substances are chemically identical, they have the same number of electrons in their clouds (for chemical properties are determined exclusively by the outer electrons). They also must have the same number of un-neutralized protons in their nuclei, to achieve electrical balance. But their different atomic weights show that they have different numbers of the proton-electron combinations (which are electrically neutral) in their nuclei.

The explanation, then, of how two substances can be exactly the same chemically but have different atomic weights, is fairly simple. But the old question of integral multiples comes up again—why, for instance, do not the three varieties of lead we have discussed have integral multiple atomic weights? This question was easy; it turned out that none of the isotopes (each such variety of an element is called an *isotope*) was a pure isotope—it was a mixture of pure isotopes, and a pure isotope was still assumed to have an integral multiple weight. Natural lead, then, with a weight of 207.2 could easily be a mixture of 80% lead with weight 207 and 20% lead with weight 208 (the average weight then being 207.2).

This discovery of isotopes clears up our previous statement that although there are only 96 elements, there are over 600 different types of atom. At first we assumed that each element had only one type of atom, and it was different from that of any other element. Now we see that an element may have several different types of atom, although all are identical chemically. The atomic weight of an element as found in nature gives a clue to the proportions of each isotope in the natural mixture.

(To be concluded in the next issue)

WHO'S NEXT?*

By Brigadier General H. L. Whittaker, U.S.A., Retired

The cry of "next!" is a familiar one in a barber shop, but how many officers on the active list remember that time and fate will cry "nĕxt" at them one day, and consider what may happen thereafter on the retired list?

With the new laws governing retirement, forced and otherwise, it can happen to anyone, and despite one's averted mental eyes, old age is creeping around in the background and will get you some day.

It all happens very suddenly at the end. One day full of zip and energy, flattered and catered to by subordinates, impressed with a sense of personal importance, and possessed of certain degrees of position, power, and the ability to deal out largesse and the high, low, and middle justice. The next day on the retired list, transferred into a new world, strictly alone, with no quartermaster and engineer to call upon. It is a mental shock and trial at best. At worst, that feeling of being a sort of zombie—one of the walking dead, or the little man who wasn't there—arises. Unfortunately this is only slightly exaggerated. The inevitable end, faced by all, is never discussed in any service schools. Most people do not even know how to go about the process at first, let alone how to do it gracefully and successfully. This is particularly true from the financial angle.

There are regulations covering the process of leaving the service, but there are none treating of the process of entering civil life. In many cases ignorance is so great that one is cheated of earned pay through technicalities which might have been avoided. I have never known an officer while on active duty to study the various regulations pertaining to retirement, or to give much, if any, thought to what happens afterward. It is thought of as a sort of Nirvana, where all is easy, and golf and fishing rule supreme.

There should be some sort of course preparing officers for entrance into civil life. We teach them how to get into the Army, and, once in, how to act. Why should we not teach them how to get out, and how to act thereafter? It is a twilight zone. Our Mr. Average (and I use the term *Mister* advisedly, because that is what he is to the neighbors, and what he actually is) leaves the service full of confidence, medals, honors, and happiness, and, in most cases, with an overweening sense of his own importance in the general scheme of things. He probably has at least thirty years' service, and is at least a full colonel. He is thoroughly impressed by the value of his monthly retired pay check, which he is going to receive for the rest of his life. Wow! All that income and no work to do! Wow again! Move over fish, here I come!

However, let us take a look at the picture from there. First, where is he going? Mr. Average probably got around to thinking about that point just about the time he submitted his request, or was asked to retire for age or disability. This is much too late—so much so that, just a few days before he graduates, he begins to mill around a bit mentally. It has suddenly dawned on him that there are no quarters where he is going.

One of the first things which occurs to him is to wonder where his friends are located. Half the time he doesn't know. The only visible crowd on the horizon is that in a colony near some Army post. This seems pretty good to him until he stops to wonder why they are there, and discovers it is because of the proximity of the commissary, officers' club, and, particularly, the general hospital. This last has some startling implications for Mr. Average, especially after he ponders on the related fact that all general hospitals seem to be in much too suggestive proximity to large national cemeteries! The last-named facility is likely to be of more real service to him in the end than the former, although he hasn't realized it yet.

Mr. Average decides to get away from the colony for a while at least, and to look around a bit. I can speak authoritatively of several areas, from experience gathered in my own efforts to find a good place to light. Army people have lived all over the country, but it looks different when in civil life. The northeastern areas are overcrowded and expensive—too much cold weather and attendant expense which may be avoided elsewhere. The west coast of Florida, by and large, is cheapest, or perhaps better to say one gets more for his money. However, much of it is not too prepossessing. Texas is too hot *for my taste*. Let it ride there—I don't want an argument with a Texan! For myself I feel that the least said about Washington the better, and I *am* prepared to argue that one. The east coast of Florida and the west coast of the United States in general, including California, are the most expensive. Miami is in a class by itself for expense.

In any case Mr. Average has to go somewhere, so he finally picks out a place for one of several reasons. The usual one seems to be that he is impressed by the publicity. He overlooks the fact that chambers of commerce do not mention little items such as the local high cost of living, housing shortages, state income taxes, personal property taxes, local miscellaneous taxes such as sales taxes, and so on, all of which eat into the paycheck like a horde of locusts.

He tells the powers-that-be where to ship his stuff. He has lived and travelled a long time, and has accumulated more stuff—a lot of it Oriental—than he realizes. (There is more Bilibid furniture for sale in the second-hand stores of Monterey, Carmel, and vicinity than there is tea in China.) In short, he has entirely too many belongings, and probably has to pay excess charges. Oh well, charge it off! He has his monthly pension, hasn't he?

Mr. Average now needs a temporary abode while he looks around for that Dream House. Searching for a furnished

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place, he discovers that even in a city as large as San Francisco there are only four places advertised in the morning paper. Investigation brings out the fact that none of these is suitable to his tastes—in fact, discouragingly unsuitable—and the further observation that even these places rent for $150 a month causes our hero to feel a slight chill. He probably begins to forget that he is a hero, since the various landlords have appeared totally unimpressed by rank, titles, and decorations.

So Mr. Average decides to stick it out in the hotel where he is, and to buy or build immediately. Both he and his wife still have some illusions about a Dream Home, and although Mr. A.'s may be wearing thin, hers are not. Women stick with amazing tenacity to ideas like this, in the face of all facts and figures. Well, who can blame them? Certainly not I, as I feel they are entitled to some hope after thirty years or more of temporary homes. Mr. Average, however, is the custodian of the checkbook, and his dream is wilting a bit around the edges.

Speed is the watchword. They must get out of that hotel before they go broke. Compromise becomes the order of the day. The economic tide is drifting them backward, you see, although they are not too much aware of the process as yet.

What with a child or two to support and educate, and with obligations over the years to entertain the general and other VIP's, the old man has been under quite a bit of expense. He has managed to take out some life insurance, and at this stage he is feeling quite proud of himself as a business manager because he has accumulated, in spite of all handicaps, around ten thousand dollars to show for his life's efforts. This is a nice round mouthful when you say it fast, but it is peanuts in civil life. This fact hasn't dawned on Mr. Average as yet, but give him time. It will, and all too soon.

They soon discover that the suave and willing real estate agent can show them nothing of the type and in the location they have in mind with a price tag of less than $30,000. A further deflation is the fact that the agent nonchalantly states that 50 per cent is the usual down payment on this class of property, and delicately assumes that a man of Mr. Average's attainments and standards of life should find this to be a mere bagatelle, whatever that is. In any case, and whatever it is, it is not nice in Mr. A.'s book, and he rapidly sees the main point, which is, "it can't be done."

So they decide to look for "something a little more simple." (More economic drift.) "After all, the children are well grown up, we won't entertain so much (and how they won't!), and we don't need so much space." End of quote; end of dream! They finally decide they can afford something around $15,000, provided the down payment is not too large.

In San Francisco, for example, this decision will mean a two-bedroom house, garage under the living room, spaciously sited on a 25-foot-frontage lot. The neighborhood is good, which actually means that there are no real bums in it and the brawls are few and fairly quiet. The excuse for passing up this so-called bargain is given as the narrowness of the lot, but it may just possibly be that even such a house requires $4,500 to $6,000 down payment, and Mr. Average hopes he can do better.

Gracefully they withdraw and start looking in the suburbs—yea, verily even unto fifty miles away. Either there are no rubes today or they have gotten smart, so they find little change in prices, although conditions, in general, are better. They then begin to think about the good old FHA or GI loan which is always there—or is it, when you come to look for it?

The Dream House, whatever may be its altered shape, has to have a plot of ground on which to come to life, so lots are the next order of business. It is somewhat disconcerting to find that a 60-foot frontage in a converted orchard costs around $1,500. Other lots of ¼- to ⅓-acre size, with 100-foot frontages, are found to be available at $2,000 and up. The next grade upward from this come in acre-sizes, and run from $4,500 to $10,000 each. This is the area in which Mr. and Mrs. Average would really like to live and could feel at home, *but,* it is out of the question.

There is another round of conferences. Shall we build or buy? They first decide to buy. It is occasionally possible to buy a real old house of goodly size and fix it up. However it is generally more run down than appears on the surface, and by the time the repairs are finished, Mr. Average would still have a house of a certain vintage, worth no more than it was originally, even though several additional thousands have been spent on it, to say nothing of the heavy labor involved, for which Mr. A. is fitted neither temperamentally, physically, nor technically.

The next classification would be a house about ten years old. This is in quite good shape, but the owner has been paying on it for ten years and has quite a sizable equity which he wants to get out. Since refinancing is probably out of the question, as banks look with a jaundiced eye on stepping up the loan on a house that old, it means a heavy down payment of eight or nine thousand. Mr. A. had ten, as we observed, so that is pretty heavy.

This brings them up to date, and face to face with new houses built by contractors in a subdivision. These, basically, have the disadvantages of small rooms, meager closet space, and no storage space at all, and the architecture is generally modelled on an old shoe box. In the East they call these little monstrosities "modified Cape Cods." In the West they are "modified ranch types." Great shades of our forebears! They are new and shiny, but will they hold up? What is under that paint besides the mortgage?

Mr. and Mrs. Average don't like these contract houses, so they persuade themselves they can afford to build and get something better, and by means of FHA get a good loan and save on the cash. They decide to settle for the $2,000 lot.

Mr. Average now has a piece of land, but no building. He starts looking into the loan proposition and finds that, before he can discuss this subject, he must have a complete set of working drawings. Interviews with architects disclose the fact that they charge 10 per cent fees if they do what they call "designing" the house. If Mr. Average can give them a floor plan, four elevations, a perspective drawing, and a bill of materials for interior and exterior finishes, he can get the architect's "drawings" for probably as little as $250 or $300, instead of the $1,500 fee for the design (based on a $15,000 house).

Next he must go to a contractor and get what is called a "firm bid." The actual building costs will run around $10

a square foot for a fairly well-built house without too many frills, but the contractor will charge Mr. Average something between $12.50 and $14 a square foot, since he has to make a profit and is faced, besides, with widely fluctuating costs during the period of building. This means that Mr. Average can get 1,000 square feet of living space for a minimum of $12,500, and when he mournfully considers that the quarters he just left had 200 square feet in the front hall alone, he feels a bit dim about the whole operation. However he decides to go ahead, and thus arrives at the loan program. He has four choices: (1) bank loans; (2) Building and Loan Corporation loans; (3) FHA; (4) combination GI-FHA loans.

Insurance companies also advertise loans. However they charge the highest interest rate of all, have strict limits and restrictions, and want so much collateral that the victim, or suppliant, might as well use his collateral in the first place and save the interest. One of the first rules of all these institutions seems to be that they will loan money any time you don't need it, or if you already have more money than the size of the loan.

Few banks will handle the combined GI-FHA any more. It is still in the law, but they won't touch it. For example, only one bank in all of San Francisco will even discuss the matter, and they make it sound a bit illegal. So Mr. Average may as well forget that idea.

On a bank loan, the legal limit is 60 per cent of the appraisal. Banks are reasonably liberal on appraisal, especially, again, if the suppliant has good financial credentials.

Building and Loan Corporations can and do loan somewhat more than banks. Ordinarily their limit is $10,000, however, regardless of what size house it involves. They also charge more interest.

The FHA sounds better, but it isn't in the long run. This is due to the fact that they base their loans on a percentage of their appraisal. Since these Government appraisals bear no relation whatsoever to actual costs, the result is not as fine as the percentage sounds. Tops in FHA, thus far, is an appraisal of $7.50 a square foot, which is a long way from the actual cost to Mr. Average of $12.50 to $14. The actual loan, therefore, often falls below 55 per cent. The FHA does have low interest rates. These will go up this year or early next, but Mr. A., after looking over the field, decides upon the FHA, as giving him a lower rate of interest which will be stable for the life of the loan.

He finds he has to fill out *FHA Form 2005*. This consists of four legal-size pages of printing in twenty-seven main paragraphs, all of which have sub-paragraphs and several of which have as many as thirty-one sub-items. Some chore, eh? But he isn't through yet. He also has to furnish two complete sets of blueprint working drawings of the house, a detailed cost breakdown (which calls for long conferences with the contractor), plus a financial statement, which also comes in four pages and is so searching that Mr. Average almost finds himself putting down the cost of the birthday present he gave Mrs. A. in 1932.

These papers are submitted through the bank selected, and will come back in about five weeks, if all goes well. If there has been discovered some grievous error, such as a comma upside down or something equally serious, they will still come back in five or six weeks, when corrections and apologies are completed and a fresh start is made on another five-week cycle. If, as is quite possible, Mr. Average is still living in that hotel apartment, these delays are serious to him, and are eating a big chunk out of that $10,000 of which he was so proud a few months back.

The last step, after approval, is to move whatever is left of his bank account into the bank of choice, whether he likes it or not.

Mr. Average finally gives the contractor the *Go* sign. It now develops that more cash is needed for payrolls and materials, due to the way loans are made. The FHA loan comes in five assorted flavors, two of them slightly bitter.

The first payment is made *after* the foundations are in, the rough plumbing installed, the girders placed, and the sub-floor laid, plus (after this is done) time spent waiting for inspection. The FHA inspector will frequently be absorbed elsewhere. If his absorption happens to be with the Bay Meadows track, I suppose that is a matter between himself and his conscience. It does make for delays, however.

Inspection is passed, finally, and another shock develops when the first payment comes. Instead of being one fifth of the loan, it is some amount about $400 less than that. The bank has "expenses" in connection with this business, and takes those out of the first payment.

Mr. Average struggles through, and the house is completed. He cannot move in, however, as there is now a "lien period" of thirty-five days before last payment can be made, during which all creditors are supposed to face Mr. Average and his contractor and give them clearances. If the contractor hasn't paid his bills as he goes along, a lien is filed and the property tied up until the judgment is satisfied. If the contractor cannot pay, it falls back on Mr. A. and his private resources.

Finally Mr. Average is able to move in. His monthly payments will figure out, let us say, $80 a month. It depends on how much of a loan he took out, but this is a reasonable figure, and includes taxes on the property, interest on the loan, and payments on the principal. One point on the cost of the loan, also, is how long it is to run. Mr. Average, remember, has had thirty years or more in the Service, and he must now be over fifty years of age. He may get by with a 20-year loan. If he went out, for age, at sixty years, he probably gets a 15-year loan. Either of these brings up the monthly payments to a larger amount than the 25-year loan which a young veteran might obtain. In addition, he will sooner or later discover that a house costs around $400 a year for upkeep, over a period of years, which, in turn, is around $35 a month. This is a point often overlooked when figuring out the monthly payments which are going to be "just like rent." He probably encounters such things as a state income tax, almost certainly a separate school tax, and from time to time, the pavements and sidewalks need repair or a water or sewer line is relocated. These are all assessments over and above taxes. Also, in most places will be found a personal property tax, which is never thought of in Service circles.

Some retired officers who went out in 1944, '45, or perhaps '46 may be inclined to take exception to my figures. I can only refer them to statistics, of this area at least, which show increases in house prices of $2,500 or more since that

period. Wages have gone up three times since last November (1947). Even the chap who rakes up the débris will not work for less than $1.50 an hour. The word "work" is used only to denote presence at the job-site and a certain amount of movement per day.

Mr. Average is settled. He and his wife look around for some associates. He is living in a $15,000 house in a $15,000 neighborhood, so he finds a class of people there who have about the same amount of cash he has, and, roughly, the same income. These turn out to be the same carpenter, mason, plumber, and so on who built his and neighboring places. How much have they in common? I need not answer that one. The social (financial) class above him is made up of the small merchants, beauty parlor operators, brokers, the chap who runs the local motel, the gas-station owner. Their incomes are from one and a half to three times that of the ex-colonel. The chap who runs the local liquor-store owns the second-best home in the city, belongs to all the proper clubs, contributes to all the causes, entertains nicely, and is a leading light in general. Mr. Average can hardly belong to the Lions Club, let alone the local country club—cannot afford it on his pay, because he does have to eat regularly.

The above is merely to bring out some comparisons which are never thought about on active duty, and to make an officer see what he is up against when he leaves the Service. Most of the retired officers I see spend their days puttering around the house and garden. For me, at least, it gets tiresome in a hurry.

If near an officers' club he can enjoy the privileges, but it is doubtful if it seems like it used to. The old gaffer is out of touch with the moderns, is politely tolerated, but can turn into a boring liability in a hurry in the eyes of the regular members.

Well, there is the medical and dental service available, you say. Yes, it is there, but try and get it! If *Mr.* Average gets sick enough he can get in, but the service is not what he has been accustomed to receiving, and he gets pushed around quite a bit. Mrs. A. can't get in at all. They simply do not have room for retired dependents. If Mrs. A., who is now getting older, needs some new teeth, there is the civilian dentist to pay. The General Hospital is short of doctors, dentists, and corpsmen. Also they are too busy checking over that last overflow of 250 men from the local VA hospital. The new choppers for Mrs. A. will set Mr. A. back a month's income.

Suppose Mr. Average is, as many are, trying to get by on his pay, keep up his insurance, and maintain a small reserve in the bank. Where does his money go? Take the case of the house he just built and go on from there:

Per Month

$80	for the house payments.
35	set aside for upkeep on house.
50	insurance, which is about an average figure for officers.
8	auto insurance.
5	public liability insurance on house and grounds.
5	insurance on household goods.
4	state income tax in many places.
4	personal property tax.
4	telephone.
6	gas and electricity.
1	garbage removal (there are no PW's in civil life).
2	water.
80	food (awful skimpy).
20	clothing (average over the year).
10	smoking.
10	gasoline (1 tank a week—also awful skimpy).
$324	

In cases where a man is retired for age or on his own request, the Finance Officer takes out the income tax in the form of withholding from the check month by month. This amounts to $60 a month—an appreciable sum. In these cases the above total becomes $384, which is almost all—sometimes more than—the monthly pension check. How much travel, amusement, entertainment can be obtained from the balance? How often can Mr. Average go to a decent restaurant or to a play? Don't be funny! Practically never.

My own reaction a few years ago would have been that there is something screwy about the way this works out. I would be pleased to have any interested parties point out my error.

I am not sure that there is any moral to this dissertation, unless to point out my belief that the average officer lives in a sort of unreal world on active duty. Lord knows the pay on active duty is far too little if the pay of the carpenter, plumber, and other skilled tradesmen is proper, and a comparison of responsibilities and relative expenses is taken into account. But there are more perquisites of office than one realizes until they are gone, and these help relieve active-duty situations. Retired pay is definitely inadequate. For thirty years an officer is brought up in the tradition of Army standards of living, associations, and thinking. It is bad training for retired status in civil life, where income is just about the only criterion of accomplishment. After retirement a man is on his own, with only memories, and too little income to lift him to the living level of those around him. We have all been trained for certain associations and certain living standards and it comes hard to change at a late age in life. This probably accounts for the numerous deaths one sees taking place one, two, and three years or so after retirement. Nothing to really look forward to, and the present plane of living is too meager for tastes and former training. Pride and interest in life cease.

Save your pennies while you may, boys. It takes more than pennies and large insurance policies to get by in civilian life after you retire to enjoy the fruits of your labors.

You Should Vote—See Ballot Page 61.

AN EDITORIAL—

Your Future Financial Security

A suggested program for insurance and investment.

The article "Who's Next?" by Brigadier General H. L. Whitaker, USA Retired, calls our attention to a misapprehension in the Army which should be corrected.

Practically all of us have been led to believe from the day we entered the Army that Uncle Sam would look after us after we had retired—that the retired pay would amount to the income from an investment of $100,000.00.

Because of this, many have decided that a savings program is unnecessary. They know, of course, they will have to save something through the years for contingencies and to cover at least a down payment on a home for their retired years. There is plenty of time, though, to begin that after they get into the higher pay brackets. Meanwhile, they figure they might as well enjoy life while still young enough to do so.

Only of late has it become apparent to us that this reasoning is fallacious, and those who give the matter even a little thought can discern the pitfalls. It is amazing how many just drift along through the years in the blissful belief that Uncle Sam has very generously provided for them. Were it not for the tragic results of such misapprehension we might be inclined to joke about these happy dreamers. The presence in our midst, however, of the widows and children of our deceased former comrades pitifully trying to eke out a bare existence for themselves is far from a joking matter. Their plight is a story in itself which we will not take up at this time but which we hope to cover in a later issue. It is our purpose at this time to expose briefly the fallacies of such reasoning and more important, to show as simply as possible the ways and means to make proper and essential provision for the future if we do not wish to risk similar unhappy experiences for our own loved ones.

The one certain fact of our existence is that we will surely die some time. We like to think, especially the young, that it will not occur to us for a long, long time—after we have finished our active careers and spent a goodly number of restful years in retirement. Yet we know we might go much sooner than that or might become disabled and have to retire before completion of the full active duty span of thirty years. Then the retirement pay will be correspondingly less but we will make out somehow. The hard fact to realize is that Uncle Sam provides quite well for the *SOLDIER*, both in sickness and in health so long as *he* LIVES. When he DIES, however, what of the family he leaves? So far as Uncle Sam is concerned they are quickly disposed of with the grant of an additional six months' pay and allowances if death occurred during active duty period. However, even this small pittance is not paid the widow if the soldier is on a retired status at time of death. Under certain conditions a widow will receive a small pension, the details of which will be covered in a future issue of the JOURNAL. That is ALL that Uncle Sam does for the family after the soldier is gone. There is no more retired pay for the family of the deceased retired soldier. The soldier, please note, was never promised nor given ownership of the tidy capital sum of $100,000.00. If he owned the CAPITAL his family would continue to get the income but unfortunately he didn't. So, let those to whom this thinking, or rather failure to think, applies, take quick leave of their "Fool's Paradise" and examine with the greatest of care their own present financial status with particular reference to provision for their dependents in the event the worst should happen. Even if you don't belong to this category you may find in the discussion that follows ways and means to provide more adequately for your future at an equal or even lesser cost to you than at present.

When one applies for life insurance he asks for protection for his dependents in the event of his death. His primary concern is the cost, so he asks the insurance agent for the cost of a $1,000.00 policy. Unless he asks for a specific policy, the insurance agent could well reply, "—— per cent of all healthy male citizens of the USA die at age 22, so your prorated share of the payments to be made to the beneficiaries of those of your age who die this year is approximately $6.00, or 50c per month. For age 23, the mortality rate is a little higher, so next year your prorated share will be a few cents more. That is the entire cost of protection—it is straight term insurance—with no cash or loan value, or no conversion privilege. However, next year you may not be able to pass the physical examination for insurance, so, at a slight increase in cost, I recommend something better than a straight term policy. A five-year term policy that must be converted in five years but does not require a physical examination at time of conversion will cost you $6.60 per year per thousand, or 55 cents per month. Similarly, 10-, 15-, and 20-year term policies may be purchased with conversion privileges. However, at age 40 the cost of term insurance is 85 cents per month per thousand and at age 60 the cost is $2.60, an exorbitant rate. Because of this increase in cost of term insurance, it should be converted to ordinary life in order to build up a reserve as soon as your financial condition will permit. Ordinary life premiums are more expensive than term premiums because the insurance company must collect additional sums from you during your early years to permit it to carry your insurance with a small premium during your later years. If you die before you reach old age, you do not benefit from this increase in cost, but to assure you protection for life it is considered the best form of insurance. An ordinary life policy at age 60 is actually costing $2.60 per month per thousand although your premium may be only $1.30,

because you have built up a reserve of approximately $5,000.00. This $5,000.00 is the cash surrender value of the policy and may be collected if policy is terminated before death."

An insurance premium paid above the cost of term insurance is a savings for a particular purpose, such as to permit the insurance company to pay the face value of the policy to the insured at a specified number of years or to purchase a paid-up policy at age of retirement or a double indemnity in case of accidental death. For any special privileges one purchases he is gambling that he will live long enough or die under certain conditions to benefit him or his heirs. It is no gamble for the insurance companies because they know within a very small per cent of the number of people who will die each year for any particular age. Until one has sufficient insurance to provide for the needs of his dependents, he should not gamble on insurance. It is recommended that additional term insurance with conversion privileges without physical examination be purchased in place of special benefit policies until dependents are assured of the income from $60,000.00, approximately $300.00 per month. At the expiration of a conversion privilege without physical examination, term insurance should be converted to ordinary life.

The cost of a 20-year endowment policy at age 22 is approximately $34.60 per month for a $10,000.00 policy. The cost of a term insurance is approximately $6.60 per month. The difference between $34.60 and $6.60, $28.00, is the amount one pays for the special privilege of receiving $10,000.00 in cash in 20 years. The insured with this policy is gambling on living 20 years. If he dies short of 20 years his dependents receive only the face value of the policy, $10,000.00, the same amount they would receive if he held a term policy, and they would lose the total of payments made above the cost of term insurance. If the insured did not have $50,000.00 additional insurance, he should have taken additional term insurance or should have used the increase in cost of an endowment policy to purchase government bonds.

Let's assume that at the end of five years, the term policy is converted to ordinary life. The premium for ordinary life at age 27 is $14.00 for $10,000.00. If the difference between the cost of endowment, $28.00 for 5 years and $20.20 for fifteen years, is invested monthly in government bonds, the net value of these investments for 20 years would be approximately $7,300.00. Thus, the insured gains $2,700.00 if he lives 20 years, but the dependents lose up to $7,300.00 if he dies in less than 20 years. (The insurance salesman's commission on a $10,000.00 endowment policy is five times the amount of commission for a $10,000.00 term policy.)

Government bonds cannot be purchased in the amounts of $20.20 and $28.00, but if $37.50 is invested monthly in bonds, the $7,300.00 is the prorated value of these investments. (If $37.50 is deposited in bonds monthly for 10 years and $6.25 is added to the $50.00 matured value for another ten years to purchase additional $50.00 and $25.00 bonds monthly, the net value of the investments at the end of 20 years would be approximately $13,000.00.)

National Service Life Insurance is the safest and cheapest form of insurance. Nonparticipating companies may have a policy which appears cheaper but the disability benefits and dividends accrued from government policies make them cheaper than policies written by any commercial company. This is easily understood when one realizes that the government pays all salaries and operating expenses connected with Government and National Service insurance. Any civilian agent who states that the cost of a policy with his company is cheaper than a corresponding National Service policy should be reported to officials of his company for misrepresenting facts and should be barred from access to Army installations. Army Mutual Aid insurance premiums are about the same as National Service. Their savings have been used to reduce premiums. To obviate change in allotments, they are contemplating increasing the amount of the insurance above the face value of the policy for profits accruing during life of policy. Their service to a widow may be worth the value of a policy. They sell the ordinary life, 20-payment life, and 30-payment life.

Adequate insurance for the average officer or EM with a family is believed to be $36,000.00 ($10,000.00 Government, $20,000.00 civilian, $6,000.00 Army Mutual Aid) if the monthly savings amount to $24,000.00 at time of retirement.

Monthly payments for life to beneficiary should be prescribed by the insured.

Dividends on insurance policies should be left with the company to purchase additional insurance, unless the insured has adequate insurance, in which case the dividends should be left with the company to accumulate. Insurance companies pay 3% on dividend savings and they may be withdrawn at any time or may be left to be paid to the beneficiary. Furthermore, dividend checks may be confiscated or lost without the knowledge of the policyholder.

It is suggested that insurance be purchased only from companies permitted to sell in states whose laws provide adequate safeguards for policyholders. The New England States, New York and New Jersey are considered to have excellent insurance laws.

Insurance and investments recommended for military personnel, officer (or enlisted man) upon entering service—

a. Without dependents

$10,000.00 Government term insurance, age 22	$ 6.60	per month
$75.00 in Government bonds	56.25	per month
TOTAL	$62.85	per month

b. With wife but no children

$10,000.00 Government term, age 22	$ 6.60	per month
$3,000.00 Army Mutual Aid, age 22	3.84	per month
$25.00 in Government bonds	18.75	per month
TOTAL	$29.19	per month

c. With wife and child

$10,000.00 Government term, age 22	$ 6.60	per month
$10,000.00 Civilian term age 22	8.00	per month
$6,000.00 Army Mutual Aid, age 22	7.68	per month
TOTAL	$22.28	per month

With each promotion, an increase in insurance or investment in government bonds should be made. With an in-

crease in size of family, additional insurance should be purchased, until a minimum of $36,000 in insurance is owned. Under certain conditions more than $36,000.00 in insurance should be purchased. For example, a lieutenant or captain with a wife and two children should carry $60,000.00 in term insurance, assuming that he has no savings. At the first opportunity he should purchase monthly at least a $50 bond, cost $37.50. Ten years after date of beginning of monthly savings, he should drop $10,000.00 in insurance, and ten years later he should drop another $10,000.00. There is no financial loss in dropping term insurance, nor is there a financial loss in dropping ordinary life as the insured will receive the savings, the cash surrender value, in cash.

Life insurance companies are either participating or nonparticipating. In participating companies, the policyholder shares in the dividends. In order to compute premiums for various policies all companies use various mortality tables. However, the participating companies allow for numerous contingencies or safety factors and pay dividends annually according to the savings on the actual mortality and interest rates. It is believed that nonparticipating companies estimate the mortality rate and compute the premiums based on their estimate. This estimate proves to be very close to the actual mortality rate, so the premiums from nonparticipating companies are less than those of participating companies. However, in many instances the dividends from participating companies reduce the net cost of a policy below the cost of a similar policy of a nonparticipating company.

The net cost of any type of insurance is the sum of premiums paid less dividends received less cash surrender value. For example, if one pays $16.00 per month for a $10,000.00 ordinary life policy for 20 years and receives dividends of $760.00 and the policy has a cash surrender value of $2680.00, the total cost of the policy has been $3840.00 ($16.00 x 240 months) less $760.00 less $2,680.00 or $400.00

Insurance in old age is very expensive and if it is not needed for dependents and one is in good health the cash surrender value should be converted to a Refund Annuity. This type of policy will pay an annuity to husband or wife as long as either lives, and if both should die before they have received the amount of the face value of the policy, the balance will be paid to their heirs. For example, if the cash surrender value of a $10,000.00 policy is $5,000.00 and the husband and wife are 60 years of age, the $5,000.00 will purchase an annuity of approximately $19.00 per month for husband or wife as long as either lives. If both should die after they have received only $4,000.00, $1,000.00 will be paid to their heirs. The interest on the capital is used to pay surviving annuitants who live sufficiently long to receive more than the capital investment. In this example, one contracts to sacrifice interest if both die before reaching age 82, provided the insurance company guarantees to pay $19.00 per month as long as either lives.

