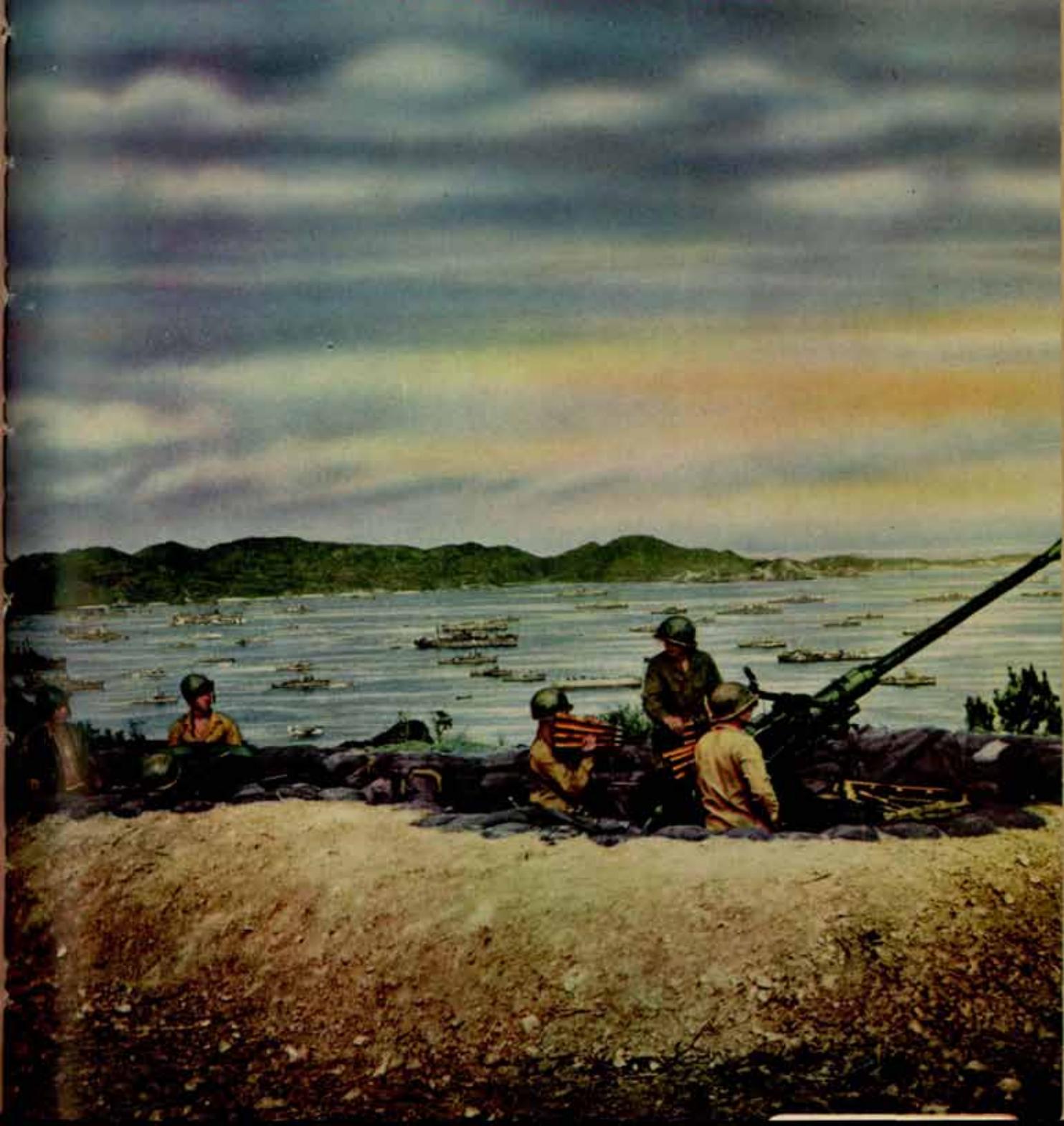


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CAC Has a Definite Future

By Lieutenant General LeR. Lutes*

Probably the foremost question in the minds of CAC officers today concerns the future destiny of the Coast Artillery Arm. The continued interest of officers no longer on active duty is a natural result of their long and active participation in the outstanding accomplishments of the CAC during World War II. For those who expect to continue in the service, the question is particularly important because it intimately concerns their future individual careers.

Unfortunately, there seem to be some who are dubious about the future of the CAC, and differing opinions have been offered as to our proper place in the future postwar Army. While some of us, who have served as Coast Artillerymen for many years, understand quite well the reasons for the present feeling of uncertainty on the part of a number of our officers, I personally feel completely assured that we of the CAC will in the future be called upon for even greater contributions to our national defense than in the past. The present situation, wherein our weapons that served us so well in the war just concluded are being temporarily outmoded, should not cause us to feel that our rôle has become less important. Rather it should be accepted by us as a challenge to develop new and better weapons. In this endeavor, new scientific developments appear more favorable to our success than in the past when we successfully kept ourselves abreast of aeronautical developments.

It is well known that other countries intend to exploit and develop the possibilities of rockets and other guided missiles, with a view to their large-scale future use for both offensive and defensive purposes. The requirements for defensive purposes are so great in themselves that large expansions are already taking place in the antiaircraft organizations of some other countries, obviously in recognition that this rôle properly belongs to the antiaircraft.

It takes little stretch of the imagination to envisage a perimeter rocket defense of the United States and its industrial centers. We believe this will be an AA mission, requiring a special rocket of short range and of a velocity greater than any other missile; further, that it will be fired from the ground.

It seems likely that our Arm will become intimately involved in research and development necessary to this rôle, as well as in the testing and operation of the developed equipment.

Aerodynamics, propulsion, guiding and control, explosive and launching are the main scientific fields pertaining to the guided missile. Consequently it behooves all Coast Artillerymen to become familiar with these subjects as they apply to the weapon at hand. To accomplish this, the COAST ARTILLERY JOURNAL, through the Director of Research and Development of the War Department Special Staff, is enlisting the services of the foremost authorities in the United States.

It is anticipated that a specialist in each one of the fields will contribute articles for publication in the JOURNAL. These subjects will be presented in a manner which will be understandable to all.

Major General Leslie R. Groves, Commanding General, Manhattan Atomic Bomb Project, has consented to write an article for the JOURNAL on the application of atomic energy to guided missiles. General Groves was the driving force behind the \$2,000,000,000 "calculator risk" which he directed to successful

completion in three years, as one of the world's greatest scientific and engineering achievements—the large-scale tapping of the energy within atoms to produce a new weapon of war.

Dr. Theodore von Karman, Professor of Aeronautics and Director of the Guggenheim Aeronautics Laboratory, California Institute of Technology, has consented to write an article for the July-August issue. Dr. von Karman is one of the foremost authorities in the world on aerodynamics and his contribution to the JOURNAL on this subject should be of great interest.

As President of the Coast Artillery Association I would like to appeal to all former members of the Coast Artillery Corps to maintain their military relationship by joining the Association. There is no membership charge unless a subscription to the COAST ARTILLERY JOURNAL is desired. The charge for this bimonthly publication is \$3.00 annually.

Although we feel the JOURNAL most worthwhile, please do not be deterred from joining the Association simply because you do not wish to subscribe to the JOURNAL. Applications for membership may be forwarded to the Coast Artillery Journal, 631 Pennsylvania Avenue, N.W., Washington 4, D. C.

Both the Association and the JOURNAL exist for the sole purpose of serving the members of the Corps, so please do not hesitate to write to the Editor of the JOURNAL or the Secretary of the Association relative to any military matter under discussion or development.



*General Lutes is Commanding General of the Army Service Forces and President of the United States Coast Artillery Association.

On the Anniversary of D-Day

Omaha Beach is now two years away and the memory of what transpired there is no longer so starkly etched on my conscious mind. It is hard to realize that what I saw that day actually happened as I sit here in the shadow of the nation's Capitol.

No longer do I remember the sequence, only isolated instances stand out vividly in my reminiscence. Yet through it all is woven the knowledge that I saw American manhood in the hour of its greatest glory—not one but thousands of unselfish heroic acts were performed on that memorable day and beach.

I can distinctly remember talking to a young infantryman the afternoon of D-Day as he moved slowly down the road to the antitank ditch we were using as an aid station. "How far is the aid station?" was his first comment. I pointed it out to him and with that he moaned, "Jesus, that far?"

"Are you hurt badly, soldier?" I asked him and in response he turned around so I could see that his whole backside had been blown away. How he had ever walked that far was beyond me but on he went—it wasn't till the next day that I found out he had thrown himself on a grenade to save the rest of the squad and then had refused help from the buddies he had saved because he knew that every man was needed on the line.

There were humorous instances too of American tenacity of purpose and devotion to duty.

When our Rhino ferry first beached, I went up the hill to find an exit. On the way I passed two of my men talking.

One said, "I'm across that damn beach now and I wouldn't go back for a million bucks."

On the way back after finding the exit, I saw that the same two men were still there.

"I need two good men as guides on the beach. Will you two men come with me?" I asked them.

"Yes, sir!" they exclaimed in unison and away we went. No! they didn't have a million dollars but then again a million dollars wouldn't buy what they had.

I could go on forever relating many similar examples of the spirit of the American soldier in combat.

Fortunately grass now grows on the battlefields we once trod and the sound of the cannon's roar is now a faint whisper through the shell-torn walls but Americanism must not die with the battle. The same singular determination with which we attacked the west wall of Hitler's vaunted fortress must now be used to maintain and retain the unity of purpose so evident on D-Day.

Today we face controversies over the merger of the Army and the Navy; the destiny of the Marine Corps; the future of the National Guard and the Organized Reserve Corps and many other vital issues.

Have we forgotten that the Regular Army, the National Guard, the Organized Reserve Corps, and the Navy fought on one team during the war and that it was definitely a winning team? How can we permit this combination to collapse? We can't and it won't if we remember the unselfish gallantry of D-Day.

Let's not break up all this team play over nearsighted issues. Let's have once more the Americanism of D-Day.

D. MacG.

THE DECLINE OF THE

The Luftwaffe, the all-powerful German weapon of 1940, reached a state of impotency by the spring of 1945. In post-war interrogations, the Germans and even be-medaled Hermann Goering admit this fact. Statements and opinions of the Reichsmarshal are not without prejudice but the opinions of a still unnamed high-ranking German air officer prisoner, who seemed honest and sincere, give an interesting approach to the decline of the Luftwaffe.

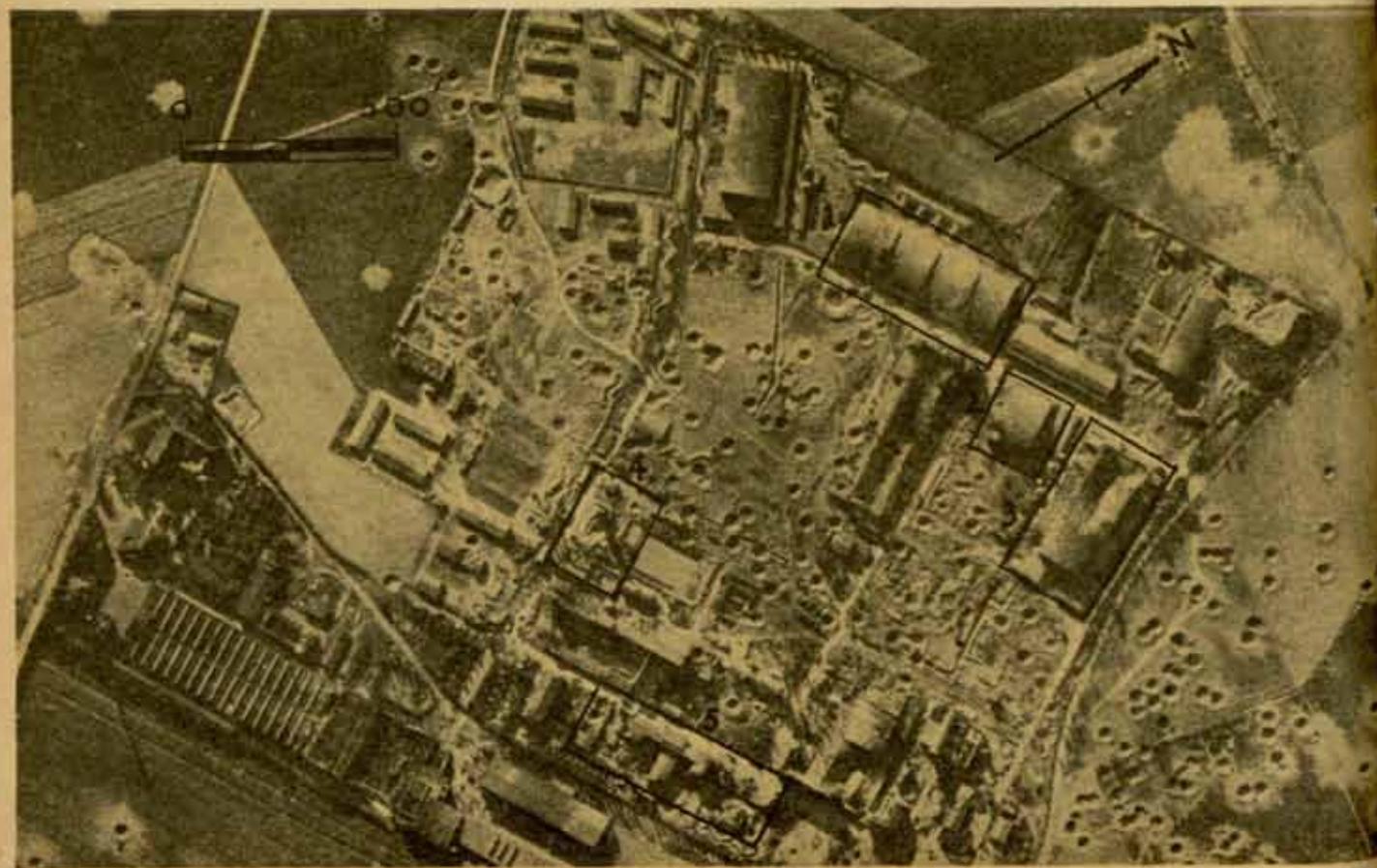
The prisoner served the GAF throughout the war as a pilot, Group Commander, and *Geschwaderkommodore*. In his opinions, he agrees with other students as to the cause of the Luftwaffe's failure. These were unwise decisions by the Luftwaffe high command and the inadaptability of mind for which the Germans are notorious.

After the GAF's success over Warsaw and Poland, over Rotterdam and Holland and in the battle for France, morale was at its highest. The airmen felt that theirs was the chief credit for the victories and they were eager to release their powerful force on Britain. These airmen felt that the Battle of Britain should be conducted by using the Luftwaffe to destroy Britain's shipping and thus cut her lifeline. The airmen's views were disregarded; the decision came down to bomb London instead and this was the first of a series of blunders which, in the opinion of the prisoner, cost Germany the war.

England recovered quickly after her initial reverses and displayed an adaptability which saved her life and produced a very efficient fighter force. In fact, her day fighters caused such high losses to the GAF that, according to the prisoner, Germany was forced to abandon day raids. Then followed a period of night raids which were continued by the Germans until Britain's night fighters were developed to the point where continuation of these raids likewise became too costly to the Reich.

In early 1941 the air battles in the East and Southeast provided England with a breathing space, during which the RAF further increased its fighter strength. This development of airpower was a distinct shock to the very confident Luftwaffe and forced it shortly to assume the defensive. In early 1942, England started her night raids on Germany. At that time the ME 110 was the only German fighter suitable for night fighting but the Germans did counter with new night defensive tactics.

At first the Germans employed belts of searchlights along the approach lanes to her occupied territory to provide illumination of enemy planes for her fighters, but this system did not prove very satisfactory. Next, restricted area night fighting was developed. This arrangement consisted of a belt of radio guide-beacons placed along the entire channel coast from Jutland to near Brest. GAF



Battered ME109 production center after 114-ton bombing raid.

GERMAN AIR FORCE

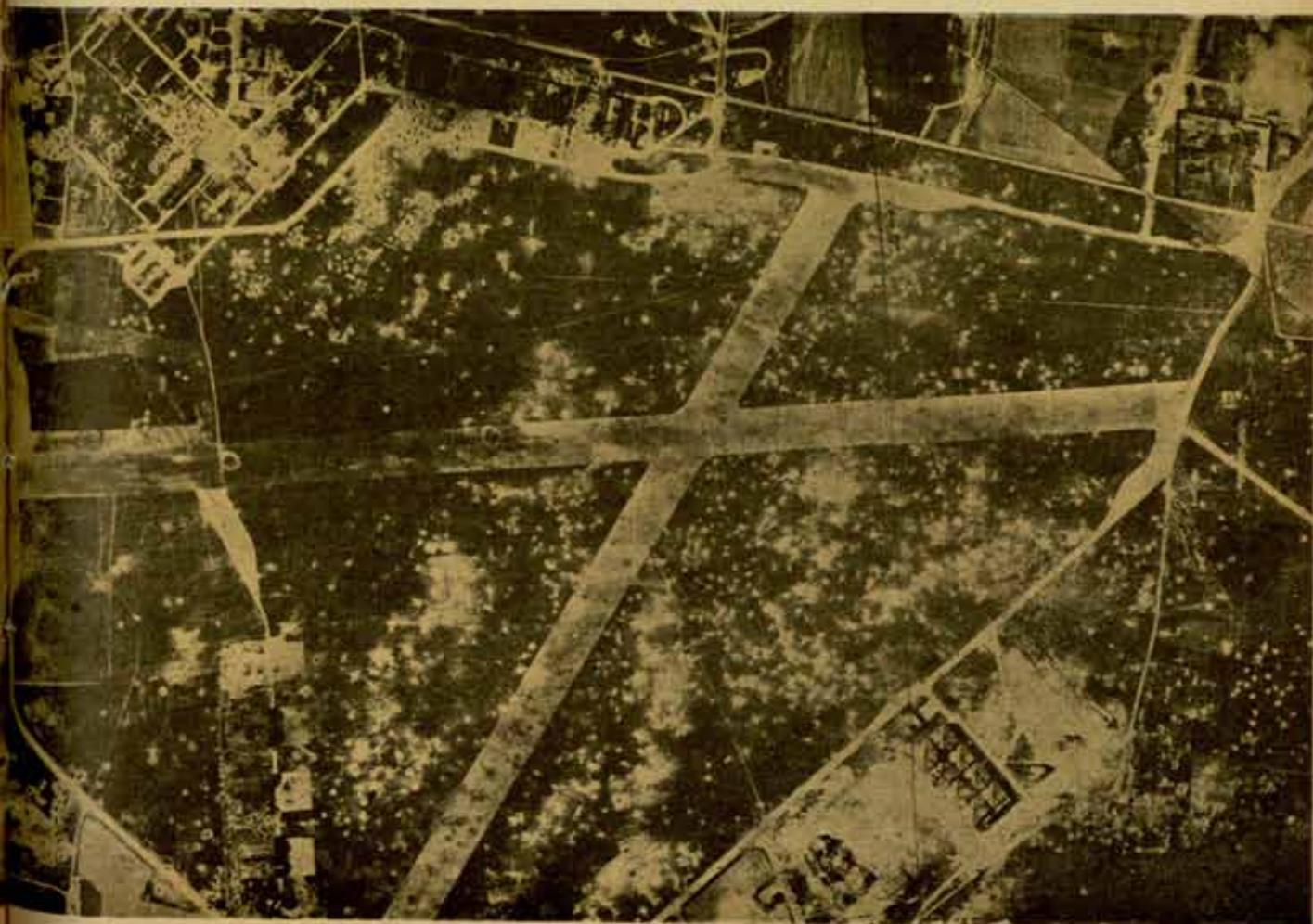
ight fighters, receiving instructions from the ground, patrolled in the area of these beacons in hope of blocking the RAF's entrance to the continent but the English counteracted these defenses by flying high and converting altitude into speed while passing through these areas. Then the British developed the saturation tactics—the technique of approaching in heavy concentrations at fairly low level. To combat this technique, the GAF developed free-lance night fighters equipped with radar. This represented the Germans' first use of airborne radar and the most successful period on the defensive; they were able to shoot down from forty to seventy British planes a night.

This temporary German success lasted only a few months, was costly and brought to a quick ending by the development of American air power in England from the summer of 1942 on. (Probably due to American bombings of German airdromes and the forced conversion of night fighters to day fighters to combat the American bombing attacks.)

As the Americans began to fly over occupied territory, Germany found herself with only 100 fighters to defend the entire coast from Heligoland Bight to Biarritz. These were far too few and were poorly armed. The ME 109, Germany's

standard fighter plane at the time, had only two 7.9mm guns and one 13mm gun. Only fifteen or twenty planes were dispatched at a single time to meet the ever-expanding streams of American planes. Requests for more planes for use in Europe were made and re-made but none came because of the situation in the East and in Africa. Even those in action had little success against the American Fortresses whose guns shot them from the skies and caused the loss of so many German fighters in a few months that an order came down prohibiting fighter pilots from attacking Fortresses. This was a great blow to fighter pilot morale. It was during this period the Germans discovered that it was impossible to attack a Flying Fortress from the rear.

When the Allies began making raids into the Reich proper—first to the Ruhr district, then the industrial areas of the Upper Rhine, then beyond the Main, Darmstadt, Ludwigshafen—the so-called defense of the Reich was initiated. This consisted of denuding the front lines in the South, the Southeast and the East and with newly assembled aircraft and pilots, forming seven divisions. At their peak, each division had from thirty to fifty operational fighter airplanes. To effectively use these fighters, a thoroughly re-



Charvigny Airdrome in France, captured by Army Air Forces Photo



Wreckage of Nazi aircraft litters an airfield after concentrated allied air attacks.

Army Air Forces Photo

liable ground control was developed. Under this control, the divisions received detailed reports about enemy raids from corps and from their own range-finding posts. As soon as the first aircraft took off in England and reached a height of 500 meters, the divisions received the report: "Assembly has started in England." The assembly was thereafter continuously observed until the planes started to cross the Channel. The line of flight was followed and decision was made as to the probable target or targets. The German planes then assembled at a designated point and headed in close formations of 30, 50, 100, or perhaps 150 aircraft towards the Allied planes. As soon as the formation sighted the Allied planes, the leader of the formation organized the attack in whatever manner seemed most favorable. This control was fairly easy as long as the Allies had no fighter escort. The first Allied attacks, which were without fighter escort, were easier to combat and enabled the ground control to direct the fighters much more efficiently than in later periods. The Germans' greatest success at this period occurred during the raid over Schweinfurt. The report of the number of planes shot down, 140, was greatly exaggerated however by the Germans; in fact, only sixty-eight destroyed planes were actually found in the Reich and the occupied countries.

Why did the Germans meet with such little success during the period of the "Defense of the Reich"? Germany had 250 to 300 fighter aircraft available, plus long-range fighter bombers; yet the Allied bombers were not stopped.

The prisoner attributed the failure of the "Defense of the Reich" to a number of causes. The German fighters did not meet the huge waves of Allied planes with an equally large number of fighters and the result was a series of dog-fights at random in which German fighters were usually shot down. Even the installation of rockets on GAF fighters did not materially increase their effectiveness because the fighters had no sights to determine ranges accurately. After considering this fact, Goering ordered fighters to close to 400 meters before firing and to attack Flying Fortresses from the rear. This order resulted in the slaughter of German fighters; fifty to seventy per cent never returning from engagements. Although the order remained in effect, the pilots

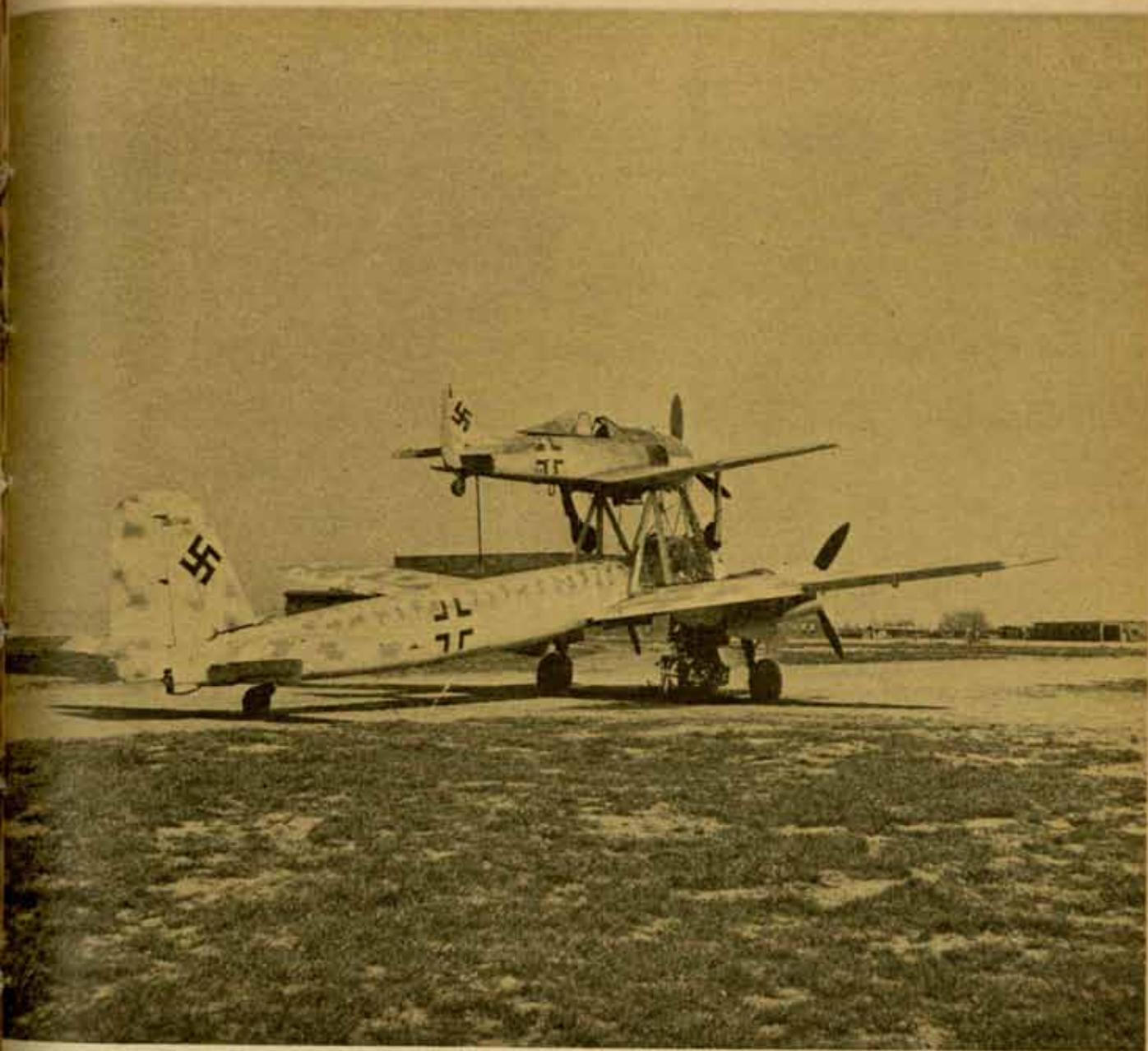
finally openly disobeyed it. An order was also in effect to only attack bombers. The pilots wanted to attack Allied fighters to put them on the defensive but the order to attack bombers only, was inflexible and resulted in Allied fighters always having the advantage over German fighters seeking Allied bombers. Before long, GAF fighters were never able to reach their target and consequently the pilots felt the planes were inferior to Thunderbolts and Mustangs. The prisoner stated that German fighter morale collapsed at that time. Meanwhile, ground control stations continued to send fighters to attack Allied bomber formations only when they were without fighter escort.

With notable disgust the prisoner related incidents of misdirection of jet-fighter employment by the GAF High Command. The ME-262, a jet-propelled plane, was originally designed as a fighter and pilots were trained accordingly. Suddenly the High Command directed that it be used as a tactical bomber. This experiment was unsuccessful because the plane had no bombsight and erratic bombing results. Later the High Command ordered the plane to be used as a fighter only but this decision came too late in the war to be of benefit to GAF. Another type of jet-fighter, the ME-163, had only seven minutes of propulsion, during which time the plane was not maneuverable. After losing power, it glided and became extremely vulnerable to attack. The ME-163 was employed extensively in the Leipzig area but the effect was totally negligible. Losses with this plane were very high, partly due to its vulnerability and partly due to the fact that it frequently exploded or caught on fire.

In November 1944, Germany achieved the production of 4,000 fighter planes a month by discontinuing production of all other types of aircraft. However this great quantity of production was of low quality because the planes were manufactured under the most unfavorable conditions. During training on these planes, many pilots and ships were lost with consequent loss of confidence in the plane.

The Allied bombing of the ball-bearing industry resulted in the use of sleeve bearings which led to a great amount of engine trouble.

Thus said the prisoner, the war was lost not by



Pick-a-back Junkers 88 with Focke-Wulf 190 mounted on top. A Rube Goldberg solution.

... or Allied strength, but by the failures of the GAF. He holds the German High Command responsible for the failure, because of its lack of foresight, because of its lack of adaptability and because of lack of flexibility. He believes that at the end of 1942 the High Command should have realized that the war with Russia was not finished, that the Luftwaffe would have to reckon with the ever-increasing strength of the American Air Force and that industry should have concentrated on the production of fighters. He stated that even as late as the middle of 1944 Germany could have produced a fighter force of 4,000 planes. With a force of this size, according to the prisoner pilot, the German Air Force could have prevented planes from ever reaching the Reich. As it was, a concentrated fighter program did not get under way until the end of 1944—then it was too late. The peculiar attitude of this prisoner concerning the closing days of the war should be noted. His attitude is one of pride and confidence in the skill and courage of the

German combat pilot and he seems to believe that Germany was entirely capable of producing, operating, and maintaining an air force superior to all others. He gives little credit to the strength and efficiency of Allied Air Forces and no credit at all to the air defense systems of the Allies which accounted for not a few German planes. He is consistent with other officers in his criticisms of the High Command, particularly of Goering. The tenor of his entire recital seems to bear out the statement of a German AA officer who commanded an air defense division, "Goering knew that he did not know the score and he knew his subordinates knew that he did not know." Regardless of the justification of the prisoner's criticism of Goering and the High Command, his attitude of confidence in the ability of Germans as airmen and his feeling that *if we could do it over we would win* are worth remembering. These are Nazi characteristics which should never be forgotten and are indicative of the sentiments of many other Germans.

Capabilities and Limitations

By Lieutenant Colonel L. M. Orman, Coast Artillery Corps

Editor's Note: This is the third of a series of articles by Lieutenant Colonel Orman who is now an instructor in the newly reorganized Department of Electricity and Electronics at the United States Military Academy. Prior to this assignment he was connected with the Communications and Electronics Branch, Development Section, Headquarters, Army Ground Forces and is a graduate of the Army-Navy Radar School at Harvard and MIT.

Since the introduction of radar sets to army ground force use several years ago a great deal of misunderstanding has arisen about this new supplement to our weapons. The greater part of this misunderstanding is due to the fact that radar information was in the classified category until the close of the war and the capabilities and limitations of it were not always understood by the user. It is with the purpose in mind of removing the curtain of mystery surrounding radar from the user's viewpoint that this article is written. No attempt will be made to evaluate the effect of unusual weather conditions nor the limitations imposed by enemy countermeasures as these subjects are broad enough to require separate treatment.

It is true that radar supplies us with eyes in the night to a certain extent and will do many other things, but the gentleman who is suing the U. S. Government because radar operators were projecting dreams on him during the night and the T/4th who asked to be relieved from radar assignment because his wife thought that it would make him sterile are not aware of the truth about radar. (For the reassurance of the T/4th's wife and other anxious people, radar waves, unlike X-Rays, have no apparent effect upon the human body. This has been proven by medical research both in Hawaii and in the U. S.)

This subject will be discussed under the following four headings:

1. Capabilities of Radar.
2. Limitations Imposed by External Factors.
3. Limitations Inherent in Radar Equipment.
4. Operational Limitations on Radar.

PART I

CAPABILITIES OF RADAR

Radar equipment is capable of detecting the presence of objects in the air and on the surface and of measuring their range, azimuth, and elevation—under certain conditions. Radar cannot locate completely submerged submarines.

Ground Force Radar sets may be grouped generally into three classes:

(1) Search

(2) Fire Control

(3) IFF

These classes may be further subdivided as follows:

(1) Search

- a. Air Search including long range or early warning and medium range.
- b. Surface Search.
- c. Mortar Detectors.

(2) Fire Control

- a. Antiaircraft.
- b. Surface.
- c. A combination of Antiaircraft and Surface.
- d. Searchlight control.

(3) IFF—Identification of Friend or Foe.

Since radars are not capable of distinguishing friendly from enemy plots, IFF equipment either operates with radar set or is built into the set. Since IFF equipment is usually considered as auxiliary to radar sets it will not be further discussed here.

Various sets have been built which will perform either search or fire control, e.g., Radio Set SCR-584 and Radio Set AN/MPG-1 were designed primarily as fire control sets but they have sufficient range and presentation to enable them to be used as search sets. Radio Set SCR-682 is primarily a search set but when modified by the addition of Precision Plan Position Indicator, called a PPI, operates with sufficient accuracy to allow its employment as a fire control set.

The requirements for each of the several types of radar differ widely. Search sets need only a fair amount of precision and a long range since their primary function is warning. Search sets should have a high degree of resolution (selectivity) to enable targets to show as separate indications. As will be shown later the requirements of long range and high resolution are somewhat incompatible. Fire control sets must be able to determine range, azimuth and altitude with a precision greater than that of the guns which are used in order to achieve destructive gunfire, and the radar should be capable of distinguishing between two very close plots thus permitting spotting.

Different types of radars are therefore designed with fundamentally different characteristics to allow them to perform their primary function best, generally at the expense of other functions. Thus, in present air search radar, some sacrifice is made of effective range at low altitudes and of degree of resolution between targets in order to enable the set to detect aircraft at very long ranges. Surface Search radar is able to detect both vessels on the surface of the ocean and low-flying planes but is unable to detect aircraft at high altitudes since its antenna will not elevate.

APPLICATIONS OF RADAR AND ASSOCIATED EQUIPMENT

Although each radar is designed for one primary function

*AUTHOR'S NOTE: For helpful suggestions and a critical review grateful acknowledgment is made to Doctor J. R. Ragazzini, Columbia University and to the many anonymous authors of service manuals and publications who unknowingly assisted in the preparation of this treatise—

s of Ground Force Radar

Other applications will undoubtedly be found as experience is gained and newer sets offer new possibilities.

1. Air Search—Radio Set SCR-270, Radio Set SCR-271 and other Service Force Sets.

Warns of approaching aircraft, so that AA defenses may be brought to the proper degree of readiness in sufficient time.

2. Surface Search Radar Equipment—Radio Set SCR-682.

Warns of the presence of enemy surface craft that are beyond the visible range at night or during conditions of poor visibility so that enemy surprise is averted.

Coaches fire control radar to enable it to get on target quickly.

Acts as auxiliary fire control radar in conjunction with a P²I.

3. Antiaircraft Fire Control—Radio Sets SCR-584, SCR-784.

Supplies smooth, accurate ranges, azimuths and elevations to a computer.

Obtains meteorological data by observing the movements of balloons equipped with radar reflectors.

4. Surface Fire Control Radars—Radar Sets AN/MPG-1, AN/FPG-1, and AN/FPG-2.

Supplies accurate range and azimuth data to a computer or plotting board.

Supplies spotting information to the plotting room.

5. Searchlight Control Radar—Radar Set AN/TPL-1

Furnishes range, azimuth and elevation to searchlights.

6. Recognition Equipment—IFF

Identifies on the radar screen the echoes from friendly aircraft and ships by returning a coded response.

INTERPRETATION OF ECHOES

The pips that appear on a radar indicator show only the presence of target within the field of view of the radar. The position of the echo signals on the screen indicates range and azimuth. The pips do not of themselves reveal any other information to the inexperienced operator. However, after some experience, a good operator is able to interpret what he sees reliably and often with a surprising degree of detail. To an untrained operator the echo from one ship looks like the echo from any other ship. However, with proper training the operator will often be able to estimate the type of ship detected. In fact, it has been reported that after the same group of ships had operated together for a long time one operator could name several of the ships simply by observing the characteristics of their echoes.

CHARACTERISTICS OF PIPS

In general there are four characteristics of pips that may be used as useful information:

- (a) Size of pip
- (b) Shape of pip
- (c) Fading or fluctuation in height
- (d) Movement in range and bearing

Operators can distinguish between land, airplanes, and ships and perhaps estimate both the type and number of targets in a group by observing these characteristics of the echo signals.

The size of the pip depends upon a variety of factors, so that reliance cannot be put in observation of this factor alone to estimate the type of target. However, since the size of the echo returned from a target at a given range depends on the magnitude of the target, the size of the echo may often be useful in indicating which targets of a group are large.

Large targets can obviously be picked up at longer ranges than smaller ones. The range of first pickup may be used as a basis for estimating the type of target detected.

The shape of the echo is very useful as an indication of how many targets are in a group. In a formation of many planes, for example, the echo will spread over a long range and on an A scope it will have many peaks. On a PPI scope the shape and size of an echo may be such that the target could not be anything other than a cloud or a storm.

The amount and peculiarities of the fading of an echo pip often indicate the nature of the target. The echo returned from an airplane flutters rapidly and irregularly. This characteristic alone is often sufficient to enable the operator to select airplane echoes from others on his scope. A large ship generally produces a pip that bobs up and down slowly while the echo from a small vessel flutters rapidly, especially in a rough sea.

Plotting radar contacts over a period of time enables the course and speed of the target to be determined. Correlation of speed with the rate of flutter and other characteristics of a pip frequently enables an estimate to be made of the type of target. It is fairly easy to distinguish between balloon borne decoys, such as used by the Japs, and real aircraft by this method.

TYPE OF INDICATOR

Because the antenna must rotate continuously to produce a PPI presentation the beam is never on a target long enough to allow the flutter of the echo to be apparent. The limiting of the echo signals that takes place before they are applied to the PPI tube removes most of the flutter that would tend to show. Consequently, practically no flutter shows on a PPI screen, so that this characteristic cannot be observed as an aid in interpreting the echo. An advantage of the PPI scope is the fact that both range and azimuth are shown, enabling the disposition of a group of targets to be shown. In the event that the disposition of the targets and the resolution of the radar do not permit the separation of individual targets the A scope may permit a more reliable interpretation to be put on the pip. A stoppage of the antenna on the target will enable an observation of the number of peaks and the type of flutter. However, this method is not reliable.

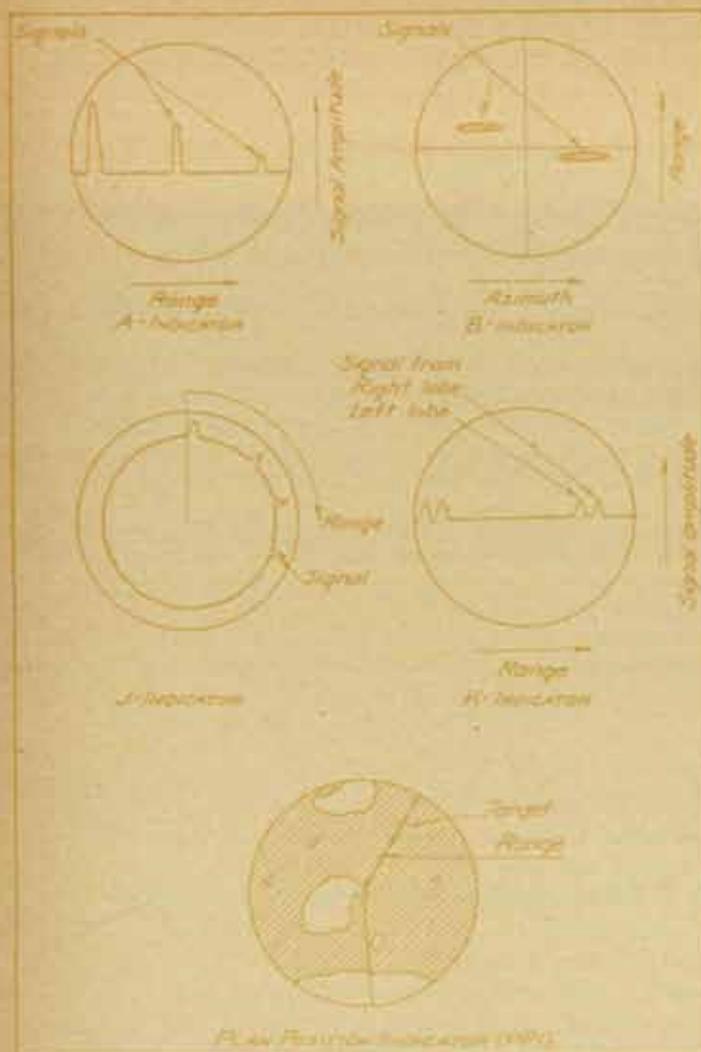


Fig. 1. Most commonly used types of radar indicators.

under combat conditions from the point of view of searching, as undetected targets may approach in the unobserved sectors. Minor variations are more easily observed on a scope with an expanded sweep. In addition, improved resolution is possible on expanded sweeps.

A knowledge of the operating characteristics of a particular radar set is necessary before the capabilities or the limitations of the set can be appreciated. A knowledge of the antenna pattern forms the basis for estimating the azimuth resolution and it gives some indication of the possible azimuth accuracy. A knowledge of the indicators and range scales available should be helpful in appreciating both the range accuracy and the range resolution of which the set is capable. There are properties inherent in a radar that limit the precision with which data can be measured. If only these factors are considered, a very optimistic picture of the accuracy of a radar will be obtained. Additional limitations imposed by operating conditions may reduce radar accuracy considerably. For example, if both radar and target are absolutely stationary, it can be demonstrated that the azimuth of the target can be determined repeatedly by relatively unskilled operators within a margin of error of perhaps 2 mils. It might then be concluded that the azimuth accuracy of the set is plus or minus 1 mil. However, when a target is moving at 500 miles an hour the horse changes color and even the

most skilled operator may not be able to obtain data more accurate than 10 mils.

PART II

LIMITATIONS IMPOSED ON RADAR BY EXTERNAL FACTORS General—

If it is assumed that radio waves travel along perfect straight paths, the curvature of the earth prevents the straight rays from striking objects that are beyond the horizon. If the height of the antenna is increased, the point at which the lowest radiated ray is tangent to the curve of the earth is made more remote. That is, the horizon is extended. An object beyond the horizon can be seen if it is high enough that the ray tangent to the earth can strike it. Radio waves like light waves are bent when they pass through a non-homogeneous medium like the atmosphere. Since the water vapor in the atmosphere bends radio waves almost twenty times more than light waves, the distance to the apparent horizon for a radar set is approximately 15% greater than the distance to the optical horizon. It has been found that if the radius of the earth is considered to be $\frac{1}{3}$ again as large as the actual radius then the radar rays may be drawn as straight lines when propagation conditions are standard. Due to the effects of diffraction, radar transmitted pulses may be intercepted by enemy receivers beyond the radar range.

Not all of the radar waves travel to the target in straight lines. Hence, energy arrives at the target at the same time from different paths. The effect of this phenomenon is to cause complete cancellation at certain points in the field. These points are called nulls. Thus, the result of reflection of radar pulses from the sea or other reflectors is to break the vertical antenna pattern into many rather narrow lobes which are separated by the nulls. It would appear possible for a plane with a suitable intercept receiver to fly down a null by keeping in the region of minimum signal strength, thus remaining undetected until it reached a very close range. The Japanese attempted this maneuver with partial success. This double path of travel actually almost doubles the range at which a target may be detected since the pulse energy which can get to the target by the two paths is stronger than that which reaches it by the single direct path.

ANTENNA PATTERN

The width of an antenna beam in either the horizontal or vertical dimension is determined by the width and height of the radar antenna in wave lengths. Very narrow beams can be produced practically, therefore, only at very high frequencies.

The sharper the beam, the more concentrated the energy and therefore, the greater the range obtainable with a given amount of transmitted power. The narrower the beam, the greater the azimuth accuracy and azimuth resolution possible. Thus low-frequency radars have relatively poor azimuth accuracy and azimuth resolution because the antenna beam cannot be made very sharp. Although a radar antenna is highly directional, not all of the radiated energy is confined to the principal beam. Some energy, usually one percent or less of the main lobe, is radiated in all directions, in spite of the fact that the radiation far off the axis of the main beam is so small, it is still sufficient to produce str-

echoes from large near-by targets. Many a round was fired at galloping ghost targets off Oahu, caused by side lobe echoes from a near-by mountain. The cosecant squared beam antenna used with some Radio Sets SCR-584 produces an especially broad beam in the vertical direction so that a large area can be scanned thoroughly.

ATTENUATION OF TRANSMITTED PULSE

The atmosphere does not appreciably weaken radar waves if the wave length is above 10 centimeters. However, the attenuation caused by absorption becomes increasingly more important as the wave length decreases. There is a noticeable decrease in range to approximately 50% of maximum during many weather in some of our shortest wave length sets. This is a definite limitation on the shortening of the operating wave length of radar sets.

EFFECT OF TYPE OF TARGET

Radio frequency energy is reflected to some extent at any surface that presents a discontinuity. Reflection takes place best from a plane surface at right angles to the radar beam. Since a metal surface presents a very great discontinuity, it sends back a strong echo. Although the best echoes are obtained from conducting objects, non-conducting targets will also return an echo. Thus echoes are sometimes received from wooden boats, birds, fish and clouds, especially with microwave radar. Sea gulls caused some anxious moments in the early days of the war. The amount of energy reflected back to the radar is nearly proportional to the effective area of the target as long as the target is large compared to the wave length of the transmitted energy. Very small targets, such as submarine periscopes and small buoys, can therefore be detected at much greater range with microwave radar than with long wave. Large targets, such as high mountains, can be detected at very long ranges with all types of radar.

A radar target is never a single point. If it is a large object, it is composed of a number of variously oriented surfaces and corners, each of which is responsible for a little of the echo returned from the target. As the target changes aspect the echo power may vary by a factor as much as 100. Since airplanes change aspect more rapidly than other types of targets, airplane echoes fluctuate more widely and more rapidly than other types of targets. Ships in a heavily rolling sea may also present rapidly fluctuating echoes.

A special case of reflection takes place when radiation is directed at an object composed of two plane reflecting surfaces which are at right angles. Such a reflector is called a corner reflector. A reflector of this sort will produce a very strong echo on a radar because the energy that strikes the corner is reflected back directly to the radar without the successive scattering that occurs with most targets. Metal corner reflectors are used often as artificial targets. They are also borne aloft on aerological balloons that are tracked by radar, on special radar buoys, as artificial targets for use in resighting radars and in target sleeves. Targets which are rounded, as opposed to a corner reflector, so that no surfaces are perpendicular to each other probably will be hard to detect by radar.

STORM DETECTION

As microwave radars have come into general use in recent years the cloud or storm echoes that are frequently seen on

the indicators have attracted attention. The possibility of using microwave radar as an aid to meteorological forecasting was recognized and it is now being put to operational use.

PART III

LIMITATIONS INHERENT IN RADAR EQUIPMENT

a. Determination of Range by Radar

The maximum range at which targets can be detected by radar is affected not only by many characteristics of the equipment itself, but also by the operator and other external factors. Thus the peak power transmitted by the radar, the duration of the transmitted pulse, the pulse repetition rate used, the efficiency of the lines that carry the pulse to the antenna, the height of the antenna above the water, the width of the lobe radiated from the antenna, the sensitivity of the radar receiver, and the type of indicator used in the set are a few of the most obvious characteristics of the equipment that affect range performance. Other factors external to the set at times exert a strong influence on the performance of the set. Among these are the skill and experience of the operator, the size, composition and altitude of the target, the effect of reflection from the water and the condition of the weather.

If the peak power transmitted by a radar is great, the power available for reflection back to the radar at any target that the pulse can reach will be greater than if a low-power pulse is sent out. However, a doubling of the peak power of a set does not double the maximum range obtainable on a particular target; it increases the range only 20%. The full effect of pulse duration on maximum range is not thoroughly understood. It is apparent, however, that greater range can be obtained with a long pulse than with a short one. An increase in the repetition rate of the radar will aid in distinguishing the echo from the "noise" on the scope since the echo will be retraced each time the beam sweeps across the screen while the appearance in noise is random in character. This fact causes the maximum range at which a target can be detected to be somewhat greater as the repetition rate is increased. This works in two ways however, for the maximum range that can be measured directly by a radar is somewhat limited by the repetition rate used. For example, the interval between pulses is 610 microseconds for a 1640 cycle repetition rate. Within this time, the radar pulse can go out and back a distance equal to 610 microseconds times 164 yards per microsecond or 100,000 yards, which limits the length of the sweep and therefore the maximum range that can be measured directly on the sweep to 100,000 yards. Echoes from targets beyond this distance appear on the second sweep and therefore at a false range. Very high pulse repetition rates are undesirable because of the limitation imposed on the maximum length of the sweep.

The energy that is radiated from the antenna is never as great as that produced by the transmitter because of the losses that occur in the transmission line. Lines of the coaxial type must be airtight. The range, at which a given target can be detected, increases as the square root of the antenna height. Assuming standard propagation conditions, a high antenna will detect more distant targets than a low one. If the antenna is made more highly directional, the energy of the transmitted pulse is concentrated into a smaller area. Thus the energy that strikes the target for a given

transmitter output is increased by making the antenna beam narrower. A narrow beam can be obtained at a particular frequency only at the expense of increasing the size of the antenna. Hence it becomes necessary to strike a compromise between the increased range possible with a highly directional array and practical difficulties that arise from the narrow beam. The more sensitive the receiver, the weaker may be the signal required to produce a visible pip on the indicator. As the sensitivity of the radar receiver is increased, then, the range at which a particular target can be detected is increased. The outstanding disadvantage of an extremely sensitive receiver is that it can be very effectively jammed rather easily, other conditions being equal.

In general, the larger the target the greater the range at which it can be detected. A group of planes can be detected at a greater range than a single plane because of the large reflecting area. Targets at high altitudes can be detected at longer range than those at low altitudes simply because it is possible for the radar pulse to reach them.

The minimum range at which radar can detect a target is controlled primarily by the length of the transmitted pulse. Some of the energy of the transmitted pulse leaks directly into the receiver which overloads the receiver causing it to be blocked or paralyzed. At the end of the transmitted pulse the receiver begins to recover but the recovery is not instantaneous. As long as the receiver is blocked, a saturation signal appears on the indicator and no echo pulses can be seen during this time. Sea and land clutter are especially bad in the immediate vicinity of the set and may cause a reduction in minimum range. Fortunately targets near the set will return large echoes and a reduction in sensitivity of the set may cut out the clutter while leaving enough of the echo to permit tracking. The minimum range to which high-flying airplanes can be tracked is dependent on the vertical coverage of the radar antenna. In general there is but little energy radiated directly overhead. Fig II illustrates an early example of vertical coverage of an air search radar antenna. A plane flying at altitude D could not be detected after it had passed point C with this particular radar.

The accuracy with which radar can measure range is dependent on the precision with which the time interval between the transmitted pulse and the echo pulse can be measured. In fire control radars this measuring equipment is built for greater precision than in search equipment. One factor which affects the precision of range measurement is the ability of the operator to align the range marker with the echo pip. On long-range scales, it is difficult for the operator to align the pip and range marker precisely because small changes in the range knob do not cause perceptible

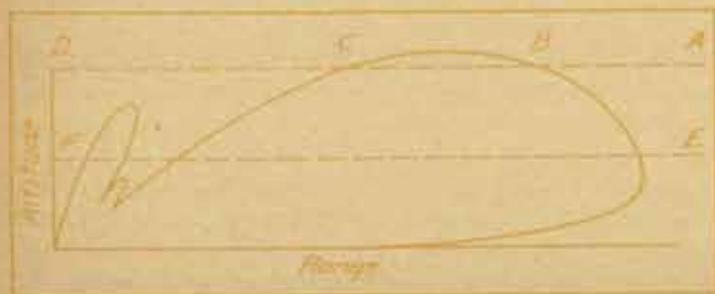


Fig. II. Vertical coverage of an early air search radar.

changes on the scope. Thus, the range accuracy of radar varies with the range scale used. In general, the longer the range scale, the less accurate the ranges. This may be avoided by the use of an expanded sweep. The expanded portion of the sweep can be centered on the desired echo so that the precision with which the range marker and echo can be aligned is constant over the whole range of the system. With aided tracking, the range marker can be made to move at a rate controlled by the radar operator. Automatic range tracking can indicate the range of a target more accurately and more consistently than the operator can. Variations in the frequency of the set will of course introduce range errors. A variation in supply voltage applied to the set will cause range errors to occur. For small changes these errors are negligible but for a change in supply voltage of ten per cent the error is appreciable.

The principal factors that affect the range resolution of radar are the width of the transmitted pulse, the receiver gain, and the range scale. For a high degree of range resolution a short pulse, low receiver gain and a short-range scale are required. Should a radar pulse strike two targets separated by less distance than the pulse width in yards obviously the pulse will be striking both of them for a portion of the time and the range to the nearest one only can be measured. A high receiver gain gives a large spot on scope of the B and PPI type. Thus, the echoes from two targets which are close together may merge into a single large bright spot at high gain but they may separate into two definite spots at low gain. On a long-range scale, a separation of a few hundred yards will not be apparent and two adjacent pips will seem to blend into one. However, if these same echoes can be displayed on a short-range scale as on an expanded sweep, the small separation will be visible.

From the above discussion and an examination of the range accuracies obtainable with radar sets it may be seen that radar ranges are more accurate than optical ranges and do not decrease in accuracy with range as do optical systems. The story of the *Hood* and the *Bismarck* may be used to illustrate this point. The *Hood* ranged on the *Bismarck* with both radar and stereoscopic ranges. The two ranges obtained differed by 4,000 yards. Not trusting the radar the optical ranges were used. One salvo was fired. It was observed to fall four thousand yards short. By this time the *Bismarck* had fired and obtained a direct hit on the *Hood's* powder magazine. The *Hood* had no chance to fire a second salvo. Had radar ranges been used the outcome would probably have been different.

b. Determination of Azimuth by Radar.

When a target is isolated and not moving too quickly, the accuracy with which its azimuth can be determined by radar is dependent on: the width of the antenna beam, whether lobe switching is used or not, the type of presentation on which the echoes appear, the size of the target and the accuracy with which the set is oriented. In a radar system which radiates its energy in a single lobe only moderate bearing accuracy can be obtained. The end of the lobe is rather broad so that a small change in azimuth produces an imperceptible change in echo height when the axis of the beam is near the azimuth of the target. However, a radar with very narrow beams both horizontally and vertically is not very effective in searching for aircraft. A small change in azimuth also

the side of the lobe produces large changes in size of the echo. If the antenna is designed so that the lobe can be switched continuously from side to side of the optical axis of the antenna, use can be made of this high rate of change of echo size with bearing as a means of measuring azimuth accuracy. Such a scheme is called lobe switching and the pattern produced by the antenna is like that shown in Fig. III. The comparison of the echo height from the left-hand lobe with that from the right-hand lobe gives the operator a sense of direction by which he knows the direction to train the antenna to bring it on target, when the two pips are adjusted to the same height by training the antenna to the azimuth of the target. Obviously, an error in orientation will cause errors in azimuth determination. Hence accurate alignment of the optical axes and the radar axes is essential. Large reflecting surfaces near the antenna may skew the azimuth axis. Such antenna locations should be avoided.

The magnitude of the angle between targets necessary to permit the separation of the targets in azimuth is dependent primarily on the effective width of the antenna beam. In general, target separation required for bearing resolution is greater than that required for range resolution. On a B or PPI presentation an echo appears as a line or an arc which is approximately equal in length to the beam width plus the target width. Thus, if two targets are separated by only half of the beam width, the echoes will blend into a single bright trace. As a result, the minimum angular separation required for resolution on a type B or PPI presentation is nearly twice the value for type A presentation. When lobe switching is used, the effective beam width of the antenna is increased over the width of the beam proper. The bearing resolution of a radar may be increased by turning off the lobe switching. This results in a narrower effective beam, but the accuracy of bearing determination is considerably decreased.

Optical azimuths, when they may be determined, are more accurate and reliable than radar azimuths. Many times radar contacts have been reported where no target could be seen. Usually these can be rationalized in some form of multiple reflection echoes, second trip echoes, reflection from clouds, birds, fish or side lobes. It is important to realize that both range and azimuth can be measured on targets that do not exist at the place indicated, or are targets of no consequence. In the early days of the war the story is told of one convoy escort who chased a target, which was always on the other side of the convoy, all the way from Australia to Hawaii.

c. Factors Affecting the Determination of Altitude.

Since long-range warning is the function of services other than Ground Forces the limitations of long-range warning will not be discussed here. A special form of lobe switching called conical scanning is convenient to employ when it is desired to measure both azimuth and position angle. In this type of scanning, the axis of the antenna lobe is slightly displaced from the optical axis of the reflector and caused to rotate about this axis. As indicated in Fig. III, the tip of the beam traces a circle in space. In general, the accuracy with which position angle can be determined is affected by the same factors that enter into bearing determination since the methods used are the same. At low position angles, inaccuracies

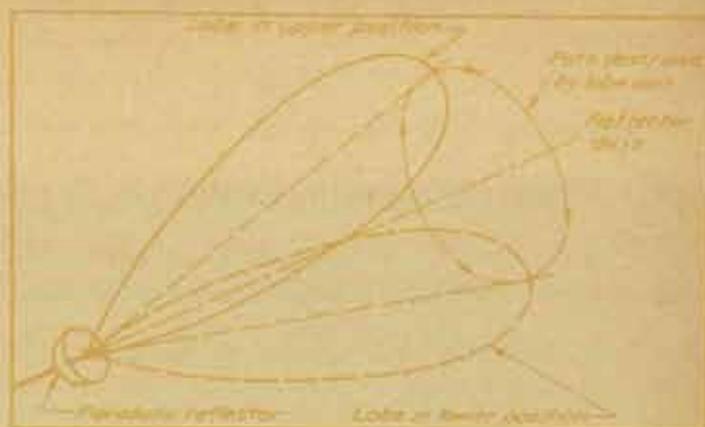


Fig. III. Conical Scanning as used in the SCR-584.

reflected path rather than by the direct path. Propeller rotation can cause fluctuation in echoes especially if the number of blades and speed of rotation cause the echo to vary in amplitude at a frequency near 60-cycle. In this case large errors in azimuth and altitude may result.

PART IV

OPERATIONAL LIMITATIONS ON RADAR PROFICIENCY OF OPERATORS

The amount of reliable data that can be obtained from any radar is dependent to a great extent on the skill of the operator. Operators must combine high native intelligence, good visual acuity and great concentration with an intense interest in the work if radar is to be used to maximum benefit. In general, a skilled operator can detect a target at a greater range than an unskilled operator. This ability results from very close observation of the scope and a "feeling" for the appearance of echoes that are lost in the grass to the untrained eye.

The tendency of many operators is to cut receiver gain to a low level in order to obtain an indicator presentation which is sharp and which shows strong contrast between signals and background noise. Large signals will continue to show up well but small ones will be lost entirely.

FALSE ECHOES

Although a directional antenna radiates energy principally in one beam a small fraction of the energy is radiated in other directions. This small radiation is confined generally to small beams called minor lobes or side lobes which are displaced from the axis of the main radiation. In spite of the fact that these minor lobes are usually small they contain enough energy to produce echoes from targets at short range when the receiver gain is high. Such a condition may be recognized by the fact that the usual direction of rotating the tracking handwheel is reversed when equalizing pip heights.

DEAD AREAS

A radar antenna will have a clear field of view only when there are no obstructions in the path of the radiated energy. Care in siting will reduce these blind areas to a minimum.

Sooo—that's the way it is. Radar can do a lot of wonderful things but like all weapons its capabilities and limitations must be understood before radar can be used intelligently

The 1st Antiaircraft Artillery Guided Missile Battalion

By Lieutenant Colonel J. W. Rawls, Jr., Coast Artillery Corps

In October of 1944 Army Ground Forces made available to the Ordnance Department, Battery C, 69th AAA Gun Bn for test firing of guided missiles at Camp Irwin, California under the ORDCIT (Ordnance Department—California Institute of Technology) project.

When it became necessary to reduce the number of anti-aircraft artillery units in Army Ground Forces, the 69th AAA Gun Battalion was inactivated less Battery C. That battery was moved to White Sands Proving Ground at Las Cruces, New Mexico in February of 1945 and continued participation in the ORDCIT project. This battery was surplus to Army Ground Forces Troop Basis but was not inactivated due to the importance attached to its work by the Commanding General, Army Ground Forces.

After V-E Day when redeployment to the Pacific was under consideration it was planned that one of the redeployed anti-aircraft artillery gun battalions would be used for participation in guided missile projects.

After V-J Day, the troop basis for Army Ground Forces was drastically reduced and no provision was made for a battalion to work on guided missiles. As Battery C 69th AAA Gun Bn was surplus to the troop basis, its inactivation was imminent.

A plan to create a guided missile battalion from the overhead allotment available to Army Ground Forces was then adopted. This plan included the discontinuance of the Anti-aircraft Training Centers at Fort Bliss and Camp Stewart. The plan also included certain manpower savings from other sources and a total of 621 spaces in the troop basis was found.