It is our sincere hope that publication of this editorial will arouse in its readers an appreciation of the importance of this subject to the future happiness and welfare of all our service personnel, this to such an extent that some one of those now in appropriate positions of authority will develop and implement a permanent plan of continuing official supervision. The junior officers on entry into service should be properly briefed at the outset of their careers and all officers periodically reminded of their obligations.

ORC PROGRAM NEEDS OFFICERS

The Organized Reserve Corps has an essential mission in the D-Day Striking Force that requires the active participation of many more Reserve Officers.

Thousands of unit assignment vacancies exist in the 18-25 Division Striking Force, particularly in the company grades.

Reserve Officers who expressed a preference for transfer to the Inactive Reserve (Reserve Officer Survey Questionnaire) should expect to be transferred thereto unless another choice is indicated before 31 December 1948. These officers are urgently needed. If you are one of that group, notify the local unit instructor or Senior Army Instructor at once of your (a) availability for assignment, (b) desire to participate in the ORC program, (c) rescission of your expressed preference to be held on an inactive status.

Detailed information is available at all offices of ORC—Senior Army Instructors, and unit instructors.

Dead Men Shoot Down No Planes

By Major John B. B. Trussell, Jr.

"In any war to come . . . anti-flak preparation will become as much a standard operation before an airborne attack as an artillery preparation is before a major attack by infantry."

The most ambitious airborne attack of the late war was the MARKET-GARDEN operation, the invasion of Holland by the First Allied Airborne Army in mid-September, 1944. There are those who say that it was magnificent but a failure, and there are others who argue that as an airborne operation it was a success—that the failure was on the part of the relieving troops, who did not arrive to complete the link-up in time. It is not the purpose of this article to contribute to the controversy. However, the airborne phase of Operation MARKET presents some examples of action of peculiar interest to the antiaircraft artilleryman. It is therefore proposed to discuss here this aspect of the invasion and to analyze it in an attempt to learn some lessons that might be of future tactical value to the Antiaircraft Artillery.

In the previous American employment of airborne troops in Europe—in the invasions of Sicily and Normandy—flak had caused considerable difficulty. On the basis of this experience, plus the importance of the mission and the rather dense concentration of antiaircraft weapons in the invasion area, unprecedented anti-flak measures were planned and executed in preparation for the landing of troops. (Figure 1 shows the concentration only of automatic weapons, but there were also some 70 heavy guns in the area.) Flak also influenced the selection of the drop zones in the British area of responsibility. It was one of the two determining factors in the decision to drop troops at so great

Figure 1

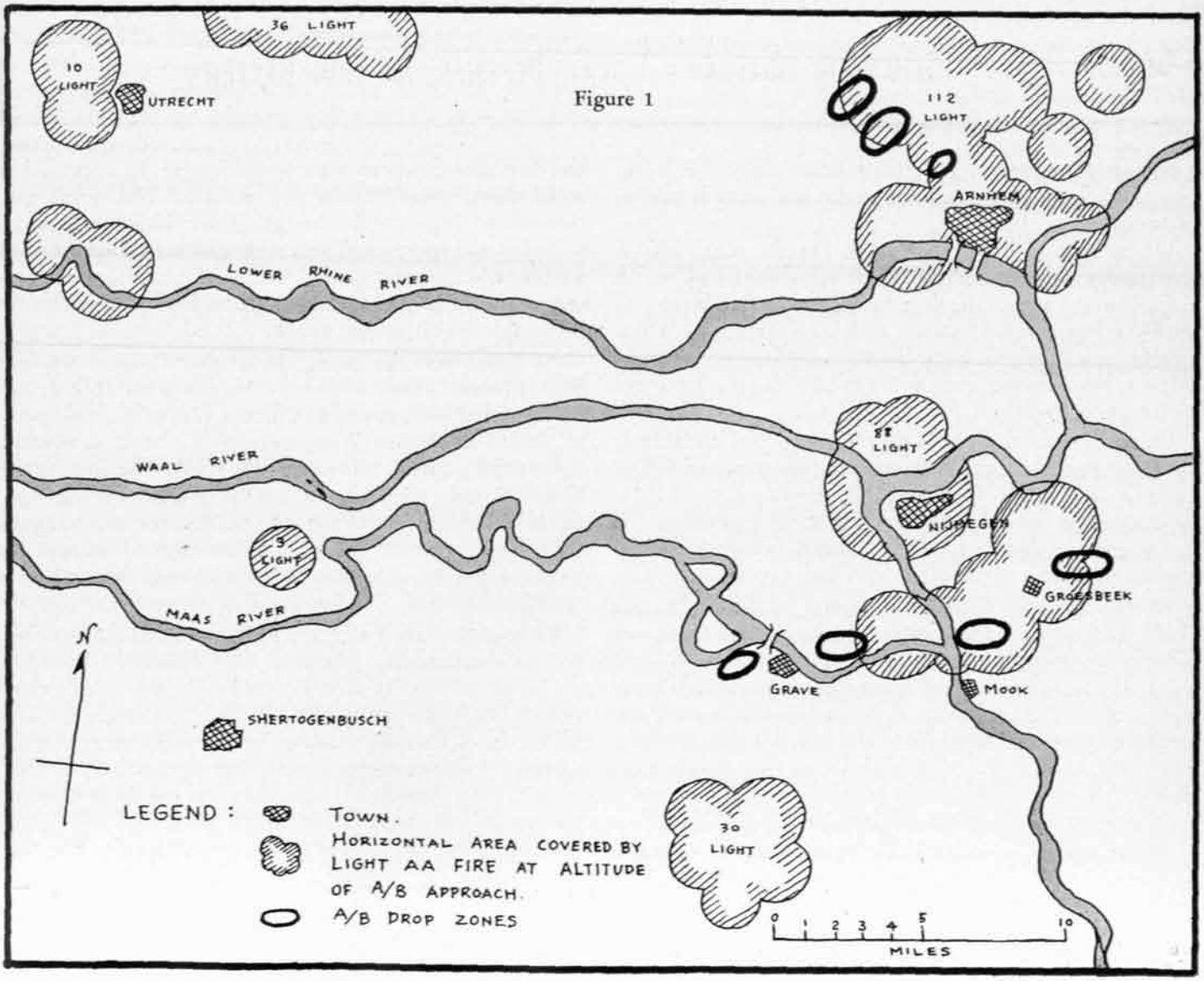
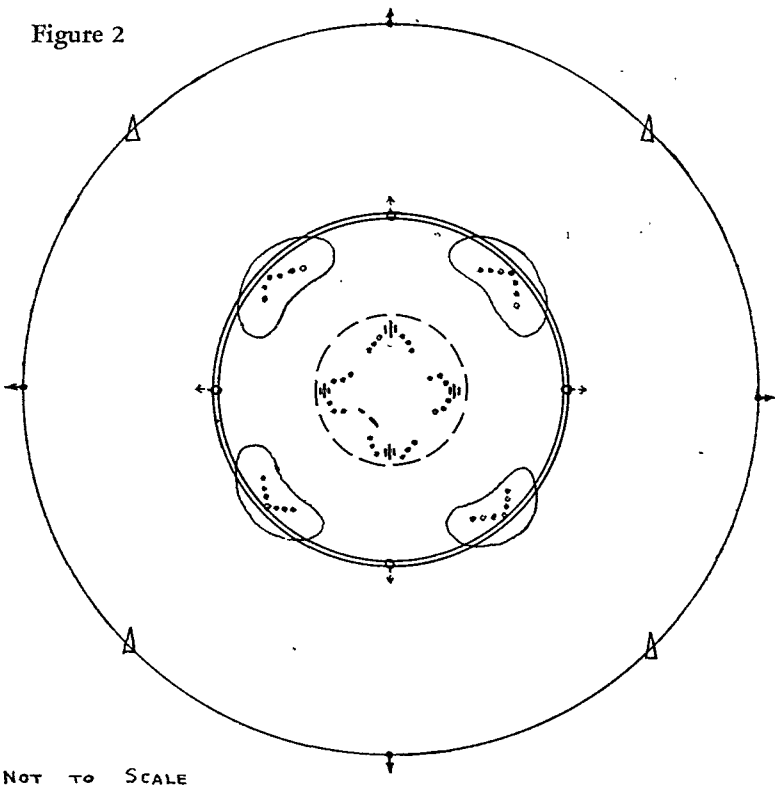


Figure 2



LEGEND

- Outpost Line of Resistance (OPLR)
- Main Line of Resistance (MLR)
- MGs, Sited for AA Defense
- Emplacements for MGs on MLR, MGs to Fall Back from OPLR as Attack Advances. (Emplacements are Dug in to Afford Grazing Fire & Sited to Permit Cross Fire in Front of Strong Points.)
- Strong Points
- Battery Installations (Guns, Radar, Director)
- Foxholes
- Outposts (OPs)

NOTES:

1. OPLR should be approximately 1000-2000 yds. from MLR.
2. Strongpoints must be far enough out from installations to afford reasonable protection to installations, but close enough in so that any two adjacent strongpoints will be mutually supporting.
3. If time permits, covered approaches (ravines, woods, etc.) should be mined & wired, & contain booby traps and/or warning devices.
4. Sufficient OPs should be established to afford observation of all possible ground approaches.
5. Routes of withdrawal of OPs & MGs from OPLR to MLR should be reconnoitered at time of installation.

Not to Scale

SCHEMATIC DIAGRAM: LOCAL DEFENSE, AA GUN BATTERY

a distance from the objective[1]—a distance which was subsequently of extreme significance to the success or failure of the mission.

D-Day was 17 September 1944. On the night before, RAF heavy and medium bombers attacked the four German airfields in the area of the drop zones, and on D-Day proper, the RAF began attacks on the antiaircraft positions. These attacks were followed, immediately in advance of the troop carriers, by bombing from B-17s of the Eighth Air Force and strafing by Ninth Air Force P-47s.

On the following day (D plus 1), attack of antiaircraft sites was continued, this time with the assistance of fighter units of the Eighth Air Force. The participation of these units deserves special attention, for their experience has had a considerable and perhaps undue influence on the anti-flak thinking of all those who had any share in it.

At that time, the fighter components of the Eighth Air Force were organized into three wings, the 65th, 66th and 67th. Each wing consisted of five groups, four of them flying P-51s and the fifth flying P-47s. For this mission the three P-47 groups were selected because of their air-cooled engines and rugged construction. Further, the precaution was taken of sending each Wing Flak Analysis Officer to his wing's P-47 group to brief the pilots in person on the locations of enemy AA batteries.

It was expected to be a rough mission, and pessimism was increased by the fact that, as airborne artillery had landed the day before, extreme care would have to be exercised to avoid shooting up friendly gun positions. The orders that came down were specific and uncompromising: artillery positions would be attacked only if they were first identified as hostile, which meant simply that a pilot had to see a gun shooting at him or at another ship in his squadron before he could take it under attack.

As if this were not enough of a liability, one group—the 56th, I believe—had a stroke of particularly bad luck. It had been briefed by Lieutenant Colonel Robert A. San Souci, of the 65th Fighter Wing, one of the most competent fighter flak analysis officers in the ETO. But just as the first ships were taxiing around the perimeter to get into position for take-off, word was received that the area assigned for strafing had been changed. There was no time now for a second briefing: the only course was to go out and hit a strange area cold.

Once in the target area, the fighters hunted the batteries, at first encountering relatively little difficulty. According to the pilots' reports at interrogation, however, it seemed that the Germans came to understand the restriction under which the P-47s were working, for the pilots swore that the German batteries stopped firing on approaching aircraft. Not knowing whether the position was hostile or friendly, the fighter had to withhold his fire; then, as soon as he passed by, the Germans would open up on him. We have been taught that a plane is less vulnerable to antiaircraft fire on the receding leg of its course, but that is not to say that it is immune. Certainly, the fighters in this operation were not.

[1]Capt. Geraldo de Menezes Cortes. "The Second Air-Ground Battle of Holland," *A Defesa Nacional* (Brazil), August, 1946; translated and digested in *The Military Review*, Vol. XXVI, No. 12 (March, 1947).

The result of this mission was the loss of thirty planes and pilots of approximately one hundred participating. Nineteen of the losses were from the group whose area was changed at the last minute. The loss figure does not include the number of aircraft damaged so severely as to require extensive repairs.

However, more than one hundred antiaircraft positions had been destroyed.[2] In the words of Lieutenant General Brereton, Commander of the First Allied Airborne Army:

> The operation proved conclusively that fighters could reduce flak in an operation of this nature to a negligible consideration.

Major General James M. Gavin, one of the wartime commanders of the 82nd Airborne Division, writes of the invasion:

> The thorough coverage of the flak positions was very successful. Not only were land batteries knocked out, but several flak ships and barges off the Dutch Islands were destroyed.

Operation MARKET provided, accidentally, at least two examples of another type of anti-flak measure. In one case, the parachutists dropped on top of a battery. According to General Gavin's account, all of the artillerymen were either killed or captured. In another case, a platoon that was trying to reach its regimental assembly area discovered a battery along its way. Engrossed in its aerial targets, the battery was completely surprised and easily destroyed. General Gavin sums up his account with soldierly brevity: "The battery lacked security against ground attack."

What conclusions with respect to flak can be drawn from the First Allied Airborne Army's experience in its invasion of Holland?

First, there is the obvious fact that the presence of flak in the area of the drop zones or along the flight path of the troop carrier aircraft constitutes a menace of major proportions.

Second, in spite of the heavy losses sustained by some of the fighters engaged in anti-flak missions, we have the testimony of the First Allied Airborne Army commander, himself an Air Force officer, that employment of fighters in such a role is worthwhile.

Third, we see that antiaircraft positions were so vulnerable to ground attack that they were able to offer practically no opposition to infantry.

The above facts constitute a definite problem for the Antiaircraft Artillery, a problem which we must recognize and do our best to solve. We may be sure that airborne forces have become firmly established as a part of the military future, and that the incidence and scale of airborne operations will be much greater in any war to come than they were during World War II. We may be sure, further, that because of the threat of antiaircraft artillery to an airborne task force, anti-flak preparation will become as much a standard operation before an airborne attack as an artillery preparation is before a major attack by infantry. And if anti-flak is shown to be effective in an airborne operation, it will quite possibly be accepted as a standard preliminary of all important air attacks.

Anti-flak can take several forms. Bombardment from high altitudes is one possibility, though certainly not a new one. Bombing of so small a target as an antiaircraft battery would be relatively inaccurate by conventional bombs. However, as early as May or June of 1944, the Eighth Air Force was carrying out experiments in combat with radio controlled bombs (called AZON or RAZON, depending on whether their fall could be controlled in azimuth only or in both range and azimuth). These experiments led the Air Forces to the conclusion that such bombs were impractical under existing conditions, as their successful employment required that the bombardier follow their fall visually. Under European conditions of visibility, this was frequently impossible. Further, the bomber had to continue its bomb run until the bombs actually struck. Under European conditions of flak, this was frequently unhealthy. It is likely that attack could and would be made by radio controlled bombs, with the bombardier following their fall electronically from such an altitude as appreciably to reduce antiaircraft hit expectancy.

Another form of anti-flak attack is that made by the strafing fighter, the fighter-bomber or (most likely, because it is most effective) the rocket firing fighter. Medium bombers might also be used, but their vulnerability is greater because they are relatively slower, larger and less maneuverable.

In addition to air attack, we must anticipate that a part of any future airborne operation will be a ground attack on antiaircraft artillery within reach of the drop zones. Nor need this hazard be limited to airborne attacks, for antiaircraft artillery in position for the defense of front-line troops is subject to attack by advancing infantry in the event of an enemy offensive. Although he was probably flying in the face of doctrine, General Patton suggested that small airborne units might profitably be employed to seize ground immediately beyond some troublesome natural barrier, such as a river, which was holding up the advance of the main body of ground troops.[3] Such employment of parachutists would also involve hazards for the advanced area antiaircraft units.

An even greater menace is counterbattery fire from enemy field artillery, when AA batteries are sited within range of such artillery. Our own field artillery carried out such missions against German antiaircraft batteries with considerable success, sometimes in order to smooth the way for tactical air strikes and sometimes to eliminate or reduce the threat of antiaircraft artillery firing in a field artillery role. The following SOP was prescribed by one Air Force in the ETO: "If target or route flak is excessive, Air Force Operations will, before the target is accepted, receive assurance from the requesting Tactical Air Command that the associated Army is able and prepared to bring to bear effective anti-flak fire. Probable effectiveness of such fire will have been corroborated by the Air Force Flak Section."

The remaining threat to the effectiveness of antiaircraft artillery that will be discussed here is sabotage. In these days, armed conflicts arise largely from friction between opposing political ideologies, and political ideologies in

[2] Capt. Geraldo de Menezes Cortes, *op. cit.*

[3] General George S. Patton. *War As I Knew It*, p. 180.

some minds transcend national loyalties. Therefore, even in the defense of our own country it would be necessary for us to contend with the work of enemy underground workers who seek to destroy the foundations of our defenses. Recent spy trials should prove that sabotage is a real if not a sizable threat.

From the discussion so far, it would seem that only the dimmest view can be taken of the future of antiaircraft artillery if an enemy makes any attempt whatsoever to counter it. Unless we make countermeasures to anti-flak attack an active and important part of our tactics, such a view will be fully justified. On the other hand, there are numerous steps which we can take to minimize the effect of the enemy's anti-flak measures.

One of the primary steps is making the fullest use of deceptive measures, such as camouflage, dummy positions, inflatable rubber "guns," etc. This will serve several purposes. It will foil any attempt by the enemy to prepare an accurate flak analysis of our defenses for the purpose of exploiting weaknesses. It will complicate his problem of carrying out anti-flak missions. Without knowledge of the locations of the German AA batteries in the Arnhem-Nijmegen area we should have been unable to brief the fighter groups adequately for their attacks on these batteries. (The value of this briefing is at least indicated by the fact that, of the three Eighth Air Force fighter groups engaged, the one which could not be briefed because of a last minute change in its target area sustained almost two-thirds of the losses.) In addition, if camouflage is employed for concealment from ground as well as air observation, it will hamper the enemy not only in infantry attacks against our positions but also in artillery attacks, provided he is in a position to make them.

We must, of course, prepare slit trenches, but we must supplement them with field fortifications sited to repel ground attack. Organically with all AA batteries we have .50 caliber machine guns for local defense, in addition to the individual arms of the battery personnel. It is established doctrine that these machine guns should be so located as to be capable of effective action against both ground and aerial targets, but the observance of this doctrine must be stressed. In addition, each battery should prepare a ground defense plan for each new position it occupies, and this plan should be coordinated with other local forces. If time permits, the plan should be tested in practice with the various participating units. The battery personnel should be exercised in the defense plan, which should include provision for effective demolition of matériel and ammunition stocks. Wire and mines can be obtained and laid out to channel any attacking forces into zones covered by machine guns or by the battery's primary weapons. Figure 2 is a schematic diagram of a suggested defense disposition of a gun battery. It is stressed that the plan illustrated here is only one of a number of possibilities.

All plans, however, should provide for sentries or lookouts to be on the alert for attackers, particularly when an airborne assault is begun or when the battery position is otherwise within possible reach of enemy ground attack. There can be no justification for such an occurrence as the surprise and overrunning of the German battery in Holland by the platoon of parachute infantrymen.

When under low-level attack, point-blank fire should be used. In combat there was a gun commander who, sighting along the line of metal and using pre-cut fuzes, shot down three dive-bombers in rapid succession. Our own fighters sustained occasional losses from German point-blank fire. With an increasingly general use of proximity fuzes, which would probably characterize a war today, the potentialities of point-blank fire will be heightened as the inaccuracy of the method is reduced. Again, even if inaccurate, such fire would be sufficiently spectacular to have a considerable effect as a deterrent.

There still remain two types of attack (high altitude bombing and sabotage) against which no defense has been suggested. The best defense against the first of these is better and more accurate fire. It is the writer's opinion that the tactical efficiency of an AA defense can be greatly and measurably increased if, as Colonel E. W. Thomson suggests in his article, "An Antiaircraft Defense of Washington," in the July-August, 1948 issue of the COAST ARTILLERY JOURNAL, batteries are disposed on the basis of flak analysis. As far as accuracy of fire is concerned, that is a technical rather than a tactical problem and as such is beyond the scope of this article.

Defense against sabotage, from the standpoint of the battery commander, is a matter of internal security. This is not to say, however, that it may be written off as a remote possibility; the chance should always be kept in mind and precautionary measures taken accordingly.

Summing up, the points which might well be remembered are:

1. In the future, it is likely that antiaircraft artillery will get an increasing amount of enemy attention.
2. This attention may take the form of aerial bombardment or strafing, in preparation for either airborne landings or air strikes; attack by ground troops; artillery bombardment; or sabotage.
3. Defensive measures of proved merit exist and are contained in doctrine, but have frequently been ignored. Such measures as dual purpose siting of local-defense machine guns, construction of field fortifications, preparation of a defense plan and its co-ordination with other units must be given more than token observance.
4. Of fundamental importance, contributing to the effectiveness of the AA defense of the objective as well as reducing the effectiveness of enemy attack on the antiaircraft positions themselves, are deceptive measures.

It should be remembered that after two days of Operation MARKET's attacks on antiaircraft positions, over one hundred AA positions were lost, and the troops who manned them were stone cold dead. This is a warning that we must take to heart: *dead men shoot down no planes.*

Don't Miss the CAA Ballot on Page 61.

Officer Promotion Policies*

By Major General John E. Dahlquist

With the announcement of a new, long-range plan for the temporary promotion of active duty officers (Regular and non-Regular), the Department of the Army has completed the revision of all promotion regulations. The policy for promotion in permanent rank of Regular Army officers was established by the Officer Personnel Act of 1947. The promotion policy for officers in the Organized Reserve Corps was revised in a new plan announced in August. The policy governing promotion of enlisted personnel was revised according to the new Enlisted Career Guidance program.

Permanent Promotion of Regular Army Officers

Under the provisions of the Officer Personnel Act of 1947, the promotion in permanent rank of Regular Army officers is by selection for all grades above first lieutenant. An annual selection is held for each grade; and officers failing twice consecutively to be recommended for promotion will be separated, with severance pay. The maximum years of service for promotion to captain, major, and lieutenant colonel are 7, 14, and 21 years, respectively. Promotions to these grades may be made sooner to fill vacancies; but qualified officers will be guaranteed promotion to such grades on reaching 7, 14, and 21 years' commissioned service (actual or constructive), even though authorized percentages in grades may be temporarily exceeded.

Promotions to colonel, brigadier general, and major general are made only as vacancies occur; but a list of recommended officers is kept current; and as vacancies occur, they are filled from the top of the list. A system of forced attrition will insure a flow of promotions to these grades. After 30 June 1953, lieutenant colonels who have not been selected for promotion by the time they complete 28 years of service will be retired. Colonels and brigadier generals not selected for promotion will be retired after serving five years in grade, but not until they have completed 30 years' service. Major generals will be retired after five years in grade if they have completed 35 years' service. There are a few exceptions, notably in the Medical Department and Chaplain Corps.

Second lieutenants, in order of seniority, may be promoted at any time to fill vacancies. They will be promoted automatically upon completion of three years' service, regardless of vacancies. Commissions of those not fully qualified for promotion will be revoked.

Medical Department officers, chaplains, and officers of the Judge Advocate General's Department will be on the same promotion schedule as other officers; but certain advantages are added. Officers appointed in these branches receive constructive service credits for promotion purposes, as follows: four years for doctors; three years for dentists, chaplains, and lawyers; and two years for veterinarians.

Selection boards composed of senior Regular Army officers examine candidates for promotion periodically. Those recommended are listed in order of seniority and are promoted from such lists. No officer may be considered for selection ahead of any officer senior to him in the same grade; and no officer may be promoted before any officer ahead of him on the recommended list.

Temporary Promotion of Officers on Active Duty (Regular and non-Regular)

The Officer Personnel Act of 1947 provided for continuing temporary promotions. It did not prescribe a specific method, except that regulations should provide a fair and equitable basis for temporary appointments, regard being given to seniority and age, and selection being based upon ability and efficiency. Temporary promotions to the grades of captain through colonel have been frozen for nearly two years (except to include major in the Medical, Dental, and Veterinary Corps). The new regulations, unfreezing promotions, became effective 1 November, with the first appointments to be made early next year.

Certain objectives were established early in the studies leading to the new temporary promotion policy. It was desired to set up a system of centralized selections by boards. All officers of the same seniority group of any grade should be considered equally, regardless of branch, component, or assignment. After promotion, officers should be reassigned, if necessary, to place them in jobs commensurate with their new grades. Finally, the new system should reconcile, at least partially, temporary and permanent seniority among the Regular officers being promoted. The plan accomplishes all of these.

Promotion of officers on the Army promotion list is to the temporary grades of major and above will be made by the Department of the Army. Promotion on other promotion lists to temporary grades of captain and above will be made by the Department of the Army. Promotion of officers on the Army promotion list to the temporary grade of captain will be made by major commands, defined as follows:

(1) All Armies, zone of interior.

(2) Oversea commands directly under the Department of the Army.

(3) Chiefs of administrative and technical services (for Class II installations, and for officers under their command assigned to the Department of the Army).

(4) Department of the Army (for all officers not covered by the above, and for Army officers on duty with the Air Force).

Promotion of officers to the temporary grade of first lieutenant may be decentralized by major commanders to subordinate commands, but not lower than those commanded by general officers. Any qualified second lieutenant who has

*Reprinted from the *Army Information Digest.*

completed 18 months' service in that grade may be promoted without regard to table of organization or allotment vacancies. This does not authorize the automatic promotion of second lieutenants after 18 months' service, but will be reserved for those who merit it. These provisions apply to male and female second lieutenants on all promotion lists, except the Veterinary Corps, where qualified second lieutenants may be promoted upon completion of 12 months' service in grade.

Promotion to the temporary grades of major, lieutenant colonel, and colonel will be made as follows:

The Department of the Army will announce a zone of consideration within each promotion list and for each grade, based on estimated vacancies and requirements. Within the temporary grade concerned, officers sufficiently senior in current temporary date of rank to fall within the zone of consideration will be arranged in two rosters—the Regular officers in order of their *permanent* seniority, and the non-Regulars in order of their temporary dates of rank. Their immediate commanders will recommend for or against the promotion of all these officers who have completed a minimum of twelve months in grade while on active duty, and not less than six months on the current tour of active duty. (Special provision is made for officers en route to new assignments, or otherwise in the pipe line.) A non-Regular officer with less than six months to serve under his current category statement may not be recommended for promotion unless he has applied for extension of his tour.

The first commander in the chain of command who has a minimum of ten officers within any grade on whom recommendations are submitted, will assemble and check recommendations, arrange the officers in the order that, in his estimation, they merit promotion, and add any pertinent remarks before forwarding. Upon receipt of all recommendations within a given grade, the promotion authority will combine the Regular and non-Regular rosters in a single selection list, which is turned over to a selection board convened by the promotion authority concerned. These boards will consist of three to five officers senior, in permanent and temporary grade, to those officers being considered. From the submitted list, the board will select officers for promotion, according to age, seniority, ability, and efficiency. Officers selected will be placed on an eligible list in the same order as they appeared on the selection list. Eligible lists will be held by the Department of the Army; and, as vacancies occur officers will be promoted in the order that their names appear.

After officers have been promoted, they will be reassigned, if necessary, to positions which are commensurate with their new grades. If no appropriate position exists in the officer's assigned organization, he will be reported as surplus in grade to the next higher commander.

Temporary appointments of general officers of all components of the Army on active Federal duty will be made under the provisions of the Officer Personnel Act of 1947. Brigadier and major generals will be selected by a board. The number to be considered, the number to be selected, and the number to be on duty with any arm or service will be prescribed by the Secretary of the Army. Lieutenant generals and generals are appointed directly by the President in accordance with positions held by such officers.

Promotion of Officers in the Organized Reserve Corps

A new promotion policy for officers of the Organized Reserve Corps is described in Department of the Army Circular 246, 13 August 1948. It is based on a recent study which was applicable also to the National Guard; but recommendations of this study will not be implemented by the Guard until 1951. Meanwhile, the Guard is operating under an interim promotion plan established in December 1947 (see below).

Objectives were to bring officers of the civilian components into the various grades at ages commensurate with the mobilization requirements of the positions; to advance the best qualified officers and retard or separate those not up to an acceptable standard; and to provide adequate incentive to insure that a sufficient number of officers of the proper type would remain active and interested.

Beginning 1 January 1949, a Reserve Officer must obtain 30 hours of credit in each calendar year in order to remain in the Active Reserve and thereby retain eligibility for promotion. Credit may be accumulated in various ways, as set forth in Section III, Department of the Army Circular 71, 16 December 1947. Promotions will be made to fill available positions within grade authorizations. Grade structure in T/O&E and T/D units will depend upon their organization tables, as established by the Department of the Army, according to mobilization missions.

The remainder of the Active Reserve is made up of officers not assigned to such units, but who are needed as ready replacements and for expansion of the Army in event of mobilization. Within this group, grade structure will be determined by section, according to the following ratio: colonels—1.4 per cent; lieutenant colonels—3.8 per cent; majors—9 per cent; captains—25.2 per cent; and lieutenants —60.6 per cent.

Position vacancies will be determined by area commanders, who will then convene selection boards to secure the best qualified officers among those available to fill the vacancies. Authority for appointing and convening these boards may be delegated down to senior state instructors. The boards may consist of officers of any component on extended active duty. At least one member of the board will be a Reserve officer; and all may be Reserve officers, on active or inactive duty. On the basis of board reports, the area commander will submit recommendations for promotion to The Adjutant General. A position vacancy will not be required for promotion of Reserve officers from second to first lieutenants.

The age-in-grade and time-in-grade requirements may be waived under certain circumstances. In addition, the officer must have passed a final type physical examination within one year prior to the date of recommendation for promotion; and he must fulfill certain minimum training standards. In lieu of these training requirements, officers who complete one year of extended active duty, and whose efficiency ratings for that year reflect an acceptable manner of duty performance, may be promoted (but not above colonel) to the Reserve grade next higher than that grade held while on extended active duty, provided they meet the minimum age-in-grade and other requirements. Such officers will be

promoted under a separate quota and according to selection board procedures similar to those above. The immediate commander of a Reserve officer on extended active duty may recommend his promotion in the Reserve at any time after the requirements have been fulfilled.

Officers of the Active Reserve serving in combat-type units of regimental or lowel level, who reach the maximum age-in-grade for such unit, as prescribed above, will be transferred to appropriate assignments elsewhere within the Active Reserve. Such transfer will be made only with the consent of the officer concerned.

Promotion of Officers in the National Guard

The interim plan governing promotion of officers in the National Guard is described in National Guard Regulations No. 20, 11 December 1947, and changes thereto. It is expected that this plan will be superseded on 1 January 1951 by a system somewhat similar to that now in effect for the Organized Reserve Corps (see above).

Under the interim plan, promotion of commissioned officers of Army units of the National Guard is based upon efficiency, length of service in grade, and demonstrated command or staff ability at the appropriate level. The following minimum years' service in grade is prerequisite to promotion:

2d Lt.	*1st Lt.*	*Capt.*	*Maj.*	*Lt. Col.*
2	3	5	3	4

Service which may be credited includes service in the same grade in active Federal wartime service, in the Officers' Reserve Corps, and in the postwar National Guard. Officers occupying position vacancies of a higher grade may be promoted to the next higher grade after serving a minimum of one year in the positions thus occupied; but no officer may receive more than one promotion under this provision. Pending publication of additional requirements, professional qualifications for the grade to which promoted shall be evidenced by excellent performance of military duties in the grade from which promoted. The minimum military educational requirement for promotion to general officer, or to colonel of a combatant arm, is successful completion of an appropriate course of the Command and General Staff College, or a local branch thereof. This may be waived where the officer has, in time of war, performed satisfactorily in the same or higher grade, or has clearly demonstrated his qualifications by actual performance of the duties for the higher grade.

Airdrome Defense In The Arctic*

By Lt. Col. R. E. Moore, Inf.

"The cold is unusual, but you can defeat it."

Early in 1947, Headquarters, Sixth Army, received a directive from Headquarters, Army Ground Forces, to prepare four successive maneuver elements, each consisting of an augmented rifle company of the 2d Infantry Division, to be rotated during the period 1 November 1947 to March 1948, through four successive airtransported Arctic exercises to Alaska. This was the beginning of Exercise Yukon.

The purpose of Exercise Yukon, as stated by Headquarters, Army Ground Forces, was fourfold:

To develop airtransportability methods for the Arctic.

To develop methods of training and indoctrination of ground force units for Arctic operations.

To carry out a series of maneuvers in Alaska involving airtransportability and defense of air fields.

To make observations and records of all operations in order to furnish a basis for the development of doctrines, tactics, techniques, and organization for future Arctic operations.

In an address before members of the 2d Infantry Division prior to Exercise Yukon, Dr. Paul Siple, an outstanding expert on Arctic living, and a leading member of several Byrd expeditions, re-stated the purpose of Exercise Yukon somewhat more informally: He said, "The cold is unusual, but you can defeat it. . . . The objective of Exercise Yukon is to determine whether, after adequate training, a group of men can drop into an area by air, be self-sufficient, and still have time left to actually fight or carry out a mission. That is the one big question we are trying to answer. This exercise will be a success if, on the final five-day maneuver, you can land on one of the outlying air fields, establish yourselves, take care of yourselves, and have time left to carry out a specific assigned mission. We have every reason to believe it can be done, but it hasn't been proved militarily."

The Defense of McGrath Field

The 1st and 3d platoons and reinforcing weapons were to be bivouacked in woods adjoining the main airstrip and the 2d platoon was to protect the radio station some 2,500 yards to the east of the airstrip. Within a few minutes after arrival at McGrath, it was evident that the principal difficulty in defending the field would be that of movement

*Extracted from the October 1948 *Military Review*.

through the deep snow. The snow depth was officially recorded at twenty-two inches, although it was much deeper in places. Despite the use of snowshoes, skis and toboggans, it proved to be a man-sized job merely to transport equipment from the aircraft on the runway to the bivouac areas a few hundred yards distant. It was evident that the movement of troops from their bivouac area to any threatened sector would be a slow and laborious process. On the other hand, the attacker's problems of assembly after dropping, of recovery of equipment, and of movement to attack the field would pose even greater problems than those of the defender—unless he chose to land directly on the airstrip after an intensive air attack, taking his losses from the defenders' fire, and hoping to smother the defending troops with the weight of his attack.

It was found that the vehicle M-29C (Weasel) is a very effective means of beating trails through the snow. In any perimeter defense in deep snow, such as that employed at McGrath, the immediate employment of Weasels to establish a system of well-beaten trails around the perimeter and between strong points on the perimeter and the headquarters in the center will give the defender a tremendous advantage in mobility over the attacker.

Although weather conditions were not severe enough to provide any real test of the ability of soldiers to withstand extreme cold, members of Ucon Company B appeared to have learned reasonably well how to live and take care of themselves in the field.

The mere problem of living in the Arctic without becoming a casualty is one that will require careful and complete training and strict discipline in any large-scale Arctic operations of the future. The difficulties involved during World War II in educating soldiers to take proper precautions to prevent trenchfoot were minor compared to the problems involved in teaching soldiers to live without becoming a casualty in the Arctic. Little things, such as failure to shed an outer garment when working to prevent overheating, or failure to brush the snow from felt boots when entering a warm room or tent, may mean the difference between a fighting soldier and a litter case.

It was true that a large percentage of each twenty-four hours was spent on the tasks incident to living, leaving less time than would be desirable for fighting. To a certain extent this is unavoidable in cold weather, due to retarded physical reactions and due to the fact that bulky clothes and heavy mittens tend to hamper the performance of even the simplest tasks. Individual cooking was probably the greatest time consumer of all. At first glance, it would appear that, with limited air transportation, field kitchens would be out of the question on an Arctic operation. However, when one considers the man-hours saved by the operation of unit kitchens, to say nothing of the improvement in soldier morale and health, the slight additional weight and bulk of field kitchens could be considered equivalent to a rather substantial increase in fighting manpower.

Throughout the six-day exercise at McGrath, a small Aggressor Force, led by two very capable officers, formerly members of the Alaska Scouts, operated against Ucon Company B. Exercises on the 12th, 13th and 14th of December consisted of the defense of the air field by Company B. On 14 December, after an intensive air attack by two squadrons of Aggressor aircraft, a dummy airdrop was made in the vicinity of the field, followed by efforts of the Aggressor Force on the ground to penetrate the defenses of the field. The field was successfully defended, although results of the air attack were not taken strictly into account. On the 15th and 16th of December, Company B moved to a simulated drop zone east of McGrath and attacked the field against the defending Aggressor Force and under strict umpire control. Throughout these exercises, small Aggressor Forces were able to infiltrate a few men through Company B's lines almost at will due to superior training in scouting, patrolling and snow mobility. It became evident throughout these exercises—to this observer at least—that although a well-trained enemy airborne force, protected by air superiority, could land some distance from the air field, assemble and move towards the field while his own air force was working over the defenders, the complete lack of roads and the deep snow would make this a slow and difficult task. His best chance of success, it appeared, would be to drop directly on the field after an intensive and stunning air attack. An air attack against troops above ground and unable to dig in, should be quite effective.

On 18 December, Ucon Company B was picked up by the 7th Troop Carrier Squadron and returned to Big Delta. In spite of thorough training of both Company B and 7th Troop Carrier Squadron in airtransportability, many small misunderstandings arose between the two, both on the outgoing and return flights. These misunderstandings were relatively minor in nature and were due principally to lack of adequate positive liaison between Company B and 7th Troop Carrier Squadron. It is considered essential that in any joint operation of this nature, full-time liaison officers be exchanged between units of the two services.

We must offer intelligent, alert and sensitive leadership throughout our system of command. For the soldier today is a thinking man and his nature balks at lack of understanding, unnecessary or harsh discipline, and at inconsiderate assumptions of privilege by his seniors.—GENERAL OMAR BRADLEY.

Guided Missile Instruction at Fort Bliss, Texas

By Lieutenant Colonel Lawrence W. Byers

Recognizing the potentialities of the guided missile, Army Field Forces inaugurated courses of instruction in this new weapon as early as September 1946 at the Antiaircraft and Guided Missiles Branch of The Artillery School, Fort Bliss, Texas. The Guided Missile Department of the school was established at that time and given the following missions:

1. To teach in detail, the tactics and techniques of guided missiles and to qualify officers to be competent commanders for all guided missile units of Army Field Forces.
2. To train selected enlisted men to be leaders of guided missile units, to be guided missile technicians, and to be instructors in guided missile units of the Regular Army, the National Guard, the Organized Reserve Corps and the Reserve Officers' Training Corps.
3. To serve as an agency of the Army Field Forces in the development and perfection of guided missiles tactics and techniques.

In the execution of its first mission, the department has conducted a number of guided missile courses of varying lengths. In addition to the courses that are devoted exclusively to guided missiles, some guided missile instruction is presented in practically all resident officers' courses.

The most important course offered from the standpoint of time, effort and the end product is the nine-month Guided Missile Course. Although the immediate need for guided missile unit commanders is not great, a pool of trained officers from which assignments may be made when missiles become operational is essential. There is currently a need for a large number of officers who are sufficiently familiar with the technical details of guided missiles to be able to evaluate the results of development projects, make tactical studies for employment and plans for the integration of guided missiles into the combatant arms.

Trained experts to perform technical work and appraise research are being supplied by postgraduate courses in civilian universities. The course at Bliss does not attempt to duplicate this effort. Instead, emphasis is placed on the tactical and operational aspects of the problem. In addition to being trained to command guided missiles units, graduate officers are well qualified to perform guided missile staff duty at policy-making level. They are also qualified to act as instructors, range officers, test officers, and as liaison officers with the various guided missiles projects.

Beginning with the 1947 class, the Navy joined in this effort and provided a number of instructors. As now presented, the course embraces all phases of the guided missile program. Both surface-launched and air-launched weapons are studied. Antiaircraft, Field Artillery, Naval, and Seacoast applications are considered. The course not only is branch immaterial, it is interservice.

During the first two years of the school, 67 Army officers and 21 Naval and Marine officers successfully completed the course, the majority of whom are now actively engaged in guided missile work. It is anticipated that approximately 60 Army and 40 Naval and Marine officers will complete the course during the current school year.

To be eligible to take the course, a degree in engineering or its equivalent is required. Courses of study that do not include differential and integral calculus and engineering physics are not considered equivalent to an engineering degree.

An Associate Guided Missile Course of 13 weeks' duration is offered for Reserve and National Guard officers and for Regular Army officers who volunteer. The first class was conducted in the 1947-48 school year. The second class will commence 7 March 1949, with a quota of 40 officers. This course parallels the nine-month course but is nontechnical. Primary consideration is given to tactical employment.

During the summer of 1948, two special guided missile courses, each of two weeks' duration were conducted for Reserve and National Guard officers. These courses were directed primarily toward training requirements for Reserve and National Guard guided missile units. This type of course will be repeated if a demand exists. Each class can accommodate a quota of 40 officers.

The second mission, training enlisted specialists, is being accomplished at present by incorporating into current specialists courses, subcourses on the application of these skills to guided missiles. If previously indoctrinated with the basic concepts of guided missiles, a specialist such as a radar repairman can quickly learn the special techniques and new equipment associated with guided missiles control systems when they become available. Guided missiles subcourses are being presented in the Master Gunners, Fire Control Electricians and Radar Repair and Maintenance courses. Other specialists' courses peculiar to guided missiles will become necessary as operational missiles become available.

The third mission, to develop guided missile doctrine, is a continuing process. The staff and faculty make studies and recommendations concerning the employment, operational control, and tactical disposition of the various proposed

Class on V-2 Motor.

missiles. These studies are used as the basis for instruction on tactical employment. Students in the nine-month course are required to submit monographs on some phase of tactical employment of guided missiles. From these two courses a great amount of thought is being recorded which is being shaped into recommended doctrine.

A guided missiles doctrine board has been appointed by the Commanding General of The Antiaircraft Artillery and Guided Missiles Center, with representatives from the 1st Guided Missiles Regiment, Army Field Forces Board No. 4 and the School. It is the duty of this board to evaluate and make recommendations concerning proposed doctrine, organization, and training requirements with a view to the establishment of approved doctrine in sufficient time to meet the requirements of operational missiles when they become available.

I am so convinced of the importance of the information and education program and of public relations, that, if it can possibly be arranged, eventually even Army graduates of the National War College will attend this school (Army Information School). For, unless we approach these subjects objectively and in an organized fashion, under leadership of a staff devoted to the study of every aspect of these subjects, we are not going to get a common doctrine.—General of the Army Dwight D. Eisenhower.

Housing For Army Families*

By Lieutenant General Henry S. Aurand

During World War II, married servicemen took incredibly bad family housing conditions in stride, bearing with good spirit the usually crowded, often unsanitary, and always expensive hotel rooms, trailer camps, and shacks which could be rented more or less near the station. Unfortunately, the situation is little better today, more than three years after the end of the war; and the "good spirit" long since has worn thin.

Adequate family housing undoubtedly is Topic A in most conversations at posts, camps, and stations. It is also one of the highest priority problems before the Department of the Army. Severely critical before, it has become dangerously critical with the expansion of the Army.

Despite continuous efforts during the past three years, little immediate improvement can be expected. In the current fiscal year, about 1500 new, permanent-type family units will be built at Army installations. All of these will be the noncommissioned officer type, and they will be built only at permanent posts. Even with the construction of several thousand additional units in Fiscal Year 1950, still to be authorized, the Army would fall far short of its needs. The 947,000-man Army authorized by the Congress will need about 193,000 sets of family quarters—107,000 for noncommissioned officers and 86,000 for officers and warrant officers. Including the 1500 units to be built this year, there will be available only about 29,000 in the zone of interior, territories, and possessions. About half of these are temporary or converted units. Including family quarters used by Army personnel in the occupied zones overseas, there are, in all, less than 40,000 units, against a need of 193,000.

The Department of the Army has made extensive studies and has established some basic guiding principles. The objective is clear-cut: To provide quarters on posts for all authorized military personnel—as rapidly as appropriations are made available by the Congress.

The policy on allocation of funds will be to concentrate on major installations—posts which may be expected to be active indefinitely, regardless of the size or mission of the Army. Meanwhile, all usable facilities elsewhere will be continually rehabilitated and kept in condition. The development of these permanent posts will be completed in accordance with a master plan set up immediately after World War II. In this plan, the posts of the permanent, peacetime Army were selected; and a planning board was established at each post to analyze the facilities and needs of the installation, according to its intended size and mission in the permanent plan. The plan, as originally formulated, envisioned the completion of development projects in an orderly fashion within ten years, at an outlay of around 10½ billion dollars. However, at the rate that construction appropriations actually have been made, this would have taken 50 or 60 years. Consequently, the Department of the Army decided to concentrate the limited appropriations, as available, on completing the development of major posts, rather than engaging in piecemeal construction over the face of the earth.

The type of housing to be built is based on recommendations made by the Corps of Engineers after broad investigation. Every type of permanent quarters was studied—from the detached, individual house to the six-story apartment building. In seeking the most for the money, the costly individual house and the duplex were eliminated. On the other hand, the least expensive type—the three-story walk-up apartment house—also was eliminated, for a number of reasons, including objections by The Surgeon General.

To provide the most economical, acceptable, best-for-all quarters, the Army decided on the multiple two-story (or row-type) house, wherein each family has a ground floor, second floor, basement, and individual yard in a garden-type development. The Corps of Engineers' design provides a minimum of common wall space and a maximum of windows, for adequate cross ventilation. Normally, there will be eight units to a row. The architecture will conform to the style of the region and the post, but some form of masonry always will be used. This is the type of permanent quarters now being built.

The policy is to provide housing first for noncommissioned officers and junior officers, since they are least able to compete with civilians for housing on the open market.

In June 1948, the Congress, on the recommendation of the Army, passed a law specifying space limitations on family quarters, in lieu of the old monetary limitations. The latter have prevented construction of adequate housing because of current high costs. The space limitations are:

	Square Feet
Enlisted men	1080
Warrant officers, flight officers, and commissioned officers of and below the grade of captain	1250
Majors and lieutenant colonels	1400
Colonels	1670
General officers	2100

These limits apply to the space inside the exterior walls excluding basement, attic, garage, and porches. The 1080 square feet allowed for noncommissioned officers' quarters would provide the equivalent of six rooms 12 by 15 feet each. In the same law, as a measure of economy in funds and materials, the Congress directed that all family housing built by the Army and the Air Force during Fiscal Year 1949 be limited to 1080 square feet, and be of multiple

*Reprinted from the October 1948 *Information Digest.*

two-story design. Similar limitations were placed on Navy construction. This general policy undoubtedly will be continued in FY 1950; although a limited number of 1250-square foot units also may be authorized in that budget.

A separate effort is under way to interest private enterprise in constructing quarters for Army use. If successful, this would result in housing developments in urban areas near Army posts. The Assistant Secretary of the Army recently sponsored a conference with officials of several large insurance companies to investigate this possibility; and a directive has been issued to Army commanders to explore the possibility of interesting local private enterprise.

Meanwhile, immediate relief is needed at camps which are being activated as a result of Selective Service legislation. For example, Camp Pickett, Virginia, has eleven noncommissioned officers' quarters and five officers' quarters to meet an anticipated need of several thousand. Comparable shortages exist at all the camps being reactivated.

Facing this urgent problem, the Chief of Staff directed that emergency means be found to provide some type of housing at these camps, at little or no expense to the Government. After considering several alternatives, it was concluded that the most practical plan of universal application would be for the Department of the Army to provide first-class trailer camp facilities. These would include an individual lot, with a hard stand for each trailer; individual electrical and water connections; hard-surfaced walkways; community baths, toilets, and laundry facilities; and parking areas. Military personnel would provide their own trailers. They would be paid the normal rental allowances, and would pay only for utilities and site rental—an estimated total expense of about $95 a year. This would leave sufficient funds among all grades entitled to family housing, to carry the payments on a suitable trailer for the normal two-year period, after the usual one-third down payment, and to amortize the complete investment in three to four years.

This emergency plan was approved by the Chief of Staff early in September; and the Commanding Generals of the six Armies in the zone of interior have been directed to submit estimates of their requirements. These will be approved to the extent possible with the limited funds available.

For two years after World War II, there were no appropriations for construction of permanent-type family housing units at Army installations; so the years 1946 and 1947 were a period of conversion and temporary construction, to the extent of 12,800 units. These provided only slight relief, and at best were cramped, unsatisfactory quarters with a rapid obsolescence rate. By December 1947, there was little left to convert to family quarters. The temporary construction program was abandoned as an uneconomical use of funds.

The Fiscal Year 1948 construction budget, including provision for new permanent-type family quarters, normally should have been enacted by June 1947. However, the Congress did not appropriate these construction funds until June 1948, when the fiscal year was all but ended. It is these funds that are now being used to build 1500 sets of 1080-square-foot type permanent quarters. The FY 1949 construction budget, which included provision for 4277 sets of family quarters of all types, was set aside because of delay in the passage of the previous year's budget. Currently, the Army is preparing its FY 1950 budget, which covers the period 1 July 1949 to 30 June 1950. In other words, a complete year of construction appropriations has been lost. It is hoped that this budget, as passed, will provide considerably more than the 4277 sets of family quarters proposed in the FY 1949 budget.

The deep concern of the Department of the Army over the shortage of family quarters was expressed by Secretary of the Army Kenneth C. Royall in a recent statement: "We cannot expect people to continue to live under wartime conditions at our Army posts. Men were willing to be separated from their families during an emergency. They were willing to live in quarters far below the civilian standard for people of their relative scale of life. But it is too much to expect that condition to continue indefinitely."

In today's Army it is not enough that a man be sturdily equipped, skillfully trained to make him a good soldier. To show the strong heart that comes from deep-rooted convictions, the soldier must know and understand the greatness of this democracy and grasp the important role he fills as part of its armed forces.—GENERAL OMAR BRADLEY.

Artillery Representation On High Level Before And During Combat*

By Brigadier General C. E. Hart

It is my desire to record for the benefit of future Artillery Commanders, before the details become obliterated by the passage of time, an accurate account of Field Artillery participation in the War against Germany, 1942 to 1945. As the account unfolds, it is hoped that the need for strong and competent Field Artillery representation on all levels of command will be appreciated as a must, if this important supporting arm is to accomplish its mission to the limit of its capabilities.

I will first discuss the activities, pitfalls, etc., of the Artillery Section, Headquarters II US Corps:

After landing [in North Africa] and prior to moving to Oran, the Corps Artillery Section was principally occupied with the survey, reorganization, and repair of the Coast Defenses within the sector of the Center Task Force, which had been previously manned by French Naval personnel. These defenses would have been of major importance to the II US Corps in the event of an Axis counterattack by sea. I am sure that no instruction was provided at the Field Artillery School on the subject of organization and operation of Fixed Seacoast Defenses and most certainly not those of the French variety. The old saying, "Necessity is the mother of invention," was never more applicable.

In anticipation of a coast-defense requirement, the 36th Field Artillery Regiment (155mm guns) had been given a short period of training in firing at water-borne targets on the southern coast of England. Upon the arrival of this regiment in North Africa, it was promptly assigned to a seacoast-defense role and integrated with the sadly depleted French Fixed Seacoast Defenses. This seacoast-defense experience was invaluable to both the members of the Corps Artillery Section and the 36th Field Artillery Regiment several months later when the seacoast defenses of Bizerte, Tunisia, had to be similarly organized and manned.

Shortly after the first of the year, 1943, Headquarters II US Corps was directed to proceed to Tebessa, Tunisia, to take over a sector of the rapidly growing front then held by the First British Army.

The Tunisian Campaign proved to be a most effective proving ground for all subsequent combat operations in Sicily, Italy, and on the continent of Europe. The Field Artillery of all ranks and echelons, as well as the other combatant arms and services, learned lessons which contributed immeasurably to the success of the Allied effort in all future operations. Some of the more important Field Artillery combat lessons learned were as follows:

The knowledge on the part of commanders of capabilities and limitations of field Artillery weapons—especially the heavier calibers—is essential, if maximum effect is to result from a minimum expenditure of ammunition.

Infantry commanders and even their division artillery advisors are prone to forget that the Field Artillery support available to the Infantry is not limited to the direct-support Field Artillery battalion, or even to the division artillery with its attachments. As a consequence, requests to the corps artillery for reinforcing fires often arrive too late to be of value. A prompt evaluation of the situation, particularly in the case of enemy counterattack, and immediate request for adequate Field Artillery support is essential to success.

Adequate orders should be prepared sufficiently in advance to permit a careful study of Field Artillery fires.

The employment of Armored, Tank Destroyer, and Antiaircraft Artillery units in a secondary role as Field Artillery should be supervised and, if necessary, controlled by the artillery commander of the appropriate echelon.

Field Artillery fire is unsatisfactory for clearing gaps in mine fields. Such fire will destroy few mines; rather, it will disrupt the pattern of the mine field and introduce a greater quantity of metal which will increase the work of the mine detector teams.

The detailed provision of aerial photography, including gridded obliques, is of paramount importance in obtaining the most effective Field Artillery support.

Dumping of Field Artillery ammunition in the position areas, except that necessary for the delivery of planned fires, should not be permitted. Failure to restrict this practice will normally result in a waste of ammunition when the Field Artillery is displaced.

A prescribed system for the rotation of Field Artillery units to rear areas for refitting, rest, and maintenance must be provided early in an operation. Otherwise, the effectiveness of all Field Artillery units will tend to deteriorate simultaneously and the command will suffer from the inability of the Field Artillery to maintain the bulk of its weapons in action.

Forward observers must be rotated frequently, inasmuch as they often will be required to maintain a position exposed to direct fire even after the Infantry is pinned to the ground and comparatively inactive. Seventy-two hours is the maximum time an experienced observer can be expected to observe effectively; under adverse conditions this time will be reduced to 48 hours.

The present allowances of personnel and equipment for the installation and maintenance of Field Artillery communications are generally inadequate. Division, corps, and

*Abridged from the September-October issue of the *Field Artillery Journal* by permission.

army signal units must often supplement the organic Field Artillery facilities.

Trial and error methods were utilized in the solution of the counterbattery organization and operation problems. Before the termination of operations in Tunisia, an effective counterbattery organization and procedure were evolved by the Corps Artillery Section in close collaboration with the 13th Field Artillery Brigade, and which, with only a comparatively few minor changes, were effectively used by all US corps artilleries throughout operations in Sicily, Italy, and on the continent of Europe. Under the general heading of counterbattery are included developments in: Field Artillery intelligence, aerial photography of all types, photo interpretation, shelling reports, special communication nets, corps fire-direction centers, TOT method of fire, radar location of enemy guns, massing of fires by all available Field Artillery weapons with the corps, and innumerable other allied subjects.

At this point it might be well to point out a very definite deficiency in our over-all Field Artillery organization which existed in the early days of operations in North Africa and unfortunately continued, for the most part, throughout the entire war in all Theaters. The deficiency to which I refer is the lack of suitable and adequate Field Artillery representation on high-level staffs. Not until after the Sicilian campaign did General Eisenhower recognize the need for a US Artillery Officer and Section in Allied Force Headquarters. When finally organized, this senior Artillery representation proved of great worth during the early days of the Italian campaign. Later, however, when Allied Force Headquarters was split into ETOUSA, NATOUSA, and MTOUSA, the Theater Section was dissolved.

The Sicilian campaign, commencing with the assault of the southern beaches on 10 July 1943 and ending with the capture of Messina by III US Corps thirty-eight days later, marked another step in the over-all strategic plan for the defeat of the Axis powers. There were several noteworthy developments during this operation as far as the Field Artillery was concerned. Cooperation on the part of the Air Forces had been virtually unknown during the Tunisian campaign. Aerial photography for Ground Force use was completely lacking. However, prior to embarking for the invasion of Sicily, the Artillery Section, Headquarters II US Corps, provided a team consisting of an officer and two enlisted men as photo interpreter, assistant photo interpreter, and radio operator, complete with jeep and vehicular-mounted SCR 193 radio set to operate in the British Army Group Photo Interpretation Center. Initially, this Center was set up in the vicinity of Tunis and later was moved to the Island of Sicily. The Corps Artillery Officer's radio net (SCR 193 set), developed through necessity during the closing phases of the Tunisian campaign, provided the means of dissemination of this extremely important, although at times meagre, information. This was to become a vital adjunct to the counterbattery technique and procedure developed during the combat operations in Tunisia. As will be seen, this small photo interpretation unit grew in size and effectiveness as operations progressed to Italy and the continent of Europe.

Another development on the chart of Field Artillery progress occurred during the attack of the defended town of Troina, Sicily. During this attack the aerial bombardment and Field Artillery fire plans were carefully prearranged and coordinated so as to obtain the maximum in surprise and effect. Two separate bomb runs were made, coordinated with massed Field Artillery fires on predetermined targets, preceding, between, and following the aerial bombardments. The results were both impressive and effective. So far as is known to the writer, this was the first time that Air Force bombardment and Field Artillery massed fires were effectively coordinated by US Forces in combat.

Upon the termination of the Sicilian campaign, General Bradley was designated as the Commander for the First US Army, which was to be assembled in the United Kingdom in the fall of 1943 in preparation for a cross-channel invasion of the continent of Europe in June 1944.

The ensuing eight months in England, prior to embarkation for Normandy, were spent by the Army Artillery Section in working out an effective staff-section organization assisting all First US Army Field Artillery units with their personnel, training, and supply problems, and other multitudinous details in connection with the preparation of the largest force in history to attempt such an amphibious operation. Keeping in mind the major combat lessons learned from operations in North Africa previously outlined and the additional ones acquired in Sicily, together with those passed on from the Italian campaign by the Artillery Officer, Fifth US Army, every possible effort was exerted by the Artillery Officer, First US Army, to enable the Field Artillery with First US Army to profit thereby. Some of the additional lessons not previously mentioned were:

Major preparations which include both air and artillery bombardment should be planned and coordinated by the Artillery Officer (Commander) of the senior echelon in order that there be no duplication of effort and to insure a thorough neutralization of the breakthrough area.

When friendly Field Artillery has successfully neutralized the enemy artillery, enemy mortars will become a major source of annoyance to the Infantry. Failure to neutralize these mortars will have a serious effect on the morale of front-line units. Therefore a carefully integrated employment of Infantry and Field Artillery counter-mortar facilities should be continuous.

The provision of an Air Force Mobile Reclamation and Repair Squadron or comparable unit for operation with the Army is a vital necessity in order to furnish continuous 3d and 4th echelon maintenance-and-supply support for the organic and attached liaison aircraft.

The physical condition of Air OP pilots must be closely watched in order to minimize accidents. Periodic resting of these pilots when operating under prolonged combat conditions considerably improves their performance and prolongs their usefulness.

Teams of one officer and two enlisted men, trained in shell identification and crater analysis, were employed with Infantry units to obtain complete and accurate shellreps. One team per Infantry regiment proved to be an effective ratio.

Continued emphasis by all units on the prompt and correct reporting of enemy artillery shelling provided Field Artillery units with a valuable means of pinpointing and ultimately destroying enemy weapons.

The use of colored smoke by Field Artillery units proved invaluable in marking close-in targets for air support.

An adequate proportion of the Air Force tactical-reconnaissance facilities available to an army should be set aside to permit the adjustment of long-range Field Artillery fire by high-performance aircraft.

Illuminating shells proved to be an effective means for the illumination of the battlefield, thereby permitting forward elements to observe enemy movements at night.

Timely information accurately distributed by leaflet-filled Field Artillery shells prompted many enemy personnel to surrender.

Realizing the potential reinforcing fire power of Tank Destroyers and Antiaircraft Artillery gun units available to First US Army, the Artillery Section took steps to coordinate their training and future operations, so as to permit utilization in combat, in a reinforcing role, when not required on their normal missions. Air Force cooperation improved to a major degree from what had been experienced in North Africa and even Sicily.

Early in the North African campaign the requirement for close liaison between G-2 and the Artillery Officer was realized. The Field Artillery channel was a lucrative source of information for G-2; likewise, G-2 could be of invaluable assistance to the Artillery Officer, both from the standpoint of enemy information and the procurement of aerial photography, photo interpretation, and aerial reconnaissance. In order adequately to tie these two offices together, an Assistant Artillery S-2 was constantly kept on duty during combat in the G-2 office. Not only was this SOP within the Headquarters of II US Corps and First US Army, but it was adopted almost universally by the headquarters of all US armies, corps, and divisions.

The Army Artillery Section had a very definite responsibility in the organization, planning, and eventual execution of Naval gunfire support, inasmuch as Naval gunfire in an amphibious operation is by-and-large Field Artillery afloat, initially being in direct and general support and later reinforcing after Field Artillery gets ashore. In close collaboration with the US Navy, Naval Shore Fire Control Parties were organized, equipped, and trained, both separately and subsequently with the Divisions with which they eventually operated. Several Airborne Naval Shore Fire Control Parties were also activated from volunteers and trained with the 82d and 191st Airborne Divisions for later employment with these divisions when they dropped in Normandy. This careful planning and training paid great dividends during early operations on the continent of Europe.

Close liaison within the limits of security had to be constantly maintained between the Planning Group and the remainder of the Artillery Section in order that formulated plans could ultimately be executed with effect. These plans, duly coordinated with all interested parties, consisted of the following:

a. Activation, organization, and training of Naval Shore Fire Control Parties for employment with airborne as well as ground troops.

b. Formulation and publication of a procedure for the accomplishment of naval gunfire support for the assaulting forces.

c. Draft, coordinate, revise, and publish the Prearranged Air and Naval Bombardment Plan for the assault.

d. Draft, coordinate, revise and publish the Artillery and Naval Gunfire Support Plan for the assault.

e. Arrange for, obtain, and issue aerial photographs and interpretation of the assault areas.

f. Conduct tests in conjunction with the Navy to determine the most practical modification to LST's when used as support craft.

g. Recommend, coordinate, revise, and publish troop lists pertaining to Field Artillery and Tank Destroyers of the assault, follow-up, and build-up.

h. Arrange, coordinate, and prescribe methods for organic Field Artillery liaison-type aircraft to arrive in the assault areas when required.

i. In conjunction with the Army Ordnance Officer, to determine, tabulate, and provide for the anticipated ammunition requirements for all Field Artillery and Tank Destroyer units ashore during the first fourteen days of the operation.