The name of the battalion was then the subject of conjecture. It was finally concluded that rather than select some unusual "fancy" name, it would be better to consider guided missiles just another type of artillery and in keeping with present designations for AAA Gun, AAA Automatic Weapons, Bns, etc., the designation "AAA Guided Missile Bn" was selected.

Just prior to activation of the battalion, Army Ground

Forces received permission to participate in a guided missile program being conducted by Johns Hopkins University for the US Navy.

Another anti-aircraft artillery gun battalion, Btry C, 517th AAA Gun Bn, which was surplus to the Army Ground Forces Troop Basis, was working with the Ordnance Department on "Little David," a 36-inch mortar. This battery was also in imminent danger of inactivation. This battery was considered an excellent source of personnel for the Guided Missile Bn due to the possibility of launching a missile by firing it from a major caliber gun.

On 3 October 1945 orders were issued by Headquarters Army Ground Forces for the activation of the 1st AAA Guided Missile Bn with personnel drawn from Battery C, 69th AAA Gun Bn, Btry C, 517th AAA Gun Bn and certain other AAA units concurrently inactivated.

The purpose in organizing a guided missile unit in Army Ground Forces was to have a nucleus of personnel, intimately familiar with ground-launched guided missiles which could be used as cadres for future ground-to-air, ground-to-ground and ground-to-sea guided missile artillery units when the weapons were produced.

The mission assigned the battalion included the furnishing of assistance to development agencies and, most important, to recommend doctrine for tactical employment of ground-launched guided missiles.

The activation of this unit received the personal attention of the Commanding General, Army Ground Forces. He was enthusiastic over its activities and directed that its personnel include adequate representation from Field Artillery, Infantry and the Armored Force. Accordingly, a Major from each of these three Arms was authorized and, in addition, Captains and 3 Lieutenants of Field Artillery.

Recently, the officer authorization for the Battalion was changed so that the Battery grade officers would be branch immaterial. This permits the selection of officers based upon individual qualification rather than upon Branch.



"We soldiers, sailors and marines won this war through cooperation and planning and determination and courage. We can win and hold the peace the same way. And the responsibility is on you men here and those like you more than on any other group of citizens in America. Without your leadership and support America and its States and communities have no chance for a successful future, and their citizens—including you and your families and your buddies—can only lose the prize for which we served and fought.—UNDERSECRETARY OF WAR KENNETH C. ROYALL.

Antiaircraft All the Way

Prepared by Office of the Assistant Chief of Staff, G-2 Headquarters, 14th Antiaircraft Command.

This story opens in the Philippines with the March day 1942 on which General Douglas MacArthur, with the skeleton staff of a scattered army, boarded a PT boat bound for Australia. In the General's mind there was shaping a plan to build from scratch a war machine that would fight its way, step by step, across thousands of miles of jungles, coral beaches and water along the "long road back."

With General MacArthur on this unhappy cruise was Major (then Brigadier) General William F. Marquat, who had commanded the pitifully inadequate antiaircraft defenses on Bataan and Corregidor. He was already beginning to conceive the nucleus of a plan for the mighty organization which was later to become the 14th Antiaircraft Command.

The epic of the Pacific struggle will be years in the recording; when complete, it will reflect the careful parallel of the history of antiaircraft in the theater with that of the general prosecution of the Japanese War. For during the whole long conflict, there has been no major airfield operated without adequate antiaircraft defense; no major landing without antiaircraft participation; and no base, however obscure, without antiaircraft protection.

It is not intended that this article confine itself to signal individual acts of heroism, though antiaircraft has had its share of heroes. No antiaircraft artilleryman feels he has won the war himself, but all of them know that they have played an important part in bringing about the final victory against the empire of Nippon. It is hoped that the experiences undergone by units in the Pacific will benefit artillerymen to come. Difficult problems were encountered and solved when this war of sea and jungle was young; techniques of expediency were developed under the pressure of tropic terrain and the constant shortages of equipment and troops. Matériel and men were used in many and varied ways far removed from their primary functions.

THE ANTI-AIRCRAFT MISSION

Less than three months after Pearl Harbor, antiaircraft artillery units were among the first shipments Pacific-bound. These units were only partially trained; token troops sent to assist Australia in defending herself against threat of invasion while her own sons were battling Rommel on the sands of El Alamein and Tobruk. The initial force consisted of two brigade headquarters, one mobile and two semi-mobile regiments, and three separate semi-mobile automatic weapons battalions. All the units except the mobile regiment were National Guard. That regiment had but recently been activated, and was officered, in the main, by newly called-up Reserve officers. The battalions had just completed their first record fire; they had been issued new and untried equipment at the port of embarkation; and they were sailing to fight an enemy whose fighting power had been clearly shown.

Shortly after they landed, the 102d Antiaircraft Auto-

matic Weapons Battalion participated in the first airborne movement of antiaircraft artillery under combat conditions. Using Dutch, Australian, and American airplanes of all types and sizes, the battalion was flown from Brisbane to Port Darwin. In May, the 101st Antiaircraft Automatic Weapons Battalion reached Port Moresby.

The remaining units were in position at strategic points on the threatened Australian mainland. At that early stage of the war, the supply routes were long and shipping was scarce; these conditions persisted throughout the war, and made necessary the development of many adaptations and changes in tactics in the Pacific Theater.

A continuous state of alert was maintained at the time. The paucity of antiaircraft troops available did not permit withdrawing any units for training under such conditions. Such training as existed was done at the guns while they were in combat position. Unit schools were conducted, and "instructor" schools, attended by battalion representatives who were to go back and train in their own organizations, were established.

While this training was in progress in 1942, the 37mm antiaircraft gun was replaced by the 40mm Bofors. Units received the new guns and ammunition, but training manuals had not been forwarded. Officers, coordinating with Australian gunners familiar with the Bofors, developed a training manual of their own, and the guns were operating against Japanese planes before the official publications reached the theater.

After the Battle of the Coral Sea and the landing of the Japanese at Buna, it was evident that New Guinea was to be a major battleground. Port Moresby was the main operational base of the Fifth Air Force, and antiaircraft artillery defense of the area was needed; however, the invasion of Australia was still a threat. Thus, another expedient, that of the composite battalion, consisting of a single gun battery, two automatic weapons batteries, and a platoon of searchlights, was developed for use in *major* operations. Less important strips had to be satisfied with an automatic weapons battery. At this time, the primary mission of the antiaircraft was the defense of landing strips against enemy air attack. The defense of supply installations had second priority.

After the battle for Buna was over in December 1942, Allied forces at last grasped the initiative. Antiaircraft defense of the beachhead, the installations, and the perimeter was recognized as a necessity in every assault operation; antiaircraft units were included in every task force. Good-enough Island, Lae, Arawe, Manus, Hollandia, Biak and Morotai, as well as Leyte, Luzon and the other islands in the Philippines saw antiaircraft artillery on the beach and in action on D-day.

Farther east, in the South Pacific Area, antiaircraft units at Guadalcanal, Bougainville, and on the Green Islands were in action against the Japanese, faced with the same privations, the same shortages of men and equipment as were the antiaircraft artillerymen in New Guinea.



Signal Corps Photo

40mm gun crew on the alert at an airstrip in New Guinea as army transport lands.

As the war progressed and as shipping became available, additional antiaircraft battalions, well equipped and highly trained, arrived in the Pacific. After a short period of acclimatization, they were committed in the operations that now were carried out by large task forces instead of the small combat teams of the early days.

The total score for antiaircraft artillery in the Western Pacific from the arrival of the first troops in Australia during March 1942 to V-J day in September 1945 was:

Total enemy aircraft destroyed	506
Total enemy aircraft probably destroyed . . .	270

This score is in no measure a true picture of the effectiveness of the antiaircraft artillery and searchlights, however. Statistics will never be able to show the number of raids turned back and the number of incompleting and inaccurate bombing runs due to flak; they will never show the number of raids canceled or not attempted because of the mere presence of antiaircraft.

Other factors affected the engaging of what few targets there were. In many cases condition "hold fire" existed because of the presence of friendly fighters. In other cases,

Japanese pilots were apparently well briefed in the capabilities and maximum ranges of American weapons and flew at altitudes which our projectiles could not reach. A technique of precision fire was adapted in order to make each round count. The one or two plane raids so often experienced put to the test the accuracy of antiaircraft gunnery. Barrage fire, even had it been possible, would not have been effective against so few aircraft.

As the war progressed into territory wrested from the Japanese, the question of "operational control" arose. The demands of the Pacific Theater developed a unique system of exercising that control. This system was determined by two primary factors:

- The scarcity of antiaircraft units, and
- The early exclusive employment of antiaircraft to defend Air Force installations.

An offensive land operation necessitated antiaircraft protection. Yet the operations were directed at enemy-occupied areas where the air strip was of major importance. It could then be assumed that, when ground forces had captured these fields and the strips were again in operation, antiaircraft artillery would undertake their defense. But at the

same time, antiaircraft would be needed to defend rear areas used for staging and supply points, likely targets for air attack. A maximum use had to be made of the few units in the theater so the luxury of organic assignment of antiaircraft units to Army, Air Force, or Service of Supply was considered impractical.

The 14th Antiaircraft Command under the guiding hand of Major General William F. Marquat, long experienced in the Pacific war, was activated to assist in the clarification of this problem. All antiaircraft artillery units then were assigned to the command and attached to the using major unit.

By this method, an antiaircraft artillery battalion might land on the beachhead on D-day attached to the Sixth Army. After ground troops had taken the strip, and after the Air Force had commenced operations from the area, the same battalion might be detached from Sixth Army and attached to Far East Air Forces for operational control. As the situation became more stable, the use of the strip might be discontinued, and perhaps priority for defense of the supply facilities maintained at the base would be established. The Service Force present would then assume operational control. This method insured antiaircraft defense where it was most needed.

TRAINING TECHNIQUES

The method of attachment to Army, Air Force, and Service of Supply, discussed above, developed a unique system of training in the Pacific Theater. Antiaircraft artillery units in the early days remained over extended periods in isolated areas; they were not sufficiently numerous to permit the withdrawal of entire units for training purposes. Too, the necessity for the standardization of techniques throughout the theater was paramount since attachment of the same unit to various major commands made a single method of procedure mandatory. To insure that training was conducted along proper lines, itinerant instruction teams were formed. These teams visited units in combat position. They explained to those who needed it most, newly developed techniques. This method, originated as a child of necessity, was found to be of invaluable assistance to units in forward areas and continued in force after a more formal Training Center had been established.

In May 1944, at the direction of General Marquat, the 14th Antiaircraft Command Training Center was established at Finschhafen, New Guinea. Units arriving in the theater were brought there for acclimatization to tropical warfare. There, on the terrain in which they would have to fight, units were trained in gunnery, care of equipment, and jungle warfare. They trained and at the same time took their turn in manning the positions which constituted the antiaircraft defense of the Finschhafen area. While some units searched the skies for the enemy, other units were firing at towed targets or radio-controlled target airplanes. Schools were conducted for staff officers and technical specialists. Antiaircraft units trained intensively, and when their training cycle was completed, they went into combat equipped and efficient in the waging of war peculiar to the Pacific. The rapid development of new methods and improved matériel posed training problems. The rugged, jungle-matted terrain and the vast expanses of sea to be

traversed forced antiaircraft artillerymen to develop new techniques continuously. Shortly after the first antiaircraft units arrived in Australia in 1942, methods of loading 40mm guns and searchlights into aircraft were perfected in order to get matériel into the inaccessible combat zones of New Guinea where it was so urgently needed. These first experiments had to be carried on in forward areas, between air raids, with all the handicaps of mud, rain and heat, on difficult and unsuitable terrain. As the war continued, research activities were intensified. The experience of the men who were battle-wise from constant combat against the Japanese, was pooled with the efforts of men new to the theater but well versed in the latest techniques that had been developed in the United States. The sum total of their energies brought forth new uses of equipment and improved methods of procedure needed in tropical warfare. Such an innovation was a mobile operations room that could be easily loaded and quickly set up on the beach in an amphibious landing.

Research and training in early warning and coordinated fire direction were carried on continuously; and as a result, antiaircraft gun crews were less and less often left unalerted until after the first bomb had landed. In the fall of 1944, Antiaircraft Operations Detachments, trained and equipped to install and operate Antiaircraft Operations Rooms and to coordinate Antiaircraft Artillery Intelligence Services arrived in the theater and began to take part in major operations.

SECONDARY MISSIONS

a. Antiaircraft Armament.—From time to time antiaircraft artillery already performing its primary mission, the destruction of enemy aircraft, has been called upon to execute many other functions that were thought to be possible in times of emergency, but generally, were not considered normal. In Townsville, in 1942 when Japanese invasion of the Australian mainland was imminent, Major General Marquat, battle-wise from his experiences in the Philippines, saw to it that all antiaircraft guns in the vicinity of the harbor were in a position permitting them to bring fire on enemy shipping.

At Milne Bay in August 1942, the airborne 709th Machine-Gun Battery met an attack of Japanese marines at Strip No. 3 and turned them back with their caliber .50 weapons. This marked the first of the long series of ground actions where antiaircraft artillerymen used the weapons of their branch against enemy ground troops. In September 1943 at Nassau Bay, a battery of the 209th Antiaircraft Automatic Weapons Battalion fired the barrage that permitted elements of the famed 41st Infantry Division to take Roosevelt Ridge, a position that the enemy had stubbornly defended for three days. At Momote Strip in the Admiralty Islands, in February 1944, antiaircraft automatic weapons were used to repel an enemy "Banzai" charge. There a sergeant cut the top off a palm tree with a caliber .50 antiaircraft machine gun on an M51 mount in order to "eliminate" a sniper. That same night, caught outside the perimeter, the antiaircraft artillerymen of Battery A, 211th Antiaircraft Automatic Weapons Battalion, repelled a Japanese surprise attack. At Biak, the group headquarters, moving its position twice, spent the night outside the perimeter with the



Signal Corps Photo

On Okinawa, this 90mm battery dares the Japs to attack.

antiaircraft guns of its battalions firing alternately at enemy air and ground targets.

In these cases antiaircraft equipment was used against enemy ground attack either as a matter of necessity as at Milne Bay, or as an experiment, as at Roosevelt Ridge. It was not until the action on Luzon that weapons meant primarily for defense against air attack were used in offensive action against ground targets according to preconceived plan. There, maintaining close coordination with infantry units, antiaircraft served effectively as field artillery, closing caves and destroying designated targets with accurate fire.

The results speak for themselves:

(a) Twenty-two days of firing in Balete Pass on Luzon by a detachment of 90mm guns:

- 75 caves closed
- 40 pillboxes destroyed
- 7 machine guns destroyed
- 13 buildings destroyed
- 3 vehicles destroyed
- 25 gun positions knocked out
- 75 support missions of unobserved harassing fire.

(b) Fourteen days of firing in the hills west and north-west of Cebu City on the island of Cebu by a detachment of 40mm guns:

- 7 tunnels blocked
- 1 CP destroyed
- 3 OP's destroyed
- 4 supply dumps destroyed
- 3 mortars knocked out
- 17 dugouts reduced
- 77 pillboxes reduced
- 10 huts demolished
- 29 machine guns silenced
- 7 trench systems reduced
- 2 automatic rifles knocked out

b. Searchlights.—In addition to their main function of searching the skies for enemy targets, antiaircraft searchlights have been used to provide beacon lights for friendly

aviation, and to illuminate battlefields for ground action. Pairs of searchlights, carefully placed at intervals of from one to two thousand yards, covered an entire division front with "artificial moonlight." They prevented enemy infiltration and "banzai" charges, decreased the enemy's use of grenades, and made it possible for the medics to evacuate the wounded hours earlier than otherwise would have been possible. Perimeter defense was made easier and "trigger happiness" was reduced to a minimum. Enemy troop movements that had been planned to take advantage of inclement weather, were clearly seen up to a distance of 200 yards. The worse the effect on the enemy, the more the morale of the infantryman was boosted.

c. Radar.—One of the most interesting developments that took place during the last months of the war concerned the use of radar against ground targets. The 14th Anti-aircraft Command began research work on vehicle detection at Finschhafen, New Guinea, in May. Further experimentation led to successful development of techniques for locating enemy mortars and artillery. This would have been a considerable contribution to the organized countermortar intelligence coordination that was being strongly emphasized in the summer of 1945. Specially trained teams were organized for mortar location by radar to work for the Sixth Army. MTI (Moving Target Indicator) equipment arrived from the United States in August and the 14th Anti-aircraft Command was conducting tests to determine its full capabilities when the war ended.

CONCLUSION

Antiaircraft artillery was one of the senior branches in the Pacific. Developments within the theater of operations brought it from a purely defensive role to that of an offensive arm, landing early in amphibious operations and fighting the enemy on the land and in the air. Units conducted training and accounted for enemy airplanes simultaneously. The story of antiaircraft in the Pacific is one of which those who wear the insignia of crossed cannon and shell can well be proud.

War Department Schools Program

The War Department is now considering a tentative school system for all officers of the Army. This program is designed in such a manner that officers will attend certain schools consistent with their years of duty and branch of service.

Certain types of duty and experience will be considered the equivalent of corresponding schools, and credit given to the officer accordingly in The Army Register in order that the availability of the officer for certain assignments will not be jeopardized due to lack of formal education. Likewise the officer's eligibility for further schooling will be definitely established.

Associate courses of three months will be conducted at War Department level for National Guard and Reserve officers. These courses will emphasize techniques of the branches and courses for officers of the Arms will stress use of weapons.

BASIC COURSE

The basic course under this contemplated schedule will be of nine months duration. The first four months will be spent on general indoctrination and branch immaterial sub-

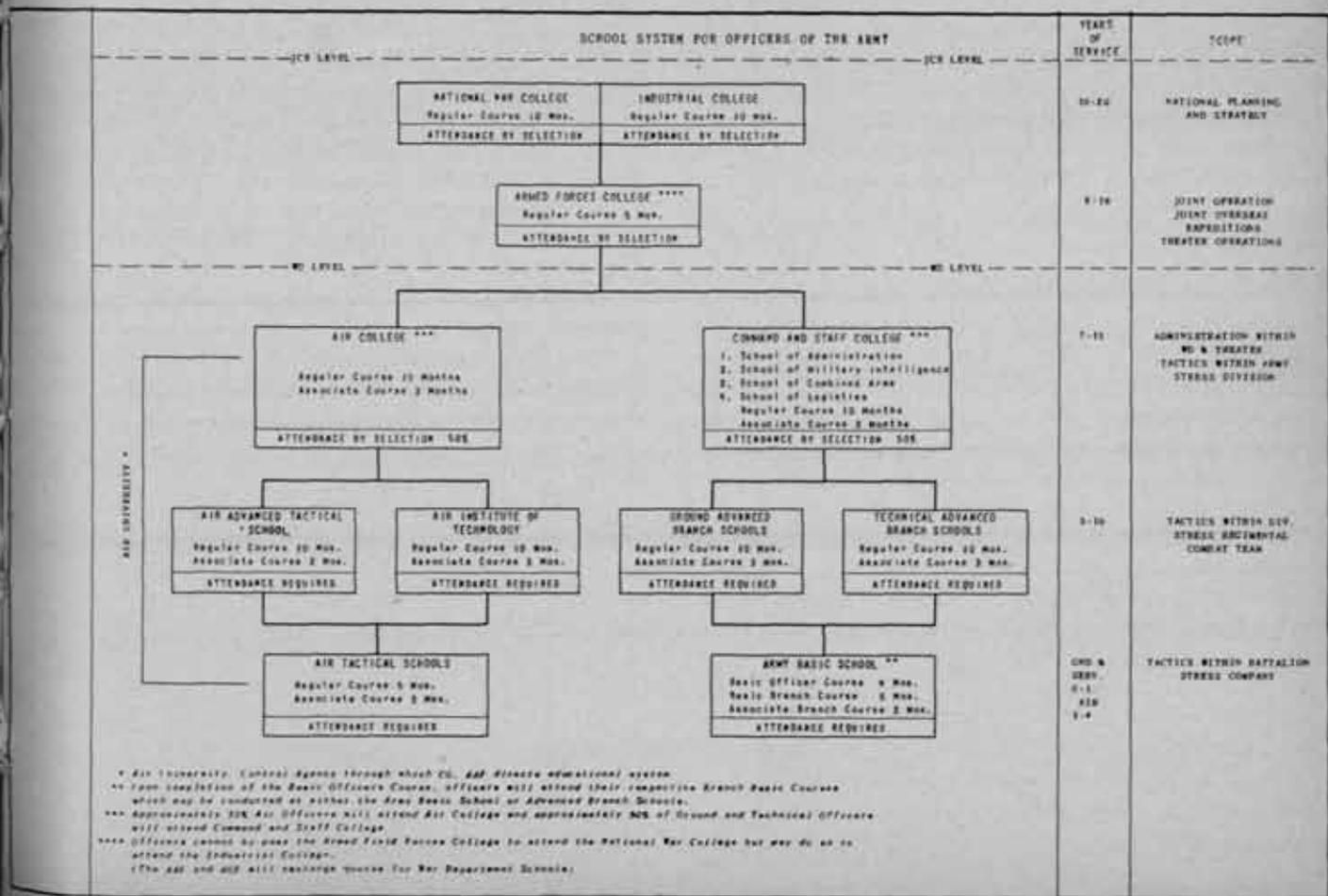
jects while the last five months of instruction will cover branch specialization.

It is contemplated that officers will be given credit for this course who have had six or more months service in any one of the following positions in an active theater (combat) or one year in an inactive theater or Zone of the Interior with an efficiency rating of Excellent or better: Battery, Company or Troop commanding officer or executive; Battalion, Group, Division Artillery or Corps communications or assistant communications officer; Company or Troop Platoon leader; Battalion S-1, S-2, S-3, S-4 or the equivalent short wartime course satisfactorily completed.

BRANCH ADVANCED COURSE

Branch advanced schools will conduct regular, associate, extension and special courses. Tactical problems in the Branch Schools of the Arms will be laid generally in the framework of a Division. Employment of the Regimental Combat Team will be stressed. Emphasis will also be placed on the development of Battalion Commanders.

Officers will be given credit in The Army Register, who have had six or more months in an active theater (combat)



or one year in an inactive theater or the Zone of the Interior with an efficiency rating of Excellent or better in any one of the following positions: Regimental, Group, Battalion or Squadron commanding officer; Regimental, Group or Division Artillery executive; Division General Staff officer (field) providing the officer has one year's duty with troops of his arm; Corps Artillery staff officers (field)—except air officers.

COMMAND AND STAFF COLLEGE

The mission of the Command and Staff College is to provide instruction in the light of war lessons and modern developments. The prerequisites for attendance will be as stated by the War Department Military Education Board for Ground and Service Colleges. This college is designed to meet the changing conditions existing in the Army. Such subjects as any War Department General Staff agency deems important can readily be included in the curriculum by the War Department Staff Agency concerned.

Four schools and one department will probably constitute the college. They are (a) School of Combined Arms (b) School of Administration (c) School of Military Intelligence (d) School of Logistics and (e) Department of Analysis and Research.

In order that officers may be given credit for this school by virtue of their experience, the following requirements are contemplated. Officers concerned must have had six months in an active theater (combat) or one year in an inactive theater or Zone of the Interior with an efficiency rating of Excellent in any one of these positions: Assistant Division Commander; Division Artillery Commander; Combat Command, Regimental or Group Commander; Chief of Staff or G-3 of a Division; Chief Deputy or Assistant Chief of Staff of a Corps, Army, Army Group or Theater; Corps Artillery Commander or Executive.

Officers possessing the above qualifications will likewise be given appropriate credit after their names in The Army Register consistent with the approval of the plan under consideration.

ARMED FORCES COLLEGE

The course at The Armed Forces College will be of five months duration. It will be mainly concerned with Joint Operations, Joint Overseas Expeditions and Theater Operations.

Service between 7 December 1941 and 13 August 1945 in any of the enumerated assignments or combinations thereof in the grade of colonel or higher with a Superior efficiency rating for a period of at least six months in a combat zone or one year in the Communications Zone or Zone of the Interior will be considered equivalent to graduation from

the Armed Forces College and the appropriate notation made in the officer's record in The Army Register provided the officer has more than fifteen years commissioned service or passed his fortieth birthday on 13 August 1945 and has never been relieved for cause from any assignment during the period considered. Occupancy of any one of the following positions subject to the above paragraph establishes an officer's eligibility for the school credit: graduate of Army War College, Army and Navy Staff College; Army Corps, Division or Brigade Commander; Assistant Division Commander, Corps or Division Artillery Commander; Port or Base Section Commander; Chief, Deputy or Assistant Chief of Staff of Theater, Army Group, Army or Corps; Chief of Staff of a Division, Executive, Chief or Assistant Chief of Staff of a Port or Base provided it is at least a Major General's command; Regimental Combat Team Commander or Combat Command Commander; Executive or Assistant Corps or Division Artillery Commander or Group Commander; War Department, A.G.F. or A.S.F. General Staff Sections; Navy Liaison Joint or Combined Chiefs of Staff and lastly an Instructor at a service school.

NATIONAL WAR COLLEGE

The regular course in this school will be of ten months duration and will consist of National Planning and Strategy.

In order to qualify for credit for this course an officer must have served six months in a combat zone between 7 December 1941 and 13 August 1945 or one year in a Communications Zone or Zone of Interior in the grade of colonel or higher with a Superior efficiency rating in any one of the following assignments or combination of assignments: graduate Army and Navy Staff College; General Officers; Colonels who served as Chiefs of Staff, Deputy or Assistant Chiefs of Staff; Colonels who served as Executives, Deputies or Chiefs of Major Groups of General Staff Sections of the War Department, Headquarters A.G.F., Headquarters A.S.F., Theater, Headquarters Army Group, Army or Corps. It is further provided that the officer must have had twenty years commissioned service or shall have passed his 45th birthday on 13 August 1945 and shall not have been relieved for cause from any assignment during the period of service being considered.

Since the entire program is still subject to further study and approval, no information on school quotas is available at this time, but the JOURNAL will make every effort to provide information relative to this matter as soon as it is released.

By referring to the chart on the school system, it is possible to ascertain the sequence of the schools, the years of service required for attendance and the duration of the courses.



Guided Missiles Are Coming

By Lieutenant Colonel William R. Kintner, General Staff Corps

EDITOR'S NOTE: The opinions expressed in the following article represent the author's and publication in the COAST ARTILLERY JOURNAL does not imply War Department indorsement.

It is only proper for military men to take stock of their profession after a war. Tactics, weapons, organization and doctrine all must come under the scrutiny of critical review to determine the sound designs or concepts which will insure our nation's future military security. The last war introduced new weapons whose capabilities have caused consideration to be given to making changes in the very basic structure of our defense system itself.

The atomic bomb is in the forefront of these weapons. Its terrifying impact on the human mind is such as to obscure certain other developments whose effect on the art of war may prove as profound. Basically, the atomic bomb is an explosive medium more lethal than anything ever imagined. However in spite of its earth-shattering power the offense must still devise ways of getting the atomic explosive to the target. Likewise, the historical requirements of the defense continue although its execution grows more complex. Psychologically, the defense will be forced to drop the *laissez faire* attitude of the football lineman, who can let an occasional ball carrier slide through and instead, accept the final responsibility of the quarterback, who must stop them all.

Into this historical offense-defense struggle has been introduced a weapon which may reshuffle the technique of warfare more than the atomic bomb—the guided missile. The eventual development of the guided missile into a proven weapon will have a tremendous effect on airplanes, artillery and most important of all, on the relation of all types of surface forces to aerial forces.

It is neither possible nor permissible to discuss the technical specifications of these weapons nor to speculate as to when any particular variety will be ready for employment. However, it is profitable now to discuss imaginatively some of the general characteristics guided missiles may later possess.

The closing stages of the war with Nazi Germany prematurely revealed the character of future global conflict. Although the net military effect of the terror V1 and V2 attacks on London and Antwerp were small, it requires little imagination to see these primitive robot weapons evolve into the predominating artillery of the future. Along with being in the forefront of technical development of this weapon, the United States must be ready to exploit its offensive capabilities to the fullest, and as well, be in a position to set successful countermeasures into operation.

Popular fancy envisions development of some mammoth rocket whose single atomic explosion will wipe out entire cities. Although this may be, unfortunately, the final outcome, common sense dictates the evolution of intermediate types, each tailor-made for a particular job.

We shall likely have guided rockets perform the tasks

now accomplished by tanks, artillery, and planes. We can contemplate rockets assuming the rôle of strategic bombing and close-support artillery. Economics and warfare often run counter to each other but it is a safe promise that we will not use these guided missiles on any wide scale until they can do the job as cheaply as the weapons they supplant. Nor will development be simultaneous on all types. These factors demand that we plan for the transitional phase between current warfare and the Buck Rogers edition.

What design details must be considered in the various models of guided missiles? The essential tactical elements are: size, fuzing, speed, duration of flight, control and method of launching. Upon the missiles' size will depend the explosive force. The size must vary according to the weapons' use. Existing proximity fuzes will meet the likely needs of ground-to-air defensive missiles as well as many types of ground-to-ground projectiles, but further fuze development may be necessary for some rocket uses.

There should be wide variation in the speed of these missiles. This factor is closely related to control; for certain uses we may desire visual selection of targets and direction of missiles which will require that they fly slowly enough to be seen. Duration of flight will depend upon the type of propulsion used. It will determine the range of use as well as the manner of use. Development here is concerned with mechanics of propulsion and fuel research, upon both of which ultimately depend over-all efficiency and economic feasibility of the weapon. Control has several aspects. These are: predetermined course, positive control from launching or forward pickup stations and homing control in which the hapless target determines its own destruction. Combinations of types of control might be desirable. Launching arrangements will largely determine the mobility of the weapon and will differ greatly between close and strategic support weapons. Fuel for mobile close-support weapons must be made insensitive to handling.

For execution of the anti-aircraft mission it will be necessary to develop several types of ground-to-air missiles. The first targets, in the transitional stages of development, that guided missiles will engage, will be prototypes of present planes. Current air forces deliver a relatively fast low-level attack and a slower, more concentrated dose at high altitudes. These targets are now engaged by automatic weapons and AA guns.

Suppose you could have sent up a guided missile toward a *Luftwaffe* hedgehopper. What would you have wanted for the job? This missile should travel at a speed of at least two hundred miles per hour faster than your target. This missile should have a short maximum time of flight. The projectile should be easy to handle and should be launched from a highly mobile launcher. In event its proximity fuze is not fired by the target the projectile should automatically seek altitude during the last three seconds of its flight and be exploded by a self-destroying fuze when the fuel gives out, to prevent injury to friendly forces.

This projectile will be radar controlled. It will be

launched roughly in the direction of the target and the control beams will be visually directed from the ground. When within 200 yards of the target it would be desirable to have the missile guided by waves reflected from the target so that the projectile would invariably home on the target. The control radar should be compact enough to be carried in a light trailer. Present AA warning systems with modifications would be adequate for the employment of this missile. The appearance of a proved guided missile having these characteristics might well eliminate the present defensive employment of tactical air forces.