As time progressed after the initial landings in Normandy on 6 June 1944, additional combat lessons of major importance were learned and passed on by the Army Artillery Section to all subordinate Field Artillery and Tank Destroyer units of First US Army, as well as to neighboring US and British Armies and Army Groups. As early as October, 1943, the Artillery Officer, First US Army, saw the great need of a medium for the dissemination to all Field Artillery and Tank Destroyer units of combat lessons learned, operational procedures, historical and statistical data, and other pertinent information. So it was decided to publish periodically such a compilation, titled "Artillery Information Service" (AIS). Some of the combat lessons not previously mentioned which were disseminated in this manner are outlined as follows:

During the major portion of the operations on the continent of Europe, Army Artillery, which included all 240mm howitzer battalions and 8-inch gun battalions, was controlled by the Army Commander through a Field Artillery brigade. By this organization, the Army Commander could cause the fire power of this long-range heavy artillery to be massed in support of the corps making the main effort or emplaced to reinforce the fires of several corps.

In the attack of a strongly defended town it does not pay to destroy buildings, even though they are fortified, until the direct-support artillery can take over and maintain neutralization from the time the heavy artillery lifts until the Infantry assaults the area. If any period of freedom from fire is allowed after the destruction is accomplished, the enemy can be expected to construct fortifications from the rubble which will, if anything, be harder to assault than the undestroyed buildings.

Corps and division commanders must be aware of the importance of employing long-range heavy artillery well forward in order to exploit its range capabilities.

Artillery concentrations, fired on known flak positions in coordination with air strikes, proved to materially reduce Air Force losses and permitted increased quantity and effectiveness of the air bombardment.

Rockets, when fired in mass, proved to be a most effective method of delivering concentrated fire on an area target.

They should be employed to augment artillery fires and air strikes on critical areas.

A self-propelled 155mm gun battalion should be organic to each armored division. When available, M12 battalions were habitually attached to armored divisions for interdiction and deep counterbattery missions, and for firing on medium and long-range targets of opportunity.

Reduction of the Siegfried Line concrete fortifications was facilitated by M12 weapons in a "direct-indirect" method of fire.

Allocation of ammunition is always based upon availability. Senior commanders have in many instances required the Artillery to expend more than their allocation. It should be realized by all echelons that this is a breach of supply discipline and may seriously affect future operations.

Base-ejection shells, loaded with medical supplies, were successfully fired into friendly areas surrounded by enemy troops.

As can be seen, the writer of this article has come a long way from the Command Post, II US Corps, set up in the vicinity of Salisbury, Wilts, early in July, 1942. The redeployment of Headquarters First US Army to the Pacific with a reorganization period of two months in the United States and then off by air to the Philippines in August, 1945, might be added to the trek. So too has the artillery come a long way since July 1942, and it is still advancing and will continue to do so for many years to come. We now think of guided missiles, integrated fire control and direction, radar location of targets and survey, and innumerable other effective technical and tactical developments. As we improved our organization, procedures, techniques, matériel, and equipment during World War II and through research and development since VJ-Day, so let us improve the one existing major deficiency in organization, namely, the lack of adequate and effective representation for the artillery on the respective levels of Theater, Army Field Forces, and the Department of the Army.

In conclusion, it is strongly recommended that representation for the artillery on the Department of the Army level be provided in the form of a Director of Artillery, charged with advising, assisting, and, in some instances, directing the solution of the many technical, tactical, organizational, and integrational problems for the supporting Field and Antiaircraft Artillery.

ABOUT OUR AUTHORS

Col. Edward Barber, USAF, assumed command of the 59th AAA Brigade in June of 1943, became a Brigadier General in the same year, and in that capacity commanded the brigade until its deactivation. Colonel Barber was commissioned a Second Lieutenant in the CAC in 1921, and in 1947 transferred to the Air Force. He is currently Deputy Commandant of the Air War College, Maxwell Air Force Base, Montgomery, Alabama.

H. J. Stewart is an Associate Professor at the Daniel Guggenheim Aeronautical Laboratory of the California Institute of Technology.

Lieut. Col. David B. Parker, GSC, is assigned to the Office of Deputy Director for Atomic Energy, Plans and Operations Division, General Staff, United States Army. Many readers will remember him for his "Death Takes a Sleeping City," published in the May-June 1947 issue of the JOURNAL, and reprinted in *Reader's Digest*.

Brig. Gen. H. L. Whittaker entered the Coast Artillery Corps in 1916, and transferred to the Quartermaster Corps in 1928. After a long military career, culminating in assignments as Commandant of the Quartermaster School; Commanding General, Fort Francis E. Warren, and Commanding General, Schenectady Depot, he was retired in November 1946. He recently established the Tropic Weave Importing Company, and is also active in the real estate business.

Maj. John B. B. Trussell, Jr., served during the war as the Flak Analysis Officer of the 67th Fighter Wing of the Eighth Air Force in the ETO. He is now a member of the Okayama Military Government Team in Japan.

Maj. Gen. John E. Dahlquist is Deputy Director, Personnel and Administration Division, General Staff, United States Army.

Lieut. Col. R. E. Moore, Inf., is an Instructor, Command and General Staff College, Fort Leavenworth, Kansas.

Lieut. Col. Lawrence W. Byers, CAC, is Director, Guided Missiles Department, AAA and Guided Missiles Branch, The Artillery School, Fort Bliss, Texas.

Lieut. Gen. Henry S. Aurand is Director of Logistics, General Staff, United States Army.

Brig. Gen. C. E. Hart is Director, AAA and Guided Missiles Branch, The Artillery School, Fort Bliss, Texas.

Preston R. Bassett is President, Sperry Gyroscope Company.

Lieut. Commander J. Burke Wilkinson, USNR, served as 12th Fleet Net Defense Officer on Admiral Stark's staff from 1943 to 1945. His first novel, *Proceed at Will*, was published in the spring of 1948.

Colonel Perry McC. Smith is Chief, Coast Artillery Branch, Career Management Group, Personnel and Administration Division, General Staff, United States Army.

Report On 120mm Equipment

The following is an extract from a letter received from an officer of the 532d AAA Gun Battalion (PS) in Okinawa, with a copy of the Journal's reply. Readers' comments on both are invited.

To the Editor:

Recently the entire battalion of 120mm antiaircraft artillery guns conducted antiaircraft firing on Okinawa at towed sleeve and radio controlled, P. Q., airplanes.

The Ordnance Department's analyses and testing board should be informed of the problems which were observed prior to and during this target practice, considering only the 120mm antiaircraft artillery gun battery.

All of the equipment discussed here within comes under the Ordnance Department for control, issue, and repair, and under the Antiaircraft Artillery for operation and minor maintenance.

One of the biggest problems to consider in the 120mm antiaircraft artillery gun battery is accurate determination of the muzzle velocity. The capabilities of this unit cannot be used to its maximum efficiency until this problem is thoroughly analyzed.

Some of the things to consider when analyzing the muzzle velocity problem are ballistics, electrical data, and ammunition.

a. Ballistics

External and internal ballistics must be considered.

(1) External ballistics characteristics such as all of the weather conditions that affect the projectile during flight which are now given as a meteorological message. Out of this, all except the wind and air density are applied to muzzle velocity. This method is believed to be very rough and certainly could be improved. The pressure and moisture of the atmosphere at different elevations should be studied.

(2) Internal ballistics characteristics which regulate the powder burning time inside the gun tube and regulate the expansion and contraction of the metal gun tube. It is believed that the powder of the propelling charge will burn much faster as the gun is heated up by previous rounds fired which will in turn affect the muzzle velocity. Also the possible expansion of the gun tube when heated up will affect the setting of the projectile as it moves through the bore and will in turn effect a change in the muzzle velocity by the change in friction between these two metals. This was first noted by the difference in recoil.

Recoil—As measured by grease on recoil slides, 5 rounds rapid fire measures 40″ to 35″ and with each successive recoil measuring approximately ¾″ less.

b. Electrical system

The change in amount of balanced potential used in computing data for range from the radar, and for fuze, muzzle velocity, and air density at the computer will affect the amount of muzzle velocity to be used. It should be noted that in certain situations a 2% change in air density will affect the muzzle velocity by 10 f/s.

Since a change can be applied to the muzzle velocity in steps of 20 f/s only, at certain times a change in air density will give closer adjustments. The power generators used with the equipment of 120mm battery will affect this electrical system and the muzzle velocity. It is therefore essential that the generator supply a constant regulated voltage at all times such as use on the M18 power generator (See page 338 TM 9-2300).

c. Ammunition

It is believed that after an analysis is made it can be stated that the gun, the weather, and the computer all have separate and distinct muzzle velocities or effect thereon. The last and least emphasized effect on the muzzle velocity is the ammunition lot number—Fuze, Projectile, and Powder Charge. Each round of ammunition fired will be affected differently by the above listed effects, however, each individual round has its own characteristics. In certain lots of ammunition, these characteristics vary a great deal more than in other lots which makes it difficult to deliver effective fire. Such lots of ammunition should be determined and eliminated. In making this study the lot number of the fuze, projectile and powder charge must be analyzed because all three will affect the individual round differently.

If one hundred rounds of each fuze lot number, projectile lot number, and powder change lot number were fired with chronographic equipment, the ammunition could be separated and more definite muzzle velocities determined for each lot number and/or combination of lot numbers. This would give using units some valuable information in determining an assumed muzzle velocity.

* * *

On the ammunition used with 120mm AA Gun.

Recommendation—That only one lot number for fuze, one lot number for the projectile, and one lot number for the powder charge be issued to a gun battery during the entire life of the gun tube. *If for any reason one of the lot numbers or the gun tube is changed, the chronographic equipment must be used to give the battery new information regarding the muzzle velocity.*

Reason—The range officer is in no way able to assure himself that his data and corrections are correct until after he has fired several trial shot problems with one lot number. When the ammunition is constantly changed, the range officer cannot accurately open fire on an enemy target within his limited time.

CHARLES O. MAY, JR.,
Major, CAC.

Dear Major May,

It is believed that trial fire is a fairly reliable method of obtaining muzzle velocity if—

1. Assumed firing data, determined from an assumed horizontal range and altitude, are placed on the guns and fuze, and the location of trial shot point is determined by computing data. A method developed in ETO by Captain E. P. Carter was outlined in the March-April, 1946, issue of the JOURNAL.

2. Fuzes are cut very accurately, preferably by hand.
3. Gun is laid accurately with gunner's quadrant. If the gun has a minus jump (as the 90mm has), the last motion of the gun should be one of elevation; the last motion of the bubble should be from rear to front. After gun has been laid on orienting point and azimuth set, gun should be moved off of orienting point and brought up to orienting point in direction of TSP. A small change in original setting may be required in order to have exact data on clock when gun is returned to orienting point for check. When laying gun in azimuth on TSP for each round come up to TSP from same direction as used in check on orienting point.
4. Meteorological data from a weather station equipped with a rawinsonde or radiosonde is available. The meteorological station should be in the vicinity of the battery; a fresh message should be available shortly before firing, and another shortly thereafter to ascertain any atmospheric changes that may have occurred during this period.

   From the statement in your report "pressure and moisture of the atmosphere at different elevations should be studied," it is assumed that no radiosonde data were available, since the radiosonde gives accurate pressure and relative humidity beyond the altitude of AA fire. The radiosonde as used during the war gave temperature, pressure and relative humidity; another balloon was used for direction and speed of the wind. The rawinsonde, however, requires only one balloon and gives all five elements of data.

Another method of determining muzzle velocity is registering on a ground target of known range using the bracketing (precision) method of adjustment with six trial shots. With the adjusted elevation and known range, the muzzle velocity may be computed from the firing table. This method entails an accurate survey which is difficult to obtain. Primarily because the orientation data for numerous O_1-O_2 baselines have proven erroneous, many officers prefer radar spotting for trial shots instead of observations from O_2. In order to make a comparison of muzzle velocities developed from various powder lots, a known range is not necessary. However, the warming-up effect from a series of problems fired in succession from one gun may cause a greater variation in muzzle velocities than the normal variation of the separate powder lots. It is believed that this bracketing method of adjustment is equal to adjustment by measured deviations, is much simpler, and may be employed while training in conduct of ground fire. The gun must be accurately laid with a gunner's quadrant and the meteorological message for terrestrial firing must be used.

Of course, the best method of determining muzzle velocity is chronographing. It is believed that one field chronograph should be authorized the Theater for each six gun battalions or fraction thereof. Allotting a chronograph to a group or brigade is not recommended because some brigades or groups will not have command of gun battalions.

The effect of moisture in the atmosphere has been a problem for many years, and as far as we know, the effects are not known. We concur with the remark that they should be determined. Captain Joseph A. Pechman, Weather Officer, IX Air Defense Command, ETO, in his article "Met Messages in ETO" in the May-June 1946 issue of the JOURNAL, stated—"The statement in TM 20-240 (page 34) regarding impact effect of water droplets on the motion of 90mm projectiles has caused some comment and discussion. Limited observation of bursts observed by radar during periods of fog and/or low cloud, indicate that these conditions may well be affecting the projectile. However, a flat two per cent correction seems far out of proportion. There is, furthermore, a question of procedure which remains unanswered: namely whether the two per cent correction should be made to the final ballistic densities or to the true zone densities before weighting. In view of the uncertainty about the exact amount of, and the method of making the correction, weather detachments were instructed to compute ballistic densities without regard to the impact effect. The problem is certainly important enough to warrant considerable research and experimentation."

The comments on warming-up effect are well taken. At Antwerp, by combining accurate ground firing with trial shot problems to determine muzzle velocities for a large number of powder lots, it was learned that the warming-up effect of a 90mm gun is considerable. This was learned by repeating the initial ground firings after a large number of rounds were expended from one gun using various powder lots and fuzes.

The recommendation that "only one lot number for fuze, one lot number for the projectile, and one lot number for the powder charge be issued to a gun battery during the entire life of the gun tube" is impracticable, if not impossible. Batteries at Antwerp during the war had as many as fifty different lot numbers of powder at one time. This should not have happened, but it did, and through no fault of the AA personnel. Our guess is that under the circumstances, it could not have been prevented.

With the same powder lot number, the developed muzzle velocity during the life of a tube will decrease by more than 100 f/s. For example, the life of tubes at Antwerp varied from about 1500 rounds to 2600 rounds, always with a loss in muzzle velocity of approximately 150 f/s. Because the loss of muzzle velocity for one powder lot is not uniform, some method will always be required for determining developed muzzle velocity. Reducing the number of powder lots issued to one battery to a minimum would be quite helpful.

A copy of your report has been forwarded to the Office of the Chief of Ordnance. I am sure that they will find it to be of great value, and that they will give it every consideration. We will send you any comments we receive from them.

We are deeply grateful for your having sent us this report. You are to be congratulated for the careful preparation that it evidences. It is exactly this type of discussion of professional problems of antiaircraft artillerymen that the JOURNAL is pledged to promote. We are sure that those who read your recommendations will also be grateful to you.

Sincerely,

The EDITOR.

Vote in the CA Election—Ballot Page 61.

Eighth Air Force Defensive Measures Against German Flak

The following is an extract from a study entitled AN EVALUATION OF DEFENSIVE MEASURES TAKEN TO PROTECT HEAVY BOMBERS FROM LOSS AND DAMAGE SINCE THE BEGINNING OF OPERATIONS IN THE EUROPEAN THEATER, made by the Operational Analysis Section, Eighth Air Force, at the request of Lieutenant General James H. Doolittle in November, 1944.

Headquarters, Eighth Air Force
European Theater
November, 1944

A few months ago, I asked our Operational Research Section to evaluate the defensive measures taken to protect our heavy bombers since the beginning of operations in this Theater, with emphasis on:

1. The major armament, equipment and design modifications to B-17 and B-24 aircraft;
2. The development of measures used against enemy fighters and flak.

The results, as contained in this report, constitute a practical summary of lessons we have learned from our defensive experience. The conclusions are considered sound for application in this Theater and in other theaters where similar problems are or will be faced.

/s/ James H. Doolittle
Lieutenant General, U.S.A.
Commanding

Defensive Measures Against Flak

1. Flak has always been a major hazard in this Theater. In 1943, ⅓ of the bombers lost, and ⅔ of the bombers damaged, were attributed to flak.
2. During the past year enemy flak defenses have been concentrated and our bombers have faced many more guns. The percentage of bombers lost to or damaged by enemy fighters has declined sharply while the percentage lost to flak has declined only moderately, and the percentage damaged by flak has remained almost constant. As a result, there has been a steady increase in the relative importance of flak until in June, July, and August 1944, flak accounted for about ⅔ of the 700 bombers lost and 98% of the 13,000 bombers damaged.
3. The toll taken by flak would undoubtedly have been much higher if we had not used the following defensive measures.
   (a) Maintaining high altitude;
   (b) Planning the mission to avoid flak defenses en route;
   (c) Selecting the course across the target which avoids the heaviest flak defenses;
   (d) Employing radio countermeasures;
   (e) Taking evasive action.
4. Additional defensive measures against flak appear to be essential to achieve any substantial reduction in flak risks. The following measures seem to offer the greatest possibilities at this time.
   (a) Reduce the size of the bombing unit on all operations when our escort can be relied upon to eliminate fighter opposition or reduce its effectiveness to minor proportions.

   When flak is aimed at our present bombing unit, each of the 12 A/C in it has about an equal chance of being hit, because the shells tend to scatter so widely around the aiming point. But if in the target area the bombing unit were spread out into elements or squadrons separated in trail respectively by about 1000 feet or 2500 feet, the risk that any one A/C will be hit by flak aimed at any of the scattered elements or squadrons is reduced about 50%. This is particularly important as 70% to 98% of all flak damage has occurred in the target area on recent operations. A secondary but important advantage of smaller bombing units is that their greater maneuverability permits evasive action which is virtually impossible with large formations. If we are to resort to smaller bombing units on a mission, we must concentrate sufficient escort in the target area to handle expected E/A opposition.

   (b) Shorten the interval between groups or squadrons crossing the target.

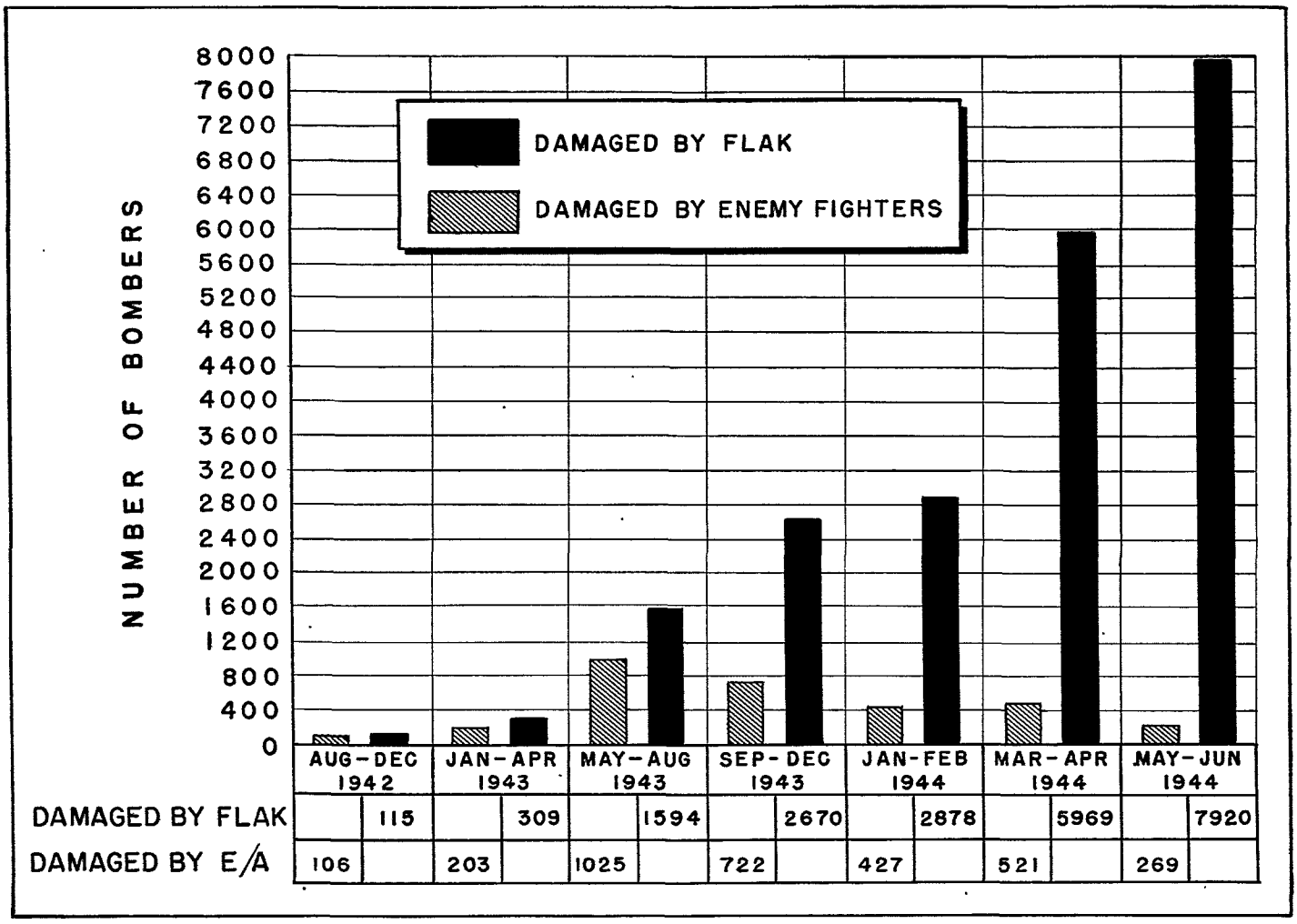
   This will saturate the enemy's flak defenses. For instance, if two groups or squadrons fly 2 miles instead of 8 miles apart in trail, they are together exposed to ⅔ as many shells and the trailing group or squadron is exposed to only ⅓ as many shells from every gun in range. Smaller intervals bring even greater reductions in the flak risk from continuously pointed fire.

   (c) Use radio countermeasures more effectively under "UNSEEN" conditions.

   Fly close enough to the source of our radio countermeasure protection and develop means of supplying leading as well as trailing bombing units with enough protection to jam the enemy's radar as effectively as possible.

Appraisal of Flak Defensive Tactics

FLAK, always a major cause of loss and damage, has steadily increased in relative importance to become the



The Number of Bombers Damaged by Flak Compared to the Bombers Damaged by Enemy Fighters During 7 Periods of Operation. (Damage to Heavy Bombers by Flak has followed almost the same trend as Bomber Exposure hours.)

greatest single combat hazard in present-day operations. For instance, in June, July and August 1944, data based on interrogation of returning crew members of lost bombers as well as from crew members who returned safely to base —indicate that many more bombers were lost to flak than to fighters. In the same period, flak damaged 12,687 of our bombers, and only 182 were damaged by fighters.

The rate of flak damage has remained fairly constant during the past fifteen months. No matter how many bombers attacked—the same approximate percentage returned with flak damage. For instance, 26.2% of the attacking bombers were hit by flak during the 6 months ending December 1943—24.9% was the rate for the first 6 months of 1944—23% was the rate for the 3 months ending September 1944. In numbers, the current rate is startling. From 3360 to 4453 bombers have returned with flak damage in each of the 6 months ending September 1944—a monthly average just about double the total number damaged by flak in the entire first year of operations. All of our efforts to reduce flak damage have apparently been offset by the fact that we have increasingly flown over targets defended by more and more guns. Further, enemy equipment, gunnery and ammunition have probably improved. The 60-gun target of a year ago is likely to be defended by 300 guns today. This makes it essential that we increase our efforts to decrease flak risks by re-examining the tactics we have been using and such new tactics as offer real possibilities.

The principal tactics to reduce flak risks are:

(1) Avoid flying over flak defenses en route to and from the target, and enter and leave the target area on courses which cross over the weakest flak defenses in the shortest possible time, *i.e.*, with allowances for the wind vector.

These tactics have been applied continuously throughout our operations and have unquestionably prevented a great deal of flak damage and loss. Constant efforts have been made to obtain accurate information as to the location of flak defenses, to plan the route in, the route over the target, and the route back to avoid flak, and to improve navigation so as to ensure that the planned routes are flown.

(2) Fly at the highest altitude consistent with other defensive and offensive considerations.

Our operations have been consistently planned for bombing at the highest altitudes consistent with other offensive and defensive considerations. While there has been some general lowering of the average altitude, primarily in the case of tactical targets, there has been no appreciable lowering of altitude against heavily defended targets.

(3) Plan the spacing and axes of attack of bombing units

to make the fullest use of the radio countermeasures WINDOW and CARPET.

Starting in October 1943, we first employed the radio countermeasure CARPET and in December 1943 we first employed the radio countermeasure WINDOW. The objective was to jam the enemy's radar so that under UNSEEN conditions he would be forced to use the much less efficient barrage fire and under SEEN conditions he would be forced to use optical range finders with a resultant decrease in the length of engagement and in his accuracy of tracking our formations and predicting their future positions.

The greatest effectiveness of radio countermeasures can be obtained only under the following conditions:

(a) *Enough CARPET or WINDOW is used to obscure the enemy's radar screen completely.* The amount required varies directly in proportion to the number of bombers flying together as a unit.

(b) *Our bombers fly close enough to the source of their protection.* A bombing unit receives no protection from the WINDOW it releases. Therefore, WINDOW protection of leading bombing units depends on releasing WINDOW ahead of the bomber force—perhaps by specially equipped bombers or fighter bombers. Successful execution of this tactic might effectively conceal the entire bombing force under UNSEEN conditions.

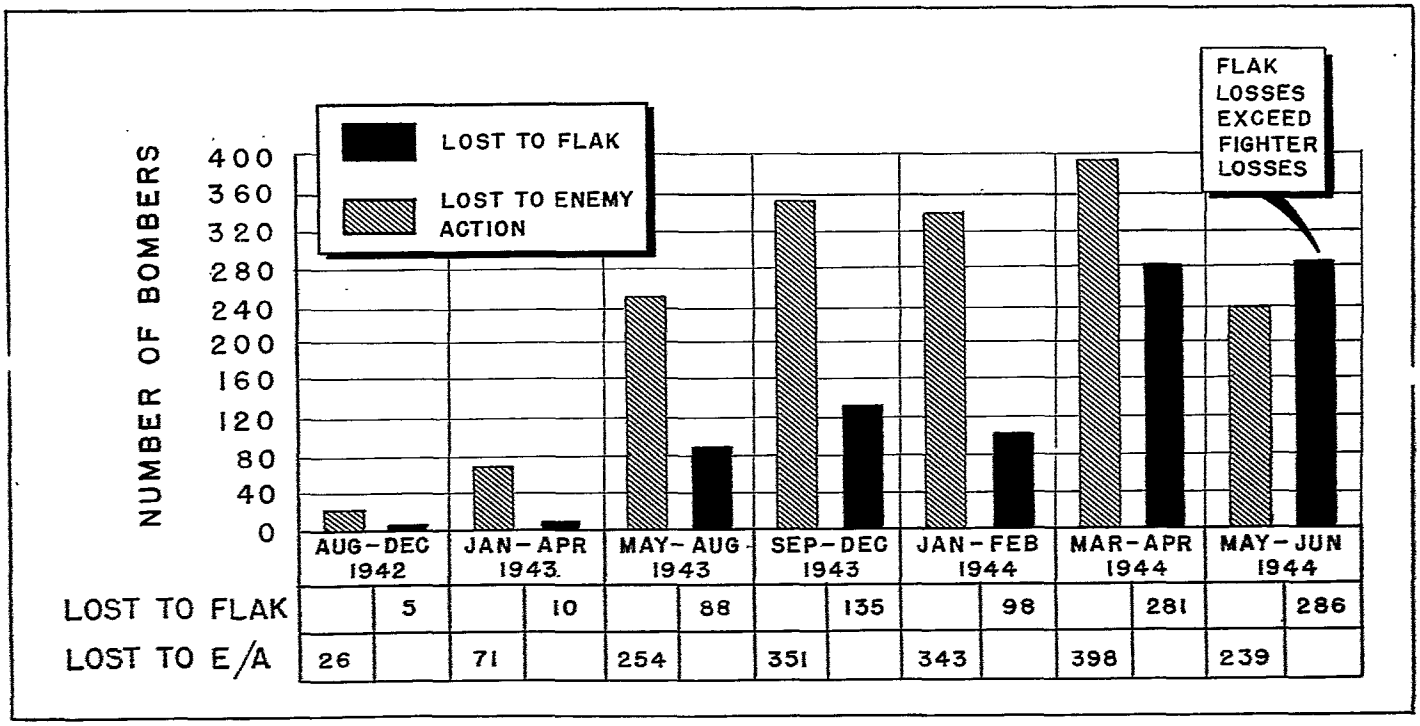
(c) *Enough radio countermeasure equipment is available to permit its proper use on all bombing operations.*

Unfortunately, until very recently we never had enough CARPET equipments. We often did not have or use enough CARPET or WINDOW to obscure the enemy's radar screen completely, and the way we flew our formations more frequently than not placed the trailing bombing units too far from the source of their protection. Even with these handicaps, there is sufficient evidence that our radio countermeasures often jammed the enemy's radar and that our flak losses and damage were reduced by their use.

(d) Minimize the number of bombers flying together as a bombing unit.

We first tried to bomb by elements of 3 aircraft, but the intensity of enemy fighter opposition quickly forced us to increase the size of the bombing unit to 6 then to 18 aircraft. This continued well into 1943, when first operations were conducted in this Theater with the B-24s in 12-aircraft formations—primarily to eliminate the trailing elements, introduce greater maneuverability, reduce flak risks, and present a solid wall of fire against nose and tail attacks. Early in 1944, Noball targets were sometimes attacked with bombing units of as few as 6 aircraft, but this was due to exceptional circumstances. In general, by the summer of 1944 we were still flying large 12-aircraft bombing units that were very vulnerable to flak by virtue of the size and compactness of the target offered to flak gunners.

If the separate elements of the formation spread out, it may be impractical to bomb on the leader and to permit accurate bombing—



The Number of Bombers Lost to Flak Compared to the Bombers Lost to Enemy Fighters During 7 Periods of Operations. (Stat Control records with unknowns prorated to known causes, based on eyewitness reports at scene of loss, which have been shown to overstate losses due to enemy fighters.)

each element leader may have to sight for both range and deflection. To reduce the number of bombardiers and radio blind bombing equipments required, we could bomb by squadrons of 6 aircraft instead of by elements—separating the squadrons by 2500 feet in trail—and obtain almost as much flak risk reduction as when flying six elements each separated by 1000 feet.