To destroy the high-flying bombers, several types of guided missiles could be employed. Against small-scale attacks a projectile capable of individual direction against an individual bomber, should be used. Such a projectile should have a strong explosive charge fired by a VT fuze at close range. The guided missile should travel at supersonic speeds and be capable of sustained flight for the entire period of interception. The complete projectile should be crew serviced and should be fired by a launcher towed by a conventional truck. It should be exploded by a self-destroying fuze when

its fuel supply is exhausted. It will be fired toward the roughly predicted position of the target. The target will be radar tracked. The missile will be radar controlled from the ground. It may be desirable to employ a homing device on the missile to become operative within close range of the target. This type of missile would defend small-area vital objectives in a manner equivalent to present AA gun battalions.

Against large-scale high-altitude bombing attacks, another variation in guided missiles should prove to be successful. Basically, the answer to the mass-attack defense problem is to saturate the air volume through which the flying armada passes, with enough explosive to destroy a decisive proportion of the formation. This guided missile should be capable of setting off an appropriate atomic explosion in the target area. The explosive would be fired by a proximity fuze. These projectiles should be capable of being fired in great numbers. Upon reaching the target area each projectile would initiate a search. Homing radar may be used in conjunction with this search system. The missile should be capable of long-range interceptions. It should have a high approach speed and a lower speed during search.

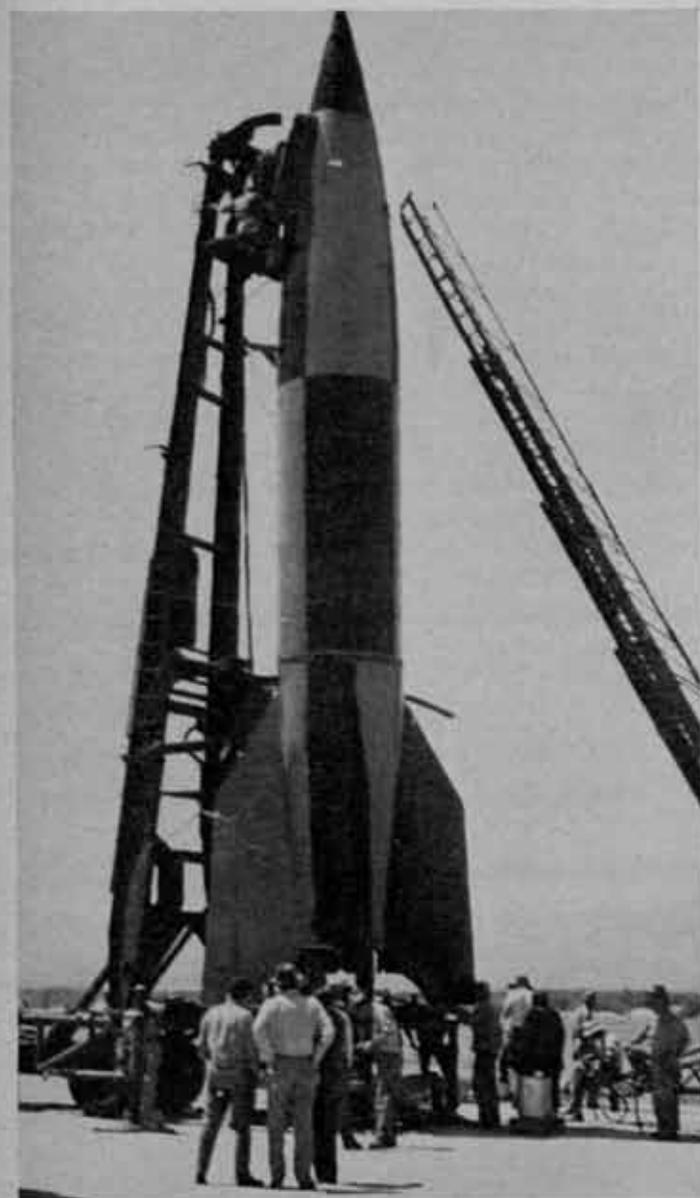
Launching sites would be set up at wide intervals throughout the defended zone. The duration of flight should be several minutes. The complete missile should not have excessive weight. This missile will be radar-directed from the ground to a point above the center of the bomber formation where it will begin to execute an expanding spiral downwards until the proximity fuze is exploded. Launching installations would be static, hence their weight would be immaterial. Present warning service, if refined and improved, would be adequate for this type of missile although adequate communications and control tactics at launching sites would have to be developed.

Concurrently with the evolution of guided ground-to-air missiles we must plan for the offensive employment of ground-to-ground missiles and the defense against them. The advance of technology has already opened the race for supremacy in this field.

What are the prospects of using guided missiles in place of present Field and Coast Artillery? Ultimately, it is the opinion of the writer, they are quite good. In Coast Artillery, the combination of great range, along with launching, guidance and homing control would prohibit enemy naval operations comparable to our own fleet's recent strikes off the Japanese shore. The advantages of greater flexibility, ease in massing fires over wide sectors of the front and the elimination of costly, cumbersome rifled guns all indicate substitution of guided missiles for present Field Artillery. The dramatic power of rocket projectiles displayed in the recent war indicates how effective they might be, once proper fire control is achieved. For this type of employment the launcher must be highly mobile. Ranges throughout the battle zone would be acceptable.

Missiles should have devastating explosive charges. Fuzes should be either VT or delayed-action. Predetermined, set course control will probably be satisfactory for most missions.

It is unlikely that any defense other than superior fire will be developed against short- and medium-range guided missiles used in ground support. On the other hand, the long-range guided missile will have flight characteristics which might make interception possible. A defensive guid-



Signal Corps Photo

Army Scientists prepare the German radio-controlled V-2 rocket for experimental firing.

missile will, of course, be the answer to combat it. This defensive missile should have a speed greatly superior to the attacking missile. It will be positively launched and directed by radar all the way to the target. This will require a combination pickup and missile-guiding radar superior to present ones. Radar will have to discriminate by coded signals, between our own and enemy projectiles. Upon pickup of the hostile missile, the radar-director must position the launcher accurately in future elevation and azimuth in order that the defensive missile can follow the shortest time straight-line course to point of interception. Launching sites will be positioned so that interception courses against targets coming from the enemy lines will end over the enemy lines. The missile should have sufficient range to permit it to traverse the enemy lines where its explosion would not be wholly wasted if it did miss the interception. The complete missile for this purpose should be readily handled by one man and the accompanying radar and launcher should have full mobility.

Fantastic, destructive long-range rockets have come closer to achieving operational success in this war than any other type of guided missile discussed. The ground has already been pioneered to produce the most destructive weapon ever made. This weapon is likewise, due to its inherent speed and altitude, the most difficult to defend against. Offensively its characteristics are fairly apparent. It will have a vast range, an impact probable error of a few miles, an atomic warhead, speed of from 3,000 to 4,000 miles per hour and a high payload in relation to projectile weight. It should have predetermined, course-set control, with radar correctional features to overcome trajectory errors in flight. These specifications are quite arbitrary, but may be considered reasonable in view of what is known of rocket possibilities.

To oppose this device we will need another rocket with a shattering explosive charge, a speed far faster than the offensive missile and a great intercept range. Control will be by ground radar until the interceptor is close enough for its own radar (sender and receiver this time) to take over.

Both the employment of this super rocket and the organization of the defenses against it will be on a continental scale. Warning radar will have to be greatly refined in range, sensitivity and ability to discriminate between targets. Warning stations and launching sites will have continental dispersion. Elaborate and positive communications will hook all sites into central control rooms. Interception missiles will have to be launched toward actual intercept points. Control of intercepts will be by coded radar signals. Electronic calculators will have to be designed to instantaneously select the priority targets in mass attacks and to allocate defense to most effective launching sites.

Radar, used both offensively and defensively, will have to be developed to a minute degree. Defensively we will seek to break down the enemy's control beam and break through the interference his missiles will generate to confuse our interceptions. Offensively we will want to have unimpeded positive control of our offensive weapons. We will need to develop intelligence missiles to cruise over disputed territory, simulating a regular target to record enemy radar sites so that we may utilize tactical ruses and feints to confuse the enemy's radar guided defenses.

The first is that the successful development of guided missiles may mean the eventual elimination of the present type of air force. Obviously there would be no need to send a piloted aircraft to do the same job that a rocket could accomplish without risk of life. Air force interception of supersonic projectiles is practically out of the question, for even if a suitable plane could be developed it is not likely that human responses would be rapid enough for interception. Nor is it likely that the human body could withstand the associated accelerations. This leads to another premise equally apparent, namely, that the agency responsible for the offensive development and use of guided missiles must closely coordinate its program with the agency charged with the defense against them.

At the present time Antiaircraft Artillery is charged with determination of military characteristics and is assisting the Ordnance Department in the development of ground-to-air missiles whose sustenance in flight depends primarily upon momentum. The foregoing discussion of the capabilities of guided missiles and the effect their development will have on current weapons is pure speculation. This speculation is based on existing technical discoveries and the astonishingly accelerated application of science to weapons. It is important to consider that all these weapons may come to pass. The imminent possibility of the arrival of guided missiles must influence all military planning especially in relation to aerial warfare. The proved guided missile may render the piloted aircraft impotent in either defensive or offensive warfare. It is possible that the piloted aircraft may find itself relegated, at best, to an exclusive rôle of troop carrier, reconnaissance and photographic missions.

Seacoast and Antiaircraft Artillery have always dealt with the highly involved control and warning system and complex directional equipment required to quickly destroy fast-moving targets. The long experience required by these artillerymen can be profitably used in coping with the manifold problems, the employment of guided missiles will create.



This remarkable photo shows the V-2 just at the moment of

German Long-Range Guns

By Lieutenant Colonel G. B. Jarrett

The ghost of the Paris Gun has stalked all through the recent war. All of the German long-range guns of World War II were versions of the original Paris Gun principles and represent the ultimate of German so-called modern Railway Artillery. "Anzio Annie," a K5(E), is one of these guns and is now to be seen at Aberdeen. Before we look at "Annie" more closely, let us look at her family tree.

Around 1900 Dr. Rauschenberger, a German scientist and ballistician associated with the Krupp Works, worked out the theory of the optimum range of artillery. His basic theory was that the major portion of the trajectory should be in the stratosphere, thereby relieving the projectile of most of the air resistance. It is interesting to note that his final figures, based on the maximum pressures, rates of powder burning, travel of the projectile, etc., should net a range of around seventy-five to eighty miles but, in the final analysis, the dispersion would undoubtedly be excessive. These figures were largely realized in the Paris Gun of 1918.

Prior to World War I, Krupps, at the instigation of the High Command and using the Rauschenberger theory, developed a mortar of unusual and massive proportions. This weapon was the 420mm "Big Bertha." Rauschenberger's idea was to fire always from a 55° angle of elevation which would permit the projectile to reach the stratosphere in the shortest possible time, thereby conserving its energy, and then it could travel a greater distance because of the absence of air friction. The 420mm mortar fired a 1,750-lb. shell twelve miles high for a lateral range of only eleven miles. In 1914 the shell, an armor piercing type, did penetrate and completely wreck the Belgian and French Forts, the targets it was designed to demolish.

In 1915 Krupp worked on an advanced idea of an elongated tube, with a decreased bore to adhere completely to Rauschenberger's theory of maximum range. Thus the Paris Gun idea was born and, after two years of further work the gun was proved at the Meppin Proving Grounds in Prussia in 1917.

In the spring of 1918 the first of the Paris Guns was installed at the Front, and until the summer these guns fired on Paris at irregular intervals. The guns were costly and the pay-off small. While they unquestionably did hit Paris, the dispersion and erosion rate were excessive, to the point that the pay-off was out of all reason and sense. The shells were relatively light and carried only small bursting charges. Even Ludendorff, in his memoirs in the '20's, said the Army would have been much better off had they had the money and time which went into the nine known Paris Guns. But that as it may, they did realize about seventy-six miles, and so proved Rauschenberger's theories.

The Krupp designers further added to this long-range development by the successful modification of the 380mm Naval rifles (battleship turret guns) into special guns for bombardment of the Paris target. At first these guns were tubed down by a liner to 210mm but were later rebored to 240mm. An extension jacket brought the entire exterior tube length to 100 feet. When firing, an additional 20-foot smooth bore section was added to the muzzle end; a bridge rig held the tube from sagging. For this weapon they also developed an excellent railway mount with a pivot base that permitted a possible traverse.

Before the Armistice in 1918, the firing positions had been captured but the guns and equipment had not. None were they seen, except by a Colonel H. W. Miller, Or...



Captured German railway artillery at Aberdeen. In the foreground is Leopold of Anzio fame.

Finance Department, U.S.A., who investigated these weapons for the Allies in 1918 and 1919. He saw only one of the cut-up barrels at the Skoda Factory in Pilsen, Austria (now Czechoslovakia). Since 1918 the Germans have carefully concealed these specimens of their handwork and through the years the Paris Gun designs have remained a well-concealed secret.

However, as far as the Germans were concerned, the matter did not die. The research on optimum ranges continued through the peace period and up to World War II time, a signal fact indeed! All through this war, evidences of Paris Gun innovations of 1918 have appeared in German artillery and its ammunition. Further, serious research into powders and projectile designs was carried out to a high degree.

When Hitler came to power he found the Maginot Line a threat at his very door. It offered a tough target to destroy and he therefore insisted on immediate development of weapons capable of demolishing these formidable fortifications. Among the many weapons developed, were long-range guns able to deliver enormous shells on the target areas, as against the relatively light shells of Paris Gun fame.

A gun bored directly from the Paris gun was the K5(E) series (Kanone No. 5 Eisenbahn). This weapon has appeared with several tubes, and the one associated mostly with the K5 nomenclature was one having twelve rather wide lands, with narrow and deep grooves. This was unconventional; it was, in fact, a special rifling job to use a pre-milled and splined projectile. The astonishing fact was that this projectile actually rode on the bottom of the grooves rather than on the top of the lands as usually is the case in conventional tubes. The shell bourrelet in reality became the full-length surface of these splines. A rotating band near the base, of course, served to obturate the projectile. This shell was also streamlined with a false ogive. It was double fluted, as was its predecessor the Paris Gun, which should virtually have eliminated duds.

This K5 series never fired on the Maginot Line. They didn't have to, as the Line was outflanked. However, they were emplaced on the Cape Gris Nez area of the Channel and did fire into England. That a strange shell existed was known to the British soon after Dunkerque. Peculiar fragments found were analyzed and it was ascertained they were of a pattern never seen before. They actually were K5(E) shells.

Time moved on and later, with the Italian Theater established, the German High Command, needing large amounts of artillery support, moved a battery of K5's into position. These huge monsters were put in direct support of the Anzio beachhead and scoured the U. S. troops severely. Firing from the Aban Hills, they completely covered the Allied held Anzio Front.

The names "Anzio Annie" or "The Anzio Express" were coined by the G.I.s while on the beaches at Anzio. Here the boys were being shelled by something which came in screaming. All shells "on the way" have a noise peculiar only to missiles in flight, a phenomenon due to the air being disturbed by the shell and usually referred to as a scream or high-pitched whizzing sound. Undoubtedly the splined shell caused an extra disturbance and to the G.I., it amounted to an enormous scream. This was added to, un-

questionably, by the fact that the 280mm shell (11 in.) had enough T.N.T. to make a huge blast and the fragments were not only large but numerous. Thus, the shelling was referred to as coming from "The Anzio Express," and later the name became "Anzio Annie."

A dud, recovered from the beach area near the 65th Coast Artillery C.P., revealed the fact that the Germans used such a gun in that theater. Also it was the first shell which could properly be examined since nothing but fragments had been obtained in England up to this time. Checking that new data against Intelligence reports confirmed the suspicion that the K(5) series was then in operation.

In the middle of June 1944, after the fall of Rome, a battery of K(5)s was located by American troops at Civitavecchia, where it had been withdrawn by the Germans. Two guns were in the battery, and known to the Germans as "Robert" and "Leopold," as per the names printed on their sides. They had been badly damaged by U. S. air attacks. In addition, the Germans had attempted to wreck them further by demolitions.

After the battery was discovered at Civitavecchia, thousands of former foxhole boys of the beachhead viewed the monsters, still calling them "Anzio Annie," and wrote their names on the carriage sides.

Eventually, "Leopold" was selected to be evacuated to the U. S. This was an engineering feat in itself as the facilities, both rail and dock, were wrecked and had to be rebuilt. This was accomplished by the U. S. Engineers. "Leopold" left Italy in March of 1945.

"Leopold" reached the U. S. the following summer. The long journey from Civitavecchia had been broken repeatedly by delays while the engineers made repairs or built facilities

GENERAL CHARACTERISTICS FOR 280MM K5(E)

Range, with regular HE shell (550 lbs.)	approximately 34,000 yards
Range, with rocket assisted shell	approximately 93,000 yards
Over-all length of barrel	70 ft. 8 in.
Tube length	67 ft. 5 in.
Number of grooves: 12 (width $\frac{3}{8}$ in.), (depth	17/64 in.)
Removable liner is used.	
Barrel weight from German figures	187,880 lbs.
Shipping weight of gun and carriage	462,000 lbs.
Length of gun carriage	69 ft. 8 in.
Length of gun with trucks	95 ft. 7 in.
Width of gun carriage	8 ft. 8½ in.
Turntable, length of platform	120 ft. 8 in.
Length of track on platform	103 ft. 6 in.
Diameter of turntable	96 ft. 8 in.
Height of turntable above ground level of a firing position	2 ft. 9¾ in.
Gun elevation to	50°
Traverse on turntable	360°
Traverse on gun carriage	½°
Recoil	46.8 in.



The breech of the 280mm "Leopold."



German 380mm railway gun, on portable turntable, laid over existing railway spur.

to get it out of Italy. The sea journey was routine, but in the U. S. it required special handling from the Port to Aberdeen.

On U. S. rails it was considered a special shipment and had to roll at 25 miles per hour or less. Due to its excess width, it had to be moved off regular schedules and so required still additional time to finally be pushed onto the sidings at Aberdeen Proving Ground. Thus, "Anzio Annie" came to a final and silent berth at Aberdeen, still covered with G.I. names. This gun probably will never fire again, since it would be more costly than worthwhile to put in operation once more.

Such weapons have only a limited pay-off value. The modern aerial survey sooner or later establishes its position and the bombers shortly wreck the position or force it to move. Several of the German High Command Generals wrote off such Ordnance, in their interrogations, as being costly and a mistake. These railway units could be classed as built to satisfy Hitler's demands for massive and crushing engines of war.

The shipment of "Leopold" and its accessories ran into excessive weights. Some of the weights are of interest:

The gun and its carriage	462,000 lbs.
Diesel power unit and carriage	50,116 lbs.
Turntable and its 2 transporter cars	200,000 lbs.
Turntable track and its transport car	120,000 lbs.
Total shipping weight	832,116 lbs.
	or (416.058 tons)

This shipment did not include the ammunition cars, for these were in bad condition at Civitavecchia and were not worth moving.

Later in the war, after the fall of Leipzig, as the Reich was crumbling, the First Army uncovered a large German Railway Artillery Shop. There was found a collection of

Railway guns from World War I and World War II. The former had been removed from France in 1941 with the idea of conversion to German use. Those of World War II were found to be the cream of the varied German series.

As the K5(E) appears to have been the most practical of the German designs developed, there were a large collection of spare parts in stock.

The First Army Ordnance Technical Information Team carefully inspected the shops. With great effort, the crane and a diesel locomotive were put into operation again and thus it became possible to cut out two rare Railway guns and the accessory cars. A brand-new 280mm K5(E) was first move and also a 310mm smooth bore version of the K5(E). This latter one was known to the Germans as the Glott.

This newly made up train consisted of the two K(5) guns on their carriages, a turntable car, an ammunition car, a powder car with air conditioned storage, a car with air conditioning engines and a maintenance car. This train left Leipzig in June, but due to the many wrecked railway bridges the journey was greatly delayed. It was necessary for the Engineers to strengthen the bridges all along the line.

Bremershaven was the only port with cranes capable of handling these enormous loads, and the train was routed through this port. It was again delayed there due to needed repairs to the tracks, docks and cranes of the Port.

Once more the ocean voyage was routine and again the railways in the U. S. had an excess shipment to carefully move to Aberdeen.

Thus, the sisters of "Anzio Annie" finally reached Aberdeen during the middle of February 1946. These guns and "Leopold" are undoubtedly all amazing monsters of small real military value, developed at the direction of the map paper hanger of Austria in his bid for world Domination and a monument to his failure.



American Ingenuity in P.W. Camps

By Colonel Robert C. Gaskill, Medical Corps

Everyone has seen examples of American inventiveness. We take it as a matter of course that we will get a thing done, no matter what the obstacles, if given the chance. Perhaps this trait is inherited from our pioneer ancestors who, in their isolation, depended only upon themselves for what comforts they might have had.

During the Battle of Bataan, when we were cut off from supplies, and replacements were not forthcoming, artillery pieces were repaired, composite airplanes assembled, alcohol for surgical use made and refined and other necessary things accomplished as a matter of course. Not until we were marched to the prison camps after the surrender however, and stripped of all tools and materials did this ability of our men to improvise make itself known in many unusual ways. The illustrations outlined in this article are merely representative.

In the medical field, where supplies initially were practically nonexistent, abaca fiber (manila hemp) which can be carefully split into almost any size desirable and readily sterilized by boiling, was used successfully as suture material in surgical operations. Ear specula, entirely lacking in some camps, were built up of paper and glue formed around a carved wooden form. Where did the glue come from? From carefully dextrinized starch taken from our scanty food supply. Applicator sticks and tongue blades were simple, only requiring the splitting of bamboo. Adjustable surgical tables were constructed and used. Artificial legs were made from everything from bamboo to aluminum piping salvaged from airplanes. A bed patient who could sit up in his bamboo hospital bay or matting covered cubicle could rest fairly comfortably against a wooden backrest.

After the dental amalgam for filling carious teeth was exhausted and prior to the arrival of more in the Red Cross supplies, coin silver was filed into tiny particles, which when mixed with mercury successfully filled many aching teeth containing caries. The metallic mercury supply later became exhausted. This essential item was reduced from its bichloride, of which there was fortunately a supply, by means of aluminum chips from a G.I. mess kit. Teeth were carved from carabao teeth and were used at least to improve the appearance of the individual. One dental officer made silver crowns of coin silver without benefit of the elaborate equipment ordinarily required. He succeeded in borrowing a gasoline blowtorch from the Japs to use in fusing his metal. In outlying camps adjustable dental chairs were built on the spot.

Early at Cabanatuan an enterprising individual successfully cultured yeast from airborne organisms. This culture was given to all prisoners and played an important part in allaying vitamin deficiency. Later, after efficient ovens had been constructed of mud and sheet iron, and while there was some wheat flour available, this yeast culture was used in making bread. The dough was baked into a product that would do credit to many modern bakeries. (An interesting thing occurred after the first oven had been built. The Japanese officer in charge of the camp denied baking privi-

secure his permission to use the scrap sheet iron. He recanted however, since his Japanese staff had sampled the bread and insisted on having it themselves.) When the ingredients were obtainable, many individuals made vinegar of coconut milk and sugar, which added a zest to otherwise tasteless food. Some would add wild peppers obtained from men working in areas where the peppers grew, thus having pepper sauce. The rinds of any citrus fruits obtained were carefully saved and used in the same manner as spices.

Some expert tailoring appeared after the initial clothing brought into the prison camp began wearing out. I have seen complete suits tailored of shelter-half canvas, blanket material and the cloth from barracks bags. A Swedish type loom was constructed, largely from the iron bands about Red Cross packing cases, and cloth woven which was made into shorts, towels, washrags, etc. The thread came from discarded sock tops and knitted underwear which was painstakingly unraveled and twisted in multiple into a stronger thread by a spinning wheel manufactured from a weird assortment of odds and ends. When shoes began to wear out, wooden shoes were carved; very presentable leather shoes were stitched from old uppers and later from leather tanned by the shoemaker.

To manufacture certain articles, a wide variety of tools was necessary. A grindstone was made by pouring cement into a circular mold. Whetstones were laboriously prepared by rubbing two rocks together. Many used these handmade whetstones to sharpen razors. Vises were made by anchoring two parallel boards together near the middle. A wedge driven into the space between the boards at one end would effectively clamp an object placed in a similar position at the other. Drills were made of wire of the proper gauge hammered flat, then twisted spirally. Hammers might be a T pipe fitting, filled with lead, screwed into a short section of pipe for a handle. Saws were made by filing teeth on the edge of scrap iron. Calipers would be of shaped sheet iron or of wood. Chisels appeared in odd shapes because they were made of tempered steel in whatever form it was found. The best razor that came to my attention was produced from the steel spring taken from the instep of a shoe. For rapid results in drilling, the pump drill was a favorite. Knives were as varied in form as were the individuals making them. In Japan the favorite knife was made of an old hacksaw blade. Apparently the only tool not manufactured was the file.

Having these basic tools at hand one was prepared to tackle any project. The craftsmen would assemble in some corner and with great patience and loving touch fashion the most beautiful pipes of ebony (carnigon) with perhaps a mouthpiece made of carabao horn. Cigarette holders were fashioned of plastic, wood, metal or whatever materials caught the artist's eye. The jewelers produced rings, wrist bands, identification tags, medallions; all beautifully chased and engraved. The making of army insignia became a specialty. They would be hammered, as for instance a major's leaves, from a centavo piece; cast in a mold or in most in-

brated instruments made: watch crystals and even parts for the works of watches were produced.

Tinsmithing was developed, perhaps to a greater degree than any other craft because of the crying need for containers. Some of this work, done entirely by hand of course, approached the perfection of tinwear seen in a five and ten cent store. Water containers capable of holding anything from ten gallons down were made, as were roasters, frying pans, kettles and the like. Naturally metal was scarce but this fact did not deter the industrious person. The first bucket I saw made held two gallons and was fashioned from the metal taken from many number one tins, all put together with beaten seams. One genius carved wooden dies and was turning out utensils in wholesale quantities. His press, entirely of wood, had power applied by means of a ten-foot pole lever.

In one case where the camp water supply was located outside the stockade a bamboo pipe line was constructed and successfully brought water to the reservoir. One of the maintenance men was capable of bending the bamboo to any desired shape.

For amusement and entertainment there were those who carved chessmen from beautiful Philippine hardwoods. The

woods more often than not being obtained from the wood pile at the kitchen where all colors were to be found. One especially fine craftsman spent a full month on each of his major chessmen. They were truly works of art. Cribbage boards of wood and of carabao horn were made, polished to a glossy sheen and artistically inlaid with metal and plastic. Even playing cards were made at Bilibid from old immigration photographs, neatly trimmed and stenciled with the appropriate characters. Banjos were seen with the sounding board placed over a part of an automobile differential housing and ukeleles built about a coconut shell. Books were written, illustrated and bound. To cap the climax one man made and operated a slot machine similar to the popular variety, using fruit, bells and other symbols.

And so the industrial ingenuity of the American prisoners ranged: from sun dials to embroidery; medical tablet molds to food graters; nails to septic tanks; bellows to kerosene lamps. One of our American interpreters who had been a Japanese language student in Japan, overheard the Jap camp commander say during one of his inspections: "You have to watch these Americans, for given some string and a few tin cans they will have a steam locomotive operating in this camp."



Aim High on Maintenance

The antiaircraft boys have to aim high to bring their targets down. And this includes aiming at high standards of efficiency in operation as well as efficiency in sighting their guns.

Preventive Maintenance must ever be among the high aims of Coast Artillery and Antiaircraft units, as much so as for any other branch of the Service. For, Preventive Maintenance alone, practiced faithfully and regularly, can keep Coast Artillery and Antiaircraft units from bogging down through equipment failures, when the going is tough and replacements are hard to get.

Preventive Maintenance of Coast Artillery and Antiaircraft equipment involves much more than merely keeping it clean and lubricated, though of course these services are essential. The more obvious maintenance services are probably seldom forgotten—it is the "little" things that must be called to attention frequently.

For example, the way the Gun Book is kept up means a great deal. It is vital that entries be up to date and accurate, for on those occasions when it is necessary to turn a gun over to an Ordnance shop, the shop must have complete information on the gun to perform properly and swiftly the necessary repairs.

Care of tires is another extremely important phase of Preventive Maintenance on Coast Artillery and Antiaircraft equipment which is apt to be slighted, especially when equipment is in firing position for several days at a time. It is easy to forget to check tire pressure, since wheels are

either blocked off the ground or removed from the equipment and are not used daily. Correct pressure *must* be maintained to conserve tires. It should always be remembered that tires should be checked for pressure before they are subjected to extensive use. A quick withdrawal from firing position requires reliable tires with correct air pressure. A fast march on tires with incorrect air pressure may cause complete tire failure.

Handling of the more delicate instruments, such as rangefinders and sighting and fire control instruments is another vital phase of preventive maintenance of Coast Artillery and Antiaircraft equipment. Even though the weapon itself may be in excellent condition, it will not hit the target if sighting is inaccurate. And, the lenses and other parts of this type of equipment are critical items. They are both hard to get and hard to repair.

Above all, War Department Lubrication Orders must be followed to the letter at all times. Only in this way, can lubrication be carried out so that the gun is lubricated at the right time, in the right places, and with the right lubricants.

These points must be emphasized again and again in Coast Artillery and Antiaircraft equipment is to serve you well. It is the officer's responsibility to see that preventive maintenance services are performed. The spot-check inspection is his guide. The higher responsibility, that of doing the work, is up to the individual soldier. His conscience must be his guide.

MET Messages in the ETO

By Captain Joseph A. Pechman, Air Corps

EDITOR'S NOTE: Captain Pechman was Artillery Weather Officer, IX Air Defense Command. He and his Detachment received numerous commendations from brigades, groups and battalions.

Before the invasion of the European Continent, artillery meteorological messages were obtained by traditional AAA methods. Winds aloft were computed from PIBALs, the densities were obtained from tables in TM 4-240. These tables were based on a standard relationship between surface and upper air temperatures, pressure and humidities. These methods proved inadequate when poor visibility and low clouds obscured the flight of balloons and when upper air densities varied from the standard conditions assumed. At the same time, the Weather Service was faced with the problem of obtaining winds aloft in a theater of operations where the ordinary PIBAL methods would yield, at best, data at irregular intervals and to limited altitudes. The requirements of Artillery and Weather units were met by an Artillery Weather Program wherein the excellent equipment of the two different branches—AAA's Radar and Weather's Radiosonde—were utilized to the best advantage.

Radar made possible the determination of upper winds under most conditions of clouds or poor visibility. Wind

data are obtained by an SCR-584 tracking the flight of a free balloon to which is attached a metal, foil-covered paper reflector capable of reflecting the radar signals back to the radar. Directions and speeds of the winds for the various altitudes are evaluated on the basis of the horizontal projection of the flight of the balloon. This procedure is called "RAWIN," a term combining the two words, "radar" and "wind."

To compute upper air densities, use is now made of the radiosonde, which measures and records the pressures, temperatures and relative humidity in the upper atmosphere. This is accomplished by sending aloft a free balloon to which is attached a radiosonde, consisting of a set of small meteorological instruments with a radio transmitter and packed in a small, compact cardboard box. During the ascent, the radiosonde transmits signals which are picked up and automatically recorded by a sensitive ground receiving station. These recordings, when properly interpreted by highly skilled technicians, give an essentially continuous record of pressure, temperature and relative humidity (from which density may be computed) of the atmosphere through which the radiosonde traveled.

This article deals only with the meteorological arrangements for gun battalions of the IX Air Defense Command. Met messages for these gun battalions were based entirely on radar and radiosonde data from the time they landed in Europe until the end of the war. Similar arrangements were made for other commands in the ETO.

PROCEDURES

The 21st Weather Squadron was assigned to the Ninth Air Force prior to the time that the meteorological requirements of the AAA were included in the weather service plans. As soon as the IX Air Defense Command was assigned to the IX Air Force, one weather detachment from the 21st Weather Squadron was attached to it for the sole purpose of providing ballistic densities to gun battalions. The commanding officer of the weather detachment was appointed Artillery Weather Officer of the IX Air Defense Command.

Meteorological messages, based on radar and radiosonde data, were supplied four times daily to gun battalions of the IX Air Defense Command during the operations on the European Continent from Antwerp to Marseilles and from Cherbourg to the Rhine River. It was possible to provide the meteorological messages throughout this wide area because of the mobility of the 21st Weather Squadron and the dispersal of its weather detachments throughout most of northern France, Belgium, Holland, Luxembourg and Germany. The one radiosonde unit attached to the IX Air Defense Command was always located nearest the largest concentration of gun battalions. Other battalions were advised to contact detachments of the 21st Weather



Signal Corps Photo

Balloon is inflated in a hydrogen tent to prevent damage by

points which they were defending. In two cases, detachments of other Weather Squadrons were called upon to provide the ballistic densities when 21st Weather Squadron detachments were not available. In all, twenty-two gun battalions were included in this program and thirteen different weather detachments were called upon to compute ballistic densities for these battalions.

During this entire period, upper winds were obtained by the meteorological sections of the gun battalions for the Weather Service at every gun defended area. Units of the IX Air Defense Command alone provided a fairly complete network of upper winds for a large section of Northwest Europe. For example, in January and February of 1945, upper winds were obtained for the Weather Service in this way at the following cities: Cherbourg, Charleroi, Antwerp, Liege, Nancy and Marseilles.

Arrangements for the interchange of meteorological data between gun battalions and weather detachments were made by the Artillery Weather Officer, who was always kept informed of the redeployment of battalions. He was also notified by the 21st Weather Squadron of the latest locations of weather detachments. When a battalion moved into a new area, the commanding officer of the weather detachment nearest to that point was instructed by the Artillery Weather Officer to provide ballistic densities to that gun battalion for the four synoptic hours each day and informed that he would receive the upper winds from the battalion for further transmission over weather channels. Provisions for communications were also made at that time; in most cases it was possible to use telephones. When land lines were not available, radio was used.

An attempt was made at all times to contact weather detachments which were equipped with radiosondes. However, when this was not feasible, weather stations were ordered to estimate the ballistic densities on the basis of the latest available upper air data. These estimates were usually very reliable because the network of radiosonde stations was fairly good. All weather stations were equipped with radio receivers and transmitters and were supplied with the latest surface and upper air data on regularly scheduled weather radio nets. In this way, forecasters in these mobile, tactical weather stations had almost the same current information as a stationary weather station.

The large number of gun battalions which were assigned to the IX Air Defense Command and the wide geographic distribution of these battalions required that the expenditure of meteorological supplies be cut to a minimum. Conservation of supplies was accomplished in two ways. First, ballistic winds for the synoptic hours in each gun defended area were obtained at a single battalion. Usually, the brigade or group commander set up a rotating schedule for the battalions to insure compliance with this conservation measure. Battalions which were not scheduled to make RAWIN ascents obtained the complete meteorological messages (ballistic winds and ballistic densities) from the AAOR. Secondly, where several gun battalions were located within a relatively small area, a RAWIN station, consisting of personnel and equipment from two adjacent battalions, was set up to provide the upper wind data for all battalions in this area. These RAWIN stations operated

THE PARIS DEFENSE

The operation of the meteorological program within the IX Air Defense Command may be explained best by describing the system used in one such area. In the Paris defense, during the months of September to December 1944, there were six gun battalions in and around the city under the command of the 47th Brigade. Weather Detachment "YH" was assigned to the 47th Brigade by the IX Air Defense Command to provide the ballistic densities for the defense. The weather detachment was located at 47th Brigade Headquarters and had direct telephone communications to the AAOR at brigade headquarters. All battalions and batteries in the defense were connected by land lines with the AAOR. Detachment "YH" made four radiosonde ascents daily and computed ballistic densities for high angle fire immediately after each ascent. At the same time a AAA RAWIN station, located three city blocks away, made four RAWIN ascents. The RAWIN station equipped with two radars and three hydrogen generators was established by pooling the meteorological sections of two gun battalions. Equipment and personnel from all six battalions in the Paris defense were rotated at the RAWIN station every month. The RAWIN station transmitted the upper winds directly to Detachment "YH" over a direct telephone line installed for that purpose. Each message consisted of two parts. Part I consisted of true winds in degrees and knots at altitudes prescribed by the Weather Service; Part II consisted of ballistic winds for high angle fire at the eleven standard artillery zones, in mils and miles per hour. Part I of the message was immediately broadcast by radio personnel of Detachment "YH" over a regular weather radio net. To Part II of the message, ballistic densities for high angle fire were added to make a complete meteorological message.

This message was transmitted to the AAOR. In turn the AAOR transmitted the message over the "hot loops" to the twenty-four gun batteries in and around Paris.

When telephone communications were not available, AAOR or brigade personnel picked up the messages from the weather detachments and battalion meteorological sections by radio and transmitted the appropriate completed messages to the batteries and weather detachments by radio. When RAWIN stations were not established, ballistic winds were obtained from the different battalions on the basis of the rotating schedule already discussed above. In all cases, the result was the same: every gun battery in the gun defended area was provided with one complete high angle fire message and the Weather Service received an upper wind report from that defense once every six hours.

THE ANTWERP DEFENSE

In Antwerp, the defense against PAC launched by the Germans consisted of an extremely large concentration of heavy guns. There, it was essential that fire be accurate at all times of the day and night. Detachment "YH" was assigned to the 50th Brigade late in December 1944, to furnish the radiosonde data and to coordinate problems of supply, administration and communications arising in connection with the meteorological program. Telephone

series, and AAOR were approximately the same as they were in Paris. The meteorological message was transmitted in a slightly different form because of the peculiar type of target involved. In view of the fact that the PAC rarely came over at heights greater than 4,000 feet, the standard meteorological message was divided into two parts, consisting of the first four and last seven artillery zones, respectively. The first part was computed while the radiosonde and RAWIN balloons were still ascending and was available for use at the batteries not more than three-quarters of an hour after the balloons were released. The last part of the message was transmitted to the gun batteries in the usual manner after the balloon ascents were completed. Four such messages were transmitted each day during a period of four months. To allow finer corrections to firing data, densities were computed by the weather detachment to the nearest tenth of one per cent. Although it is impossible to make a quantitative estimate of the contribution to the firing that was made by the meteorological messages, there can be no doubt that the excellent firing may be attributed in part to the accurate messages that were always available to the firing battery. The total number of PAC launched against Antwerp was 4,883, of which 2,783 approached the vital area and were engaged—of these only 211 actually landed in the defended zone.

TECHNICAL CONSIDERATIONS

Section V, TM 20-240, "Meteorology for Artillery," describes a procedure for computing the RAWIN data which differs slightly from the procedure used by the IX Air Defense Command. TM 20-240 bases its calculations on radar readings of azimuth, angular height and altitude, which are obtained at specified altitudes, whereas the method utilized provides for readings to be taken at half-minute intervals. The methods outlined in TM 20-240 was given a great deal of consideration even before the manual arrived in the European Theater but it was not adopted for the following reasons. First, if the radar were off target at the precise moment when an altitude reading at the beginning or end of a standard altitude zone is scheduled, the wind information for two zones would be lost. The altitude converter in the SCR-584 cannot be used for RAWIN purposes when the radar is not tracking automatically yet, manual tracking is necessary when high, gusty winds prevent automatic tracking, and, therefore, must be used often below 32,000 yards slant range. Second, the altitude converter gives readings only up to 10,000 yards. Third, this procedure is not easily adapted to obtaining winds at altitudes prescribed by the Weather Service, or above the upper limit of the altitude converter. It is believed that the "time" method is superior to the "altitude" method because information can be interpolated easily for readings that are lost during the intervals when the radar is off target, and because it does not delay the computations when messages for both AAA and the Weather Service are required. Provision should at least be made in TM 20-240 for interpolating the missing data when horizontal distances are plotted on the ML-122 plotting board (step b, page 54, TM 20-240).

The statement in TM 20-240 (page 34) regarding the "Impact" effect of water droplets on the motion of a 90mm

projectile has caused some comment and discussion. Limited observations of bursts at the 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.

METEOROLOGICAL PERSONNEL

According to the current T/O of a semimobile and mobile gun battalion (T/O&E 44-16 and 44-116), the battalion meteorological sections consist of four men. Under field conditions, it has been found that this number is too small, when one section must make at least four RAWIN ascents each day. This T/O was established before the potentialities of the RAWIN program were exploited, and when the Schwartzchild method was widely used. More men are, therefore, now urgently needed. It is recommended that the T/O be altered to include a total of six men in each section.

In this connection, it may be pointed out that, on the basis of the experience in the European Theater, it has been found that, in the past, men assigned to these sections have had little aptitude for the work they are required to perform, and have had not more than a mechanical knowledge of what the procedures imply. The men should be given a technical training course, which is almost as complete as the three-month course given to weather observers, so that they will be capable of computing ballistic winds according to all methods available and ballistic densities and temperatures from radiosonde data. They will then have the background to follow new procedures when they are introduced.

EQUIPMENT

One of the most serious difficulties encountered in the field was the lack of sufficient hydrogen to inflate the large, 350-gram balloons that are used in RAWIN ascents. One balloon, inflated to a free lift necessary to obtain an ascent rate of approximately 500 yards per minute, requires one ML-185 tankful of hydrogen. The T/E of gun battalion authorizes only one hydrogen generator, M1-185. Under field conditions, where the chemicals are likely to deteriorate, and where it is almost impossible to heat water, full charges are difficult to make. Hence the balloon is under-inflated, rises slowly and goes out of range of the radar before reaching higher altitudes. When the balloon breaks before it is released, the ascent is delayed until more hydrogen is made. For these reasons it is suggested that T/E authorization of hydrogen generators be increased from one to three.

Hydrogen shelters are needed because it is difficult to control a 350-gram balloon in the open when the wind is more than eight or ten miles per hour. Since these shelters are not a regular item of issue it was necessary to im-



Signal Corps Photo

Balloon is filled for a trial run at a mobile weather station.

provide them. Under field conditions, improvisation was difficult. Detachments of the 21st Weather Squadron were equipped with specially designed, mobile inflation shelters (approximately 7' x 7' x 10'), made of a durable, water-proofed material. Manufacture of shelters similar to these for AAA use is strongly urged.

Lack of weights to measure the free lift of 350-gram balloons makes it possible for the amount of hydrogen put into a balloon to vary, causing variations in the rate of ascent. It is suggested that a nozzle with weights be added to the T/E to counteract this.

The plotting board, ML-122, and the Brass Rule, ML-126, that is used in conjunction with it, were originally designed for making PIBALs which rarely went beyond 10,000 yards. Ninety-nine out of every hundred RAWIN ascents exceeded this range. When this occurs, it is necessary to divide the horizontal distances by two, and sometimes by four, to get them on the plotting board. It is recommended that two more rules be manufactured for use in RAWIN computations: the Brass Rule, ML-126, has a scale of 750 yards to the inch—the other two rules should be made with scales of 1,500 and 3,000 yards to the inch, respectively.

CONCLUSIONS

The experience of the IX Air Defense Command provides ample proof that a special weather program for AAA units is a vital necessity during tactical operations. Such a program should be a permanent part of any AAA defense plan, and should provide facilities for the computation of ballistic information from the latest and most scientific devices available to measure the meteorological phenomena of the upper atmosphere.

The sections of the T/O&E of gun battalions relating to meteorological personnel and equipment might well be revised. At least two more men are needed in each section with technical training given to them before they are assigned to actual duty in battalions. Supplies and equipment are necessary to provide the basis upon which a meteorological program can operate which provides for four RAWIN messages a day.

TM 20-240 is an excellent summary of meteorological procedures for artillery and a vast improvement over TM 4-240 which was formerly in use. One minor addition regarding RAWIN procedures should be made and further research in the matter of corrections for firing during conditions of fog and cloud should be undertaken.



The Missile Is the Answer

By Major Ralph M. Rogers, Cavalry

"They've gone about as far as they kin go?"

This line from a song from the musical production "Oklahoma" has probably been heard in every land, at every stage of history, and after every new development. Usually the statement springs from a combination of bug-eyed wonderment at the new, and a wistful nostalgia for the "good old days." In each case, subsequent events have proved the fallacy of the statement. For the Armed Forces, instituted by law to uphold the Constitution and to protect the nation against all aggressors, foreign and domestic, this proven fallacy carries a particular significance. We must go forward in the light of new developments, or we slide backward. For us there is no in-between static condition as long as any nation in the world maintains armed forces equipped with modern weapons. Twice in our generation, we have been able to avert national disaster by developing, at immense cost, the means for our salvation after the need had become a very urgent and real thing. Today through this payment of lives and material in two wars, we have bought a lesson at a very dear price. The establishment by our Armed Forces of a Guided Missile development program is one of several indications that we have learned the lesson well and that we are determined to profit by it.

To hazard a prediction, the guided missile of the future will have as its propulsion system a reaction motor of either the rocket or jet (airstream) type, and possibly a combination of the two. From the viewpoint of general knowledge, it is interesting to note that neither the rocket nor the jet engine is a complete innovation. A jet motor had been built almost 2,000 years ago by Hero of Alexandria, and a crude rocket was used against the besiegers of a city in China in about 1232 A.D. The rocket, as a fireworks display, was well known to the citizens of the 18th Century, and the early part of the 19th Century saw the Congreve War Rocket used as a very potent military weapon, as measured by the yardstick of the time. For us in the United States, the menace of a rocket weapon in enemy hands was immortalized in the words of Francis Scott Key written during the bombardment with rockets of Fort McHenry near Baltimore by the British Navy: "the rockets' red glare, and bombs bursting in air." The advent of rifled artillery with its greater range and accuracy caused a temporary lull in the development of rockets as a military weapon, but the requirements of World War II lent impetus and urgency to the program which resulted in truly spectacular strides in both the rocket and the jet field. Both the Allied and Axis Forces developed solid fuel (powder) rockets which were extremely effective. Some of these are: the Bazooka, a one-man-carried antitank weapon; the 4.5-inch artillery rocket, launched from a 2½-ton truck, the turret of a tank, or the deck of small landing craft; the British "Z" gun, an antiaircraft rocket gun used in a barrage rôle; the German Nebelwerfer, a multi-barreled rocket howitzer mounted on a modified 37mm gun carriage; rockets as plane armament on fighter-bombers; Jatos, or jet-

assisted-take-off units, used to shorten the take-off run of heavily laden bombers and carrier based fighters.

But the developments of World War II which hold the most significant portent of the future of guided missiles are: the V-1 or Buzz-Bomb, an intermittent-jet-propelled pilotless plane; the V-2, a true liquid-fuel rocket; and the turbo-jet plane. The advent of the atomic bomb, at least in the public mind, somewhat overshadows the accomplishments of the V-1 and V-2. But the possibility of using a guided missile as a vehicle for an atomic warhead presents a picture that is spine-stiffening and hair-raising in its implications. In a world where world-wide wars are begun with no prior statement of intention on the part of combatant powers, the defense against a supersonic weapon from the Army standpoint appears to be an intelligent combination of hair-trigger preparedness of interceptor guided missiles, adequate dispersion of important domestic objectives, instant retaliation with similar weapons in greater strength, followed in a minimum of time by the dispatch of airborne troops to seize and secure the launching sites and nerve centers in the enemy country. This is not a pretty picture; war is not a pretty business.

During the course of World War II, no effective active defense against the V-2 was developed. A passive warning defense was only partially effective in that it gave persons a matter of two or three minutes, at the most, to take cover. With its maximum velocity of 3,600 miles per hour, range of over 200 miles, and maximum ordinate of about 70 miles, the V-2 could not be coped with, and it was only after the last launching site was captured by our ground troops that the V-2's ceased to fall in the London and Antwerp areas. This velocity, range and altitude is impressive, but so was the 30 miles per hour of the automobile of 1900. We have seen only the beginning.

Today we have rocket and jet motors that are almost 50 per cent efficient. A condition for maximum efficiency is that, the scientists tell us, the motor must be moving at or near the velocity of its jet stream. What are these velocities? With fuels we now have they range theoretically from slightly above the speed of sound (760 miles per hour) up to about 11,000 miles per hour. These are the speeds with which we must deal in the rocket age.

The guided missile development program is concerned with all phases of the problem to include fuels, motors, airframes, ballistics, guidance or control, and the evolution of tactical doctrine. The details of guidance systems are largely secret; but in this day of radar contact with the moon, television, and homing systems, it is not difficult for a person with only a superficial knowledge of physics and electronics to guess the general pattern these guidance systems may take.

As would be expected, development projects of specific missiles for the Army are the responsibility of Army Service Forces and Army Air Forces. However, Army Ground



Signal Corps Photo

An abandoned German Nebelwaffer in France. One of the early enemy ventures in rocket guns. The sign speaks for itself.

Forces, in addition to maintaining close liaison with developmental agencies, has a field force consisting at present of the first AAA Guided Missile Battalion,* at Fort Bliss, Texas, which assists in the test-firing of missiles and from its experience, submits recommendations on T/O's, T/E's, and finally tactical doctrine for accepted missiles in which Army Ground Forces will have a primary interest.

In general, launching devices for guided missiles promise to be of less bulk and of considerably less weight than guns of comparable caliber. With guidance systems, rockets approach pinpoint accuracy. To the nation which developed the almost miniscule apparatus in the V-T fuze, the development of guidance equipment to be carried in the launcher vehicle or accompanying vehicles seems to be no

*See the article appearing in this issue on The First Antiaircraft Guided Missile Battalion.

insurmountable obstacle. No attempt is being made here to delve exhaustively into all the ramifications of the problem, but only to touch on some of the more basic considerations.

Looking at the entire field, it is too early to make any unqualified statements as to the military uses of guided missiles. That heavy types may one day supplant, or at least supplement, bombardment aviation appears as a probability; that lighter types may take over the rôle of interceptor planes and antiaircraft artillery gun battalions appears as almost a necessity; and that still another type may one day augment field artillery in a ground support rôle seems to be feasible. One thing appears certain: the guided missile program must be pushed—and pushed hard. In the event of another World War, the nature of warfare will have undergone a sharper change than was occasioned by the introduction of the airplane.



Reserves Are the Backbone of Peace

By Brigadier General Edward S. Bres

EDITOR'S NOTE: This article is an abridgement of one by General Bres which appeared in the Army Day Review, but it still gives us a much needed insight into the future of the Organized Reserve Corps.

Future plans for National Defense and the exact composition of our postwar Army have yet to be determined by Congress. However, the outlines are generally agreed upon as follows: a small but highly trained Regular Army, a strengthened and enlarged National Guard, the balance of the army required for National Defense to be a strong Organized Reserve Corps.

The Organized Reserve Corps will include both officers and enlisted men, and will provide the units required to supplement the Regular Army and the National Guard in the event another emergency requires mobilization of the Army of the United States. Prior to World War II, units in the Reserve were largely paper units, with officers assigned, but no enlisted men and no equipment. These units were never mobilized as units. But in our postwar Army, the Organized Reserve Corps will contain full-strength units, with unit equipment, ready to be mobilized on M-Day.

Units in the Reserve will be organized under three classifications. Class A units will be war strength units, with full complements of officers and enlisted men assigned. In addition each Class A unit will have all essential equipment required for training and initial mobilization. In the event of an emergency, each Class A unit will be able to take the field and function successfully in its assigned mission after a short period of additional training. To accomplish this it is contemplated that each unit will have fifteen days of active duty training each year and one hundred and five hours of inactive training, such as armory training, et cetera. Members of such units will be paid full pay and allowances during active duty periods.

Within the Class A classification will be two subdivisions. Class A-1 units will be largely service type units, in the numbers required to balance the Regular Army and National Guard on M-Day. Many of these units will be what is known as "affiliated" units, in other words, units of a technical or specialized nature which can be sponsored by civilian concerns and organizations performing a similar function in civilian life. The concept of affiliation was employed to a limited extent in World War II, and can provide many of our essential, technical service units in the event of another mobilization. Examples of the types of units obtainable through affiliation are Ordnance Motor Vehicle Assembly Companies, Heavy and Medium Maintenance Companies, Tire Repair Companies, Signal Operations and Construction Battalions, Quartermaster Depot and Sales

Companies, Engineer Construction Units, Hospital Units, et cetera. It is obvious that the principle of affiliation can go far towards filling the highly technical and specialized requirements of a modern army.

Class A-2 units will be combat units primarily. The number of divisions, tank battalions, artillery battalions, et cetera, in this classification is dependent on the approved postwar Army.

Class B units of the Organized Reserve Corps will be of both combat and service types. These units will be organized with a full complement of officers, at least a cadre of key enlisted men, and essential training equipment. In the event of mobilization, these units will be given their filler personnel through the Selective Service System and will have a mobilization priority of three to six months after M-Day.

Class C units of the Organized Reserve Corps will comprise the balance of units which it is planned will be required during the first twelve months after M-Day. These units will consist of a full complement of officers only, similar to Reserve units prior to World War II. Class B and C units will both be given periods of active duty and inactive duty training, but to a lesser extent than Class A units. Wherever possible, Class B and C units will be associated with Class A units of the same type for training.

In addition to the Reserve personnel assigned to the above three classes of units, there will be a large pool of officer and enlisted reservists, available as fillers and replacement for units of the Regular Army, National Guard and Organized Reserve Corps as needed in the event of an emergency.

In the preceding paragraphs I have given the generally accepted concept of the Organized Reserve Corps. The extent to which this program is capable of accomplishment is dependent on many factors, such as the enactment of Universal Military Training in some form and determination by Congress of the approved postwar Army. In any event, the Organized Reserve Corps will be an important component of the Army of the United States and will be developed to the extent authorized along the lines indicated above.

Originally the Officers Reserve Corps were organized on the basis of the nine Service Commands located as follows: First, 808 Commonwealth Street, Boston, Massachusetts; Second, Governor's Island, New York; Third, U. S. Postoffice and Courthouse, Baltimore, Maryland; Fourth, Postoffice Building, Atlanta, Georgia; Fifth, Hayes Building, Columbus, Ohio; Sixth, U. S. Postoffice Building, Chicago, Illinois; Seventh, New Federal Building, 15th and Dodge Streets, Omaha, Nebraska; Eighth, Fort Sam Houston, Texas and Ninth, Fort Douglas, Utah.

It is now anticipated that the Six Armies will assume control of the program according to the geographical constituency of each command.

The contemplated sectors of control and administration of each of the Armies follow:

First Army Area with headquarters at New York City: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Delaware.

Second Army Area with headquarters at Baltimore, Maryland: Pennsylvania, Maryland, Virginia, West Virginia, Ohio, Indiana, Kentucky.

Third Army Area with headquarters at Atlanta, Georgia: North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi.

Fourth Army Area with headquarters at San Antonio, Texas: Louisiana, Texas, Oklahoma, New Mexico, Arkansas.

Fifth Army Area with headquarters at Chicago, Illinois: Michigan, Illinois, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Wyoming, Colorado.

Sixth Army Area with headquarters at San Francisco, California: Montana, Idaho, Washington, Oregon, California, Nevada, Utah, Arizona.

The following list shows the tentative assignment of instructors to units. These instructors may be members of the Regular Army, Organized Reserve Corps or National Guard.

AAA OFFICERS

Each brigade	1 colonel
Each battalion	1 major or captain
Each two Opns Det.	1 major or captain
Each Airborne Bn. with Airborne Div.	1 major or captain

AAA ENLISTED MEN

Each brigade, Class A & B	1 T/Sgt and 1 T/3
Each brigade, Class C	1 T/3
Each battalion, Class A & B	1 S/Sgt
Each battalion, Class C	1 T/3
Each two Opns Det., Class A & B	1 S/Sgt
Each two Opns Det., Class C	1 T/3
Five Airborne Bns. with Airborne Div.	4 S/Sgts and 1 T/3

SCA OFFICERS

Each Hq. Btry, HD	1 Lt. Col.
Each two CA Btrys	1 major or captain

SCA ENLISTED MEN

Each Btry, Class A and B	1 S/Sgt
Each Btry, Class C	1 T/3



A 521's LAMENT

After the advent of the M-1 height finder and the M-4 director I became a 521 (basic) as far as gun matériel was concerned. Finally after I had convinced everyone what an intellectual dwarf I was, orders were issued sending me to Fort Monroe.

After three months I emerged an expert (an expert being an ordinary guy away from home) only to find my newly won education was to be shelved in favor of a year's detail in the Air Corps. Once again I became a 521 and again it took six months to convince everyone (you must convince everyone) that I didn't know which end of the bombsight the bomb bay came out of. Then away I went again for exposure to some Air Forces education. I emerged all wide-eyed and bushy-tailed. Immediately, I was returned to the organization that had sent me to school and believe it or not assigned to a position consistent with the schooling I had just finished.

And so it went—for six weeks. A request I had put in some ten months ago for return to the Coast Artillery had finally been found and approved.

Well, nothing to worry about now, I still remembered the director and height finder from Monroe.

I was assigned to command a 90mm Gun Battery—my morale dropped ten points—I knew all about the 3-inch gun. After the first disillusionment I became very philo-

sophical; only one piece of equipment! Hell, I could learn that standing on my head. The next day as I walked into the gun park, something whisked my hat off my head. I turned to find myself staring at the most fouled up bunch of wire I had ever seen and there it was just whirling around waiting to knock somebody else's hat off.

"What the Hell is that thing doing in the Gun Park?" I yelled.

To which the sergeant on the platform replied, "This is an SCR 268, Sir," and proceeded to inform me that this instrument was destined to revolutionize antiaircraft fire.

Then they really opened fire on me. Along came the SCR 545, 547, 584 and just to make sure I stayed down for awhile, the M-9 director.

Right then I was the 521 of all 521s. There followed a gruesome period of oscilloscopes and thermogoggles until once again I could almost hold my head up in public—I am even made a Battalion Commander.

So we fight the war and everything is not too bad till I come home from Germany.

I am rather proud and conceited about what I know and then as I report into Bliss, a great big sign clumps me right on the noggin. "The First AA Guided Missile Battalion" so move over brother basics, here I come again.

Coast Artillery School Moves to San Francisco

The Coast Artillery School, which has been located at Fort Monroe since its founding in 1824, will move to Fort Winfield Scott in San Francisco, California, early this summer. The historic, famous Coast Artillery School, as the oldest service school in the Army, claims to have laid the foundation for the present system of military education in the United States Army. Actually, The Coast Artillery School was not designated as such until 1907, when the United States Artillery was divided into the Coast Artillery and the Field Artillery, each a separate branch of the service and with a separate school.

ORGANIZED IN 1824

In April 1824, the Secretary of War directed that a regiment of 10 companies be organized at Fort Monroe to be known as the "Artillery Corps for Instruction." This group was placed under the command of Colonel and Brevet Brigadier General John Rogers Fenwick, a hero of the War of 1812, and a former Marine Officer. Colonel Abraham Eastis did the actual organizing of the Artillery Corps as a "school of application," as it soon became known. The original idea was to train this regiment as a perfect example for the rest of the Artillery. The actual curriculum of the school consisted principally of routine garrison duties of the regiment with some laboratory work.

At first the school was acclaimed a great success and led to the creation of a similar organization for Infantry at Jefferson Barracks, Missouri. Frequent changes, however, in the garrison at Fort Monroe and the shifting of personnel made actual instruction exceedingly difficult, and in April 1834, 10 years after the founding of the school, it was closed.

From the close of the school in 1834 until 1856, the Artillery was occupied variously in Indian Wars and the Mexican War, but in 1856 troops were once more made available for duty at Fort Monroe to form "a school of practice for service with heavy guns." It took but a short while to reorganize the school, and regulations were published in 1858 providing for the establishment at Fort Monroe for "theoretical and practical instruction of artillery, a school, to be termed The Artillery School." The personnel of the school consisted of the companies of the garrison at Fort Monroe with the senior officer as commandant. The course was to be theoretical and practical. Instruction was given in drills and mechanical maneuvers; saber exercise; the science of gunnery; military pyrotechny; the construction, preparation, inspection, and proof of ordnance and ordnance stores for field and garrison purposes; engineering, surveying and topography; the organization, proportion and arrangement of the artillery of an army for campaigns, sieges, defenses, and battles. There was to be an annual encampment of 1 month, during which the instruction was to be confined to instrumentation, camp duties, field fortification and surveying. Examinations were to be held annually for the subaltern officers and semi-annually for the non-commissioned of-

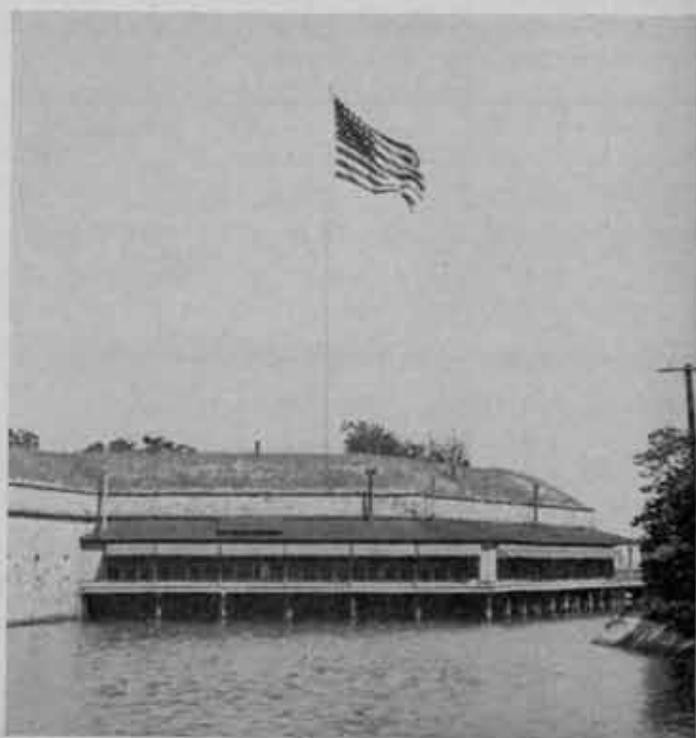
ficers. Although the threatening Civil War brought to an end the second period in the history of the Artillery School in 1860, the training was to make itself felt in many a bloody field in the next few years.