Whenever the elements of a formation spread out in trail and a crosswind is present on the bomb run, care must be taken to fly along the same track as preceding elements rather than directly behind relative to the air stream in order to avoid gross bombing errors when sighting for range only.

In summary, we have employed large-size bombing units which are particularly vulnerable to flak and by their size limit the possibilities of effective evasive action. We can cut our flak risk from continuously pointed or predicted concentration fire at least in half if we separate the elements of our bombing unit by about 1000 feet in trail just prior to crossing the gun-defended target area and bomb by elements or squadrons. This will not be a net gain until we can bomb with sufficient accuracy by these smaller units and we can afford to counteract through escort cover the poorer formation defense against enemy fighters.

5. Increase the spread of the entire formation in altitude and breadth to reduce the risk from barrage fire.

Our primary danger is from continuously pointed or predicted concentration firing methods and we can seldom predict when the enemy may use or be forced to use the less efficient barrage fire. This makes it impractical to plan a maneuver or a formation to reduce the risk from barrage fire. However, we can appraise our formation or proposed formations from the standpoint of their vulnerability to barrage fire—when, if and as used.

Barrage risks decrease as we increase the vertical or lateral dimension of the entire formation. If the enemy increases the dimensions of his barrage box in proportion to the increased vertical or lateral dimensions of our entire formation his density of fire in the area through which our bombers must fly is decreased and each bomber is thereby subject to a smaller risk. If the enemy does not increase the dimensions of his barrage box while we increase the vertical or lateral dimensions of the entire formation, the bombers outside of his barrage box get a risk-free ride.

6. Close up in trail to reduce the time between attacks of successive bombing units and thus saturate the enemy's continuously pointed or predicted concentration flak fire.

Flak guns employing continuously pointed or predicted concentration firing methods have definite limitations to their rate and continuity of fire. They get hot and have to cool off—they must allow at least 30 seconds for retracking whenever they cease firing at one bombing unit and plan to fire at a succeeding bombing unit.

If we fly successive targets of bombing units in trail three or more minutes behind each other we create an ideal situation for the flak gun. Each gun then can fire a maximum number of rounds at the first target, retrack and fire a maximum number of rounds at succeeding targets.

The more bombers we can get within a given interval the greater the reduction in flak risk per bombing unit. For instance, when our bombers fly at 20,000 feet and at 260 MPH ground speed on a course tangent to the dead zone of 88mm. flak guns firing 1 shell every 4 seconds—

(a) 2 wings flying 11 miles apart instead of 4 miles apart are exposed to around twice as many shells—and the trailing wing is exposed to about 3 times as many shells per gun.

(b) 3 bombing units flying 2 miles apart instead of 1 mile apart in trail are exposed to about 18% more shells —and the trailing units are exposed to around 60% more shells per gun.

Whenever we can bomb with two or more bombing units abreast we will achieve a substantial reduction in the trail length of our formations. Unfortunately, most of our targets do not lend themselves to bombing with units abreast and the only way we can effectively saturate the enemy's flak defenses is to close up in trail. To do this, we must develop maneuvers which can be flown with confidence that we will not be upset by prop wash, that we will not incur the risk of collisions or fear of collisions, that we will not be in danger of bombing one another or in fear of it. This may be done by using additional altitudes or axes of attack or both with careful planning and training and execution of the flak defensive maneuvers involved.

While such saturation flak defensive attacks have not been used in this Theater except on an experimental basis to date, there is every reason to believe that they can be developed and flown without any serious offensive or defensive disadvantages and effectively cheat the flak guns out of more than half of their shells. Properly flown, such formations would also obtain maximum protection from radio countermeasures, reduce the number of bombing units subject to smoke obscuration of the target, avoid prop wash and collision dangers, and actually reduce the hazard from enemy fighters in the target area by reducing the area to be guarded by our fighter escort and attaining mutual position support between the individual bombing units.

7. Plan evasive action when flying over known antiaircraft positions (except on the bomb run) to make it difficult or impossible for the enemy to get accurate data for continuously pointed or predicted concentration firing tactics.

Evasive action offers large possibilities in reducing flak risks. Its object is to prevent the enemy from calculating the future position of our bombers. The possibilities of taking effective evasive action in this Theater, however, have been limited by the size and lack of maneuverability of the formations flown. Evasive action by groups or wings must be planned so as to maintain the desired fighter defensive character of the formation, permit achievement of the briefed bombing altitudes and headings and be coordinated to enable assembly at the rallying point without loss of time.

Generally, our plans for evasive action by groups have included:

(1) Flying groups at different altitudes.

(2) Starting bombing run at altitude different from that used in crossing coast defenses.

(3) Change of altitude by at least 1000 feet (preferably diving) between the I.P. and the bomb run. (When the selected I.P. is too close to the target, such altitude change is made prior to the I.P.)
(4) Loss of altitude after "bombs away" and on withdrawal.
(5) Making turn on to bomb run and after "bombs away" as sharp as is consistent with other objectives.
(6) Minimizing the length of the bomb run.
(7) Groups attacking at approximately the same time on different headings limited to 45° between outside groups.
(8) Making irregular changes in course of at least 20° every 20 to 40 seconds, except on the bomb run.
(9) When possible, feinting toward another target.
(10) Avoid making a bomb run into a strong head wind.
(11) Special training of pilots, bombardiers and navigators in planning and executing evasive action techniques. Maximum benefits can *only* be attained with small maneuverable bombing units carrying out evasive action techniques that have been carefully planned to meet the conditions on particular operations.

Experience with collision courses, fear of collision, fear of bombing one another, and navigational problems resulted in a wide variation in the time interval between bombing of successive groups.

The following are extracts from another report prepared by the Eighth Air Force and the Army Air Forces Evaluation Board, also at the request of General Doolittle.

Bombing

Flak was an omnipresent hazard. In the Ruhr, for example, the huge concentration of antiaircraft guns made visual bombing very costly. For that reason, a few valuable precision targets which might have been hit there visually were seldom bombed. Furthermore, the Royal Air Force hammered the Ruhr at night with great bomb tonnages, destroying areas which the Eighth could not attack until overcast techniques became more reliable.

The accuracy of enemy antiaircraft fire normally required our formations to bomb from heights around 25,000 feet despite the fact that bombing accuracy decreased in direct proportion to altitude. Early experiments with bombing from 7,500 and 8,000 feet resulted in such heavy flak losses that, as a rule, the Eighth Air Force never thereafter bombed heavily defended targets from low altitude.

Certain Factors Affecting Targets

Flak

The Importance of Flak: Flak was a major and ever-present problem throughout the war in Europe. The number of Eighth Air Force bombers *damaged* by flak always exceeded those damaged by enemy aircraft. However, flak damage usually was repairable in a short time. After May 1944 bombers *lost* to flak exceeded those lost to enemy aircraft, but this represented no great increase in the effectiveness of flak. It was due rather to the negative reason that the enemy fighter force was losing its effectiveness.

The number of bombers damaged *and* lost to flak rose steadily from August 1942 until October 1944, due to greater numerical exposure which occurred when increasing numbers of bombers were sent out against heavily defended targets. After October 1944, the damaged *and* lost total fell off. This trend came about mainly because skilled enemy antiaircraft artillerymen were not available in sufficient numbers to meet the enemy's increasing requirements and later because of shortages of antiaircraft ammunition and consequent restrictions on firing.

Other influences included improvement in the quality and quantity of flak intelligence; the use of anti-flak tactics such as tactical bombing of gun positions and firing of Allied field artillery on front-line enemy flak batteries, and countermeasures against enemy range-finding devices.

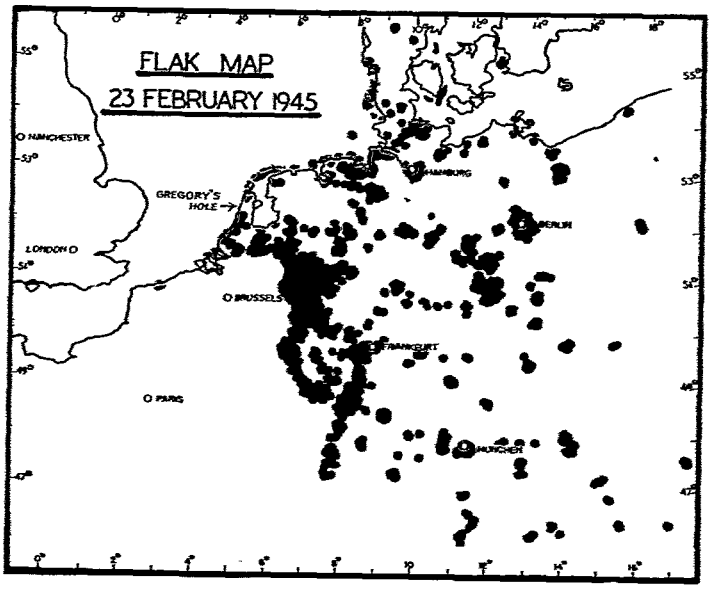
The *percentage* of Eighth Air Force bombers which were hit by flak reached a level of about 25 per cent of the attacking force by November 1942, fluctuating above and below an average of 25 per cent until October 1944. Thereafter, the percentage of bombers hit by flak decreased rapidly, for the same causes given above.

Data now available show that one Eighth Air Force bomber was lost to flak for every ten damaged during the period August 1942-June 1943; during July 1943-October 1944, one was lost for every 13 damaged; by the end of 1944 one was lost for every 16 damaged; and by the end of February 1945, one was lost for every 22 damaged.

German Antiaircraft Artillery Dispositions: The location of enemy flak guns in the areas of bombing attacks by the Eighth Air Force was well known throughout the war. Rarely did a heavier disposition of antiaircraft guns turn up than was estimated beforehand. Flak intelligence was of a high order, due to constant use of photographic reconnaissance to locate the enemy guns.

Shifts and increases in enemy antiaircraft gun dispositions tended to follow variations in target priorities. As Eighth Air Force bombers penetrated deeper into enemy territory and attacked targets in a new category, antiaircraft defenses built up rapidly around similar targets located within the Eighth's demonstrated range capability.

The magnitude of enemy flak defense is indicated by the fact that frequently during 1943 the Eighth attacked targets defended by more than *100 heavy guns.* In 1944, with



equal or greater frequency, targets defended by more than *200 heavy guns* were attacked. Around such targets as the Leuna Oil Refinery at Merseburg approximately 450 heavy guns were disposed. In greater Berlin, there were at least 450 heavy guns. In the great Ruhr area, the weight of enemy antiaircraft artillery was enormous.

German Antiaircraft Guns and Range-Finding Devices: The standard gun used by the German antiaircraft batteries through 1940 was the low velocity 88mm. In 1941 three new guns were in production: the high velocity 88mm., 105mm. and the 128mm. Although the 105mm. was produced in reasonably large quantities, its output finally was discontinued in favor of the other two models because of technical difficulties with the gun.

At the end of the war over 50 per cent of antiaircraft guns in use by the Germans at that time still were old low velocity 88mm. models. The low velocity 88mm. had a maximum effective range of 26,000 feet while the high velocity 88mm. had a maximum effective range of between 32,000 and 35,000 feet.

Early in the war the Germans relied entirely on visual sighting, but by 1940 they had developed satisfactory radar for the finding of unseen aircraft through cloud and darkness. By this time they also were using a good mechanical predictor with either visual or radar finding.

Accuracy of visual sighting methods was greater than it was for unseen fire. As long as antiaircraft guns could sight on an individually tracked unit, effectiveness was high. As soon as barrage fire on predicted concentration was resorted to lethal effect became far less.

Flak defenses around targets under constant strategic bombing attack were static. That is to say, they were not equipped with mounts for moving the guns to other targets. These guns could be, and quite often were moved, however, but they had no high inherent mobility, since it was necessary to employ railroad cars or very heavy trucks.

The Large Battery Site: The chief technical development of the war in enemy flak defenses was the large battery site. Some sites had as many as 36 guns, all operating under one tactical control. The Germans claimed certain advantages for these large batteries, but their employment was due, at least in part, to the lack of an adequate supply of gun sighting devices. Another cause was the increasing shortage of highly trained technical personnel as the war progressed.

Variation of Risk from Flak with Altitude of the Bomber: The Eighth learned early in the war that low-level bombing presented a far too dangerous flak risk to be continued. Early attacks at 7,500 and 8,000 feet over St. Nazaire resulted in 100 per cent battle damage to the bomber force.

Target Systems: The Eighth Air Force operated under a rigid system of target priorities. This resulted in many attacks on targets where a risk of flak loss and damage was high because the enemy had grasped our target intentions.

Isolated high priority targets, such as Synthetic Oil Plants, generally were most dangerous from the flak point of view. Such targets were very heavily defended with flak batteries. Although the risk of loss and damage was great, these targets had to be attacked even when the conditions of visibility were such that the expectancy of successful bombing was not great.

The concentration of guns around such targets was responsible for mounting bomber losses and flak damage in 1944.

Large city areas containing important manufacturing and communication targets had strong and relatively stable defenses. There was little change in the number and disposition of guns in such locations.

V-weapon installations often were defended by small numbers of highly mobile guns, the positions of which shifted frequently. The situation was further aggravated by the low altitude of attack required for visual sightings and by the overlapping of the flak defenses of these areas.

During periods when the battle line became stabilized, flak defenses adjacent to the line were subject to frequent change. Heavily built up defenses usually were found at communication centers. This situation complicated the selection of routes over battle lines and made great accuracy necessary in selecting headings for the bomb runs on communication targets.

Isolated low priority targets such as airfields in France and Belgium generally were lightly defended. However, the flak defenses underwent periodic changes as importance to the enemy of an airfield increased or decreased. This type of target was dangerous only if attacked from too low.

Route Planning: Most enemy targets had to be attacked frequently to insure that the damaged status was maintained. Such attacks had to be carried out in spite of heavy concentrations of flak. The risk, however, could be modified to varying degrees by selection of routes for bombing and withdrawal allowing minimum exposure to antiaircraft fire. Flak intelligence, therefore, was a major factor in route planning. But, as indicated elsewhere in this report, flak was only one of many factors to be considered. The final route usually was a compromise between the safest flak route and one dictated by other operational factors.

Defensive Measures against Heavy Flak: Bombers can best evade antiaircraft fire by flying at high altitude and by taking evasive action. But both of these practices are enemies of bombing accuracy. This situation demanded a compromise. In actual practice, formations generally flew at high altitudes but took no evasive action on the bombing run although intensity of fire there would be severe.

Other measures taken to reduce flak exposure were:

a. Formations were reduced in size and spaced closer together in trail. This reduced the size of the antiaircraft gunners' target and tended to saturate flak defenses.
b. The quality and quantity of flak intelligence was improved.
c. Constant pressure was exerted to improve navigation and the flying of true courses so that cross winds would not sweep trailing formations over flak defenses en route. Accuracy in navigation also tended to keep aircraft in channels of least flak exposure.
d. Aircraft and crews received more and better armor.
e. Radio countermeasures and the dropping of "Window" were employed to jam enemy gun radars.

Conclusions: Although the enemy experimented with centimeter wave-length radars, proximity fuzes, and radio-guided missiles and many other things, data now available indicate that the most important source of heavy flak loss and damage was the conventional antiaircraft gun, controlled and fired by conventional methods.

Antiaircraft Artillery Has An Assured Place In America's Forces*

By Preston R. Bassett

"The key to a perfect antiaircraft weapon system is the elimination of the one unpredictable element—the human factor."

Radar came into the antiaircraft picture in the following important sequence of steps. First came the long-range warning, which eliminated the sound locator, followed by radar ranging, which used very accurate echo timing of radar pulses.

In quick succession there followed radar tracking, which made possible tracking through overcast; tracking at night, thus eliminating the searchlight; and, finally, tracking which supplanted optical means. This gave great impetus to the effectiveness of antiaircraft fire.

Simultaneously with the radar revolution another fundamental change was taking place. This was caused by the rapid strides made in the development of servomechanisms and power controls.

It was not until electronics, the introduction of rates, and lightweight but powerful hydraulic motors were available that a satisfactory gun control could displace the human operator. This revolution came during the war years and at the close of the war all our larger antiaircraft guns had automatic power control.

Now, let us add to all this one more revolutionary device developed entirely during the war—the proximity fuze. Fuze-data transmission, the fuze setter and its operator, the uncertainties caused by dead time of setting the fuze, all dropped out of the picture at once.

Statistics are in many cases somewhat meaningless and very difficult to analyze. Nevertheless, some figures are interesting.

When a battery was well equipped and the personnel well trained some remarkable performances were turned in. Perhaps a record was set by the Marine battery in the Pacific which shot down, in one day, 14 Japanese bombers flying at altitudes of 20,000 feet or higher with the expenditure of only 44 rounds of ammunition.

Or take another case quoted by Lieut. Gen. L. H. Campbell, Jr., where an Army battery in one month had the record of bringing down 16 aircraft with the expenditure of only 50 to 60 rounds per aircraft at altitudes running as high as 27,000 feet.

To quote another outstanding achievement, in certain sectors antiaircraft fire brought down 93 per cent of the buzz-bombs before they reached their destination. [EDITOR'S NOTE: At Antwerp this figure was over 97 per cent.]

But, all of these cases are exceptions—the conditions were ideal, the crews exceptionally well trained. If, on the other hand, we take an over-all average, I suspect it would be found to be still several thousand rounds per airplane. No one has yet found any basis for quoting a definite figure.

The fact remains, however, that the wartime antiaircraft systems were still made up of independently developed components, each one designed to carry out its own function as well as possible and only secondarily to work with the other units of the system.

Very frequently the matching of the units so that the output of one was acceptable as the input of the next one had to be worked out under the stress of actual field experience. For example, the output of any piece of apparatus will have a certain unevenness or a certain type and frequency of perturbations. It may well be that the apparatus that this is fed into has a critical period at about this frequency of perturbation, or it may have been designed to smooth perturbations of quite a different frequency.

It was, therefore, apparent to all the experts in the field that, in spite of the remarkable improvements made in wartime antiaircraft, there was room for much more efficiency by properly integrating the components of the system or by putting the responsibility for a system design into the hands of a single group of engineers instead of several groups each responsible for a component.

There are many other instances where an integrated design of a system can greatly improve performance and accuracy, but we must not overlook another advantage of the integrated system.

The time factor has now become so small for all the operations involved that the human link, which appears to be the only unchangeable factor in the whole problem and which is a very erratic one, has become more and more the weakest link in the chain of operations until it is quite apparent that it must be dropped out of the sequence.

THE HUMAN FACTOR

The following statistics of the number of men that were inserted in the whole series of operations give some idea of the progress in this direction. In World War I there were about 20 men inserted in the sequence of functions from search to firing. By 1935, with components well developed, there were still 18 men in the chain at night and 12 men by day. At the beginning of the war, there were still ten men,

*An extract from an address delivered to the Ordnance Technology Round Table at the Thirtieth Annual Meeting of the Army Ordnance Association.

but during the war years with radar and gun control the number fell rapidly to three or four. All that can be said now is that those few remaining must also go.

In the prewar years, such success as was achieved was possible because the targets to be engaged by earlier weapons had speeds that were relatively slow compared with the time-determining factors in the components of the system. For example, shell velocity far exceeded airplane velocity when airplanes flew at speeds less than 200 miles an hour. The ratio was over seven to one.

Alerting times for a battery involving many minutes were acceptable under the same circumstances. The time required to acquire the target and carry out tracking operations similarly was such as to present no great difficulties.

With the advent of targets of significantly increased speeds, many factors which were heretofore of little consequence assume importance and must be taken into account.

The ratio of projectile to target speed has already fallen to 2½ to 1. The maximum reliable operational range of early-warning radar against enemy targets determines the permissible overall time available to an antiaircraft battery. With the greatly increased speed of approaching targets, not much time is allowed.

It becomes necessary, therefore, to shorten drastically the time consumed in carrying out the various operations within the entire system in order to fire with a high probability of bringing down the enemy target. Thus procedures involving voice communications are out of the picture.

In fact, it becomes necessary to devise a new and improved means for target acquisition, and in so doing almost all parts of the system may be affected. In such an analysis, one fact pointedly revealed is that antiaircraft systems must be designed for specific antiaircraft roles. That is to say, fire-control systems must be designed around the caliber, range, and lethality of the armament which it is to control. Though the basic objective is the same in many respects for a long-range antiaircraft fire-control system and short-range weapon, the similarity ends there.

Time of the Essence

In any antiaircraft system, the question of time must now be analyzed to see how it affects all parts of the operating sequence. A detailed analysis must be made of all sequences from the standpoint of early warning, target acquisition, settling time, down through the actual firing time available. It must also be borne in mind during these time studies that for all practical purposes target speed is increased to the point where the probability of successful engagement is limited only to the incoming leg.

In the development study we cannot dismiss the fact that there comes a point where the airplane breaks away from its orthodox pattern and suddenly comes in at very low altitudes and very high speeds, counting on the element of surprise and almost eliminating the use of antiaircraft weapons by reducing the possible time of engagement to less than the normal time of slewing the gun onto the target.

There has even been a feeling of futility that this job is too difficult to be solved adequately. Here I think we can sound a very encouraging note. With the elimination of the human links and with the use of all the new electronic tricks for very rapid signals, solutions, and response to signals, the low-altitude antiaircraft artillery will make even more surprising strides than the high-altitude. It will, of course, take new types of radar and a completely new set of numbers for such things as slewing rates, acquisition time, and similar factors.

Solution in Sight

Now, with the possibilities of eliminating human operators and utilizing high-speed acquisition, tracking, and computing techniques, it at last appears possible to solve the short- and medium-range antiaircraft systems.

I must conclude this rather rapid survey of antiaircraft with the opinion that its future is assured. It has made remarkable progress through the two phases of (1) component development and (2) the radar revolution. It promises further immediate improvement in this present third phase of integration of components.

Although less spectacular and receiving vastly less appropriations at the present time than the activity surrounding guided missiles, effective antiaircraft artillery can be made available immediately and can be applied to a large number of important new tactical situations. It is difficult to foresee the time when such equipment will be superseded by guided missiles. For a long period yet to come the two types of weapons will supplement each other.

No investment by the American Government has returned such tremendous dividends as the amount of money spent on the Army school system during the years between the two world wars.—General of the Army Dwight D. Eisenhower.

The Big Bear Wets His Paws*

Some Remarks on the Russian Navy Based on the Secret Hitler-Molotov Documents and Other Firsthand Evidence

By Lieutenant Commander J. Burke Wilkinson, U.S.N.R. (Inactive)

One day back in early 1944 an aging U. S. cruiser was submarine hunting in the South Atlantic. A friendly plane circled her, plumped into the drink near by. Two couriers came aboard the cruiser. In the secrecy of the captain's cabin he received his orders. Their gist was: *you will deliver your ship to J. Stalin at Murmansk.* It was signed with the august name of the commander in chief, Franklin D. Roosevelt.

The captain pointed his ship north, ran the difficult Murmansk run, and reached the battered Arctic port in safety. He picked up a Russian shakedown crew, and he shook them down for two weeks at sea. Then he turned over his ship and hightailed it for home. Thus the *Milwaukee* became the *Murmansk.*

The British, too, loaned the Russians a capital ship. Also delivered to Murmansk, the *Royal Sovereign* was rechristened the *Archangelsk.* Reliable sources there reported that she had been shackled to her dock by her own anchor chains. A detachment of soldiers, the report further stated, were doing guard duty on her historic decks. Wood fires were spotted, and samovars with coffee for the soldiers on sentry-go. The Royal Navy shuddered at the blasphemy.

But all that was nearly four years ago. Back in July of 1945 Stalin himself, in an Order of the Day, served notice that we could expect bigger and better things of the Red Navy:

> "The Soviet people (he said) wish to see their fleet grow still stronger and more powerful. Our people are constructing new battleships and bases for the fleet. . . ."

But can the big red Bear, the land-roaming, land-gorging mammal, really put to sea? What kind of Navy are they capable of developing? Have they the know-how to build and man a modern fleet?

First of all, there is the testimony of tradition. Behind the Russian ships and men of today stands a strong heritage. Their special aptitudes and limitations have been moulded by certain influences that began over 200 years ago and which continue to dominate Russian naval strategy despite the changes the Bolshevik Revolution has wrought.

In a sentence, their tradition is one of a navy of coastal waters and narrow seas.

The bursting energy of Peter the Great gave the Navy its start—in the innermost corner of the Baltic, the Gulf of Finland. In a narrow, completely landlocked strip of sea studded with islands and skerries, the Russian Navy took its first steps. In this same Gulf its history has been concentrated right down through the Finnish War of 1939-1940 and the struggle against Hitler that followed.

For this narrow sheet of water has continued to condition the Russian Navy's outlook long after it had spread its sails to other distant seas: to the Arctic and the Black Sea, to the coastal waters of the Far East, the Yellow Sea and the Seas of Japan and Okhotsk. Unlike ours and Britain's, Russian naval history boasts few great battles on the high seas or for the command of broad ocean highways. Its exploits have mostly centered on the support of coastal fortresses and naval bases, with the fleet acting as a mobile wing to a static defense.

So it was that the naval forces served before Sevastopol in the Crimean War, before Port Arthur in the Russo-Japanese War of 1904-1905, in the Baltic islands during World War I, and around Murmansk, Leningrad, Odessa and once again Sevastopol in the recent war.

The humiliation suffered by the barnacled and bewildered old Imperial Fleet at the hands of the Japanese at Tsushima Straits in 1905 showed what could happen when the shore-nudging ships of the Czar put to sea. As every student of naval history knows, they were disastrously outgunned by a smaller but highly efficient Japanese squadron.

So, up to very recently, the battleship, classic weapon of high seas warfare, has never figured prominently in Russian naval thinking. Those which the Russians have operated have generally been of foreign design and construction. During the brief honeymoon between the Nazi and the German regimes from 1939-1941 there were symptoms of increasing Russian interest in capital ships. The secret documents of the two governments which the State Department has now made public shed some sharp sidelights on naval affairs. They reveal, for example, that during this period Russia asked her German partner for a good deal of battleship material—plans of the *Bismarck* and *Tirpitz,* heavy gun turrets, firing directors, and the like. But this interest was still largely a matter of prestige, as time was soon to prove. For, when the partners fell out, the Red Navy capital ships in the Baltic and the Black Sea, some six or seven in all, proved almost completely useless although *unopposed by any heavy German ships.*

But battleships are only a small part of the picture. The Russian Navy has always done a good job in its traditional tasks of defending coastal waters. Back in the Crimean War it made the first effective use of a newly discovered weapon called the mine. Since that time mine warfare has been one of its special skills. During the siege of Port Arthur the Japanese lost one-third of their battleships to Russian mines, and in World War I the Imperial mine defenses in the Gulf of Riga were a most serious hazard to the Germans. Not until World War II did the Germans take up mine warfare with such vengeance as to succeed in outpointing

*Reprinted from the *United States Naval Institute Proceedings* by permission.

the Russians in this very deadly little game of bowls.

Russian skill and interest in submarines is nothing new, although the scare headlines feature it today. They started experimenting with small submarines early in this century. From 1914-1917 their underwater squadrons in the Baltic bled the Germans sorely. Between wars they built large U-Boat fleets in the Gulf of Finland and the Far East. They have claimed some successes against the Germans in the Baltic in the last war—a claim which has not yet been verified. It is a matter of record that the Japanese feared the Russian submarines based at Vladivostok more than they did their Far Eastern bombers.

The Russian Navy has never been the senior service as in Britain, or of equal rank with the Army, as in the United States. It has always remained in the second rank, an appendix to the Army and subordinate to it. The old Russian capital ships carried the merger with the army to unusual lengths, for their guns in some instances were of army calibers ill-suited to naval purposes. This enabled them to draw shells from army arsenals—a perfect example of being kopekwise, rouble-foolish, for it resulted in grave undergunning of the ships.

Throughout the interwar period Russian policy was out to *close these watergates.* When the Russians felt strong enough, they reannexed and overran the Murmansk area and the Far Eastern Maritime Provinces. Not daring openly to annex the small Baltic states created at Versailles, they used neutrality-and-friendship pacts to gain control.

And they backed Turkey diplomatically against the other powers, at the same time keeping a weather eye on that narrowest sluice-gate of all, the Dardanelles, outlet to the Mediterranean, to warm water and new fields to conquer.

The naval forces in all four of the coastal seas were given special attention. Submarine building was stepped up and extended to the base at Vladivostok. The Leningrad Class destroyers came into being with French help—fast, heavy torpedo craft able to do double duty as minelayers. Motor torpedo boats, their powerful engines throttled down, began to appear on the great rivers in some force. Minelayers and minesweepers practiced their endless, intricate drills in the narrow seas.

We now know, from the Hitler-Molotov documents, that Russia's ambitious plans for controlling and protecting her narrow seas received a mighty impulse in 1939. Courted by both contestants—the Western Allies and the Nazis—the Soviet leaders were able to exact the maximum price for their favors. When the British and French military delegates arrived in Moscow in early August of 1939 they found themselves confronted with a point-blank demand for a free hand in the Baltic Republics. This they could not accept without tossing Finland and that hapless trio—Latvia, Lithuania, Estonia—to the mercies of the Soviet. They refused to do so.

When the late Joachim Ribbentrop in his turn flew to Moscow as the German suitor for the hand of Russia, he was immediately asked whether Germany recognized that the small Baltic states fell under the Russian sphere of influence. Like the good lackey he was, Ribbentrop suggested ringing up his master at Berchtesgaden and asking for a quick decision. The connection made and the question posed, Hitler pondered his wall map for a minute or two —and said yes. Negotiations then proceeded merrily and were completed in a single session. Late that same night the open treaty and its secret supplement were signed. The supplement, now made public, shows clearly what a hard bargain the Russians were able to drive. They secured recognition of their control over Finland—the land bridge between the Baltic and the Arctic—and of the small states on the western shore of the Baltic, plus the larger part of Poland. Also the Russians obtained virtual control of enough of the Balkans to give them a springboard for dominating Turkey and the Straits.

The Soviet leaders wasted no time cashing in their chips. The small Baltic countries adjacent to Russia found themselves confronted with demands which amounted to complete surrender—for example, the turning over of key naval bases such as Finland's Hango to the Red forces. What happened is history: the three smallest countries gave in perforce. Finland fought stoutly but by the following spring had to concede defeat. Along with Hango, the Rybachi Peninsula and key Arctic areas passed into Russian hands.

The uneasy honeymoon was over within a year's time. In the autmun of 1940 Molotov arrived in Berlin to patch up the increasingly strained relationship. But his conciliation took the form of even more peremptory demands which he presented in person to Hitler. Not only did the Russians want to dominate the whole Baltic area but pressed their claims to the Danish straits into the North Sea! To the South their classic urge toward the Mediterranean went even further. They demanded nothing short of "real guarantees" that would have clinched their hold over the Straits and placed Turkey completely at their mercy. Bulgaria was to become a Russian protectorate, a halfway house to the long-sought Straits. The Russians also wanted some islands in the Aegean to give them a flanking position from which to exert leverage on the Dardanelles, and to protect them once they were possessed.