REOPENED AFTER CIVIL WAR

The value of the school was proved during the War Between the States, so it was reopened for the third time in April, 1868, as "The Artillery School of the United States Army," under the command of the Civil War artillery chief, Major General William F. Barry. The course offered instruction in mathematics, artillery tactics and technique, engineering, astronomy, international law, mechanics, military history and tactics, surveying, gunnery and ordnance.

By 1875 most of the lieutenants of artillery and a few officers of other branches had received instruction at the Artillery School. So important was the school considered that all lieutenants in the artillery were required to attend its courses of instruction and in order to qualify for promotion, had to complete the course successfully. The wisdom of requiring all artillery officers to attend the school has been confirmed by the experience of every war.

In 1891 many students of the school expressed a desire to publish an artillery journal to serve as a medium for the exchange of thought and the discussion of artillery questions by artillery officers and others. The scheme was approved by the staff of the school and the facilities of the school press were made available for a journal's publication, other expenses being borne by subscribers. In January 1892 the



JOURNAL of the United States Artillery made its initial appearance as a quarterly. It was an immediate success and came to be recognized as a leading publication on artillery matters.

The work of the school was temporarily suspended in 1898 for the duration of the War with Spain, but resumed operations in September, 1900. The school was now organized into five departments: Ballistics and Seacoast Engineering; Electricity, Mines, and Mechanism; Artillery, Chemistry, and Explosives; Art and Science of War and special courses, including customs of the service, usages, property returns, correspondence, regulations, and the actual performance of all the different duties of an officer at a post.

The student officers were chosen from subalterns recently appointed, who were not West Point graduates and certain officers who elected to take the course, regardless of rank. Instruction consisted of reading, lectures, practical field work, and preparing papers on assigned subjects.

SEPARATION OF COAST AND FIELD ARTILLERY

The organization of the Coast and Field Artilleries in 1907 into separate branches of the service brought about a reorganization of the Artillery School under the name, "The Coast Artillery School." The departments became: Department of Artillery and Gun Defense; Department of Electricity and Mine Defense; Department of Enlisted Specialists. In 1907 the School of Submarine Defense at Fort Totten, New York, was combined with the Coast Artillery School at Fort Monroe.

Our entry into World War I in 1917 found 37 Regular officers, 8 National Guard officers, and 1 officer from the Chilean Navy taking the regular course. Fifty officers were receiving instruction in a preliminary or basic course for provisional second lieutenants and 137 enlisted men were enrolled in the Enlisted Men's Division.

During the World War the curriculum of the school was increased and changed to train candidates for commissions in the Coast Artillery Corps. Although the biggest task was the training of officer candidates, the other work of the school was not neglected and in 1918 special courses for aerial observers were instigated to give the air officers an understanding of the artilleryman's problems.

POST WORLD WAR I OPERATION

At the close of World War I the School resumed instruction with courses reviewed in the light of our war experience. The Enlisted Men's Division resumed its schedule in 1919 with students in Artillery, Clerical, Electrical, and Radio courses. In 1920 new courses were added. During this postwar period, the Department of Correspondence Courses was added to the school. This department prepared correspondence courses for Reserve and National Guard officers.

For two decades after 1920, the Coast Artillery School continued a progressive march of military education and training. Courses were changed or supplanted, new techniques were incorporated into instruction, and there were many innovations made, but the mission of the school remained unchanged: to produce proficient artillerymen trained in the operation of the combined arms and qualified for joint operations.

One important development during the period was the increased cooperation apparent between the Coast Artillery School and both the Navy and Air Corps. Many opportunities were offered Coast Artillery School instructors and students to witness Navy matériel and gunnery methods. Each year a series of five or six lectures was given at the school by selected officers from the Fifth Naval District. For several years the Navy and the Coast Artillery School held joint battle practices off the Virginia Capes, and several student officers were invited to Guantanamo, Cuba, to observe the Navy battle practice there. In 1934 a group of marines arrived from Quantico, Virginia, for special target practice at Buckroe Beach.

DEVELOPMENT OF ANTI-AIRCRAFT ARTILLERY

With each successive year of this period, more emphasis was placed upon courses in anti-aircraft artillery at the expense of older courses. The Coast Artillery School was the mother of this new arm until weaned in 1942. When Brigadier General Stanley D. Embick became Commandant of The Coast Artillery School in 1930, he voiced his views at the opening session of the school on the importance of anti-aircraft in the defense of harbors. As a result of this emphasis, the instruction in anti-aircraft artillery was increased until, in 1940, it was upon a par with seacoast artillery. The Coast Artillery School began training students to act as instructors at stations where anti-aircraft artillery was new or to exchange instructors at flying schools of the Air Corps. In this latter arrangement, Coast Artillery instructors conducted a course in matériel and methods at the Air Corps Tactical School, Maxwell Field and in return, instructors from the Air Corps gave a course for advanced students at The Coast Artillery School. To coordinate instruction, officers from Fort Monroe visited the Air Corps Tactical School and the Command and General Staff School and participated in anti-aircraft and Air Corps exercises at Fort Knox.



Bridge over the Moat leading up to the entrance of the Old Fort.

In April 1931, upon recommendation by the Coast Artillery School, three planes and five officers from Langley Field were specifically assigned to Fort Monroe for AA target practice missions.

The policy of emphasizing antiaircraft instruction resulted finally in an equal distribution of both theoretical and practical training in antiaircraft and seacoast artillery. This broadening of the course of instruction affected each branch of the school. The Advanced Course students received more instruction in the tactics and technique of antiaircraft artillery, the Battery Officers' Course studied matériel, gunnery, and adjustment of antiaircraft fire. Instructors in the Advanced Engineering Course concentrated on antiaircraft position-finding equipment, data transmission systems, searchlights, sound locators, and comparators. In order that a nucleus of officers might be formed who would be highly qualified for engineering work in the development of antiaircraft matériel, courses were extended 1 month. The Master Gunners' Course was revised to include work in meteorology and in the use of the Jackson antiaircraft camera.

COURSES FOR EM, NATIONAL GUARD AND RESERVE

The Department of Enlisted Specialists, because of the large number of enlisted applicants, found it necessary to limit the number of admissions to its courses in 1927. There had always been an interest in these courses, partially because of the higher ratings usually granted its graduates.

In 1930, the Electrical Course added a new section which was to instruct in motor transportation only. These enlisted men worked on all new types of engines and received special instruction in welding, lacquer finishes, fender repairs and upholstery problems so that they would have a general knowledge of all types of repairs on motor vehicles. The following year the course was further increased by permitting all eligible Coast Artillerymen to attend, rather than just those from motorized units. In addition to this increase in motor transportation, a new course in Chemical Warfare, taught by a graduate of the Chemical Warfare School, was added so that, with the increase in antiaircraft instruction, it was found necessary to increase the length of the courses to 42 weeks in 1934.

In 1929, a Special Refresher Course was started at the school for senior officers who had been detached from the Coast Artillery Corps for a considerable time. Its purpose was to inform these officers of all new developments in matériel and firing methods. Although there was no prescribed time limit to the course, it usually lasted about 3 months. In 1931, however, it was reduced to 8 weeks and remained at that length until 1934, when it was discontinued.

The Battery Officers' Course for National Guard and Organized Reserve officers was held each year, with increasing emphasis upon antiaircraft, in keeping with the policy of the school. Each spring, at the conclusion of the course, the officers divided into two groups, one proceeding to Aberdeen Proving Grounds for antiaircraft and machine-gun practices, the other to Fort Eustis to man 8- and 12-inch railway artillery. The original 6 weeks course was increased to 8 weeks, and finally to 12 weeks in 1937.

Courses were also given each summer for the ROTC and the CMTC, and many officers from the school were detailed to the 2d Corps Area for extended duty with the CCC

In 1936, as a result of the Thomason Act, plans were made to give a full year's course to train recent ROTC graduates, besides the regular summer courses for Reserve officers.

CHANGES MADE IN MANY COURSES

The great depression of 1929 was slow in reaching the Coast Artillery School, but its approach was nonetheless inevitable. The Economy Bill of 1933 cut deeply into the budget of the school and cast an ominous cloud over Fort Monroe. The quota of student officers and faculty of the school was reduced 51 per cent and 33½ per cent respectively. As a direct result, one of the foremost courses at the school, the Battery Officers' Course, was merged with the Advanced Technical Course in 1934. This new course was called the Regular Course, and lasted 10 months instead of the usual 9 months for the former courses.

There had always been a great demand for the Battery Officers' Course, and every Coast Artillery officer above the rank of 1st lieutenant was given the privilege of taking it. However, because of this curtailment, many officers had to wait before they could be accepted.

As in all other parts of the school, the changes in the Battery Officers' Course, and in the Regular Course that supplanted it during this period, were in the increasing amounts of time allotted to antiaircraft and motor transportation. The courses in basic gunnery were revised so that less emphasis was placed upon its effect on firing. Throughout this period, educational methods were constantly being revised and modernized with an increased interest in visual aids and a continuous effort was made to supplant much of the theoretical with the practical work.

After the introduction of the single-conductor submarine mine cable in 1928, many officers were found lacking in knowledge of this improvement in submarine mining; consequently the Battery Officers' Course was lengthened to include this instruction. In 1930, the Submarine Mine Depot was moved from Fort Totten, N. Y., to Fort Monroe, thus completing the transfer begun in 1908 when the Submarine Mine School had been moved to Fort Monroe. One of the results of this change was the completion of the modern Submarine Mine Depot in November 1940. In 1932 the course in submarine mining was completely revised to include special instruction for prospective ship commanders in the technique and tactical uses of the submarine mines.

PERMANENT QUARTERS ADDED

In addition to the changes in the school curriculum, there were numerous external developments which added much to the beauty and utility of Fort Monroe. The World War I temporary buildings that were used by the school as quarters for officers and men, as repositories for records and equipment, and as classrooms, began to reach the end of their usefulness. These makeshift structures were wet, cold, and expensive to maintain. From 1929 on, each successive Commandant recommended replacement of some of these structures, and attractive new brick buildings gradually took their place. The old bachelors' quarters were converted into housekeeping apartments, and by the fall of 1930, enlisted men had been given new permanent quarters and 12 new double housekeeping apartments had been completed for

officers. In 1932, the new bachelor officers' residence, Randolph Hall, was completed.

In 1932 a continuous data transmission system for the 155mm gun was constructed and developed on the post. In the early thirties work was begun on radio-controlled targets; there was an extensive redesign of the prewar-supply system for the single-conductor mine system; and an antiaircraft director with data transmission was received.

On the night of 22 August 1933 a hurricane, striking with unexpected violence, inundated practically the entire post with sea water. The tide rose to a height of two or more feet in the shops, laboratories, and garage of the Coast Artillery School, damaging structures and destroying a large amount of Government property. Damaged structures were repaired with emergency funds, but some of the equipment was irreparably damaged and had to be replaced.

The months of November and December 1933 were spent in repairing this damage. Fortunately for Fort Monroe, PWA and CWA money was available. Access to these funds led to the construction of the million-dollar sea wall, the engineer and mine wharves, the Noncommissioned Staff Officers' Club, and the replacement of trees and shrubs which had been damaged by the storm in 1933.

PREPARATION FOR WORLD WAR II

In the fall of 1939 the impact of the European War was felt and Fort Monroe, the crossroads of the Coast Artillery, found itself engrossed in more than its usual activity as a result of the limited emergency proclaimed by President Roosevelt on 8 September 1939. Officer personnel were constantly shifting and the months of September and October, usually quiet after school activities were under way, proved to be strenuous. Troops were constantly coming and going from Forts Story and Monroe, and a complete reorganization of the harbor defenses was effected as of 1 November.

Early in 1940, a gradual change was noticeable in the school. Work in both Officers' and Enlisted Men's Divisions was tapered off, and the standard courses were brought to an orderly, if abbreviated, termination. Students graduated at odd times and left at once to join old organizations that were being expanded or new ones being formed.

On 1 July, the school emergency program was ushered in with a series of 6 short refresher courses. Each course was of a month's duration. The groups ranged in size from 16 officers in the first course to 89 in the fifth and averaged 60 for the series. This refresher course was made necessary by the expansion of the Coast Artillery Corps and by the greatly increased stress on antiaircraft. By 14 September, when the last class graduated, each officer had received instruction in antiaircraft artillery, automatic weapons, searchlights, and antiaircraft matériel. The course culminated in a week of firing with the 3-inch antiaircraft gun, the 37mm antiaircraft gun, and the .30- and .50-caliber machine guns.

The 375 officers who completed this course had lived in tents and old cantonments. Meanwhile, plans were laid and work was started on many enlargements of the school facilities, which even the modest beginning of the emergency program had strained. To meet the demand for space to provide study rooms, lecture halls, and classrooms for indoor instruction, and to house adequately an ever-increasing number of students, more and more new buildings were re-

quested. Increased enrollment, however, continued to tramp on the heels of new construction.

The outcome of these plans was the razing of the dilapidated buildings in the stable area, the filling in of low ground along Mill Creek and in old camp areas, and the appropriation of some parade ground areas for construction of the new cantonment buildings, barracks, classrooms, and storehouses, and the conversion of older buildings for housing the expanding activities.

As facilities were provided, the tempo of the emergency courses increased. Beginning 15 September 1940, the courses were extended in length to 10 weeks, but the same organization that governed the 4-week courses was retained. The course of instruction from September to February, which included National Guard and Reserve officers in each group, was for antiaircraft artillery only. In order to provide an adequate corps of instructors, the faculty of the Coast Artillery School was augmented, mainly by Reserve officers on extended active duty. By September 1941, the faculty had increased approximately sixfold.

STEPPING UP TEMPO AND ENROLLMENT

In planning the courses, the problem of handling a larger number of students than had been in attendance in the past was met by telescoping the classes. The instructors were arranged in groups, each to have the class for 1 week. The first class, after completing the first week of instruction, was passed on to the second group of instructors, and a new class arrived for instruction from the initial group of instructors. Thus, each week the number of students enrolled was increased by one new class until the capacity of the facilities was reached. The limit of capacity naturally occurred in housing. New construction at Camp No. 3, Battery Eustis, where a large fill had been made, provided classrooms, mess halls, administrative buildings, and 12 temporary barracks. Whereas the first 6 groups had drawn their students from Thomason Act officers, Reserve officers who were just beginning to be ordered to extended active duty, and younger officers of the Regular Army, groups beginning with the 7th Refresher Course drew their students from the Coast Artillery Corps at large. Enrollment was increased to groups of 100, and a new class entered the school approximately every 2 weeks. Students varied in rank from colonel to 2d lieutenants, and one group included two brigadier generals. Teachings embodied new matériel and methods based upon observations of World War II and were revised from time to time to fit current field conditions.

Intervening in the series of Refresher Courses were three Replacement Center Courses, timed and devised to fit the needs of the replacement centers which were being organized to receive the influx of selective servicemen. Two of these courses were in antiaircraft and one in seacoast artillery. The antiaircraft courses were 10 weeks in length, and the seacoast course was only 5 weeks, all three graduating in February 1941. These courses were the regular Refresher Courses 10, 11, and 12, which had been revised to include administration, mess management, supply, infantry drill and physical training. During the emergency, the Department of Enlisted Specialists initiated Special Refresher Courses for noncommissioned staff officers in electricity, motor transportation, and radio.

OFFICER CANDIDATE SCHOOL

One of the most important contributions of the Coast Artillery School during this period was the Officer Candidate School started by the Department of Enlisted Specialists. The original plan was to include four consecutive courses of instruction, each of 3 months' duration. The Officer Candidate School, as first conceived, was for selected enlisted men of the National Guard and the Regular Army, each class to be made up of 125 students. However, the first meeting in July 1941 found 200 men assembled at Camp 3, where new quarters and classrooms had been assigned and a teaching staff had been organized. The candidates were selected and appointed by corps and department commanders on the basis of demonstrated leadership ability. Educational requirements were waived; the education of members of the first class ranged from 1 year of high school to that required for the degree of doctor of laws. The course provided 360 hours of instruction in gunnery and matériel and 144 hours in miscellaneous basic subjects. Required evening study under the supervision of officers was held each night from 1800 to 2000 excepting Saturday.

The second group of officer candidates began their studies in October. This course was shortened to 12 weeks, a length established for all future courses. By 1 January 1942, new construction at Camp 3 and Battery Bomford permitted doubling the output of officers. Beginning on that date, 100 officer candidates were admitted every 2 weeks.

SCHOOL ON WARTIME BASIS

With the formal entry of the United States into World War II, the Coast Artillery School was placed on a full wartime basis. The Nation felt the need for a still greater force of antiaircraft and seacoast artillerymen. Hence, the demands of the Army for officers and enlisted specialists in these branches taxed the facilities of the school to the utmost. Antiaircraft artillery was vital until we could achieve air superiority. Because, with the increased demand for antiaircraft officers, it had outgrown the facilities of Fort Monroe, the Antiaircraft Artillery Officer Candidate School was moved to Camp Davis, N. C., in February 1942. At the same time a Barrage Balloon School, Training Center, and AAA Board were established at Camp Davis as part of the Coast Artillery Corps. In April 1942, a seacoast division of the Officer Candidate School was organized at Fort Monroe, with plans to graduate 800 officers each 3 months in seacoast artillery only.

As a result of the reorganization of the War Department in March 1942, antiaircraft artillery was separated from the Coast Artillery until 6 months after the termination of the war. The Coast Artillery Corps became a part of the Army Ground Forces and the Coast Artillery School was placed under the Replacement and School Command.

Before this reorganization, seacoast artillery instruction and training had been given at Camps Stewart and Davis and Forts Bragg and Monroe. Under the new scheme, all seacoast instruction of the Coast Artillery Corps was assigned to Fort Monroe. All antiaircraft artillery instructors at the Coast Artillery School were sent to Camp Davis, and all seacoast instructors at Camp Davis were returned to Fort Monroe.

In November 1941, a Field Officers' Course was organ-

ized to train field officers in the tactics of their branch and in command and staff duties. This course was of 4 weeks' duration and had as its main purpose the instruction of new field officers in the tactics and training of antiaircraft and seacoast artillery. Courses alternated in the ratio of two antiaircraft and one seacoast, but with the removal of antiaircraft instruction to Camp Davis, the course at Fort Monroe was limited to seacoast artillery.

TRAINING PUBLICATIONS

After the proclamation of a state of limited emergency by the President, there existed no need for the Department of Extension Courses as such, since all Reserve officers were subject to immediate call for duty. This department had been charged with the responsibility of preparing a large proportion of the training publications of the Coast Artillery School. In the latter part of 1940, the Department of Extension Courses was discontinued, and its work was taken over by a new department, the Department of Training Publications. Provisions for the formal organization of the visual education program were later made in a Visual Aid Section, which was charged with the production of training films and other visual teaching materials.

FULFILLING ITS WAR MISSION

Due to the gradual enlargement during the period of temporary emergency, the school was much better prepared for this wartime emergency than it had been during World War I. Despite the fact that most instructors retained from the early classes had little or no military training, and that all courses had to be thoroughly condensed, the school has been able to fulfill its wartime purpose of providing the Coast Artillery Corps and other arms with fully trained officers and men where and when they were needed.

POSTWAR PLANS

At the time of the signing of the peace treaty with Japan in Tokyo Bay last September, the streamlined specialist courses at the school were still in progress and the full program was maintained until the then current classes were completed. With the beginning of the year 1946, a series of interim period courses were inaugurated and completed while the school was still at Fort Monroe. A number of officers and enlisted men were graduated from these interim courses in the latest types of Radar, Directors and other Special equipment for Seacoast Defense against air and amphibious attack.

The modern Coast Artillery School will have three primary functions: 1) to complete the education of artillery officers by training them in the special gunnery problems of seaward defense, including both Harbor Defense technique and the employment of mobile weapons; 2) to carry on the training of officer and enlisted specialists in submarine mine matériel and operations; and 3) to train officer and enlisted specialists in the maintenance and repair of technical equipment.

At Fort Scott, the School will be established in the heart of a modern Harbor Defense. The new location, with its surrounding forts, will provide room for expansion and maneuver areas, which are lacking in the old, and, the terrain and climatic conditions of the San Francisco area will permit more realistic instruction in that increasingly vital factor of seacoast gunnery and radar.

AA Battalion Conducts Sight-seeing Tours

By Lieutenant Colonel Francis J. Roddy, Coast Artillery Reserve

Soon after the war in Europe was over, the 441st AAA Battalion was given the very novel assignment of organizing conducted tours of Hitler's place at Obersalzberg and the Eagle's Nest!

The 101st Airborne assumed the tremendous task of clearing the premises of the debris caused by incessant bombing and German pillaging. In spite of visitors who poked into every nook and cranny in their quest for souvenirs, organized crews of prisoners of war cleared away the rubble in a minimum of time, oftentimes from under the very feet of the never-ending stream of visitors.

To organize this work, one company of soldiers was stationed at Obersalzberg and quartered in the Platter Hof. The Platter Hof is a large, modern hotel built by the Nazis just a short way up the mountain in the rear of Hitler's home. Here, the lesser party officials were housed when they visited the "boss" or attended a party conference. This hotel was not destroyed by the bombing, but it did suffer considerable damage from blast.

The first time I visited the Platter Hof it was a shambles, with furniture smashed and scattered; linen, draperies, china and glassware whole and broken littered the premises. The ballroom was representative of the rest of the building. Here all the windows were broken; chairs and tables were broken and the upholstery ripped off. The draperies and window shades hung in nondescript fashion from the ornate curtain rods. And right in the middle of the dance floor, surrounded by all this debris, sat a soldier playing on the miraculously undamaged grand piano.

The road to the Eagle's Nest, built by slave labor under the Nazis, started at the main establishment and wound up the mountain, a distance of about three and a half miles. It was a very steep road carved right out of the mountain of

rock. Three tunnels had to be constructed along its length. It took a good jeep fifteen minutes to travel this road from Obersalzberg, where Hitler's home and the SS Barracks were, to the Eagle's Nest.

The road ended in a large parking area carved out of the mountain about five hundred feet below the summit. To reach the summit and the Eagle's Nest, a small footpath had to be negotiated. A person in good physical condition could cover the distance in ten minutes.

Later the elevator was repaired, which eliminated this obstacle hitherto confronting the sight-seer. The elevator shaft was right in the heart of the mountain and had been blasted its whole length of five hundred feet out of the solid rock. To reach the shaft, a tunnel had been built from the parking area to the middle of the mountain. After a two-minute ride in the elevator one arrived at the entrance hall of the Eagle's Nest. The elevator would hold only twelve people and the return trip took four minutes.

Upon being assigned to the 44th Brigade, the 441st relieved troops of the 101st Airborne in the mission of operating this famed installation and providing the area security. Batteries B and C were assigned to this mission. The security presented no unusual difficulties but the "sight-seeing" mission was a new one. From 10 July until 5 September many high ranking officers of the Army, Navy, and Air Corps visited the installations and were escorted through the various buildings.

The assignment was ideal for the men after the long campaigns through Sicily, Italy, Anzio, Southern France and Germany.

Both batteries were quartered very comfortably in the Platter Hof. Each room was furnished, had hot and cold running water and electric lights.

Several men were trained as guides and soon knew every inch of the ground and a great deal of the history of the establishment. A large sand table relief of the whole area, which had been made by the Germans, was set up in the lobby of the Platter Hof. Here all incoming parties and individuals were given an orientation talk on the various buildings, and their location pointed out to help the visitors make their trip pleasant and worth while. Small sketches of the area, which we had printed locally, were also distributed.

In addition to the Platter Hof and Hitler's home, called the Berghof, where Hitler lived a good portion of the time with his mistress, Eva Braun, there were several other places of interest at Obersalzberg.

Hermann Goering and Martin Borman also had homes at Obersalzberg and there was a large guest house for the use of visiting dignitaries. A large horticultural nursery was maintained to supply flowers and shrubs for the buildings and grounds. There was also a cider mill and a farm connected with the establishment. The whole place was honey-



Hitler's Home, the Berghof, at Obersalzberg, where Hitler had a grand panorama view.

combed with underground tunnels built for defense and as a shelter from air raids.

The tunnels were fully twenty-seven miles in length and the rooms leading off from them were well furnished. They were equipped with complete hospitals, living and sleeping quarters. Huge stores of medical supplies of all kinds were maintained here. In addition there were libraries of books, thousands of phonograph records and hundreds of reels of movie film. There were large cellars of the choicest wines and champagnes. The Nazi higher-ups were fully prepared to live a long time in security and luxury.

The existence of these supplies had been rumored for a long time among the mountain folk and townspeople of Berchtesgaden. Likewise these same supplies had been strictly rationed to them for years and the temporary disintegration of law and order accompanying active warfare was all that was needed to give them the chance to loot the things they had long desired. During the confusion of the first few days after the air raids and before the arrival of our troops, they carried off everything they could carry and destroyed much more. However, the place was too immense to be utterly destroyed and looted. Consequently when we moved in two months later and all during our stay there, serviceable furnishings and supplies were being found. Many explorations of the tunnels were made and numerous items recovered that were turned over to the Military Government or the C.I.C. (Counter Intelligence Corps).

When we were first ordered to Berchtesgaden, the mission of escorting thousands of visitors did not seem at all inviting. But when we had discovered the hidden, and I do mean hidden, possibilities of the Platter Hof and put them



Berchtesgaden and the surrounding mountains from the road above Obersalzberg.

to work for the comfort and enjoyment of the men, they really enjoyed the mission.

When Bob Hope and his troupe visited Berchtesgaden they spent several hours with the men and had dinner with them. During that visit Bob Hope remarked that he had never seen a set-up for soldiers to equal it in all his travels.

Of course when we were ordered to return to the States there were no deserters left behind but morale was very high and many wouldn't have cared if the orders had been delayed. Then when we were delayed a whole month in assembly areas in France, in tents without light or heat, many wished to be back at the Platter Hof with its electric light, roomy quarters, running water, laundry service, barber, modern kitchens, bar and bowling alleys.



German Invasion of England — on Paper

Documents discovered in Berlin show that the Germans were preparing in the fall of 1940 to strike at south and southeast England with twenty-two divisions and with seventeen more divisions in reserve.

The initial attack was to be launched by the German Ninth and Sixteenth Armies, forming Army Group A. The Sixteenth was to sail from Ostend, Dunkirk, Calais, Boulogne, and the mouth of the Somme River, and was to land on the Kentish coast between Margate and Hastings. The Ninth was to leave Dieppe, Le Havre, and Caen and hit the British coast between Portsmouth and Brighton.

Airborne landings were planned north of the Romney Marshes, between Folkestone and Hastings.

Army Group B, made up of the enlarged German Sixth Army, was to follow these initial thrusts by sailing from Cherbourg for Bournemouth on Weymouth Bay.

Landing forces of the two army groups were to comprise eleven infantry and two mountain divisions, with a mobile force of six armored, one SS, and two motorized divisions.

Reserves were to total nine infantry divisions and eight additional infantry divisions which were to be available from general headquarters reserves.

The Germans apparently hoped to smash British and Canadian defenders in the hedgerow country of Kent, Sussex, and Surrey and then drive on to the second objective, a line from Colchester on the east to the mouth of the Severn and north of Bristol on the west.

The Nazis hoped to cut off London and send mobile forces through to occupy important coastal towns and industrial towns in the midlands.

The documents disclosed that the earliest top-secret order from German headquarters to the Sixteenth Army was sent on 17 August 1940. No D-day was specified.

If the Germans had launched their invasion it was likely they would have employed a force for the landings about the same in strength as the Allies used in Normandy on D-day. The Nazis had thirteen divisions earmarked for the actual landing operation, along with airborne forces totaling probably a division and a half. About nine divisions probably would have gone ashore the first day.

For the first few days after the projected Nazi D-day, the Germans would have hurled in about three more divisions.

(From a news release)

V-2---THE "ATOM

By Major Hal D. Steward*

5,000-MILE RANGE IS GOAL

A self-propelled Atomic Bomb with a 5,000-mile range is the goal of the Army Ordnance Department. Daily at the White Sands Ordnance Proving Grounds in New Mexico, Ordnance experts are working toward the development of such a bomb, which will in all probability prove to be the most potent war weapon in the world.

The Ordnance Department is getting its start on the weapon from captured German V-2 bombs, which at present are self-propelled and have a maximum range of about 200 miles at a velocity of 5,600 feet per second, which is about twice the speed of a .30 caliber rifle bullet.

By research and development, the Ordnancemen hope to increase the range of this bomb to the previously mentioned 5,000 miles, and load its warhead with atomic explosives. Further hopes of Ordnance experts are that the bomb can be propelled by atomic energy instead of its present fuels of alcohol and liquid oxygen.

When Navy men heard about this potential weapon, one Naval officer remarked, "If this proposed weapon is developed to expectations, the Navy will have to pick up its marbles and go home."

FIRST AMERICAN FIRING OF V-2

On April 16, 1946, at White Sands, New Mexico, the first American firing of the German V-2 bomb took place. The firing was reasonably successful despite the fact that one of the bomb's fins fell off a few seconds after it had bolted into the air. The test established the fact that American Army Ordnance personnel are capable of firing the monstrous bomb.

The V-2, which was used by the Germans in the latter stages of the European war, is 46.05 feet long, and weighs 28,380 pounds when fully fueled and loaded. Unloaded it weighs 8,816 pounds. The bomb's diameter is 5 feet, 4.9 inches. In its present stage, the V-2 fully loaded with its 2,200-pound warhead will make a crater in the earth about 35 feet in diameter and 18 feet deep. It can be fired vertically and is capable of reaching an altitude of approximately 100 miles.

A crew of about 28 men is needed to set up and fire the V-2. Two men are required for the firing board; five men on propulsion; seven on the trailer on which the bomb is carried; four on the electrical port; and 10 men to fuel the bomb.

*Press Branch, War Department Bureau of Public Relations.



"CAGE" WEAPON

Ninety minutes is required to put the bomb into position and fire it. This also includes prefire testing. For safety, personnel must be at least 100 yards from the bomb when it is fired, but a greater distance is preferable.

In its present stage, the V-2 roughly compares in damage-power with the American 4,000-pound aerial bomb. The weight of the actual explosive in the warhead is 2,200 pounds. The explosive used is Amotol, the same as employed by the American Army.

V-2 is accurate to within 200 yards of a designated target. Its cost is approximately \$20,000.

RANGE ALMOST UNLIMITED

The disadvantage of the bomb at present is its great weight, which is caused by the large amount of fuel it must hold. Until a substitute fuel can be found to propel the bomb, it will be almost impossible to increase its range. Should it be possible to use atomic energy for propulsion as it is hoped, the bomb will have an almost unlimited range.

If it can be propelled by atomic energy, and carries an atomic warhead, the use of aircraft in war would be practically outmoded. It then would be possible to send thousands of these bombs by radio control over a designated target, and maintain an even greater accuracy than is now possible from aircraft.

With such a bomb the only mission ground troops would have is that of occupation.

The United States is not the only country endeavoring to develop this bomb. Most major world powers now are employed in research and development on this "Atomic Age" weapon that has every possibility of becoming the most dangerous war weapon the world has ever seen.

Experiments on the V-2 are being conducted in the middle of the New Mexico desert, 85 miles by road west of El Paso, Texas. The area is level and the small garrison camp can be seen from a distance of 10 miles before it is finally reached. The camp is commanded by Lieutenant Colonel Harold R. Turner, an Ordnance officer with years of engineering experience.

The spot at which the V-2 is actually fired is nearly 10 miles from Colonel Turner's camp. It is known as "The Technical Area," and is encircled by a barbed-wire fence which has armed guards at each entrance. Entrance can be obtained only with a pass signed personally by Colonel Turner.

V-2 FIRING CONTROL

Inside the technical area, besides the base from which the V-2 is fired, is a cement blockhouse with walls of cement 10 feet thick, and a ceiling which is 27 feet

thick. Inside this concrete house are the electrical instruments that fire the V-2 and control its flight.

Once the bomb is fired its flight is followed by radar units which have been set up at many places on the New Mexico desert. Every effort is made not to lose track of the bomb for one moment while it is in flight. During the first firing test it was possible for the Ordnance technicians to follow the bomb from the time it was fired until it plunged into the ground several seconds later and exploded.

Major Herbert L. Karsch of 2409 South St. Louis Street, Tulsa, Oklahoma, a petroleum engineer in civilian life, has direct charge of the firing of the V-2 bomb. He probably knows more about the V-2 bomb than any other officer in the American Army.

The V-2 is carried and put into firing position by a Mono-wagon, a trailer invented by the Germans which has hydraulic levers that lifts the V-2 into a vertical position.

When a firing of the V-2 is scheduled, Ordnancemen in jeeps warn all the near-by ranchers.

During the next few months several V-2s are to be set off in the New Mexico desert in experiments that may develop the V-2 into the world's most powerful weapon.

And what will be the defense against this weapon? That is anybody's guess. When the author asked one high-ranking antiaircraft officer what would be used as a defense against this potential atomic weapon, his answer was: "That's a good question."

This concrete blockhouse that has 10-foot walls and a 27-foot ceiling is the place from where the V-2 bomb is fired electrically during experiments.



Conference Recommends Combined Artillery

By Major N. C. Ruddell, Coast Artillery Corps

With the forthcoming Army reorganization which will probably include plans for the consolidation of Seacoast, Antiaircraft and Field Artillery into one artillery arm, Coast Artillerymen will be particularly interested in details of the Field Artillery Conference held at Fort Sill, Oklahoma in March.

General Jacob L. Devers, commanding general of Army Ground Forces, with nineteen other general officers and about 100 other officers who were artillery specialists from Army installations in all theaters, attended the conference from March 18 through March 23. Representatives of the Navy, Marine Corps—the British and Canadian Armies were also present. Detailed studies were made and demonstrations of newly perfected artillery equipment and techniques were witnessed as the basis for future developments and organization in artillery. A second week from March 25 through March 30 was devoted to committee study, summarizing results and drawing conclusions from the conferences and demonstrations.

In opening the conference, Major General Louis E. Hibbs, commandant of the Field Artillery School, told the assemblage of officers that the gathering would be the source of "valuable evaluations of combat experience and recommendations which will have a great bearing on the decisions made by the War Department on questions affecting organization and equipment of artillery in the post-war Army." It was further stated that many factors contribute to combat effectiveness of artillery and that in the late war, weapon for weapon, our matériel was the best in the world. Communications likewise were superior. However, the weapons and communications facilities that have been perfected since the end of hostilities and shown for the first time at Fort Sill will provide means for an even more powerful arm.

The first of the demonstrations by the Department of Gunnery, brought into play the latest self-propelled weapons, including the highly mobile 155-millimeter howitzer, the 155-millimeter gun, the 8-inch howitzer and the 240-millimeter howitzer. Neither the 8-inch howitzer nor the 240-millimeter howitzer, both self-propelled, reached the battle fronts before World War II ended. Pin-point shooting by forward observer methods was employed to close the mouths of caves with shattered rock. The huge 240, which had its veil of secrecy lifted at this demonstration, weighs sixty-three tons and moves under its own power at speeds up to 21 miles per hour. The projectile weighing 360 pounds can be fired at ranges up to 26,400 yards. The observers were amazed to see the howitzer go into position and fire its first round in only two minutes and fifty seconds as "action right" was commanded while still traveling on the road. It normally takes the towed 240-millimeter howitzer from two to three hours to perform the same feat. In nine

rounds, its large shells pulverized the cave used as a target.

The 4.5-inch rocket, which made its debut on Iwo Jima, was employed in another portion of the same demonstration to show the advantage of heavy mass artillery fire on a large target area in a short space of time.

A lecture on jet and rocket propulsion and guided missiles by Dr. H. J. Stewart, California Institute of Technology, began the third day's session of the conference. In the afternoon the conferees witnessed a demonstration of the advantages and tactical use of the V-T (proximity) fuze with revised forward observer procedure for coordination with all arms of the service.

Dr. W. A. MacNair, Bell Telephone Laboratories, the first speaker on the fourth morning's program, discussed electronics. General Devers also spoke to conferees the same morning.

The rôle that aircraft plays in the operations of artillery units was highlighted in the fourth afternoon's demonstrations.

The Brodie device, with the aid of which artillery liaison planes can take off from the decks of seagoing LSTs or from jungle areas without ground contact, was shown and its purpose, employment and installation discussed. The device is a result of experimentation and training which started in 1943 in the Department of Air Training (now the Army Ground Forces Air Training School) of the Field Artillery School.

Other aerial applications to artillery, which were demonstrated, included: emergency resupply by liaison type aircraft; dropping of illuminating flares from liaison aircraft for night observation; wire laying by liaison aircraft; air fire power, as shown by sixteen "P-51s" and six "A-26s" strafing, rocket firing, precision bombing and skip bombing; and uses of the helicopter.

In the concluding demonstration on the same afternoon, airborne and parachute artillery and infantry simulated an attack by a parachute rifle company, supported by two 75-millimeter field artillery sections to neutralize hostile resistance prior to air landing of a regimental combat team.

A total of 250 parachutists, members of School Troops battalion, Airborne School, Fort Benning, Georgia, participated in the demonstration which brought to the conferees the latest techniques employed in such coordinated efforts. The Ninth Troop Carrier Command, Greenville Army Air Base, Greenville, South Carolina, carried the parachute and glider riflemen and artillery pieces into the demonstration with four Douglas C-47, eleven Curtiss C-46 transport planes and one CG-4A glider.

The carrier command also demonstrated its technique of making a "snatch" pickup off the ground of a glider bearing simulated wounded.

The fifth morning's demonstrations included a showing

television equipment and its application to artillery purposes. Conferees observed activities on a screen in a closed tent while a plane transmitted objects and shell bursts on the ground from the target area. The use of radar in the adjustment of artillery fire, location of hostile artillery pieces and detection of vehicular movement also was demonstrated.

That night the delegates saw the use of illuminating flares, illuminating shells and "artificial moonlight" searchlights for night observation, while the sixth and last afternoon's session featured discussion, display and firing of new types of weapons: small arms, mortars, rockets recoilless and self-propelled.

The second week of the conference which consisted entirely of committee study, presentations, round-table discussions and preparation of final reports, resulted in a recommendation for changes in field artillery organization to be made to higher authority. Although this recommendation is in no way binding upon the War Department or any future Boards, it is expected to be given serious attention in army organization. A digest of the recommendation follows:

The most important feature is the creation of an artillery division for each Corps, to be commanded by a major general, which would combine under one headquarters all separate artillery (including AAA) battalions and artillery groups for administration and parenthood. This would not alter tactical doctrines or methods of combat artillery employment as developed in World War II with regard to both Corps and Division Artillery.

The number of organic battalions and types of weapons to be included in the Corps Artillery Division would be similar to the number and type normally assigned to a Corps.

Among other conclusions reached at the conference was the need for additional medium artillery battalions in both the infantry and armored divisions. This result led to the recommendation that one medium howitzer battalion be added to the division artillery of the infantry division and one 155mm gun battalion be added to the division artillery of the armored division.

In divisional artillery, only the towed 155mm battery would retain four guns, it being suggested that six-gun batteries be the basis of armament for all light artillery.

Among the non-divisional units, four-gun batteries were favored for the towed 155mm howitzer and all heavy artillery.

Regardless of the number of guns per battery, it was considered essential that the number of batteries in any unit, or the over-all number of active batteries or battalions in the Army, should not be reduced.

The conference recommended that the three artilleries—field, seacoast, and antiaircraft—be consolidated into one arm in such a manner as to permit coordination of their common interests and overlapping missions yet preserving the distinctive technique necessary for the fulfillment of the primary missions of the three arms.

Delegates strongly urged the discontinuance of the present signal assault company as a normal means of employing naval gunfire in amphibious operations. At the same time it was advocated that the technique of adjusting ground and naval gunfire by forward observers be made uniform for all services.

Among the possible personnel changes which may be effected as a result of the conference, was the recommendation that a lettered battery be added to the Observation Battalion; that there be an increase in the number of liaison officers and forward observers and that an ammunition train be re-established for heavy artillery battalions.

The general officers who attended the conference and demonstrations included: Major General Harry Hazlett, commanding general, Replacement and School command, Army Ground Forces, Birmingham, Alabama; Major General Elbridge C. Chapman, Jr., former commander of the 13th Airborne Division in Europe and now commanding general of the Airborne School, Fort Benning, Georgia; Major General Clarence R. Heubner, assistant chief of staff, G-3, Army Ground Forces, Washington, D. C., who commanded the 1st Infantry Division and subsequently the V Corps in Europe; Major General Edward H. Brooks, commanding general of the 4th Service Command, Atlanta, Georgia, who commanded the 2d Armored Division and later the VI Corps; Major General Robert T. Frederick, commandant of the Coast Artillery School, who commanded the 1st Airborne Task Force landings at Marseilles and in the final stages of the campaign, the 45th Infantry Division; Brigadier General Robert H. Van Volkenburgh, commandant of the Antiaircraft Artillery School, who commanded the 40th AAA Brigade in the Southwest Pacific; Brigadier General Harold A. Nisely, AGF Ordnance Officer, Washington, D. C., who was ordnance officer for the 12th Army Group in Europe, and Brigadier General Charles D. Palmer, chief of staff, 4th Service Command. While overseas, he was chief of staff of the VI Corps in the European Theater of Operations.

Also present was Major General Maxwell D. Taylor, superintendent of the United States Military Academy, West Point, who commanded the 101st Airborne Division in Europe.

Other general officers in attendance were: Major General Stafford LeR. Irwin, Major General George P. Hays, Brigadier General Edward S. Ott, Brigadier General Wyburn D. Brown, Brigadier General William N. Gillmore, Brigadier General Charles E. Hart, Brigadier General Doyle O. Hickey, Brigadier General Guy O. Kurtz, Brigadier General Harlan N. Hartness, Brigadier General Harold F. Nichols, and Brigadier General James F. Brittingham.

A combined Seacoast Artillery and Antiaircraft Artillery conference will be held at Fort Bliss sometime this summer. It will be conducted similarly to the Field Artillery conference. Further details will be published when available.



Rockets as Offensive Weapons

By W. R. Cook, M.Sc.

Many factors are involved in discussing the merits and demerits of weapons, particularly the factors involved in service use; the following discussion cannot hope to include all of these nor will it be either exhaustive or critical.

The main advantages of the rocket follow in the order that they will be discussed:

- (a) Lightness of projector and absence of recoil of the mounting.
- (b) Low acceleration with consequent freedom in designing the best shell for the purpose.
- (c) Flexibility in firing different projectiles from the same mounting.
- (d) Good underwater ballistics.

Lightness of projector and absence of recoil

Since the rocket moves forward by ejecting gas backward, there need be no reaction or recoil on the mounting apart from a very slight degree of friction as the projectile moves along the guiding rails. The gases must be allowed to pass unhindered to the rear of the mounting to ensure no recoil. In practice this condition can hardly be achieved perfectly since the gas jet in expanding will impinge on supporting struts and so forth but the reaction is actually very small.

With no forces to withstand, except the weight of the projectile, the mounting can be made of very light construction and sited where the recoil of a gun of equivalent caliber would be prohibitive.

Very heavy projectiles can be fired from ships and vehicles incapable of mounting the corresponding caliber gun.

*Reprinted from "The Journal of the Royal Artillery."

This advantage of lightness of mounting or projector ought to be of extreme value in jungle and mountain warfare, provided sufficient accuracy is maintained to retain the advantage.

Where the object is to put the largest number of rounds into an area in the shortest time rather than to pinpoint a target, as in an area barrage, it is an advantage to use a light mounting with multiple barrels. Then it is usually necessary to alternate the firing to avoid mutual interference between rounds of the same salvo.

Over and above the tactical advantage of being able to fire heavy ammunition from light structures we must remember the production advantage of not having to manufacture gun barrels and of being able to disperse production of projector throughout a wider class of manufacturer. This is of special importance in rapid expansion of armaments manufacture in wartime. Further, there is little wear of the rocket "barrel" and consequently little maintenance and replacement necessary.

Design of shell or head

Gun accelerations are high, those of a rocket considerably lower. The following table gives some examples:

	Peak acceleration g
3.7" A.A.	18,000
4.5" How.	13,000
6" How.	9,000
3" Rocket	90
5" Rocket	130

To withstand the high acceleration stresses, gun ammuni



British high pressure weapons in action. Each gun fires nine rockets.



M-4 rocket-firing tanks in Germany move into position near the front.

on has thick walls and bases thus the proportion of filling carried to total shell weight is usually well below the optimum. This is particularly the case with antipersonnel explosive shells, shells for damaging light structures, smoke, chemical, incendiary and star shells. It does not apply to armor piercing ammunition where the weight of the metal is proportionate to the target and not the firing stresses.

Advantage can be taken of the low acceleration of the rocket to design the projectile or head to give the best target performance. This means that either greater effectiveness can be obtained for a specified shell weight or a smaller shell can be employed for the same effectiveness.

For general purposes, including antipersonnel, the point can best be illustrated by comparing the howitzer with the rocket fitted with 29 lb. H.E. shell. The howitzer shell contains about 12 per cent of explosive while the rocket shell contains 25 per cent.

The rocket and howitzer shell are equivalent in hitting power and the rocket is fired from lighter, cheaper and more easily produced equipment. This sounds as if the advantage is all on the side of the rocket but one must not forget the inherent inaccuracy of the rocket with present-day technique. The advantage still holds, however, for area barrage where a high concentration is required.

Similarly, light cased heads can be used for smoke, incendiary and chemical fillings with a large gain in quantity of filling per ton of ammunition carried. The same argument applies to plastic explosive and hollow charge fillings. It applies even more strongly to flares and star shells where weight for weight, brighter candles of longer duration can be fired from simpler projectors than when guns are used.

Flexibility

A feature of rocket ammunition which has been of great value is the adaptability of almost any type, size and weight of head to any motor. Rockets which are gyroscopically stabilized must be excluded from this statement since, generally, an alteration of head weight upsets stability and necessitates modifying the motor while a change of caliber necessitates a new projector and a new motor. However,

with fin stabilized rockets and with rockets which, while being fin stabilized, rotate slowly to improve accuracy, the head can be changed within limits, without repercussions on the motor or projector. Normally, the fins are considerably larger than required for bare stability and changes in stability resulting from changes of head make little difference.

Thus, with rockets projected from two or more guide rails, the head can be changed at will while the caliber remains constant. With the aircraft mounting on which the rocket is slung by means of two saddles, the length, weight and the caliber can be changed readily. The range is of course altered with change of head weight and sighting has to be adjusted accordingly.

With the projector barrel fitted with helical guide rails, the length of the projector has been made such that the head protrudes from the barrel. Then the size of the barrel does not limit the size of head used and heads can be interchanged freely.

The protrusion of the head from the barrel is a further advantage in that time fuzes can be set from the mounting immediately before firing.

Controlled projectiles

The low acceleration of a rocket combined with the possibility of sustaining the thrust for long periods, makes the rocket suitable for control during flight. The potentiality exists of producing weapons firing large quantities of explosives, incendiary mixtures and so forth to ranges of from say thirty miles to at least many hundreds of miles from relatively simple installations. In conjunction with radar developments, such weapons may be used in the future for artillery concentrations both from bomb proof home based firing bases and from relatively light structures in the field, for coast defense, for long-range air and water borne torpedoes.

Only development in the future will decide what accuracy such projectiles can attain and what their range limitations are. It is certain that they cover a wide field which is prohibited to the gun.

The Psychology of Surrender^{*}

By Lieutenant Theodore Draper

A civilian (in the Army everything is so simple; for us there are only two kinds of people: soldiers and civilians) thinks that when a soldier caught in a trap wants to live, he has only to give up. Only! It is much more complicated. A man decides to give up when he has been reduced to utter hopelessness and helplessness and life is worthless, or when he has a last reserve of courage to take the final risk that surrender demands, or when he has enough battle experience to know how the trick is done with a minimum of danger. Far more is involved than the mere desire to get out the easy way.

One way to tell a new outfit is by the number of prisoners it takes. New outfits always take as many as they can get. The boys behave the way they would like the enemy to behave. They have not seen and heard enough men die; they have not fought enough to kill a man in cold blood.

The first two prisoners I ever saw were a young man of twenty-four and an older man of thirty-five. The older man was insensible; he didn't care any more. The younger one was twitching, crying, crazed with fear. We looked at them with curiosity and loathing. We did not understand them. That comes later, when you yourself have to wonder how you might surrender.

They say our men get angry only after they see the boy they used to sleep next to, shoot craps with, swap troubles

with, fall on his face with a piece of 88 in his head. They say the main motive of our men is revenge, personal revenge. You suddenly find this is a game you play for keeps; but somehow it is still a game, not a cause or a crusade or conquest. This is a part of the story. There are other things just as interesting about the game.

You are running or trotting or walking or pulling yourself with pain on a road. A burp misses you. The word "sniper" leaps into your head. You fall on your belly into the slot on the side of the road. So do the rest of your squad—ten men. A few more burps and you have a pretty good idea where the bastard is. A couple of men crawl out of the road into the field while you cover them. The sniper knows he hasn't got a chance and doesn't dare stick his head out of his hole to fire another shot. He has to jump out of his hole and surrender or wait for the kill. To surrender, he *has* to stick his head out, or at least his hands. Who knows whether he *wants* to surrender? If he crouches in his hole and waits, one of our men will reach him and riddle him full of holes, or, more likely, fling a grenade ten yards away and cut him to pieces.

Now comes the moment when we know we have him. Should we give him a chance to surrender? Should the game stop for a moment to give him a chance to decide whether he wants to give up or to go down fighting? Obviously, that would be risky for us. He might choose to

^{*}From *The Atlantic Monthly*.



Signal Corps Photo

Some of the old didn't care any more . . .

Some of the young were crazed with fear . . .

Some were arrogant, sure that the Führer would . . .



Not exactly a safe way to surrender in a tight situation, but it was much better than cowering in a hole waiting for the inevitable hand grenade.

down fighting—with one or more of us. You cannot play the gentleman's way unless you are sure he is a gentleman or a coward.

But even if somehow you knew he had had enough and wanted to give up, would you let him? Why should you? When he took a pop at you, he was playing for keeps with your life. If he won, it was your skin. If he has lost, why should he get away so cheaply? Why should he enjoy the luxury of playing for keeps when he thought he could plug you, but change the rules in the middle of the game because now you can plug him? Is it really so murderous and inhuman to put a few slugs into him just because you maneuvered him into a grave which he dug with his own hands? You have to feel a burp or a whistle or a whine or a mud miss you by an uncomfortably small margin to play this kind of game seriously.

The worst, the most extreme, version of this thing is pillbox warfare. A few determined men in a pillbox can cause a vast amount of trouble, hold up a battalion—even a regiment—lay down a fierce fire if the pillbox is well placed. At the cost of many casualties and much effort, you work around to the sides and button up the front, and at last the men in that pillbox know they are lost. The pillbox has become a prison. Every man in it has been sentenced to execution.

Some men in that spot will wait to die bravely. More will not. They will crack, and shake with fear. Instinctively, they want to run out, escape from the prison walls. Where can they run? That is sure suicide. Sometimes our men, instead of slipping the charges in the slots and blowing them up into a salad of cement and steel and invisible bones, walk out to take possession. A half-dozen cowering men wait an eternity inside. Our men walk out alone. That is when you really have to shoot men in cold blood, inside four small walls, and the noise of the execution rattles through the place.

Why not? Not so long ago, those six men thought they were pretty smart and well fixed in a cozy pillbox, nicely camouflaged as a haystack, with walls so thick the shells of your artillery bounced off like rubber balls. You managed to seize the upper hand, at some cost. If they won, it was



Signal Corps Photos
Prisoners require guards and guards reduce the number of your effectives. These Krauts were marched to the rear by two riflemen of the 100th Battalion.

thinks who has been scared to death but has not died.

A veteran will tell you other things on the practical side. Everything is so simple when you kill the enemy—which is, after all, what weapons were made for. Take prisoners and your troubles begin. Many prisoners have to be taken in open fields in the middle of an action. A machine-gun crew has been popping away at everything in sight and a lot more in their imagination. The game is up. They jump out of their hole. They look very awkward with their hands up and their heads bare, because they don't know whether to step forward to meet you or to jump back again into their hole.

Suppose you let them live. What would you do with them? You cannot let them stay there. If you sent them back alone through the no man's land of one or two thousand yards or more, they could pick up other weapons, jump into another hole, and go into operation again. Or, as soon as you moved out of sight, they could try to get back to their own lines. When the first troops advance over open country, everything is wide open, pell-mell. So you have to send someone back with them. And if thirty or forty have been picked up, a platoon may have to lose three or four men to take them back under guard.

These prisoners have deprived you of three or four men as effectively as if they had killed them. Those three or four men, a few minutes later, might save a whole squad or turn the balance in favor of a whole platoon. If you had to make the decision, you would think twice if you had any sense or experience. You know you will need every man desperately before the action is over, and you could use twice as many as you have. How can you bring yourself to part with a single man when it may soon cost your life, and the lives of the men under you?

Suppose you are new at the game and you send your prisoners back under guard. In many circumstances, you have sentenced your own men to death. In the advance, it is very unlikely that you cleaned up everything on the way, especially if you jumped off in the dark, an hour or two before dawn. The enemy is lying behind you as well as in front of you. You don't worry about those behind, because other friendly forces will take care of them. But that will



One of the safest methods was to surrender to your own prisoners and that is what this long column of Germans did in Southern France, in August 1944.

sitting behind machine guns, burp guns, rifles, in a dozen holes which you cannot see before you are actually on them, and which you do not suspect until a shot gives you nervous warning.

If the small-arms and automatic weapons don't get your guards on the way back, the 88's may have zeroed in on the route by then, because our follow-up forces are coming through the same way. Incidentally, when the shooting starts, the prisoners get panicky and run off in all directions. The guards are too busy trying to take cover; and even if they should fire at them, most of the prisoners will probably get away in any event.

What have you, the commander, gained by sending back your prisoners under guard? You should have known that the chances were only about even that they could get back. Meanwhile, you lost men whom you desperately needed. Your men were lucky to get through in the first place. Why send them back with prisoners when they have nothing in their favor? The enemy has been alerted; anyone you have by-passed is tensely clutching a trigger, ready to let fly at the trembling of a leaf. And where, unless they do not know what it is all about, will you find men who will be willing to make the trip back with a gang of worthless Krauts who would have knocked them off a few minutes before? It is too much to ask of anyone.

The practical difficulties of taking prisoners are greatest for armored outfits. Such outfits are tightly organized and simply do not have the men to spare for the job. That is why, on both sides, a tank's life is cheapest. Knowing that tankers find it a nuisance to take prisoners, and do so rarely if at all, it is military policy never to take tankers alive. Once an outfit gets a reputation for not taking prisoners, it cannot expect any mercy. When the word went around that SS men, to show their toughness, never took prisoners, we stopped capturing SS men. Revenge feeds on itself, and an old outfit is willing to take almost no one alive. This is the secret of the absence of prisoners on the Russian front when the fighting was bitter.

There is one exception to all this. In a breakthrough, whether you like it or not, thousands of prisoners pile up. By slashing through for ten miles or more, inevitably thou-



Signal Corps Photo

The rule was to surrender to infantry—but even better to wait for the rear echelons to come up. Infantrymen of the 3d Division took these three Krauts.

forest for the trees. In fact, you don't fight at all unless you positively have to. You keep rolling, without firing a shot as long as you can. In a breakthrough, you don't take prisoners, but neither do you shoot them. You just ignore them or wave them down the road.

An experienced soldier—and the Germans became very experienced in this respect—obeys several rules about the art of surrender, whether he has ever bothered to codify them or not. Some of these rules are:

(1) Don't try to surrender to an armored outfit. Wait for the infantry to come up. You have to be careful when you try to surrender to the infantry, too, but your chances are at least twice as good. When you see the enemy's armor come up and you know you have to give up to live, find a dark hole—in the woods, a cellar, a church loft, a closet—and go to sleep or pretend you are dead, or do anything else more original to suggest you are not there, until the tanks have passed.

(2) Don't try to surrender to the first wave of infantry. They do most of the fighting and dying and feel it is unsportsmanlike to take prisoners. Wait them out, too, especially if your hideout is not likely to draw attention. On the other hand, if you don't have time to think of anything better than hiding under the bed, it may be better not to try to hide at all.

(3) Make yourself as obscure as possible for as long as two or three days. By that time, the rear echelon will take over the town. It is well known that rear echelon men never die except of diarrhea and boredom. They would rather take you prisoner than kill you. You are the living proof they were really "in combat." You might have been killed by another one. Needless to say, the papers will report that the town was "flushed" out and several hundred prisoners were taken "who offered little resistance." No one will know that you sweated it out for two days between two mattresses until you dared to make a personal appearance in the street.

(4) Don't try to surrender in the dark. To surrender successfully, you have to let the enemy know that you want to surrender. That is a very delicate operation. One of your thoughtless comrades—he did not think that one day you would want to surrender—made a false move. He came running out of the woods yelling at the top of his lungs,

when he saw only three of the enemy ahead of him, bunched up, he could not resist the temptation to toss a grenade—with which he had *not* parted—at them.

In the dark, the enemy has no way of reasonably assuring himself of your intentions, except possibly by your voice, which may be a decoy, and the sounds may be plain gibberish to him even if you are in dead earnest. Better wait until it is light and you can put on a good performance of helplessness and despair.

(5) Don't forget to take cover even if you are waiting to surrender inside a house. The first enemy troops to enter a hostile town start shooting the moment they see the first house, and don't stop until they pass the last one. They throw grenades into as many windows as they can. If you are hiding in a cellar, remember that no one wants to walk into a black space without a good assurance that it is empty or that you really want to give up—an assurance which unfortunately you are not in a position to give him. A desperate man, anxious to sell his life as dearly as possible, especially if he has found a cache of good food in the cellar, could plug him before he went down three steps. Anybody but a novice will send in a calling card before him in the form of a grenade, just to make sure. Therefore, it is not enough to hide out in a house. Try to find a place that will also protect you against a grenade if one is thrown, or a place where a grenade is not likely to be thrown.

(6) Try to surrender in a group—the larger the better. It does not require too much of a psychological wrench for a hardened soldier to get rid of one, two, or three if he is not in a mood to take prisoners. But with the worst will in the world, most men will hesitate to stage a massacre even of the not so innocent. To knock off a crowd requires an SS mentality.

(7) If there are many of you who would surrender if only you knew how, try one and test the reaction. If you see that one of your crowd has given himself up without regret, you know the coast is clear. Better yet, let him explain that there are a lot of friends where he came from and he can arrange to induce them to come out too.

(It is always amusing to see this scene. A doughboy goes into a house and comes out with a meek little individual who

looks like a fellow caught trying to slip into the subway for nothing. This individual starts talking but he is understood only when he points to other houses. He walks into one and comes out with five friends, equally depressed. Soon the street seems to be filling up with prisoners equally relieved. This type of surrender has the stamp of safety and experience on the face of it.)

(8) Surrender to your own prisoners. Admittedly the circumstances are special but it has been done. Often it happens that your side has had its own way for a while, but enemy reinforcements have come up and you know the end is near. In your better moments, you may have taken a few prisoners yourself and not shot them. If you give yourself up to your prisoners, they will probably be so giddy at the transformation of their own fortunes that they will haul you outside and march you down the road with all the pride of world conquerors. Since it will look as if you were their catch, no one else will interfere and waste any bullets on you. Your captors would not like the competition. This technique will almost always get you by the most terrible moment in any surrender—the first.

(9) If nothing else will work and your chances of coming out alive seem so slim that only the most desperate measures can save you, try to wound yourself, the more seriously the better. If you obviously cannot walk or use a weapon, you cease to be a menace, and you can be left to rot where you are. Most men will not have the heart to finish the job. This method will almost always work if the enemy has been doing a lot of shooting and has to conserve ammunition.

(10) In those awful moments when the first wave is shooting everything in sight, choose a nice, bloody corpse. Be careful to choose an enemy corpse. Lie down next to him, smear some of his blood on you, but don't get so close that a running rifleman won't be able to see at a glance that your dead companion is one of his own. You may benefit from a confusion of corpses. The rifleman may get the idea that all the stiff bodies are corpses and were all on his side.

The last piece of advice, found in a German document captured in the Ardennes, shows that much thought and ingenuity have been devoted to the art of surrender by those who have learned from experience how hard it is.



GOIN' TO GUAM?

By Lieutenant Colonel Homer B. Chandler, Jr.

Coast Artillery Corps

The natives have a song. The natives I found, have lots of songs but none are as strange and appealing as the words and tune of "Uncle Sammy, Please Come Back to Me." This plea, I discovered, originated during the fearful days between 8 December 1941 and July 1944. During that time, it was sure death to sing it openly, for the very nature of the words indicated a reluctance to participate wholeheartedly in the new "Asiatic Co-prosperity Movement" that sprang from Tokyo. However, after a few days of terror and confusion in 1944 "Uncle Sammy" did come back and came back to stay—the United States Armed Forces returned to Guam.