Hitler was aghast. From that day forward his fixed purpose was the destruction of Russia. He ordered his staff to prepare a timetable of invasion.

Just as Russia herself did, his staff recognized the vital importance of the Russian coastal seas. German plans hinged around the elimination of the Red Fleets from them, especially from the Baltic. Then seaborne supplies would enable Hitler's left wing to surge on ahead of the rest of his armies, join hands with the Finns across the ruins of Leningrad. With a firm pivot established in the north, the great swing down to Moscow would be set in motion.

The plan met with success at the start. On the night of the 21st of June, 1940, two groups of German minelayers camouflaged as merchantmen penetrated the Russian patrol lines across the Finnish Gulf and, as the long day of the summer solstice neared its close, started to lay a powerful mine barrage in the rear of the Russians. Six weeks later the German minelayers, operating from Finnish ports, laid down a second and even stronger barrier off Cape Juminda, fifty miles in the rear of the important Russian naval base at Reval. Several cruisers, some 20 destroyers and numerous torpedo boats composing the Russian task force stationed there were trapped. Three weeks later the swarming German armies forced the evacuation of Reval. The Russian ships tried to make a break through the mine fields.

Severely damaged, the cruiser *Kirov* did manage to limp into Kronstadt but the remainder of the fleet were blasted by mines or so severely damaged that the Luftwaffe was able to make short work of them.

But the final clue to the inefficacy of Russian naval power in World War II came in the closing months. In their victorious sweep the Russian armies had succeeded in surrounding and completely cutting off the fortress of Koenigsberg, the capital of East Prussia. That was in January of 1945. Yet German naval forces, operating without hindrance in the Baltic, used their massed gunfire to blast the Russians away from the coast, enabling the beleaguered city to hold out for another two months while key troops were evacuated by sea. Official Russian accounts of this campaign pass over this episode in silence, while the sporadic successes of Russian submarines against German Baltic convoys receive full play.

It is not easy to assess the Russian Navy's wobbly record in the war in precise terms of sinking and damaging of enemy ships. Paul Martin, writing in the June, 1947, *Proceedings,* credits it with exactly five medium-sized German torpedo boats, two heavy German destroyers of the Z class and one of the T class. All of these were sunk by mines, not surface action. To direct attack by Soviet forces, Martin reckons the Germans lost exactly one minor warship, the destroyer T-22. *And even she was finished off by the Red Air Forces.*

So much for the recent exploits of the Red Fleets. What about the future? Strategically the Russians are in a stronger position then even Molotov could have dreamed in that fateful interview with Hitler back in November of 1940. Their control of Finland is complete. In the Baltic they have incorporated Koenigsberg outright and renamed it Kaliningrad. So for the first time in their history they have a Baltic port which is free from ice all the year round. More than that, they can dominate the Baltic all the way to the Danish narrows which they eyed so hungrily back in 1940.

But all their attempts to control the Dardanelles have so far broken themselves against the stubborn refusal of the Turks to cooperate. Russian attempts to outflank them in Greece have in turn been thwarted. In Bulgaria and Rumania the Russian protectorates are swinging along, and they virtually control the vast river net of the Danube. But their King Charles' Head, those Straits of Destiny, remain to elude and challenge them.

Yet the centuries-old program for control of their coastal seas is very near to fulfillment, nearer than ever before. In the Far East the Red occupation of the Kuriles, the southern half of Sakhalin, Northern Korea and their former base at Port Arthur has enabled the Russians to close the strategic Sea of Okhotsk and to strengthen their hold on the Japan and Yellow Seas.

Now we come to the crux of the problem, granted the premise that, in the flush of victory, the Soviet leaders are setting their sights on even more glittering successes. With the whole of the vast Eurasian heartland now in their hands, they know that a few decisive moves forward would place them astride the Mediterranean, opening the way to India and to Africa. Toward the subjugation of the pivotal group of countries—Greece, Turkey, Syria, Palestine, Iraq and Iran—most observers believe that all their diplomacy, all their political and economic power, have been working at full pressure these last three years. Insistent reports place powerful Russian land and air forces in massed concentration along the shores of the Black Sea, ready to follow up any sudden success on the political or diplomatic front, any vacuum created by the falling-off of democratic interest.

But the Soviet leaders are fully aware that they cannot overrun these countries unless they can keep the great Anglo-Saxon democracies at arms' length while they consolidate their gains.

This is where the Red Fleet, traditionally subordinate, with a record of local successes and vast over-all inadequacies, comes into the picture. Within the global strategy of the Soviet leaders, the Red Fleet has today assumed a new purpose: the task of preventing British and American sea power from effective intervention when and if the chance to absorb the key countries in the heart of the old world does come.

The naval task force—complete with planes and amphibious troops—has been much praised, by Walter Lippmann and others, as an ideal weapon for "police" purposes, short of the cataclysmic expedient of the atomic bomb itself. By the same token the most effective answer to this "moderate" form of warfare is a naval one: a powerful force of swift new submarines.

We are talking specifically about the years that lie ahead between now and the time when Russia solves the final secret of atomic energy and begins to stockpile the bombs. The recent Finletter report sets late 1952 as this time of decision, but many experts consider that it will take Russia longer than that to catch up with us in the race. So the present remarks concern all-war-short-of-atom-war, in this interim period.

No matter how many Orders of the Day of Marshal Stalin may call for bigger and better battleships, the chief interest of the Russian Navy is the submarine. Battleships are still prestige ships, part of the panoply of a great power. But, as we know, the Russians handle them indifferently. They like submarines much better.

The submarine today is not what it was back in 1943, when Admiral Doenitz and his U-boats were crushed by the Allies. In the two years following that defeat, German experts worked feverishly to find an answer to radar and the other detection and destruction devices which had spelled annihilation. By the spring of 1945 they had a solution to the problem. The new German submarines which were beginning to come down the ways at Hamburg and Stettin were as different from the conventional U-boats as a Model A Ford from the old Model T. Their hulls were streamlined, their engines completely revolutionary in concept and design, tripling the underwater speed. Above all, the new airpipe, the famous "Schnorkel," enabled them to run submerged not just for one or two days but for weeks on end. This nullified in large part the detection devices of the allies.

Doenitz was too late to reap the benefit of his endeavors: the first batch of these swift killers were on their maiden cruise when the German collapse came and they never did see action. But his submarines remained. When they were divided among the victors, the Red Fleet gained access to all the secrets which the German Navy had worked for so many

years to perfect. And there were plenty of experienced U-Boat men to lend the Red Fleet their services and the benefit of their trials and errors.

Last fall the *Herald Tribune* reported that German submarine assembly yards had been dismantled and shipped to Russia along with the engine-manufacturing establishment there and "some four thousand submarine experts and construction supervisors." It is known that at least two high-ranking Admirals of the German Navy are working closely with the Soviet Navy as well.

Speaking to the Navy League recently, Secretary of the Navy Sullivan reported that the Russians now have 250 operating submarines and are capable of producing on short notice "a large number vastly superior to any operated by the German Navy during World War II." The timetable for Type XXI production has been estimated at 20 to 30 in 1948, increasing to 200 at least within the next three years. This in addition to the 250 of conventional design mentioned by Sec-Nav.

Which brings us full circle. Are they good enough seamen and technicians to man these intricate craft? A backward look at history does not supply the full answer, for their chronic dislike of capital ships is balanced by considerable skill with smaller coastal vessels—minelayers, gunboats, torpedo boats.

So I turn for help to some of the men who know best—the American deck officers, diesel men, gunnery experts and submariners—who have had occasion to see the Russians in action.

First meet a man who served ten years in the old Imperial Russian Navy, escaping in 1917 as a full lieutenant. During the recent war he joined the U. S. Navy and has just gone on inactive duty with the rank of Commander. One of the finest seamen in our service, he laughed when I questioned him about Russian know-how.

"Know-how? Don't let's fool ourselves, my friend. They have plenty, and more important they have discipline, too, and the will to learn. And the Germans to help them learn. I wish I could tell you different, but today there are as fine seamen in the Russian Navy as in ours, maybe finer. They are bound to their 'great Stalin' by personal loyalty of the most intense kind. They have the spirit of adventure and they are learning, my friend, learning. . . ."

Now hear the damage control officer of a U. S. carrier, a man who spent four years on one of the most battle-scarred ships of the war.

"Brother," he said, "if any one tells you the Japs were poor sailors they're crazy. Again and again we'd think we'd sunk a ship only to have it limp home. What saved those ships? Morale, brother, morale and discipline, qualities that can keep a ship afloat long after common sense says abandon her. And don't think the Russians haven't got as much of that kind of fanaticism as the Japs. Oh, brother!"

And I talked to an old submarine man who had watched some Red pig boat down in Panama. "Those Red submarines were taut ships," he told me. "Beautifully kept, clean as a whistle, and smoothly run, too."

But my star witness was a diesel engineer who served in Russia for two and a half years, not an observer or a liaison officer but a man whose primary job was to get the job done. His written answer is so illuminating that it warrants quoting in some length: "Generally speaking, their engineering abilities are fair. I met a number of engineering officers in the Soviet Navy and found most of them to be very well qualified engineers. This probably is true with a large percentage of the engineering officers. However, I do not believe the enlisted personnel receive enough instruction for their engineering duties. They always impressed me as being very slow to grasp anything new. I saw one firsthand example of this during a time when we ran some tests on some General Motors diesel generators in Moscow.

"The Soviets were experiencing a great deal of trouble with their lubricating oils in our high-speed diesel engines, and we had to run a test to prove to them their oils were unsuitable for use in our equipment. At the time the test was run in Moscow, under the supervision of a General Motors technician whom we had loaned to the Soviets, the Russians set up two units for test and also shipped to the test floor all the associated equipment which we forwarded with the diesel generator sets. It was our practice to supply them with 100% spares for equipment of this type and, of course, such items as special tools. We watched the Soviet Navy personnel trying to hook up these engines and were amazed at their clumsiness and general lack of knowledge as to just what to do. We were very much surprised to find they never opened the box of special tools, which were absolutely necessary to hook up the equipment. As you know, our manufacturers will make a tool for one specific purpose. It might be a special tool to tighten up a single nut. Tools of this type are designed to make work easier, but since the Russians did not understand what they were all about, they preferred to do it the hard way. Even after we took an afternoon off and explained to them the function of each and every tool, I noticed they were very reluctant to use them and noticed they preferred to use their own clumsy methods.

". . . For some reason or reasons the Soviets seemed to have a very difficult time installing any of the equipment we supplied them for their shipbuilding program. This probably was due to a great many reasons, but I would think the principal reasons were the inexperienced type of laborers in the shipyards and general lack of know-how, and probably more important than anything else, the bureaucratic, party-dominated administration. I got the impression, after visiting a number of shipyards, that the first step to an insane asylum would be the job of running a Soviet shipyard. I had nothing but pity for the poor unfortunate fellows who were supposed to be in charge of their shipbuilding programs. Some of them were what we would call 'good Joes,' but how they ever got anything accomplished, hamstrung as they were with red tape and limited with very poor labor, is beyond me."

But as my correspondent points out, some years have passed. Considering the millions of tons of equipment we poured into Russia during the war and the help we supplied with the equipment, it is not surprising that their know-how is on the upgrade. Or, as my technical friend put it: "As far as the Soviets building naval vessels of reasonable efficiency, I feel quite confident they are capable of doing this with or without German help. In addition to the tremendous amount of naval equipment given them during the war, they no doubt picked up a considerable amount of know-how from every manufacturer supplying the Navy

with materials, and all of this information will probably be reflected in their future building programs. . . ."

With his half-dozen prestige battleships, a score or so cruisers, at least 60 destroyers, some of them really first-class, his swarms of submarines and many coastal craft, Uncle Joe's Navy may soon rank second to ours in total active strength. Technically it is still in fourth place, but austerity is gnawing away at the British fleet and domestic uncertainty keeps the French naval program in flux.

It would, perhaps, be a mistake to think of the Big Bear as a distance swimmer yet awhile, but he's learning a lot of new tricks. One of these days he may really go swimming on his own.

Or put it another way. With Russian imperialism—the "inverted Czarism" of Clement Attlee's excellent phrase—really on the march, the Russian Navy, traditionally defensive in its techniques, may find itself with half a world to "defend."

ORDNANCE AND THE NAVY*

By Blake D. Mills, Jr.

One of the first requirements of allied naval vessels in World War II was to protect themselves and their convoys from heavy air attacks. Not so many years before this war the principal antiaircraft armament of our naval vessels consisted of caliber .50 machine guns firing solid projectiles and 3-inch hand-loaded and manually aimed guns shooting time-fuzed explosive projectiles at a none-too-rapid rate of fire. The woeful inadequacy of these guns against modern aircraft had been recognized well before the war, and some of our ships had been equipped with 5-inch, low-muzzle-velocity, antiaircraft guns which were power driven.

The advent of the 5-inch guns was a major step forward, and it was to be followed by the development of a higher-velocity 5-inch gun, the now-famous "Five-inch Thirty-eight" (5-inch bore diameter or caliber, 38 calibers or 190 inches long), which was probably the most effective antiaircraft gun ever to appear in action.

Guns of this type were placed on nearly all our modern naval vessels which were large enough to carry one or more, and they were nearly entirely automatic in their operation. At first they fired only conventional projectiles, but during the war came the successful development of the amazing proximity fuze which would explode automatically upon coming within several yards of a plane. This fuze increased the antiaircraft effectiveness of the 5-inch gun several times over.

Most of the wartime feats of the 5-inch thirty-eight will doubtless go unpublished, but one of the announced accomplishments of our "Battleship X" was the destruction of 39 out of 40 torpedo bombers which simultaneously attacked the ship. However, this fine piece of ordnance can by no means be considered the ultimate in antiaircraft armament, and by this time it is doubtless almost obsolete in favor of faster-firing guns with higher muzzle velocity.

Many naval vessels are too small to carry a 5-inch gun, and it was necessary to fit these vessels with weapons which could protect them from strafing or bombing as well as to facilitate their effective attack on enemy vessels.

At the start of the war, the available and reliable caliber .50 machine gun was the obvious choice of more than one navy, and it was installed in a variety of flexible mounts that permitted quick aiming and protracted bursts of rapid fire. But the caliber .50 bullet is too small to stop an attacking plane immediately unless many hits are made, and it was considered essential to equip vessels with machine guns firing larger and explosive projectiles.

Many types of such machine guns, between 15mm. (about 0.6-inch) and 40mm. (about 1.6 inches) in caliber, were introduced by the various navies. Among the commonest types to see action in World War II were the 20mm. Oerlikon and the 40mm. Bofors. These guns, oddly enough, had their origins in countries which remained neutral throughout the war—Switzerland and Sweden, respectively.

Before the war was over, the forces of several countries, allied and Axis alike, were using guns based on and closely similar to the Oerlikon and Bofors designs. Both types of guns fired high-explosive projectiles at high rates of fire, somewhat over 400 a minute for the Oerlikon and around 120 a minute for the Bofors, at velocities of about 2,700 feet a second.

The 20mm. was most often used in single-gun mounts, manually operated by a single gunner with the aid of ammunition handlers to keep him supplied, and this gun accounted for downing many an attacking plane which eluded the 5-inch and 40mm. guns for a close-in attack. By the end of the war, however, the tactical effectiveness of guns as small as 20mm. came into doubt, for although such guns shot down many planes they could not often prevent even a low-altitude bomber from completing his bomb attack before being downed.

In combating torpedo-plane attacks on major naval vessels it was found practicable to bring into play even the main battery of heavy guns which had previously been thought of as useful only against ships or shore. By firing into the water in front of a wave-skimming torpedo bomber, waterspouts could be raised which might envelop the attacking plane or at least force it to maneuver and thereby lessen the accuracy of the torpedo run.

The foregoing gives some idea of the changes in naval guns and ammunition which were brought about in order that ships might successfully protect themselves and their convoys from air attack. No less radical changes were made in the fire-control equipment which directs the aiming of the guns. The acme of fire control, of course, would be the perfection of equipment which could be sighted on an attacking plane, which would then keep itself aimed at the plane, and would keep the guns aimed at the proper point in space so that the projectiles would hit the plane.

*Extracted from an article with the same title from *Ordnance* magazine.

Overseas Roster For CAC Officers

By Colonel Perry McC. Smith, CAC

The numerous individual inquiries both by letter and by personal visits to the Coast Artillery Branch, Career Management Group, make advisable an explanation of the overseas requisitioning procedure in general and the operation of the CAC overseas roster in particular.

Overseas theaters requisition officer personnel based upon the projected theater manning level established by the Department of the Army, reflecting requirements of the third subsequent month. Personnel assigned against a particular overseas requisition will be shipped during the fifth month following; *i.e.*, officers requisitioned in January will be shipped overseas in June.

World-wide requisitions received in the Department of the Army are reviewed to determine priority of acceptance, based upon the relative operational priorities of Zone of Interior installations and of the several theaters and upon the availability of personnel. At the present time overseas requisitions receive first priority. From this study The Manpower Control Group of P&A Division announces allocations which must be filled by the arm or service designated, within specific time limits. Continuing the example above, allocations will be announced by the 15th of February. In order to allow ZI installations time in which to obtain replacements, and to allow the individual officer maximum leave prior to overseas shipment, foreign service orders are published as soon as possible after receipt of allocations, thus normally allowing three to four months advance notice to the individual and the unit concerned prior to port of embarkation. In the above-cited example, orders normally are published by the 8th of March.

Monthly branch material requirements of a theater must be filled by the arm or service concerned. The balance of the theater requirements, branch immaterial assignments common to all the arms and services, such as personnel, intelligence, supply, etc., are allocated to the several arms and services on a proportional basis. Thus the CAC requirements of a theater will include both branch material and immaterial requirements, which, when added to the number of (CAC) officers already assigned to that theater, should not exceed the branch authorization in the manning levels for the month of shipment (June).

A roster, by grade, is maintained in each arm and service, of all officers of the respective arm or service, including those detailed therein, who are eligible for foreign service. Eligibility varies from time to time, depending upon availability of personnel (recalls to active duty have filled many of the overseas requisitions since June of this year) and upon changes in the relative operational priorities of the several overseas theaters and the Zone of the Interior (augmentation) units. At the present time all officers with less than thirty-six months previous foreign service since 7 December 1941, who are not deferred from overseas shipment, are reported to the P&A Division monthly as available for overseas assignment.

In addition to the normal requisitions described previously, other special or emergency requirements arise which must be met. Emergency requisitions calling for critical branch material MOS's often must be filled in a limited period of time calling for immediate air travel of the officer to his overseas destination. For certain key assignments it may be necessary to select an officer regardless of availability and previous foreign service. Similarly, requests for retirement or deferment for compassionate reasons of officers under orders to an overseas station necessitate the assignment of another officer to fill the original allocation. It should be readily apparent that a position on the eligibility list is far from firm, as an officer may find his name advanced several months because of a combination of these circumstances. There is only one stable position on an overseas roster—the top man. He is certain to be selected when an allocation is received.

A bone of contention to many officers has been and will continue to be the deferment of individual officers for limited periods. Deferments fall more or less readily into two classes; deferments under the provisions of Circular 62, cs, and special deferments.

Deferments under Circular 62 were instituted to effect better stabilization of officer personnel within the Zone of the Interior in certain key assignments. In the case of officers assigned to a key activity prior to 1 March the period of deferment is dependent upon previous overseas service. Personnel with less than 12 months' foreign service are released when required for foreign service; those with 12 to 24 months inclusive, after they have served a minimum of twenty-four months; those with over 24 months' foreign service are normally retained in key assignments for three years in the field grades (2 years in the company grades). In assignments subsequent to 1 March 1948 field officers will normally be retained on key activities for three years; company grades two years. There is a definite possibility that the number of months previous foreign service required for deferment may be increased beyond 24 months, as the average foreign service credit of officers since 7 December 1941 increases.

Special deferments are approved individually by higher authority than the offices of the Chiefs of Branches of CMG. This group of deferments includes deferments for over age, deferments for compassionate reasons, deferments because of lack of a suitable replacement, or deferments to allow an officer sufficient time to complete a special assignment.

Department of the Army directives do not indicate that

attainment of any age is a bar to foreign service, other than the restriction contained in Circular 188, 1947, which directs the port commander to screen from overseas shipment any officer who has less than one year remaining before expiration of a category statement or before reaching the statutory age for retirement. Compassionate deferments are approved only in unusual cases and then, for a limited period, to allow the officer time in which to make arrangements to alleviate the conditions which give rise to such requests. With the exception of the above special deferments, cogent military reasons determine approval of other deferments under this category.

Preference cards are used in making overseas assignment where possible. For example, CAC colonels' vacancies have varied during the past year from none to three or four per month. If only one vacancy occurs, the top man on the overseas roster, consistent with the MOS requirement, must of necessity fill it; if several assignments are available, we try to fit together MOS qualifications and the preferences of the officers concerned. As about 80% of the senior officers request duty in Hawaii, selection often presents a problem. Requests for assignment to particular theaters contained in individual letters or indicated during personal visits to this office are treated the same as choice of theaters listed on preference cards.

Occasionally, requests are received from officers already under overseas orders to one theater for a change of assignment to another theater. Theater personnel sections make tentative assignment of officers upon receipt of approved allocations, two to three months in advance of the expected time of arrival in the theater. In many cases these assignments are firmed up from information contained in Department of the Army orders, either through knowledge of the qualifications of the officer assigned or from his MOS. In addition, the Far East Command with its many separated bases must forward shipping instructions, based upon approved allocations and tentative assignments, in sufficient time to permit issuance of movement orders and an orderly allocation of shipment spaces for the various overseas stations. Because of the incidental time lag in securing personnel to apply against overseas requisitions and to insure timely issuance of change of station orders such requests for changes in assignment receive favorable consideration only in exceptional cases and then, only when the exigencies of the service rather than the personal desires of the officer so dictate.

Many inquiries are received relative to the arrival of dependents at an overseas station. Department of the Army Circular 350, 1948, contains the estimated time lag between arrival of principals and dependents at the various overseas stations. It is contemplated that this information will be published quarterly as a guide for officers alerted for overseas duty, in making interim arrangements for their families.

The Antimissile Missile*

In the light of the best that was accomplished during World War II against the V-2, there are those who hold that the antimissile missile is nearly an impossibility. However, study has shown that this problem has certain solutions in the development of special and advanced equipment. It is here that speedy transmission of data is so vital, and it is interesting to note that the methods of digital computation offer a new approach to this problem as well as furnishing a means of prediction and computation.

The guided-missile engineer is prepared today to go even further than long-range missiles bound to the earth. He envisions vehicles that because of their high velocity at a fixed altitude become satellites of the earth.

Such an orbital satellite flying at an altitude of 100 miles would complete a circuit of the earth every hour and thirty-three minutes. Another at an altitude of 1,000 miles would complete the circuit every 2 hours and 13 minutes.

The basic principles for the development of such vehicles are known, and only funds and time are necessary for them to become realities.

When one asks if these out-of-the-world vehicles have any useful place other than as cruising missiles, one can point to them as possible relay stations. Four 1,500-mile-high orbital satellites properly spaced would make it possible to reach any inhabited spot on the earth from any other through line-of-sight radar or radio means, thus making them relay centers for television, broadcasting, or remote control.

But of more immediate interest to all of us are the facts that ground-to-ground, ground-to-air, air-to-ground, and air-to-air missiles are coming into being in this country—that defensive and offensive weapons are on the way.

*Extracted from an address by Dr. C. F. Green, consulting engineer, General Electric Company. Reprinted from *Ordnance* by permission.

Antiaircraft Journal

Fifty-seventh Year of Publication

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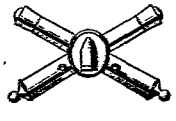

The purpose of the Association shall be to promote the efficiency of the Coast Artillery Corps by maintaining its standards and traditions, by disseminating professional knowledge, by inspiring greater effort toward the improvement of matériel and methods of training and by fostering mutual understanding,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

News and Comment

The Cover

The cover shows a vertical shot of a sponge-rubber table model of Saipan, the island on which the 59th AAA Brigade spent much of its war service. The model is the property of the Army Map Service, and was made by the Office of Strategic Services. The picture was furnished by the Army Map Service.

New Officers' Efficiency Report

The new officers' efficiency form—Form 67-1—will be used in conjunction with a new system of scoring; replacing the old method of efficiency rating by adjective. The new system is intended to minimize the personal prejudice element and present a clearer indication of the individual's capabilities and professional defects. It seeks to compare officers with each other rather than with a theoretical "perfect officer." Principles of the rating system for officers and enlisted men are to be basically identical.

More Jobs for Warrant Officers

Several hundred Army jobs have been earmarked for Warrant Officers. Many are presently filled by commissioned and enlisted personnel. No immediate shakeup will occur, but Warrant Officers will be shifted to these assignments gradually. Among them are instructor posts either in Service Schools or with civilian components.

C&GSC Candidates to Take Scholastic Test

The Army has adopted a scholastic aptitude test as part of the selection criteria for admission to the Command and General Staff College. The purpose is to determine in advance scholastic aptitude for successful completion of the course.

Monument to the 184th AAA Gun Battalion

The JOURNAL wishes to correct the omission of the name of the commanding officer from the article that appeared in the September-October issue concerning the erection of the monument to the 184th AAA Gun Battalion at Lippitts Hill, Essex England. His name is Lieutenant Colonel Julian Albergotti, who is now unit instructor for the 713 AAA Gun Battalion (ORC) at Lancaster, S. C.

Army May Need 20,000 Inductees Monthly

The Army has requested Selective Service to induct 20,000 men in January.

This will be the Army's third request for additional manpower through the peacetime draft. Previous requests called for the induction of 10,000 men in November and 15,000 in December.

The Army has indicated that the January quota of 20,000

inductees will probably constitute the regular monthly schedule for 1949, unless voluntary enlistments decline.

The Navy, Marines and Air Force are still filling manpower requirements by voluntary enlistment and have so far made no request to Selective Service officials for inductees.

The men for the December quota will be called up during the first 20 days of the month to avoid inductions during the Christmas holidays. They will be drawn from the pool of 23- and 24-year-olds who have registered for military service—roughly 50 per cent of each age group.

At present 450,000 officers and enlisted men are in the Army. Its manpower ceiling is 900,000 but its available funds for the current fiscal year will be sufficient for a top limit of only 790,000 men.

Utah Beach History Available

Utah Beach to Cherbourg, the last volume of the Army Historical Division's "American Forces in Action" series, is now obtainable, it has been announced.

Author of the volume is Maj. Roland G. Ruppenthal, former historian of the Seventh Corps and veteran of the Utah invasion.

Veterans of World War II who were wounded during the Utah-Cherbourg operation, June 6-July 1, 1944, may obtain a free copy of this volume from the Historical Division of the Army. Others may purchase copies from the Superintendent of Documents, Washington, D. C., for $2.00 including postage.

To the Editor

I have just completed reading the July-August issue of the COAST ARTILLERY JOURNAL. It certainly has taken on new life since I lapsed my subscription some years back.

Please enter my subscription until I notify you to stop. Start with the September-October issue.

I have just talked with Colonel Ellsworth Young, presently Marbo G-2, and Colonel Harold I. Detwiler, Commanding Officer of Saipan (a part of Marbo). We propose to contact all CAC officers here with a view of getting them to subscribe for the JOURNAL.

Congratulations and best wishes on your continued success.

LESLIE J. STAUB,
Lt. Colonel, GSC (CAC).

NG—ORC Cooperation

The JOURNAL is pleased to report another example of the fine spirit of cooperation that exists between the National Guard and the Organized Reserve Corps in the Washington area. The 340th AAA AW Battalion (SP), Washington, D. C., National Guard, commanded by Lt. Col. George V. Selwyn, recently furnished a team of one officer and five enlisted men, with two M-16 half-tracks, to instruct 26 officers of the 453rd AAA AW Battalion (SP) (Res), commanded by Lt. Col. James Cook. The instruction team was commanded by Lieut. John L. Buckley.

Col. LeRoy Mann, Commanding Officer of the 260th AAA Group, Washington, D. C., National Guard, recently delivered a talk to 20 reserve officers of the Coast Artillery Section of the 204th Composite Group in Maryland, at

BALLOT

UNITED STATES COAST ARTILLERY ASSOCIATION INSTRUCTIONS AND INFORMATION

The President and three members of the Executive Council are to be elected on this ballot, to replace officers whose terms of office expire December 31, 1948. Please show your interest in the Association by voting.

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

Each candidate was considered in connection with the geographic location of his residence. The Constitution of the Association requires that at least five members of the Council reside in the Washington area, and that at least three of them be on active duty, in order to facilitate the transaction of business.

Ballots received after December 31, 1948, cannot be counted.

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

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

FOR PRESIDENT (1949-1950)

☐ Lieutenant General LeR. Lutes
Director of the Staff, Munitions Board, National Military Establishment.

☐ _____

FOR MEMBERS OF THE EXECUTIVE COUNCIL

From Organized Reserve Corps (One Member)

☐ Colonel Charles M. Boyer
Assistant to the Executive Director, Reserve Officers' Association, Washington, D. C.

☐ _____

From National Guard (One Member)

☐ Brigadier General John C. Henagan
Assistant Division Commander, 51st Infantry Division, South Carolina National Guard.

☐ _____

From Regular Army (Vote for One)

☐ Brigadier General Robert W. Crichlow
Army Secretary, Research and Development Board, National Military Establishment.

☐ Colonel Legare K. Tarrant
Member of Joint Staff Plans Group of the Joint Chiefs of Staff.

☐ Colonel Frank T. Folk
Chief, Far East Pacific Branch, Plans and Operations Division, General Staff, United States Army.

☐ _____

☐ _____

Signature _____

Rank & Organization _____

Address _____

the Armory of the University of Maryland. The subject was "Organization and Operation of an AAA Group."

Arrangements have been made for the officers of this group to visit the National Guard Armory in Washington periodically for AAA instruction.

TI&E Study to be Published

The results of a million-dollar wartime research project on morale, undertaken by the Army Troop Information and Education Division, will be published soon in a two-volume sociological study entitled "The American Soldier" by the Princeton University Press.

In compiling the monumental work, trained psychologists, sociologists and other experts in opinion research interviewed better than half a million servicemen on their intimate problems of morale. The new methods employed in the project are reported to have revolutionized social science research.

6 States Votes Bonuses

Many veterans of World War II are in for a $500 million windfall in bonus payments due to the recent election.

The states of Indiana, South Dakota, Louisiana, Iowa, Washington (and apparently Minnesota) voted for veterans' bonus payments.

However, the bonus voted for Indiana veterans is not binding on the 1949 legislature of that state. In Minnesota, the bonus decision will not be final until the State Canvassing Board determines whether the measure received the required number of votes.

Veterans in other states were not so fortunate. Missouri, Nebraska, Wisconsin and Oregon rejected bonus propositions. North Dakota and California voted down tax exemption proposals for veterans.

Wins CA Association ROTC Medal

Cadet Captain Dudley L. S. Woods, Jr., has been announced the winner of the 1947 Coast Artillery Association ROTC Medal at the College of William and Mary, Williamsburg, Virginia, according to Col. Giles R. Carpenter, FA, PMS&T. The medal was presented at the Honors Convocation at the college on 17 November 1948.

Mr. Woods is a veteran of World War II, having entered the Air Corps in February 1943. He went overseas in August, 1943, serving in Australia, New Guinea, Netherlands East Indies, the Philippines, Okinawa, and Japan. He was discharged in 1945, and graduated from the College of William and Mary in June, 1947, with a B.A. degree.

Automatic Weather Station

Having developed an automatic weather station that can send radio reports on temperature, pressure, relative humidity, wind speed, wind direction, precipitation and sunshine intensity, the Signal Corps now is seeking to extend its period of unattended operation beyond one year. If current experiments are successful, the weather stations will be placed in near-inaccessible corners of the world and allowed to run themselves.

Signal Corps scientists, working closely with the Wind Turbine Company of West Chester, Pa., have developed a wind-driven generator which charges a bank of storage batteries for this purpose. The batteries in turn operate the automatic weather station. A wind of seven miles per hour is sufficient to generate electricity, and one of 24 miles per hour will produce the generator's rated output of 2.5 kilowatts. An automatic regulator will prevent overcharging of batteries.

To the Editor

Major Trussell's critique in the Sept.-Oct. number of the JOURNAL of my article on "An Antiaircraft Defense of Washington" in the July-August issue is greatly appreciated. My only apprehension is that in commenting on certain statements and minor conclusions in the original article Major Trussell and other readers may have devaluated some of the major conclusions of the study of the Hamburg defense. May I restate these important theses:

(a) *The disposition of the antiaircraft guns in the defense of a city or large industrial area should be related to the high priority installations rather than be merely an area defense.* Hamburg was initially an area defense, but this was changed late in 1943 to a defense of priority targets. When I was on the planning staff of the VIII Bomber Command I remember no "area targets" assigned—the bombers were always given a specific target and a definite aiming point. The British, however, bombed whole cities in their night bombing. Perhaps that is why the defense of Berlin remained an area defense until the end of the war.

(b) *A centripetal defense in which there is a concentration of guns near the target or within the bomb release line is far superior to one "in-depth-outward." The most effective position for any gun battery is within the area bounded by the bomb release line.* A flak computer can be used to measure the effectiveness of a gun battery along any direction of approach, and the sum of these effectivenesses over the twelve cardinal directions gives a value for the "all-around effectiveness" of a battery. Since making the original computations a new target-centered flak computer for 90mm guns has been made available. Under no-wind conditions the effectiveness was computed with this computer to be 180 for a gun at the target, 166 at the 75° line, 160 at the BRL, and 63 at (BRL-60). The conclusion is inescapable that a battery at or within the BRL has an effectiveness from 2½ to 3 times as great as one at (BRL—60). Too often we have considered "mutually supporting distance" as the number one factor in determining a defense. This is merely the *maximum distance* apart that the batteries should be—there is no minimum distance, at least not until the batteries are in one another's way, or create mutual interference, either from traffic or radar considerations.

(c) *Prevailing winds must be considered in evaluating a defense.* There is a persistency of wind at altitude in any area and this changes the ground speed of the plane, and therefore the effectiveness of the defense. When flak analysis was started the wind aloft was the first factor considered.

I find myself in agreement with Major Trussell's comment on the *grosse batterien* that our "four-gun battery need not be sacrosanct." Fire power and flexibility are both to be desired. The *grosse batterien* gave both of these when

there were at least two directors and two radars per battery. Maybe the six-gun battery is the answer. The proper size should be investigated by evaluation from a tactical standpoint.

On the subject of *anti-flak action* it cannot be denied that "antiaircraft batteries are particularly dangerous targets." However, from the air force point of view the advantage of decreasing the effectiveness of AAA batteries is a real one. Even though the losses of fighter-bombers are considerable when attacking AA positions the decrease in losses of heavy bombers will offset this. The accuracy of bombing from high levels is not sufficient to put a large percentage of antiaircraft positions out of action. When only several *grosse batterien* would cause most of the losses along a particular approach these should definitely be attacked by anti-flak action. This appears the most efficient method to decrease over-all losses in the coordinated operation.

The consideration of *adjacent defenses* in the planning phase of an air attack can enter in two ways. First, in the approach from landfall to the vicinity of the attacked city, a route should and can be plotted which will avoid all antiaircraft concentrations. The matter of following these routes is then a matter of proper navigation. To avoid having these flak-free routes is difficult for the antiaircraft commander with limited facilities. Secondly, the defense of certain cities can be made contiguous. For example the antiaircraft defenses along the Weser River extended in an unbroken area from Bremen to Vegesack to Bremerhaven to Wilhelmshaven. In planning any attack in this area the approach from the mouth of the Weser to Bremen had to be avoided. New York and its satellites certainly would have such a coordinated defense. However, as Baltimore is 35 miles from Washington, and there is little of military value to defend between these cities, it is believed that it would be a loss of fire power to make these two defenses contiguous. Certainly this would be contrary to the previously stated argument for a separate centripetal defense for each of the two cities.

The negative appraisal of *flak towers* came from the interrogation of German flag generals after the war. Essentially the argument was that the advantages derived from these towers were not offset by the tremendous output in personnel, time and material resources required in their building. These towers were huge and each was a real engineering problem.

The problem of the *evaluation of light and medium flak* is difficult. There are numerous qualitative approaches; there should be some quantitative basis. It is true that from an air force standpoint the *emphasis on proper evasive tactics is the best approach.* However the study of proper local defenses of heavy batteries, and of proper defenses of important strategic points should be continued in the light of the experiences of World War II. The defense of Utah and Omaha beaches, of the Remagen bridge, of the airfields on Saipan and Okinawa all have their lessons. The biggest lesson is that casualties to enemy fighters and fighter-bombers increase in direct proportion to the number of well-trained automatic weapons batteries in action.

Definitely the methods of flak analysis should be used to evaluate any defense and to show its unbalance, or lack of maximum effectiveness in all directions.

May I thank Major Trussell for writing such an able critique on some of the conclusions of the article on "An Antiaircraft Defense of Washington."

EARL W. THOMSON
Colonel, CAC-Res.
Senior Professor
US. Naval Academy.

Only Volunteer Reserve Officers to be Called

No Reserve officer will be recalled to active duty, unless he volunteers for such service, the National Military Establishment has announced.

To clarify over-all military defense policy it was explained that Reserve officers are being encouraged to volunteer for return to active duty with the Armed Forces. However, they will be accepted only on a voluntary basis.

Reserve officers now on active duty may resign if they can show good reason for a return to civilian status, such as undue hardship, but it is preferred that officers request a transfer to the Inactive Reserve rather than resign their commissions.

In the event of an emergency, all Reserve officers will be subject to recall and would face court-martial if they refused. In the event of a draft, even those who resigned their commissions would be subject to service, it was explained.

Industrial Reserve Plan Begun

An "industrial reserve" program has been instituted by the Government, with a nucleus of 12 war plants that cost $146,168,000.

The Federal Works Agency said that the plants are the first of 100 or more that will be placed in "mothballs" so they will be ready for renewed production if and when needed.

The "industrial reserve" program was authorized at the last session of Congress.

At the same time the Army Signal Corps announced that safeguards have been taken to insure against a serious bottleneck in the communications industry in the event of war by the storage of field wire stranding and twining machines.

About 400 machines have been secured from the War Assets Administration under the joint Army-Navy Tool Program of the Munitions Board and will be stored in Signal Corps depots until needed.

Decision on Reserves in Civil Service

The Civil Service Commission acknowledged recently in response to a query that Reservists who become eligible for nondisability retirement and Civil Service Retirement are not limited, in the amount they may receive, by the Dual Compensation Act of 1932.

Earlier this year, the Commission ruled that Public Law 810 makes it possible for certain periods of military service to count toward both military and civil service retirement. Some doubt has remained, however, regarding application of the Dual Compensation Act.

According to Alfred Klein, Chief of the Civil Service Commission, Legal Section, "retired personnel are not considered Government employees so receipt of two forms of retirement does not constitute receipt of dual compensation."

Mr. Klein also said that the $3,000 ceiling contained in

the Dual Compensation Act will not apply to persons who become eligible for nondisability retirement payments under Public Law 810 and continue to hold down Civil Service jobs.

This is because of Section 305 of Public Law 810, which states as follows: "No period of service otherwise creditable in determining the eligibility of any person to receive, or the amount of any annuity, pension or old age benefit payable under any provision of law on account of civilian employment, in the Federal Government or otherwise, shall be excluded in such determination because such period of service may be included, in whole or in part, in determining the eligibility of such person to receive, or the amount of, any retired pay payable under this title."

In addition to the above provision of law, Mr. Klein pointed out that a person drawing nondisability retirement pay under Public Law 810 and holding down a Civil Service job "actually is being paid for only one job so no dual compensation is involved."

In view of this and the previous Civil Service ruling, there is no reason why Civil Service employees must wait until they retire as civilian employees before applying for nondisability retirement benefits to which they will be entitled under Public Law 810 when the latter goes into effect January 1.—(By permission of *Armed Force.*)

ORC Active Duty Applications to be Speeded

The Army recently announced it will speed up the processing of Reserve officers' applications for active duty.

Reserve officers may now apply directly to the Adjutant General for such duty instead of submitting application to local Reserve instructors as heretofore.

Under the new procedure, a Reserve officer will be notified in a matter of days whether or not he will be returned to active duty.

Inactive National Guard Reestablished

Reestablishment of the Inactive National Guard, in existence before the war, will make it possible for officers and enlisted men unable to continue active training with their National Guard Army units to retain their Guard status.

AAA Battalions to Augment NG Divisions

Organizational changes that will materially increase the fire power and mobility of the National Guard's Infantry and Armored Divisions have been announced by Major General Kenneth F. Cramer, Chief of the National Guard Bureau.

The change parallels reorganization of Regular Army Divisions which was announced two years ago.

They are based on revised Tables of Organization and Equipment which utilize the battle experience of World War II.

Major revisions are:

Each of the 25 infantry divisions in the National Guard will add an AAA automatic weapons battalion (self-propelled) and a Heavy Tank Battalion.

Each of the two National Guard armored divisions will add an AAA automatic weapons battalion (self-propelled), and a self-propelled 155mm Howitzer Field Artillery Battalion.

National Guard strength of the infantry divisions will be increased to approximately 14,000 officers and men; of the armored divisions to some 12,000. The old peace or reduction strengths were approximately 13,000 and 9,000, respectively, or 80 per cent of full combat strength.

Full strength of infantry divisions is expanded to about 19,000; of armored divisions to about 16,000. The old figures were approximately 16,000 and 11,000, respectively.

Reorganization, which started October 1 and is expected to be completed by the early part of the next calendar year, will become effective for all organizations of a given type in the National Guard, such as separate companies, battalions and regiments, until complete divisional reorganization is accomplished. Effective dates for the reorganization of the various types of National Guard organizations will be announced from time to time by the Chief, National Guard Bureau, as the new Tables of Organization and Equipment are printed and distributed to the field.

Reorganization will be carried out first by the infantry divisions, followed approximately a month later by the armored divisions. Revised T/O&E's will be applied thereafter to other National Guard units as soon as possible.

National Guard Distributes $770,000 in Unit Funds

Major General Kenneth F. Cramer recently announced that approximately $11,000 in enlisted men's unit funds has been authorized for distribution to National Guard units in 14 States. This brings to approximately $770,000 the amount of unit funds authorized for distribution in 43 States, the District of Columbia and Hawaii.

Additional National Guard unit funds may be discovered through a survey now being made of all dormant military bank accounts. Several thousand dollars in Guard funds, from before and during World War II, have been located.

National Guard Enlisted Men Can Earn Commissions at Home

Enlisted men of the National Guard can now earn commissions in the Guard without taking time from their civilian pursuits.

Hitherto enlisted men could earn commissions only by attending regular 9-month courses at the Regular Army's Officer Candidate School, unless they were eligible for direct commissions through wartime service in the first three noncommissioned grades.

Now all enlisted men and warrant officers in Army National Guard units between the ages of 21 and 32 inclusive (the maximum age drops to 28 after July 15, 1949) may be appointed as second lieutenants under temporary waiver if they meet the following requirements:

(1) Have completed a minimum of one year's service with the armed services or the National Guard.

(2) Have successfully completed the courses of the 10-series Army Extension Courses.

(3) Have been recommended by an examining board for appointment or commission with waiver.

Such officers will be Federally recognized by the National

Guard Bureau with two-year waivers which must be retired if Federal recognition is to be retained.

Waivers may be retired when the officers satisfactorily complete a basic associate course of instruction at an appropriate service school or pass a practical test given by the senior Army Instructor and appear before a final examining board which recommends Federal recognition without waiver.

Where no unit vacancy exists for second lieutenants they maintain their enlisted grades and will be granted certificates of eligibility by the Chief, National Guard Bureau. (Certificates of eligibility may also be issued to officers of other grades.)

Such certificates will be withdrawn after two years if the holder fails to be assigned to an appropriate vacancy in the troop basis. However, they may be reinstated or extended for an additional two years by successful appearance and examination before an appropriate board of officers.

National Guard Staff Officers Get Special Training Program

National Guard staff officers will be able to advance their professional training at home with a minimum loss of time from their civilian pursuits through special staff training programs being developed by the Army.

The Army Field Forces, which is responsible for supervising the training of Army units of the National Guard, already has developed a "home-training" command and staff course for Division staffs. The course is being sent to each division commander of the National Guard in sufficient quantity to conduct training of his staff. It is a modification of the regular courses given at the Army Command and General Staff College.

Announcement will be made of staff programs for brigade, regimental and battalion level training as they are developed.

Also available to selected National Guard officers are two-week Command and Staff Special Courses, developed by the Command and General Staff College, which will be given at schools established in the various Army areas by the Army Commanders.

National Guard Announces Enlisted Career Guidance Plan

A Career Guidance Plan for enlisted men will be put into effect for Army units of the National Guard. Objective of the National Guard plan is to provide:

(1) A dignified and attractive military career for the part-time civilian soldier with opportunities for advancement limited only by ability and initiative.

(2) An efficient, highly trained noncommissioned officer corps that can be the basis for an even flow of trained, junior commissioned officers to the National Guard.

(3) Orderly and systematic assignment, training and promotion of enlisted men in the last three grades of Recruit, Private and Private, first class.

It was also announced that National Guard Army units will conform to the new grades, titles and insignia established for enlisted men of the Army. The new titles become effective November 1, 1948.

The new grades run from first to seventh, inclusive, and the equivalent titles are Master Sergeant; Sergeant, first class; Sergeant; Corporal; Private, first class; Private and Recruit. The first four grades are noncommissioned officers. The three technician grades, third, fourth and fifth, are abolished. The occupational titles of First Sergeant and Sergeant Major are retained.

New enlisted insignia is divided into combat and noncombat types according to organization. Enlisted men assigned to combat-type organizations will wear the combat insignia: blue chevrons against a gold background. Insignia of those assigned to noncombat units will be gold chevrons against a dark blue background.

General Fleming to Head Army Division With NGB

Appointment of Major General Raymond H. Fleming, Commanding General of the 39th Infantry Division of the National Guard in Louisiana and Arkansas, to head the newly established Army Division within the National Guard Bureau has been announced by Major General Kenneth F. Cramer, Chief of the National Guard Bureau.

General Fleming, who has also been serving as an assistant to Major General Lewis B. Hershey, Director of Selective Service, was Adjutant General of Louisiana for 20 years.

He will retain command of the 39th Infantry Division while serving with the National Guard Bureau in Washington.

The establishment of Army and Air Force Divisions in a reorganization of the National Guard Bureau was accomplished October 1.

Additional National Guard Units

The following National Guard Coast Artillery Corps units have been Federally recognized since the last issue of the JOURNAL:

Florida.
- Battery C, 692nd AAA AW Battalion, Jacksonville.
- Battery D, 692nd AAA AW Battalion, Daytona Beach.

Illinois.
- Battery C, 693rd AAA AW Battalion, Chicago.

Louisiana.
- Battery C, 769th AAA Gun Battalion, Plaquemine.

Massachusetts.
- Medical Detachment, 685th AAA AW Battalion, Bourne.

North Carolina.
- Battery D, 150th AAA Gun Battalion, Wilmington.
- Medical Detachment, 150th AAA Gun Battalion, Wallace.

California.
- Battery D, 271st AAA AW Battalion, San Francisco.
- Battery B, 73rd AAA Gun Battalion, San Diego.

New Mexico.
- Battery D, 726th AAA Gun Battalion, Espanola.

Don't Miss the Ballot on Page 61.

COAST ARTILLERY ORDERS

Department of the Army and AFF Special Orders covering the period 1 September through 15 November 1948.

Albro, Ivan C., Lt., to ASN Postal Directory US Army, Alaska APO 942, c/o PM, Seattle, Wash.
Aldrich, Harry S., Col., to retirement.
Aman, Paul W., Capt., to 34th AAA Brig., Ft. Bliss, Tex.
Barbee, Ray C., Capt., to 34th AAA Brig., Ft. Bliss, Tex.
Barrett, Joseph W., Lt., to 1294th ASU ROTC Univ. of Dela., Newark, Dela.
Barto, Edward E., Capt., to European Comd, Bremerhaven, Germany.
Bianchi, Joseph J., Capt., to 109th CIC Det. Second Army, Ft. George G. Meade, Md.
Bigger, Walter K., Capt., to AA & GM Br., TAS, Ft. Bliss, Tex.
Blunda, Gaspare F., Maj., to Trans. to USAF.
Boone, Daniel L., 2nd Lt., to MDW, Army Medical Center, Walter Reed GH, Washington, D. C.
Boone, Martin K., Maj., to US Army Caribbean, Shpmt. OM-K550.
Borton, Jesse Thomas, Jr., Capt., to 4401st ASU, AA & GM Br., TAS, Ft. Bliss, Tex.
Boyles, William Walter, Lt., to 5th AAA Gp, Ft. Bliss, Tex.
Braxley, Samuel Evans, Lt., to 5th AAA Gp, Ft. Bliss, Tex.
Briggs, Leon A., Capt., to USAF.
Buntrock, Walter Frederick, Capt., to Pers. Cen., Cp. Kilmer, N. J.
Cain, William F., Capt., to US Army Forces, Antilles, San Juan, PR.
Cairncross, Renolds L., Jr., Capt., to Far East Comd, Yokohama, Japan.
Card, Roy B., Capt., to 34th AAA Brigade, Ft. Bliss, Tex.
Case, Billy M., Lt., to European Comd, Bremerhaven, Germany.
Cheatwood, Robert C., Lt., to Far East Comd, Yokohama, Japan.
Clark, Ridgway J., Lt., to 2553 ASU Western Pa. ORC Instr. Gp., Old PO Bldg., 4th Ave. & Smithfield St., Pittsburgh, Pa.
Cochran, Harrington W., Jr., Capt., transferred to CE.
Conerly, Uldric E., Capt., to Second Army, 2311th Asu, US Army & USAF Md Rctg Dist, Baltimore, Md.
Coyne, John H., Capt., to Second Army, 234th ASU Harbor Defenses of Chesapeake Bay, Ft. Story, Va.
Culpepper, Edwin Murphy, Lt., to Pers. Cen., NOPE, New Orleans, La.
Devine, James G., Col., to Hq., Sixth Army, Presidio of San Francisco, Calif.
Deyo, Marvin Chas., Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Eickhoff, David L., Capt., to 6708th ASU, Southern Calif. ORC Instr. Gp., Ft. MacArthur, Calif., w/sta. Los Angeles and detailed as Instructor.
Ellert, Laurence J., Maj., to USAF.
Emme, Arthur H., Lt., to 113th CIC Det Fifth Army, Chicago, Ill.
England, Charles F., Maj., to Far East Comd., Yokohama, Japan.
Farber, Charles Francis, 1st Lt., to Pers. Cen., Cp. Stoneman, Calif.
Farrell, Thomas F., Jr., Capt., detailed in Cavalry.
Fields, Leonard B., Lt., to Far East Command, Yokohama, Japan.
Filocco, Mario Anthony, Lt., to 5th AA Gp., Ft. Bliss, Tex.
Fisken, Archibald D., Col., Retired.
Fling, William J., Capt., to 5th AA Gp., Ft. Bliss, Tex.
Flynn, Robert Edward, Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Fox, William M., Capt., to 34th AAA Brigade, Ft. Bliss, Tex.
Gadwell, Frederick, Lt., to 17th Abn Div., Cp. Pickett, Va.
Garvey, George Francis, Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Gettys, Charles W., Col., to G-3, MDW, Washington, D. C.
Goffe, Arden C., Capt., to 5426th ASU ROTC, Detroit High Schools, Detroit, Mich.
Greenberg, Bernard I., Maj., reld. fr. CE.
Guhl, Robert C., Lt. Col., to 2554th ASU, Va. ORC Instr. Gp., Richmond, Va.
Hamilton, Kenneth L., Lt., to Far East Comd., Yokohama, Japan.
Harley, Hersel S., Capt., to Far East Comd., Yokohama, Japan.
Hartwig, Henry A., Lt., to 17th Abn. Div., Cp. Pickett, Va.
Harris, Merton Cabot, Lt., to 503 A/B AAA Bn., Ft. Bragg, N. C.
Hindle, Clifford D., Col., to 6601st ASU, Calif. NG Instr. Gp., c/o State AG, State Office Bldg. No. 1, Sacramento 14, Calif.
Hoke, Leland R., Capt., to Fourth Army, 4001st ASU, AA & GM Br., TAS, Ft. Bliss, Texas.
Horneij, Edwin H., Capt., to 1156th ASU, Office Senior NG Instr., 360 Broad St., Hartford, Conn.
Hufstetler, John R., Capt., 3344th ASU, Georgia NG Instr., Atlanta, Ga.
Jaccard, Paul A., Col., detailed in IGD.
Johnson, Ted D., Lt., to Ryukyus Comd., Okinawa.
Kahn, Harry Martin, Lt., to 5th AAA Gp, Ft. Bliss, Tex.
Katsainos, Charles T., Capt., detailed in CAC.
Katz, William Morris, Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Kaup, Edgar L., Capt., to European Comd., Bremerhaven, Germany.
Kennedy, Duncan L., Capt., to European Comd., Bremerhaven, Germany.
Kingston, Frank M., Lt., to US Army Caribbean, Quarry Heights, CZ.
La Mee, William S., II, Capt., to 34th AAA Brigade, Ft. Bliss, Tex.
Lanasa, Philip J., Capt., to 34th AA Brigade, Ft. Bliss, Texas.
Ledeboer, Frederic W. C., Lt. Col., to 6814th ASU ROTC, Univ. of Washington, Seattle, Wash.
Lindsey, Henry C., Capt., to Ft. Winfield Scott, Calif.
Littlejohn, John C., 2d Lt., to Stu. Det., TAS, Ft. Sill, Okla.
Loiselle, Postford A., Lt. Col., to 5th AA Gp., Ft. Bliss, Tex.
Marshall, Edward I., Maj., to 503rd Abn AA Bn., Ft. Bragg, N. C.
Martin, John B., Jr., Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Martino, Philip T., Maj., to 34th AAA Brigade, Ft. Bliss, Tex.
Maykovich, John J., Capt., to 34th AAA Brigade, Ft. Bliss, Tex.
McGinnis, Hugh Wesley, Lt., to 5th AA Gp., Ft. Bliss, Tex.
McLean, Harold A., Lt. Col., to Seacoast Br., Arty. Sch., Ft. Wn. Scott, Calif.
Miller, Robert J., Capt., to 34th AAA Brigade, Ft. Bliss, Tex.
Moloney, Thomas F., 1st Lt., to Second Army, 2302d ASU, Eastern Pa. Mil. Dist., Phila., Pa.
Mooney, Harry F., Capt., to Second Army, 2317th ASU, US Army & USAF Rctg. Dist., Indianapolis, Ind.
Moore, Carroll Arthur, Lt., to 34th AA Brigade, Ft. Bliss, Tex.
Moore, Wayne D., Lt., to 101st Abn. Div., Cp. Breckenridge, Ky.
Morden, Carroll V., Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Moyer, Maynard G., Maj., to American Embassy, Nanking, China.
Muir, James B., Col., to retirement.
Myers, William R., 1st Lt., to Fourth Army, 4001st ASU, 1st GM Regt., Ft. Bliss, Tex.
Nash, Thomas H., Maj., to US Army Pacific, Ft. Shafter, TH.
Nelson, William A., Lt., to Marianas Bonins Comd., Guam, Marianas.
Northrop, Charles R., Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Odom, Herbert R., Maj., to 34th AAA Brigade, Ft. Bliss, Tex.
Olivares, Jose E., Lt. Col., to First Army, 1104th ASU, Hq & Hq Det, HD of Portland, Ft. Williams, Maine.
Parr, William R., Maj., to Fourth Army, 4001st ASU, Stu Det AA & GM Br, Ft. Bliss, Tex.
Pechulis, Frank Vitautas, Capt., to 5th AAA Gp., Ft. Bliss, Tex.
Peterson, Coleman Alonzo, Lt., to 5th AAA Gp., Ft. Bliss, Tex.
Raigoza, Juan, Capt., to 34th AAA Brigade, Ft. Bliss, Tex.
Rawcliffe, William F., Capt., to Stu. Det., 4001st ASU, AA & GM Br., TAS, Ft. Bliss, Tex.
Reagon, Paul R., Maj., retired.
Reid, Samuel L., Capt., to American Embassy, Nanking, China.
Reierson, John E., Lt. Col., to European Command, Bremerhaven, Germany.
Ringer, John F., 1st Lt., to 101st Abn. Div., Cp. Breckenridge, Ky.
Robertson, Francis E., Lt., to 5th AAA Group, Ft. Bliss, Tex.
Roden, Charles E., Lt. Col., to 34th AAA Brigade, Ft. Bliss, Tex.
Rothgeb, Clarence E., Col., to 4404th ASU, N. Mex. NG, Santa Fe, N. Mex.
Routh, David B., Lt. Col., to duty with Gen. Staff, US Army.
Semmers, Clifton P., Capt., to 4001st ASU, AA & GM Br., TAS, Ft. Bliss, Tex.
Sharp, Felix C., Jr., Maj., retired.
Sippel, Walter A., Lt., to Northern Calif-Nev. ORC Group, Presidio of San Francisco, Calif.
Skillman, Bryant D., Lt., to US Army Forces, Antilles Comd., San Juan, P. R.
Slaughter, Solomon W., Lt., to US Army Caribbean, Quarry Heights, Canal Zone.
Smith, Donald B., 1st Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Smith, Fred D., Lt., to 5th AAA Group, Ft. Bliss, Tex.
Smith, Hiram N., Lt. Col., to 1104th ASU, Ft. Williams, Maine.
Spackman, Jestin L., Lt. Col., to Hq. Sixth Army, Presidio of San Francisco, Calif.
Springer, Franz A., Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Steltzner, Roger L., Capt., to European Command, Bremerhaven, Germany.
Stewart, Wilfred H., Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Sullivan, Andrew P., Col., retired.
Tall, Charles H., Lt. Col., relieved from detail in Infantry.
Taulbee, Charles P., Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Tedick, Eugene, Capt., to Fordham University, New York, N. Y.
Thiele, Claude M., Col., retired.
Thompson, Clarence A., Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Thompson, Louis H., Col., retired.
Titley, Richard J., Capt., to University of Illinois, Urbana, Ill.
Tolman, William J., Lt., to European Command, Bremerhaven, Germany.
Topping, Frederick L., Col., to Hq. Sixth Army, Presidio of San Francisco, Calif.
Tranter, Charles J., Capt., to European Command, Bremerhaven, Germany.
Tribble, Harold C., Capt., to Far East Command, Yokohama, Japan.

Trop, Herman, Lt., to Personnel Center, Camp Kilmer, N. J.
Vanlandingham, Robert W., Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Warner, Robert H., Lt., to 5th AAA Group, Ft. Bliss, Tex.
Watson, Gale A., Capt., to University of Cincinnati, Cincinnati, Ohio.
Watson, Frank W. W., Lt., to Far East Command, Yokohama, Japan.
Watson, William R., Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Way, Thomas Z., Lt., to 34th AAA Brigade, Ft. Bliss, Tex.
Weeks, Lawrence B., Col., retired.
Whisenant, James H., Lt., to Far East Command, Yokohama, Japan.
White, Alvin D., Jr., Lt., to Ryukyus Command, Okinawa, Ryukyus.
White, Robert A., Lt., to 5th AAA Group, Ft. Bliss, Tex.
Whitfield, Patrick H., Lt., to 503rd Abn AA Battalion, Ft. Bragg, N. C.
Williams, Albert C., Lt. Col., to 34th AAA Brigade, Ft. Bliss, Tex.
Woolridge, Kermit D., Capt., to 101st Abn Div., Cp. Breckenridge, Ky.
Zaldo, William T., Capt., to AA & GM Br., TAS, Ft. Bliss, Tex.
Zoladz, Alfred E., Lt., to 17th Abn Div., Cp. Pickett, Va.

Changes of Addresses of Subscribers

The following changes of address have been made since publication of the Address Supplement in the September-October issue:

Ackert, T. W., Lt. Col., 844 S. Highland St., Arlington, Va.
Barnett, W. H., Maj., 2721 Wheeling St., El Paso, Tex.
Barry, R. B., Jr., Lt. Col., 1401 Elm St., El Paso, Tex.
Baynes, W. H., Lt. Col., 4145th AFBU, Holloman AF Base, Alamogordo, N. M.
Bellamy, P. E., Lt. Col., 48th AAA AW Bn, APO 403, c/o PM, New York, N. Y.
Benz, H. T., Col., Bordentown Military Institute, Bordentown, N. J.
Bice, Vernon M., Box 4546, University Station, Tucson, Ariz.
Bottoms, C. B., Col., 2272nd ASU Escort Det., 2620 Grays Ferry Ave., Schuylkill Arsenal, Philadelphia 46, Pa.
Brant, Z. M., Capt., Box No. 201, Lebanon, Ohio.
Bresnan, D. F., Maj. 1125 Mass. Ave., Arlington, Mass.
Brown, H. C., Maj., 34th AAA Brigade, Ft. Bliss, Tex.
Case, Homer, Col., 2301 Connecticut Avenue, N.W., Washington 7, D. C.
Catlett, James T., Col., 5 Pleasant St., Ashburnham, Mass.
Chilson, George H., M Sgt., 138th AAA Gp., APO 503, c/o PM, San Francisco, Calif.
Clark, Frank S., Brig. Gen. (Oct. to Apr.: 2109 Kecoughtan Rd., Hampton, Va.), (May to Sept.: Liberty, Maine).
Cox, J. C., Maj., Ft. Shafter Officers' Club, APO 958, c/o PM, San Francisco, Calif.
Cunningham, R. T., Col., 490 Mineola Avenue, Akim, Ohio.
Cushman, Willis A., PFC, Brandon, Vt.
Daggett, L. E., M Sgt., AAA School, Box No. 22, Ft. Bliss, Tex.
Darrah, J. T., Lt. Col., 5th AAA Gp, Ft. Bliss, Tex.
Davis, L. L., Brig. Gen., 2510 J. Avenue, National City, Calif.
Dillon, G. M., Capt., 26 West Lawnwood Ave., Shanks Village, Orangeburg, N. Y.
Dinardo, Carlo, Lt., 4617 N. Kenmore Avenue, Chicago 40, Ill.
Downer, W. V., Jr., Capt., Qrs. 552A, Ft. Bliss, Tex.
Dunham, W. H., Jr., Col., 1512 Rutledge Avenue, Charlottesville, Va.
Durschnitt, S., Lt. Col., Main Officers' Club, Ft. Dix, N. J.
Ebel, Henry N., Lt., Ft. Warren Det., Ft. Banks, Mass.
Eddy, Warren W., 335 East Grand River, East Lansing, Mich.
Erdman, G. W., Lt., Hq. 59th AAA AW Bn., Ft. Bliss, Tex.
Finkenaur, R. G., Lt. Col., Hq. 1st Bn, 1st GM Regt, Las Cruces, N. M.
Franson, P. O., Jr., Lt. Col., Rt. 1 Box 127, Montgomery, Ala.
French, Charles A., Brig. Gen., Ft. Monroe, Va.
Gettys, C. W., Col., 1507 Park Road, N.W., Washington 10, D. C.
Gilbert, C. M., Lt. Col., 271st AAA AW Bn (SP), Calif. NG, Ft. Funston, San Francisco 16, Calif.
Good, W. O., Capt., Parker Avenue, Wading River, N. Y.
Gower, A. W., Col., 115 E. Oakview Place, San Antonio 9, Tex.
Griesinger, F. D., Capt., 340 Crescent Avenue, Buffalo, N. Y.
Griffith, W. C., Capt., 228 Bentwood Avenue, Johnstown, Pa.
Guilford, P. B., Maj., 1017 Wayne St., Defiance, Ohio.
Hastings, Frank H., Col., Rt. No. 5, Box No. 121, Lakeland, Fla.
Hayden, Frederick L., Brig. Gen., Hq. Antiaircraft Training Center, Ft. Bliss, Tex.
Hickey, D. W., Jr., Col., AAA & GM Center, Ft. Bliss, Tex.
Immer, W. L., Col., 74 Ellis St., Fitchburg, Mass.
Jones, A. W., Col., 305 Hillcrest Blvd., Millbrae, Calif.
Joseph, H. B., Lt. Col., 1302 Ea. Montana St., El Paso, Tex.
Kallis, S. A., Lt. Col., 34th AAA Brigade, Ft. Bliss, Tex.
Kelley, S. R., Lt. Col., 88-33 191st St., Hollis 7, N. Y.
Knowlton, C. T., M Sgt., Apt. 6, 318 Highland, Buffalo 17, N. Y.
Langstaff, James D., Jr., Lt., Btry C, 450th AAA AW Bn, Ft. Bliss, Tex.
Lazar, A. M., Col., 55 Charlcote Rd., Bethesda, Md.
Ley, Willy, Pine Manor, Montvale, N. J.
Liwski, F. A., Lt. Col., CA Branch, P&A Div., Pentagon, Washington 25, D. C.
Longanecker, C. R., Lt. Col., 4705 Post Road, El Paso, Tex.
Mater, M. H., Maj., 728 N. 4th St., Corvallis, Ore.

May, J. B., Maj., 267th AAA Group, Ft. Bliss, Tex.
McCartney, R. W., Capt., Hq. 753d AAA Gun Bn, APO 503, c/o PM, San Francisco, Calif.
McConnell, Frank C., Brig. Gen., Hq. 5th Inf. Div., Ft. Jackson, S. C.
McFadden, G. M., Lt., 1411 College Avenue, Palo Alto, Calif.
McGeehan, C. W., Col., 1700 Ramblewood Rd., Baltimore, Md.
McKay, W. D., Capt., 2518 Hartzell St., Evanston, Ill.
McKee, R. A., Capt., 530 Atkins St., Shreveport, La.
Meinert, Fred H., Lt. Col., Munich Post Exchange, APO 407-A, c/o PM, New York, N. Y.
Metzler, E. C., Jr., Lt., c/o U.S. Dept. of Agriculture, Date Inspection Office, Rt. No. 1, Box No. 31, Indio, Calif.
Miller, G. E., Lt. Col., 7802 SCU, APO 751, c/o PM, New York, N. Y.
Mitchell, James B., Brig. Gen. (Retired), Hobe Sound, Fla.
Miter, F. F., Col., 1805 Army-Navy Drive, Arlington, Va.
Moore, E. C., Lt., 4445 Coyle Street, Houston 3, Texas.
Moore, G. F., Maj. Gen., Hq. Sixth Army, Presidio of San Francisco, Calif.
Moorman, R. R., Lt. Col., SSTS, AFF Bd. No. 1, Ft. Baker, Calif.
Murello, C. E., Capt., 34th AAA Brigade, Ft. Bliss, Tex.
Nelson, W. M., Lt. Col., 32 Decatur Road, Havertown, Pa.
Nichols, C. R., Col., 915 Lindberg Rd., West Lafayette, Ind.
O'Connor, D. A., Lt. Col., 4113 Clifton Street, El Paso, Tex.
O'Donnell, N. J., Lt., Student Detachment, Guided Missiles School, Ft. Bliss, Tex.
Ogden, M. L., Lt. Col., Armed Forces Staff College, Norfolk 11, Va.
Pandorf, E. C., Capt., 8029 Winton Road, Cincinnati 24, Ohio.
Parker, J. C., Lt. Col., AAOC No. 1, TAS, Ft. Sill, Okla.
Phillips, W. S., Col., University of New Hampshire, Durham, N. H.
Peeples, E. T., Maj., Office, Chief of Information, 2E 878, Pentagon, Washington 25, D. C.
Ramelli, Lloyd R., Lt., Red Rock Lakes National Wildlife Refuge, Monida, Mont.
Raymond, Montgomery B., Lt. Col., Qtrs. 66, US Military Academy, West Point, N. Y.
Reed, P. L., Lt. Col., 20217 Lanbury Avenue, Cleveland 22, Ohio.
Reuter, H. C., Col., Submarine Mine Depot, Ft. Monroe, Va.
Russell, E. O., Jr., Capt., c/o Du Pont Co., So. San Francisco, Calif.
Schouman, H. C., Lt. Col., Dir., Operations & Training, 6708 ASU, 756 So. Spring, Los Angeles 14, Calif.
Shepler, Lloyd F., Lt., 6015 Blain St., Muncie, Ind.
Sherman, R. G., Capt., 203 N. Douglas, Peoria, Ill.
Stayton, T. V., Col., 3233 Memphis St., El Paso, Tex.
Stott, Roy, Jr., Maj., 2359 Kensington Ave., Snyder 21, N. Y.
Stout, J. M., Capt., Rt. 2, Box 114, Arlington, Tex.
Stricklen, W. A., Lt. Col., APO 503, c/o PM, San Francisco, Calif.
Sullivan, Francis J., Jr., Lt., RFD No. 2, Watervliet, N. Y.
Testa, John F., Capt., Hq. 34th AAA Brigade, Ft. Bliss, Tex.
Thatcher, T. O., Capt., c/o Ent. Dept., Colorado A&M College, Ft. Collins, Colo.
Tighe, J. J., Lt., Btry A, 48th AAA AW Bn., APO 403, c/o PM, New York, N. Y.
Turner, J. G., Lt. Col., Hq. 8th Army, G-3 Section, APO 343, c/o PM, San Francisco, Calif.
Tuttle, C. F., Lt., 441st CIC Det., Kayana Area, APO 301, c/o PM, San Francisco, Calif.
Twyman, Joseph H., Jr., Lt. Col., 34th AAA Brig., Ft. Bliss, Tex.
Vickers, L. T., Lt. Col., OMA, Rome, Italy, c/o ID Msg. Ctr., Rm. 2C 840, Pentagon, Washington 25, D. C.
Waters, T. L., Col., 766 Stevens Avenue, Portland, Maine.
Waters, Vernon E., Capt., 607 Rosemont Avenue, Los Angeles, Calif.
Weinnig, A. J., Lt. Col., Apt. 3, Bldg. 7-507, Ft. Monroe, Va.
Wellenreiter, F. L., Maj., 441st CIC Det., GHQ, FEC, APO 500, c/o PM, San Francisco, Calif.
Willett, T. A., Jr., Capt., 1021 "A" St., Portsmouth, Va.
Williams, W. J., Maj., 34th AAA Brig., Ft. Bliss, Tex.
Willis, H. J., Maj., 571 East 29th St., Brooklyn, N. Y.
Wood, J. E., Jr., Lt. Col., 3414 Porter Avenue, El Paso, Tex.
Wreidt, Niel M., Capt., PO Box No. 5100-A, Albuquerque, N. M.
Wright, J. M., Jr., Maj., c/o Msg. Ctr. Br., ID, GSUSA, Pentagon, Washington 25, D. C.
Young, Ellsworth, Col., 7322 Highland, Kansas City, Mo.

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BOOK REVIEWS

Industrial Mobilization

THE WAR LORDS OF WASHINGTON. By Bruce Catton. Harcourt, Brace & Company. 313 Pages; $3.00.

INDUSTRIAL MOBILIZATION FOR WAR. Volume I: PROGRAM AND ADMINISTRATION. By James W. Fesler. Government Printing Office. 1010 Pages; Charts; Index; $3.75.

The strangest thing about the entire war was America's reaction to it when it was over. America did one of the most stupendous jobs in history and came out of it with an inferiority complex and a deep sense of fear. It did the job with a fantastic upsurge of national power and vitality, setting the stage for a postwar release of human energy and confidence such as the world had never seen before. But the release didn't take place. "We came out of the war timorous, uncertain, confused, not quite clear just what it was that we had done and everlastingly perplexed as to exactly what we ought to do next." We had won the war without realizing that it was not just a war we had been fighting. It was a "world revolution: one of the great turning points in human progress, a breaking up of the old tables, a swallowing of the old formulas, an overwhelming, fire-stained demand that human institutions be readapted to meet the eternal needs of human beings." But we fought the war for the preservation of the *status quo*, and when the war was over, and things were changed to the very roots of society, America attempted to fight the changes by decreeing that changes must stop.

Mr. Catton believes that it was the nature of our industrial mobilization that made America miss its chances to bring democracy out of the war as a great revolutionary force that knew its own strength, knew why it was strong and knew exactly what its great power was going to mean. He has written a coherent, fast-paced and powerful account of how we lost a fight for democracy at home while winning a physical victory over foreign "isms" on the battlefields of Europe and Asia. The fight we lost was in Washington, and the issue was *how* American business and the American people were to be organized for the superhuman production effort that was required for victory. The fight was between those who believed that a democracy at war should be a cooperative effort of all the people, of big and little business and labor alike, and those who wanted the war production handled in such a way as not to threaten any vested interest of big business or any privilege of the War or State Departments.

The account of this struggle centers largely around the War Production Board and the many "experts" who were washed in on the high tide of enthusiasm to unsnarl the tangles, only to be sucked into oblivion by the cross currents of intrigue and selfishness. Many of the other wartime agencies enter the picture as the story ranges over the whole production effort and the organizations engaged in directing and hindering production and in informing and deceiving the public about the state of the war effort. Catton draws a vivid picture of the savage infighting behind closed doors, of power politics in the White House, the Capitol and the Armed Services, of frenzied appeals for mistaken causes and of cockeyed propaganda. It is a story of warring personalities, of Donald Nelson, Henry Wallace, George Marshall, Senator Harry Truman, President Roosevelt, Baruch, Cap Krug, Jesse Jones, Harry Hopkins, Stettinius, Robert Horton and scores of others.

Bruce Catton is too angry over the sorry spectacle of the war lords in Washington to have produced a well balanced book, but what he has to say is extremely valuable and full of meaning for Americans who are jittery about the cold war without knowing what the cold war is all about. Catton gives no documentation for most of his statements, but if there are any doubting Thomases let them refer to the first volume of the official War Production Board History. This, in a cold and detached historical manner, backs practically every one of Catton's statements with the record. The two supplement and complement each other so admirably that they really should be read as a unit.

The official history is a vastly more inclusive job, and is one of the finest examples of governmental writing yet produced. The first volume, the only one so far published, covers the program and administration of the WPB from 1940 to 1945. One part is devoted to each year, under the title of: The Preparedness Program, 1940; All Aid Short of War, 1941; The Crucial Year, 1942; The Turn Toward Victory, 1943; Production

Readjustment, 1944; and Victory, 1945.

The purpose of recording history, one supposes, is to learn from our past mistakes. If the number of official and unofficial histories being rolled out, covering various phases of World War II, are used for that purpose, the next hot war should be a cinch for our side. I wish Dr. Kinsey would take time off from what is unquestionably an infinitely more fascinating subject and give us a report of how many officers in the planning branches have read, marked, learned and inwardly digested the official War Department histories so far published. Or how many high executives in business and labor have read this War Production Board history. It would amaze me if more than two per cent could discuss the books intelligently, and if more than five per cent could even pretend to have read them. We're not doing so well in the cold war, and if my statistics are correct, we'll do even worse in a hot war.—R. G. McCloskey.

Infantry Replacement

TOWARD AN UNKNOWN STATION. By Allan Lyon. The Macmillan Company. 286 Pages; $3.00.

Allan Lyon was an infantryman. And he fought as an infantryman in the winter in Europe—which gave this reviewer a strong, initial, pro-Lyon prejudice. But his book just isn't very good.

It has its high spots, of course. Lyon's recital of his trip to an infantry squad as a replacement might serve as a text on how not to run a replacement system. But there's nothing new in that story, nothing that hasn't been told a hundred times before.

His story of his stretch as runner for a platoon commander—the grinding weariness and exhaustion that marked the troops, the beginning of an unconscious, unadmitted dislike for the lieutenant who just wouldn't quit, the shock when the officer finally broke down—physically and, one suspects, mentally—and had to be evacuated, would have made a fine short story.

And there are other things in his book that might interest Army leaders. There were replacements who knew no more of their situation than Lyon, there were infantrymen who were never oriented in the attack, there was in every battle a good deal of avoidable confusion. *Toward An Unknown Station* is full of these things, which should not have been.

But on any other count the book is inferior. Mr. Lyon peoples it with his friends and comrades at arms, but they never emerge as real. His publishers claim, probably correctly, that Lyon "deals with fact, not fancy" but the manipulation of these two-dimensional characters, the utter lack of reality behind his battle scenes, indicate that Lyon was concentrating much too deeply on himself to reconstruct the bitterness and the dull heroism of the European winter fighting in 1944.

While it may be heresy in an ex-infantryman, I would say that Lyon's book ranks far below War Correspondent Martha Gellhorn's *Wine of Astonishment* as a reconstruction of war. And of course, there has been no story of infantry in combat yet published to rank with Charles MacDonald's *Company Commander.* As time goes on, it seems more and more doubtful that there will be.—J. C.

5th Battalion, Coldstream Guards

A DISTANT DRUM. By Capt. J. Pereira. Gale & Polden, Ltd. 213 Pages; Illustrated; $6.00.

Captain Joyce Pereira was intelligence officer of the 5th Battalion, Coldstream Guards, 1944-1945. *A Distant Drum* is a sort of unit history, a good deal more personal than most, and infinitely more readable.

It is an inescapable fact that most American prose is modeled on American newspaper style, even (God help us) American sport pages. This is not to say that it is inferior to the British language, because there is nothing on earth more awesome and forbidding than the English of official Britain. But it does mean that most American unit histories, and most American writing of any sort for that matter, fall far below the writing of such odd Britons as Captain Pereira, who, having grasped the point that English is a means of communication, uses it to tell you about something quite simply and accurately.

That is the thing which makes his book memorable.

The 5th Battalion fought from Normandy to Cuxhaven, and Pereira covers its campaigns adequately, in his curiously personal way; but it is in the minutiae, the casual comments, that soldiers, and especially infantry soldiers will recognize the war they fought. There is the NCO that every Army man will recognize; in this case a signalman, ordered to check his radio; "'Interference very bad tonight, sir; doubt if it'll do much good.' Corporal Lyons was never a believer in anything doing much good."

Most infantry commanders will recognize the feeling in Pereira's note on higher echelons: "Throughout every campaign Brigade Headquarters always man-

aged to preserve an air suggesting that one was about to sit down to a Fort & Mason picnic lunch and that if it rained it would be quite simple to call the whole thing off and go home. . . . It is only when one goes back to Battalion . . . that the magic wears off, to be replaced by the conviction that life is, despite all things, very uncertain . . ."

And every soldier will remember ". . . the gradual ageing that wears the countryside down to the ever-repeated pattern of war . . . the cornfields become trodden in by countless pathways . . . shell splinters lop boughs off the trees . . . the turfed bank, the tree beside one's trench, everything takes on an air of permanence and individuality so that at times it seems almost as much a part of you as anything that one has ever seen."

There are differences in the book, of course, things that Americans will find strange. The headquarters of the 5th Battalion took things a little easier, sometimes, than was customary in the U.S. Army. Some men may find Pereira's writing a little light of touch in dealing with a serious subject. But most army men, and certainly most veterans will find, in *A Distant Drum* as in no other book this reviewer has seen, a queer uneasy nostalgia for something no man could possibly want to live over.—J. P. C.

Good Writing—But Too Much

THE YOUNG LIONS. By Irwin Shaw. Random House. 689 Pages; $3.95.

The Young Lions is almost a monumental novel. Certainly it is monumental in sheer physical size, in conception, in range of thought. Unhappily, it falls short of being monumental in execution.

Irwin Shaw has taken three soldiers, two Americans and one German, and through them has made an honest and at times brilliant effort to tell the stories of all soldiers in all armies—the men who go into the lines to fight and perhaps to die, and the men who sit in a rear area somewhere and pound nails out of used boards until they become a little mad.

Michael Whitacre, bright young man about Broadway, goes through most of his military career being confused. In the years from 1938 until Pearl Harbor he carries with him a nagging, nameless impulse to make the grand gesture, to quit Broadway and fight somewhere on the side of a civilization that desperately needs someone to fight for it. Yet he drifts, first into the Army via his draft board, then through a series of rather useless Army assignments, until he finally finds some justification for himself in the comradeship of the Infantry.

Noah Ackerman is Michael's opposite. A young Jew, dedicated to the battle against human slavery, he enlists after being rejected once on medical grounds. He then finds himself forced to fight a personal battle against anti-Semitism on the part of the men in the unit to which he is assigned. The author has hammed this up unmercifully, writing a bitter, incredible caricature of a sadistic, cowardly company commander and a most ridiculous scene in which Noah fights successively the ten biggest men in the company (all violent anti-Semites) in an attempt to gain the respect of the company. Noah eventually becomes a great combat soldier, dedicated to his cause, courageous, and selfless, an integral part of a good combat company.

Christian Diestl is the third of the trio, an Austrian who became a Party member because he felt keenly the fact of Germany's resurgence as a nation and his own uselessness to the cause as a skiing instructor in the Austrian Alps. Step by step he disintegrates from a first-rate soldier as the German Army retreats—across North Africa, up the Italian peninsula, across France, and finally across Germany. When the end comes there is nothing left of him but contempt for the amateur soldiers who had beaten him and an animal instinct for personal survival.

At last the wheel comes full circle. The three soldiers meet, late in 1945, in an Austrian forest, near the same mountains from which Diestl had started out in 1938. The German kills one last man, Noah, and is in turn then killed by Michael, who typifies the despised amateur soldier.

There is some wonderful writing in this book, descriptive sketches of Army camps and the bewildered people who generally inhabit them, sketches of men in battle, men in London or Berlin, men celebrating the liberation of Paris, men making love to their wives or to other men's wives. There is a theme that is meant to hold these scenes together, the theme of a destiny that will finally bring these three soldiers together for an accounting. Unhappily, in the enormous personal and geographical complexity of Shaw's sketches the theme is lost sight of for long passages at a time.

That is one fault with this novel. The other is that it is not a novel. A novel, to be worthy of the name, must be about people, and Shaw's three soldiers do not quite succeed in being people. They walk and they talk, but in the main there is no life to them. Occasionally they do become flesh and blood, but there are long, dreary passages between when they

are shadows spouting long, dreary, ideological dissertations.

The Young Lions is the more disappointing because of its flashes of greatness. Irwin Shaw has the familiarity with language and the technical skill to be a superb writer, but the range and scope of the work he has attempted here have obviously swamped him. One has the feeling that, if he had brooded over *The Young Lions* for a few years longer before he started writing, the result might well have been an achievement of classic proportions. As it stands it is good reading, but the reader finishes the last page feeling cheated, as if he had been expecting a steak dinner, and had gotten hamburger.—O. C. S.

D. C. Guide

INTRODUCING WASHINGTON, D. C.: A Pictorial Guide Book. By Clara Bishop MacIntyre. Anderson House, 1948. 73 Pages; Maps; Illustrated; $3.00.

This is far and away the best of the Washington guidebooks currently obtainable. The author obviously knows and loves the town. The beautifully reproduced photographs are as fine a collection as we have seen in a long while, selected with a real feeling for the charm and grandeur of the city.

The tours are simply laid out and overlook nothing, even to the recommendation of good restaurants near their termination points. The list of things to do, places to go, and where to find things, from the best ice cream in town to places to repair dolls, from what to do with your old clothes to where to find baby sitters, is a particularly valuable section of the book.

Washington residents will have a copy in the house to lend to visitors; visitors, whether for a day or for permanent residence, will find a copy a valuable book in their wanderings around the spread-out metropolis.

Three dollars seems like quite a stiff price for a book of this size, and it probably is, but limited circulation and expensive illustrations account for the apparent overpricing.—A. S.

Spain's Stand

ENTRE LES PYRÉNÉES ET GIBRALTAR: Dix Ans de Politique Espagnole. By Serrano Suñer. Constant Bourquix, Editeur. Bibliotheque du Cheval Ailés, Genève. 337 Pages; $4.00.

Considering its secondary role, Spain's part in World War II has received a remarkable amount of attention. The reports by Ambassadors Hayes and Hoare have been followed by the publication of a number of key German documents on the part of the State Department and the Russian State Archives and finally by Dr. Feis's elaborate study utilizing the entire German, Italian and Allied material available.

Yet while the struggle of the two opposing coalitions in and for Spain had thus been extensively illuminated, Spain's own position in that struggle still remained in the dark. It is therefore fortunate that the man best able to supply that missing element, Serrano Suñer, Franco's brother-in-law and Spanish Foreign Minister during the crucial period from October 1940 to September 1942, should have decided to break his long silence and give us his point of view.

But Señor Suñer has not seen fit as yet to give us the exhaustive documented account of his stewardship, which he promises for a later date, but merely a preliminary reply to some of the criticisms directed against him. Thus, after a brief account of his use as liaison man between his brother-in-law and the Party, he gives us merely a series of selected sketches of some of the most important events in which he participated: his visit to Rome in June 1939, on the eve of World War II; his trips to Berlin and Berchtesgaden in September and November 1940; his and Franco's meetings with Mussolini at Bordighera and with Pétain and Montpellier in February 1941.

Fragmentary as the account remains —the decisive meeting between Franco and Hitler at Hendaye in October 1940 is just as completely omitted as any reference to Suñer's fervid pro-Axis activities in 1941 and 1942—it is not without value. It does give for the first time the Spanish point of view, however much adapted to subsequent developments. It corrects a number of inaccuracies in Sir Samuel Hoare's book. It presents of those events Suñer cares to discuss a more comprehensive and intimate account than we have had so far. Finally, Señor Suñer, revealing more sensitive perception than one would have suspected in a man of his narrow rigidity of outlook, has delineated to us a series of pen pictures of Mussolini and Ciano, Hitler and Ribbentrop worth close attention.—Herbert Rosinski.

Japanese In America

AMERICANS FROM JAPAN. By Bradford Smith. J. B. Lippincott Company. 409 Pages; Index; Illustrated; $5.00.

The first Japanese we know about who lived in the United States was a man

named John Mung, a shipwrecked sailor who was rescued and brought here by an American sea captain in 1841. Other Japanese followed John Mung, first to the Hawaiian Islands, later to California. It has taken just a shade over a hundred years to convince some of the American people that the whole kaboodle of them shouldn't be shipped back to Japan, and the battle is not over yet.

This is the sorry story that Bradford Smith has to tell. It is a story of justifiably bewildered people, people who were eagerly sought as cheap labor in the early days of their immigration, and then reviled as "the yellow peril" when they sought to better themselves. It is a story of people who, by nature and training, valued above all else the family and community group, and who withdrew even more completely into their own small community units when it became plain that they were not welcome in the Caucasian community. Not until their sons and daughters, the Nisei, American citizens by birth, began to come of age and break away from the Japanese community was there a beginning of any understanding between the two groups.

Mr. Smith has divided his book into two sections, one dealing principally with the history and sociology of the Japanese element in Hawaii, the other dealing in a like manner with the group in the United States. In general the Hawaiian Japanese-Americans have fared considerably better than their fellows. Although the change has been slow, the Islanders have been largely assimilated into the over-all social and economic group. More and more of them are able to get jobs commensurate with their education and abilities. The Mainlanders have had and are still having a harder time. Young men who are graduate scientists and engineers are obliged to go back to farming or domestic service to make a living. Life on the West Coast especially is still not too happy for them.

By and large, however, life is better now for the Nisei. Their record in World War II, both in the Pacific, where they served as interrogators, translators and intelligence specialists, and in Europe, where they made up the tough, hard-fighting 442d Combat Team, earned them the respect of most Americans. This reviewer, who served with them in the 442d, knows even better than Mr. Smith the price they paid for that respect.

The fact that they fought as they did bears eloquent testimony to the fact that these people want more than anything else to be recognized as Americans rather than as Japanese-Americans. This is especially true in the case of the Mainlanders who had visited upon them by our military and political systems in the persons of General DeWitt and the Dies Committee, one of the cruelest persecutions ever forced on any people within our borders. I refer, of course, to the wartime evacuation of all Japanese, citizens and aliens, from our West Coast. This program, through mishandling and through greed on the part of private citizens to whom the evacuees entrusted their property, cost many of them the fruits of a lifetime of toil. And it is a further blot on our record that, when the federal government lifted its exclusion order, many of the evacuees who tried to return to the West Coast, met with a well organized campaign of terror to keep them out.

Much of this is history now. The Nisei and their children, the Sansei (third generation), have settled in widely scattered places throughout the country: the old West Coast concentration is breaking up. In Hawaii, where there was never a great deal of discrimination their prestige is greater than it has ever been.

Mr. Smith has written an excellent study of our Americans of Japanese ancestry. It is well documented and handled in scholarly fashion, but not in a scholarly style. His writing is light and easy to read. He has tried valiantly to be impartial, and if he has erred it is on the side of the people of whom he writes. This reviewer could not, however, discover any deliberate or serious distortion of fact in the text. Anyone who is interested in our Japanese-Americans as citizens or who would like to know the background of some of World War II's greatest fighting men, can hardly do better than to read *Americans from Japan*.—O. C. S.

The Early West

THE SHINING MOUNTAINS. By Dale Van Every. Julian Messner, Inc. 407 Pages; $3.00.

Here is a story of the American fur traders, mountain men, and pioneer settlers who flooded across the Mississippi into Louisiana Territory at the beginning of the nineteenth century.

For a hundred years and more the Territory had belonged to France. For another fifty years it had been ruled by Spanish governors from Mexico city. During the Napoleonic Wars French armies overran Spain and set up a puppet government which ceded Louisiana back to France. To forestall probable British seizure of New Orleans and St. Louis,

Napoleon sold the entire territory to the United States at a bargain price. President Jefferson sent Lewis and Clark up the Missouri to explore the newly acquired domain, and set up an American territorial government at St. Louis.

Spain, now freed from French domination, insisted that the sale was illegal and Spanish soldiers were sent from Mexico to uphold Spanish sovereignty. Meantime traders from the Hudson's Bay Company were setting stiff competition for French, American, and Spanish traders. Then the War of 1812 broke out, and British forces, having driven an invading American army out of Canada, crossed the border at Detroit and threatened to advance against St. Louis.

The fur trade was big business, the principal industry of the Territory and a desirable prize for the three competing nations, neither of which gave any consideration to the prior rights of the Indians who actually occupied the land. Shrewd and powerful leaders of the Sioux, the Mandans, the Pawnees, and the Blackfeet, attempted to reap the advantages of commercial relations with white traders while keeping pioneer farmers from settling on their lands.

The Shining Mountains were the Rockies, the goal of fur traders and settlers whose canoes and river boats ventured up the Missouri from St. Louis. The adventures of a young man who started as a hunter for the Lewis and Clark expedition and later became a successful fur trader, provide a theme around which Mr. Van Every has written an interesting historical novel.—Col. Presley W. Melton.

Brief Reviews

THE ART OF CONFERENCE, Revised Edition. By Frank Walser. Harper & Brothers. 206 Pages; Index; $3.00. A revised edition of a standard reference work for all who participate in group conference work.

BRASSEY'S NAVAL ANNUAL, 1948. Edited by Rear Admiral H. G. Thursfield. The Macmillan Company. 538 Pages; Illustrated; $6.00. The 59th annual edition. Includes the full text (in English) of the German naval archives released in 1947.

MUNICH: Prologue to Tragedy. By John W. Wheeler-Bennett. Duell, Sloane & Pearce. 507 Pages; Index; Illustrated; $5.00. A British historian reviews the steps leading up to Munich and preparing the way for World War II.

FIGHTING CRIME. By Captain Burr W. Leyson. E. P. Dutton & Company. 193 Pages; Illustrated; Index; $2.50. How the New York City Police Department operates.

MIRROR FOR AMERICANS: Japan. By Helen Mears. Houghton Mifflin Company. 329 Pages; Appendix; $3.50. A study of our relations with Japan, past and present, with special relation to the occupation.

DIXIE RAIDER: The Saga of the CSS *Shenandoah*. By Murray Morgan. E. P. Dutton & Company. 336 Pages; Illustrated; $4.00. This was the ship that almost ruptured relations between the United States and Great Britain after Lee's surrender.

WORDS INTO TYPE. Based on Studies by Marjorie E. Skillin, Robert M. Gay and other authorities. Appleton-Century-Crofts. 585 Pages; Index; $5.00. "The present-day rules and standards of usage covering every step in the preparation of printed material from the manuscript to the printed product."

SHORT NOVELS OF THE MASTERS. Selected and with an Introduction by Charles Neider. Rinehart & Company. 643 Pages; $4.00. A new anthology containing Melville, Dostoyevsky, Flaubert, Tolstoy, James, Chekhov, Joyce, Mann, Kafka, Lawrence.

CALIFORNIA. By Josiah Royce. Alfred A. Knopf, Inc. 409 Pages; Index; $4.00. A classic account of the early days of the state and a study of American character.

EDUCATIONAL LESSONS FROM WARTIME TRAINING. By Alonzo G. Grace, Director, and Members of the Staff of the Commission on Implications of Armed Services Educational Programs. American Council on Education. 265 Pages; Illustrated; $3.00. A study of the accelerated wartime and military teaching programs.

THE WORLD'S GREAT OPERAS. By John Tasker Howard. Random House. 488 Pages; $2.95. The entire repertoire of musical drama from the 16th Century to the present time briefly and clearly summarized.

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