As a member of the Army Garrison Forces, I was able to witness the changes that came to the island and to the people in such a short space of time; that development was almost unbelievable even to an eyewitness. Hence, I feel that a description of the Guamanians and of Guam itself can and should be of interest, particularly since in all likelihood, "Uncle Sammy" is now determined to make Guam one of our major naval and air bases, and in so doing has made the people of "Uncle Sammy Come Back to Me" very, very happy.

Let us first examine the twenty thousand souls, native to the land, who suddenly had their peaceful little world so badly shattered on 7 December 1941. The Guamanian is a strange person indeed. He faithfully sends his children to school to learn English, and then equally faithfully speaks nothing but Chamorro in his home. Chamorro is a language which is composed of a few words of every other language imaginable with the emphasis placed on words containing a large number of vowels. The Guamanian himself is a combination of many races that seem to vary from white to very dark. In general, they are a happy lot, much more so than those you will find in Hawaii. The men spend most of their time drinking tuba or agi. Tuba is the juice which flows from a coconut tree when the blossom is cut away. Tuba runs about 45% alcohol, and has a very strong laxative effect in general. Agi is simply distilled tuba juice, and runs about 100 proof on the average.

The natives are in general quite clean, and it seems that the women are eternally washing clothes or kids. They are a godsend as far as laundry problems are concerned, and for a dollar or two per week they will wash everything and anything you can throw at them. What they do with the money is hard to say; they certainly do not spend it on clothes. To me, it was a little alarming at first to see a mess of children running around in clothes made out of Marine Corps camouflaged ponchos.

The natives are also great visitors. I found it was impossible to travel any road or trail without coming upon numer-

to be prepared for almost anything, for the natives would never pass you without a greeting of some sort, and you were expected to reply in kind. You might be greeted by a snappy salute, a "Hi, Joe" gesture, a tip of the hat, a deep bow, a broad grin, a spoken word, or a combination of all of the above. If you were an officer you usually rated "the works," except that the smiles from the girls were noticeably lacking in invitation.

Instead of being scattered throughout the entire island, the natives, in general, were located in the villages of Dededo, Sinajaña, Yona, Agat, Talofoto, Inarajan, Merizo, and Umatac. The last three named were untouched by the war and today present a true picture of how the natives have lived for centuries past. The large town of Agaña has been completely destroyed by our liberation forces, and the natives, consequently, have been forced to move out. The majority of those living in Agaña moved to Sinajaña which became a comparatively modern community of about two thousand people. I found these villages surprisingly clean, for even the dirt around the houses is swept each day. The Marine guard detachments and the Naval Corps men stationed at each one, have done a marvelous job in teaching sanitation to the natives. If the progress continues, the population is sure to double itself in a very short time, for the mortality rate is dropping fast. More and more, the people, particularly the younger generation, are being persuaded to take up farming, instead of tuba collecting. The future holds great promise for the Isle of Guam, and for one, hope the promise is realized. These people are one of our smallest minorities, but one well deserving of our assistance and concern. By and large their loyalty is unquestioned, and their faith and trust in the United States makes you sometimes wonder if we ourselves fully realize what our flag stands for.

But so far I have described only the people of "Uncle Sammy" fame. What of the land upon which they live and refer to as "home" as dearly as we recall our own family community? Guam, quite truthfully, resembles a Hollywood version of a south seas island. It is typical of such islands inasmuch as it differs from any other island. It is unlike the other islands of the Marianas Group, such as Saipan, Tinian, and Rota. It even contains great differences within itself. In ages past, Guam was not one, but two volcanic dots in the broad Pacific. Today, you will find between Pago Bay and Agaña a row of foothills at the bottom of which runs a solid coral belt approximately one foot beneath the top soil. From the middle of Guam north, the island rises gradually from sea level, until you reach the northern cliffs which you will find rise abruptly from the sea to elevations between 500 and 600 feet. From the foot-

you will see a huge plateau, averaging 300 feet elevation, that is broken by a mountain ridge 1,000 feet high, and cut by numerous rivers and streams that flow eternally into the sea. Having then established the basic foundation for the island as it appears today, I will now endeavor to describe what you can expect to see today.

Our first consideration then, will be a brief examination of the climatic conditions, and the geographical features of the territory. Guam is seldom too hot and never too cold, and hence, khaki shorts, and short-sleeved shirts are in order the year 'round. The temperature seldom varies more than ten degrees from winter to summer. Few days pass without rain, but rain storms last perhaps thirty minutes at the most before the sun is shining again. When the rain comes, though, it has all the characteristics of a cloudburst. This great abundance of fresh water, trapped in huge subterranean pools, and flowing so freely in its many rivers, has given Guam a wealth of junglelike growth, and permitted some one hundred thousand people in addition to its own twenty thousand native population to live on the island during the recent war, free from any problem regarding fresh water.

I have spoken of the junglelike growth on the island but not all of Guam is jungle by any manner of means. Except where it has been cleared by man, the island is dense jungle from the line Pago-Agaña north. South of this line you will find typical tropical growth only on the edges of streams. Except for patches of sword grass, the ground of the plateau and mountains is covered by short grass, and the land is used chiefly for farming and cattle grazing. There are not many beaches as such on Guam, and only one real harbor. The landings of our forces, the reader will recall, were made on Dadi and Agaña beaches, and even there it was necessary to use LVT's in order to come in over the coral reefs. The small, but attractive Tumon Bay was made into a recreational area for Officers and Enlisted Men, but even here you find the shore protected by a coral reef, which however, by action of rather strong currents, begins not closer than fifty yards from the beach. The famous Apra Harbor that in prewar days could accommodate only shallow draft vessels, can now admit the largest war vessel and by using hundreds of tons of fill from Cabras Island (now joined to Guam itself) our engineers have extended the breakwater to afford great protection for ships anchored in the harbor or secured to the many docks recently constructed. But one man-made change in the geographical features of the island deserves mentioning. I speak of the superhighways constructed with the maximum of efficiency and the minimum of time by the famous "Seabees" and our own Army Engineers. War and war installations could not change the face of Guam as much as the completed highway system has done. Trails and

cow paths have become four-lane, hard-surfaced highways. Hills have disappeared, villages have ceased to exist, and even huge portions of the jungle now feel the hurried caress of incessant traffic. It is small wonder that even the natives would become confused and lost, so rapidly and completely were old landmarks and familiar terrain obliterated or altered. But it was with a definite purpose that this took place, for today there exists a modern highway system that can serve well this island stronghold, and assure a more efficient defense than could otherwise be realized.

I have mentioned the number of the military and native population. Naturally, with an island of this size, most food and matériel must be imported. On the island itself, coconuts, bananas, bread fruit, corn, beans, yams and papayas grow exceedingly well. Livestock includes water buffalo, horses, cows, pigs and chickens. Cats and dogs are few and far between, most of them having been eaten by the Japs just prior to our liberation.

In mentioning water, I recall that I referred to it as a blessing to this island. It is a blessing in itself, but in addition, I found water to be responsible for our greatest concern. With the annual rainfall of some 80 to 100 inches, one would imagine that the insect problem on Guam would be terrific. Prior to January '45, it was a problem, mainly because of the lack of personnel and equipment. Dysentery, Yaws and Dengue fever were to be found in every part of the island. In some of our units 80% of the personnel were hit with Dengue fever in the first month they were on the island. By January 1945, however, the rate on Dengue alone had dropped to two men per thousand per month. Yaws is a disease which belongs almost exclusively to natives. It is contracted by direct contact or by having a break in the skin infected by flies.

The insect problem was licked, though, licked by hard work on the part of all organizations. Jungle growth was cleared away, water holes filled up, latrines, kitchens, garbage racks, grease traps and drains fly- and mosquito-proofed. Rats by the thousands were systematically exterminated and the natives in particular kicked out of their lethargy and forced to learn proper sanitation and hygiene. Aided by our friends, the countless thousands of toads and blue-tailed lizards that seemed to inhabit every foot of the ground, in sixty days, what had been a grave problem became a small nuisance that was easily controlled by aerosol bombs, mosquito repellent, screens, and later, DDT.

I found it most interesting to note that as the geographical face of Guam was improved, so advanced living and health conditions. Inasmuch as there are no poisonous insects and no snakes existing on this island, the elimination of the insect problem has made this land a very healthful place in which to live.



War Department Announces Post-War ROTC Policy

The War Department has announced approval of a post-war policy concerning the Reserve Officers Training Corps which makes provision for military training in two divisions, the Junior ROTC at approximately the secondary school educational level, and the Senior ROTC at the junior college and college level.

The program is the result of a three-month study by the War Department, during which time a number of civilian educators and military authorities were consulted. Among recommendations adopted was one granting increased emoluments to Senior ROTC students to make the training more attractive.

The mission of the Junior ROTC will be to lay the foundation of intelligent citizenship and give the student basic military training which will benefit himself and the Military Service if he should become a member thereof. The Senior ROTC will carry the mission into the production of junior officers who have qualities and attributes essential to their continued development as officers of the Army of the United States.

Junior ROTC instruction will be given in military school units of high school level and above, which do not grant college degrees, and at regular civilian high schools, and may be given at certain essentially military institutes which do not confer college degrees but are designated as a separate category by the Secretary of War. The course will consist of three hours of formal instruction per week for three academic years of 32 weeks each. Students satisfactorily completing the course will be credited with the completion of the first year of the Senior ROTC.

The Senior ROTC program, mostly conducted at the college level, will consist of two parts, known as the elementary course and the advanced course, the latter including a summer camp.

The elementary course will be a minimum of three hours per week for two academic years of 32 weeks each. It will be given at military institutes which offer college courses but do not grant college degrees, junior colleges, and civilian and military colleges and universities.

Whereas the Junior ROTC and the elementary course of the Senior ROTC will provide only general military training, the advanced Senior ROTC will be of a specialized branch type, designed to qualify selected students for reserve commissions in the several branches of the service, such as the Infantry, Field Artillery, and others. At present, there are no Air Force ROTC units, establishment of which will require legislative action.

The advanced course will consist of a minimum of five hours of formal instruction per week for two academic years of 32 weeks each. The summer camp period will be of eight weeks duration instead of the present six, if legislation permitting the extension is enacted. The advanced course will be conducted only at civilian and military colleges and universities offering four-year courses leading to a degree.

Land Grant colleges which have required military training may continue this requirement with the War Department encouraging and assisting. However, all students will not necessarily be formally enrolled in the ROTC and eligible for its proposed emoluments unless they meet prescribed requirements. The War Department will seek passage of enabling legislation to grant emoluments to students in the elementary course of the Senior ROTC of 66 cents per day plus uniforms, and to increase the emoluments to students in the advanced course to 66 cents plus \$1.25 per day. The advanced students would be required to buy their own uniforms. Institutions desiring to provide a distinctive type of uniform or individually tailored uniforms for the Junior ROTC or the elementary Senior course may draw commutation in lieu of issuance of Government uniforms in an amount set by the Quartermaster. Students at ROTC summer camps will be furnished the necessary field-type uniforms.

Minimum requirements for a reserve commission will include the successful completion of four years education at the college level and the successful completion of the Senior ROTC course. The student also must have reached the age of 21 before he is granted a commission. For a commission as a First Lieutenant in a professional branch, such as the Medical Corps, the candidate must have received his professional degree.

In case a student is specializing in a technical or scientific field, such as engineering or chemistry, at an institution which does not have that ROTC branch, he may be sent to a summer camp of the appropriate branch, such as the Corps of Engineers or Chemical Warfare Service camp and obtain his commission in that branch within quoted limitations.

The War Department also plans to negotiate with schools maintaining ROTC units to obtain academic credit for such training on the same basis as for nonmilitary subjects where such an agreement does not now exist.

Quotas for the Senior ROTC will be allotted annually by the War Department, and separate contracts will be executed by students admitted to the elementary and advanced Senior ROTC courses. No contracts will be executed for the Junior ROTC.

Military instruction at each institution will be under the direction of the Professor of Military Science and Tactics appointed by the War Department. He will be assisted by other officers and noncommissioned officers of the Army. If authorized by legislation, the War Department will also negotiate with the individual institutions for the services of civilian instructors in the teaching of certain academic subjects related to the military.

The new program will go into effect with the start of the fall term of 1946 insofar as existing laws and appropriations will permit. The present interim ROTC program will be absorbed into the new program insofar as practicable.



The Current Military Situation



By Colonel Conrad H. Lanza, (Retired)

EDITOR'S NOTE: This is the second of a series of articles by Colonel Lanza.

During his military career, Colonel Lanza participated in the Philippine Insurrection and saw action as commanding officer of the 66th Field Artillery Brigade and for a time as G-3 of the First Army Artillery in the first World War.

He is a graduate of the Artillery School at Fort Monroe, The Staff College, and in 1915 was an honor graduate of The School of the Line.

He subsequently served as an instructor at Leavenworth for four years where he was head of the G-2 section which included History and Strategy. For his work in the field of history, he was decorated by the French Government.

Colonel Lanza was retired in 1942 after 44 years of service.

Introduction. The subjects discussed below are short military studies of areas in which the United States hold interest. The studies are intended to be factual as to what has occurred and impartial as to current conditions, and are based on information available to the author. They do not necessarily imply War Department indorsement of factual accuracy or opinion.

THE GENERAL SITUATION

Outside of Southeast Asia where military activities are decreasing, the military situation is dominated by the actions of Russia. In Manchuria, Russian troops remain in spite of treaty provisions which called for their withdrawal. In Europe, Russia is consolidating her position, with particular attention to organizing Soviet forms of government, which prior to withdrawal of Russian troops, may be expected to "vote" for amalgamation into the Soviet Union.

Russian diplomacy is strong and aggressive. It is not limited to areas adjacent to Russia. It is seeking a naval and air base from Greece in the Aegean Sea. It is asking for assignment of mandates over the former Italian colonies of Libya, Cirenaica and Eritrea.

Russia is engaged in a multiplicity of adventures. Each is a separate operation. Opposition comes from the United States and the British Empire, now frequently referred to as the Western Powers, who are endeavoring to prevent further Russian territorial gains.

Russia has a unique advantage. It is actively aided by Communists throughout the world who transmit valuable information and carry out propaganda. Reports from Canada are that Canadians arrested as Russian spies did not act as such for pecuniary reasons, but did so because they desired to aid Russia, rather than their own country. No nation except Russia has this kind of world-wide assistance. It is peculiar that just at the time when this kind of aid is being widely tendered through sympathy, Russia's own citizens, who have come in contact with the western world, are showing marked antipathy to their government, accompanied by numerous desertions and suicides to avoid returning to their own country.

SOUTHEAST ASIA

Indo-China. On 28 February, France signed a treaty with China at Chungking. France relinquished its extra-territorial rights within China. In exchange China agreed to evacuate, in favor of France, Indo-China north from 16° Latitude by 31 March.

Upon receipt of this information at Saigon, the French High Commissioner, Admiral Georges T. d'Angleieu, ordered an amphibious expedition including the 2d Armored Division to proceed without delay to Haiphong. The division was loaded on Landing Craft escorted by two cruisers and a number of destroyers.

On 6 March, the expedition advanced on Haiphong harbor. Unexpectedly at 8:30 a.m. it was fired upon by the coast defenses manned by China troops. It took the French ships a half hour to assume battle stations and return the fire. A two-hour engagement then ensued between the 5-inch batteries of the cruisers and the coast defenses. At 11:00 a.m. the French withdrew.

The cruiser *Triomphant* had been hit four times, lost ten killed and an unstated number of wounded. Two of the LCs had been hit and set on fire. Total French losses were reported without confirmation as twenty killed and forty wounded. There is no information as to Chinese losses.

As far as known, this engagement is the first one where Chinese coast artillery ever repulsed a naval or amphibious attack by a foreign power.

The French proceeded to negotiate. China explained that the early arrival of the French had not been foreseen and that the commanding general at Haiphong had not been offi-

cially advised as to the treaty of 28 February. He was now instructed to withdraw and permit the French to land. This started on 12 March and thereafter proceeded without incident. On 15 March, a Chinese transport (American Liberty ship) arrived as the first of a fleet to withdraw the Chinese troops by sea. The movement was scheduled to be completed by the end of the month but administrative authority was to pass to the French command on 21 March.

The natives on north Indo-China have had an organized government known as the Viet Nam. Its CP has been at Haiphong, capital of Tonkin but it also controlled Annam. The President of Viet Nam is Ho Chi Minh. On 6 March the same day as the French repulse, a treaty was signed at Haiphong between France and the Viet Nam which provided for ending hostilities between the two parties. The treaty has not been made public. It is understood that it provides that Viet Nam shall rule Annam and subject to an election yet to be held, Tonkin and Cochin China. It has complete control of interior administration.

Outside of this provisional military force, France retains military control for five years but the French troops are not to exceed a division of 15,000 men this year and thereafter are to be reduced 20% per annum until at the end of the prescribed period all French troops are withdrawn. Initially a Viet Nam army of 10,000 men is recognized, but this is to operate under the French High Command during the five-year period. France is to retain control of foreign affairs. This treaty may establish a precedence for settlement of the independence movements elsewhere in Southeast Asia and is therefore most significant.

Also on 6 March, the British Southeast Asia Command officially turned over to France, its supervision of south Indo-China, less repatriation of Japanese prisoners. For the latter purpose two battalions of British troops remained at Saigon.

On 27 March, France recognized a provisional native government under President Nguyen Van Thinh as in charge of Cochin China until the elections regarding union with the Viet Nam are held. The election is scheduled for 15 July.

The Viet Nam has a diplomatic representative at Chungking named Mr. Vinh Thuy. This gentleman up to the beginning of 1945 was Emperor Bao Dai of Annam. He was relieved by the Viet Nam and reduced in rank to a plain citizen. He appears to have entered into the spirit of the game and has become a prominent member of the Viet Nam, representing the Conservative element as opposed to the Communist one.

British Southeast Asia. On 1 April, the British inaugurated a new Malaya union. This consists of Malacca, Penang and nine native states ruled by Sultans. The Sultans had remained at their respective capitals, and had continued to operate under Japanese rule. The new British Governor is Edward Gent. Singapore is not included in the new union.

The British are seeking to install a receptive government in Burma. There is considerable political opposition. Main dissident elements are headed by Aung San, Major General Japanese Army but a native of Burma. He is supposed to have cached in the hills large quantities of weapons and munitions left by the Japanese. He has direct liaison with

Thailand, or Siam, since his forces are close to the boundary.

Another dissident is U Saw, who was a prewar Prime Minister. On 5 April, this former statesman declared that the British were driving the people to desperation and that an explosion might soon result. The Prime Minister during Japanese occupation was Ba Maw. U Saw and Ba Maw are the leaders respectively of the conservative and popular parties which have joined forces.

The future of Malaya and Burma is uncertain.

Netherlands Indies. Fighting has declined to minor warfare. The British continue to occupy five main cities in Java with a corps of three divisions and three cities in Sumatra with one division. Dutch troops have commenced to arrive in Java but have remained within British lines. Dutch troops are engaged at various points in Borneo, Celebes and Timor against native troops, allegedly led by Japanese. The Dutch have occupied Vali without opposition. The natives in this island, who are not Moslems but Brahmans, have started a boycott of the Dutch by refusing to trade or to furnish services. Japanese troops continue to hold the remainder of the Netherlands Indies and still have important armed forces on Java and Sumatra. Evacuation of the Japanese from Java has begun.

The Javanese government resigned on 2 March but the same Premier, Sutan Sjahrir, formed a new government which received a vote of confidence by 140 to 67 in the local parliament. Reorganizing his cabinet, he renewed interrupted negotiations for a peace settlement. He was aided by the British mediator Sir Archibald C. Kerr. This gentleman, who is a career diplomat, has been designated as ambassador to the United States upon completion of present duties regarding the Netherlands Indies. He has just been accorded the title of Lord Inverchapel.

According to his report, by means of numerous cocktail parties which it seems the Javanese are willing to attend, he brought together the Javanese and Dutch leaders. He has reported that he succeeded in arriving at an amicable settlement. Pending approval of the same by the Powers, its nature is secret. Premier Sjahrir with three other Cabinet Ministers, the British mediator Lord Inverchapel and the Dutch representative Governor General H. J. van Mook left Batavia together on 4 April for Holland. They arrived on the 8th and final negotiations commenced at Amsterdam on 10 April, to be completed later at London.

This agreement will also establish another precedent throughout the Far East and progress is being followed with great interest by all.

The Dutch Government has purchased the property of the Hollandia New Guinea base from the United States. It consists of wharves, buildings, machinery and stores. Present intention is to transfer this to Batavia.

CHINA

The Chinese situation at present is supposed to be guided by an agreement made on 9 January 1946 at Chungking. Under the direction of General George C. Marshall, in his capacity of U.S. ambassador to China, representatives of the Kuomintang or Nationalist Party and of the Kungchintang or Communist Party agreed to a cessation of hostilities be-

between themselves and to an American directed executive CP in Peiping to supervise the truce. The latter was duly established.

The executive CP has organized teams of one American officer and one each from the National and Communist parties. Teams are sent out into the field with the mission of arranging for the peaceful disposition of troops of both parties. Considerable success has been had with the important exception of Manchuria.

It is necessary to remember that the National and Communist parties, then as now both dictatorially ruled respectively by Generalissimo Chiang Kai-shek and General Mao Tse-Tung, signed a similar agreement on 22 September 1937. In both cases the relative military situation of the two political parties was the same—the Communists were markedly inferior and unable to wage a war other than through guerrilla actions. Cessation of hostilities in 1937 enabled the Communists to reorganize and re-equip their troops and the same thing appears to be happening this time in Manchuria where the Communists are receiving substantial accessions of arms and munitions reportedly from captured Japanese stores. After 1937, the Communists recommenced hostilities as soon as they were ready. In view of that precedent it would not be surprising if the same thing occurred again.

The Russians formally evacuated Mukden on 9 March and it was taken over by Kuomintang troops, who had been in and around that area for nearly two months. The Kuomintang troops include the 1st, 5th, 6th, 13th (armored) and 52d Armies. The 71st Army was en route and joined during the last half of March. Chinese armies are really corps, usually of three divisions. All those listed are American equipped and trained. The 1st Army had combat experience under our General Stilwell. In addition to Mukden these troops occupied the railroad back to Tientsin. That part of the railroad south of the Great Wall was covered by the 1st U.S. Marine Division. The U.S. Army furnished the Chinese with air transportation and supplies; the U.S. Navy furnished water transportation. These troops are to relieve the Russians in Manchuria.

On 22 March, the 1st Army moved north from Mukden to take over Changchun, to where the Russians had withdrawn. By 10 April it had advanced less than ninety-five miles. This represents a rate of only five miles a day. This is because the enemy (Communists) hold a strong position around Szepinghai which will require a formal attack. Although the Kuomintang troops have American combat equipment, the divisions do not have supply trains nor motor trucks. It has been necessary to improvise transportation utilizing horses, donkeys, camels and coolies. There is an excellent railroad along the line of advance but it is inoperable due to constant enemy (Communist) raids.

According to returns for 1 April, the United States had to date moved 231,500 Kuomintang troops to Manchuria. This figure checks with a TO strength of about 10,000 for each of eighteen divisions (six armies) plus usual corps and service troops. Against this force, the Communist strength in Manchuria is estimated by American correspondents as not over four divisions. Only one of the Communist divisions has artillery while all of the Kuomintang divisions are equipped with American artillery.

In addition the Kuomintang has two airborne armies of two divisions each (92d and 94th Armies) in GHQ reserve, operating only when the United States furnishes necessary planes, which it hasn't done recently.

As this account closes, the American directed truce teams are endeavoring to arrange within Manchuria for a Communist withdrawal, or amalgamation, so as to enable the Kuomintang to take over Manchuria from the Russians by the end of April.

IRAN

On 4 April, the Russian ambassador at Teheran signed an agreement with the Iran government proclaimed to be a complete settlement of the differences between Iran and Russia. According to so much of the agreement as had been released it provides for:

1. Russian evacuation of Iran by 8 May 1946.
2. Iran to negotiate directly with Azerbaijan "in a benevolent spirit."
3. A joint stock company, with Russia holding 51% of the shares, to exploit oil north of the line Lake Urmia Mianeh—Elburz Mountains—Miyana—Meshed (exc) plus the greater part of the salt desert (Dasht-i-Kavir) south-east from Teheran.

THE LEVANT AND TURKEY

Turkey is reported as retaining complete mobilization. One army group is covering Istanbul; another the eastern frontier while a third is in GHQ Reserve. The Russian occupation of Azerbaijan in Iran caused a deterioration in Turkey's military activity as this action interposed Russian forces between the Turkish and Iranian armies, whose two countries have an alliance.

In view of this situation on 30 March, Turkey signed a treaty with Iraq. Details are secret. Through Iraq, Turkey would have access to Iran irrespective of Russian occupation of Azerbaijan.

Turkey was further alarmed by the closing of the Russian Army Group CP at Bucaresti, in Romania on 18 March. It reopened on the same day at Plovdiv, Bulgaria. A Russian Army CP was also identified at Nova Zagora about sixty miles from the Turkish frontier. Both these Russian CPs are well situated to supervise operations against Turkey. However there have been no special Russian troop movements to warrant undue suspicions. Russian propaganda against Turkey continues to a moderate extent.

On 22 March, Great Britain and Trans-Jordan signed a treaty of alliance which provides for mutual assistance in war and for British garrisons which are already there. This British action together with the Turkey—Iraq treaty with both of which countries the British are closely connected, tend to consolidate British leadership in the Levant.

France has withdrawn its troops from Syria. The British have replaced French influence. A movement has been started to have Syria unite with Trans-Jordan, accepting the ruler of the latter state who is the Emir Abdullah as the head of a greater Syria. If this succeeds it would further increase British military influence in the Levant.

The British are evacuating the strong naval base of Alex-

andria, Egypt. It is no longer required as there is no hostile naval force left in the Mediterranean.

France has agreed to evacuate Lebanon by 31 August next. Lebanon will become a small Arab state—the smallest of all.

YUGOSLAVIA

This state is dominated by Marshal Tito at the head of a severe communist regime. There is no political freedom and little economic freedom. Opposition is growing to Marshal Tito but is mostly unorganized. Organized opposition centers in two small divisions, one near Montenegro and the other in east Bosnia. They cannot operate while the mountains in which they are located are snowbound.

The leader of these two anti-Tito divisions has been General Draja Mihailovitch. This officer was formerly the Allied leader in Yugoslavia, and had been equipped by Lend-Lease supplies and supported by British and American Liaison detachments. He was renounced by the Allies when recognition was withdrawn from King Peter, in December 1945.

Tito's government reported that Mihailovitch was captured on 13 March and will be duly tried for treason. On 30 March, our State Department requested that American officers who had served with Mihailovitch be permitted to testify in the proceedings. The capture of Mihailovitch has not been explained, and has been denied in radio dispatches from his divisions.

Tito is reported to have fifteen divisions in three armies most of whom were deployed along the line Nagykanizsa (esc)—Zabreb—Ogulin facing northwest toward Istria. During the last half of March a pronounced movement of an estimated ten divisions began towards the frontier of Istria, held by the British XIII Corps, which has only two divisions—88th U.S. Infantry and 56th British. Thereupon the commander in chief in Italy, the British Lieutenant General William Morgan, on 27 March issued a formal warning. He announced that following the Yugoslav advance, incidents occurred along the border which he would not tolerate. He announced the firm determination of the Allies to cover Italy, including Istria. This had the desired effect, incidents disappeared and the Yugoslav advanced stopped.

It had been announced that Russian armor had joined the Yugoslavs. It is known that Russia had large armored forces just west of Budapest but Russia has denied sending any of their troops southwards. This seems probable as the frontier region of Istria is not very suitable for operation of armored troops.

GERMANY

Notwithstanding that the Potsdam Agreement prescribed that there would be established a central government operating throughout the four occupied zones, no such government has been set up. Each of the four occupying Powers continues to administer its zone independently. Main difficulty is France, which refuses to agree to anything of importance until its own special claims to the Ruhr are settled.

There is an Allied Council in Berlin. On 28 March, it announced its decision as to the future industrial conditions to be permitted within Germany. Main features are:

1. No war industries of any kind permitted. This includes aviation and ocean-going ships.

2. No industries permitted for synthetic gasoline or oil, ball bearings; heavy machine tools (including tractors and trucks); the light minerals (aluminum, magnesium, etc.); radio-active materials or radio transmission; certain chemicals.

3. Following industries are permitted but restricted to an annual output of 7,500,000 tons of iron

292,000 tons of copper
223,000 tons of lead
16,000 tons of tin
9,500 tons of nickel
1,000 tons of zinc

4. No locomotives to be manufactured until 1949. Permitted chemicals not to exceed 40% to 70% of prewar production; machinery 11% to 31%. Motor vehicles not over 80,000 cars and trucks per annum plus 10,000 motorcycles.

The foregoing quantities are less than is required for German needs, allowing nothing for export. If this schedule is approved and enforced, it means extensive unemployment and a material reduction in the standard of living.

In eleven months since the end of the war, the United States has furnished goods to Germans in its zone to a value of \$51,000,000. This figure appears to be a low for Great Britain reports a cost for its zone of almost \$300,000,000. No report is available for the French or Russian zones.

Elections were held in Germany at the end of March. One issue was the consolidation of the German Socialist and Communist Parties. In the American and British zones where the results of the vote are known, this proposition was rejected by a 6 to 1 vote; this apparently represents the relative strength of the Socialist and Communist Parties. Notwithstanding this vote, a second election has followed in the Russian zone to which only *leaders* were eligible to vote. As usual in Russian elections, the vote was unanimous and favored amalgamation of the two parties. It is presumed that the *leaders* who rejected the popular vote, were hanged. The new consolidated party represents a majority of all voters.

Certain American correspondents have made a tour of the Russian occupied zone. They were not allowed to visit every place desired (for example concentration camps) but saw considerable, although under constant Russian guard. Based upon these American reports the conditions within the Russian zone are listed below.

Russian troops are not allowed to fraternize with Germans. This is said to be mainly because Germans will not associate with a Russian. Russian soldiers found fraternizing are sent back to Russia, which is a serious punishment for them.

Looting and ill treatment of Germans has stopped and discipline within Russian ranks has been partially restored. Troops are raggedly dressed, poorly equipped and present an undesirable appearance. They live off the land, obtaining supplies by requisition on the populace. This has resulted in a marked deficiency in food for the Germans. The latter are feeding children first—adults take what is left which isn't much.

From conversations with Germans, it was figured that

number of able-bodied Germans transported to Russia as slave labor is about four millions. In towns visited, the proportion of men to women between the ages of twenty and thirty was noted as 1 to 15. This has resulted in a deficiency in farm labor.

The great German estates have been broken up and allotted to farmers at about ten to twelve acres each. Many Germans were originally in favor of this but after an experience of nine months, they no longer agree. Farms of this small size in Germany cannot be economically cultivated. The Russians knew this as they had had the same experience in Russia when they divided the land after World War I. The solution is the re-establishment of large farms only now as government-owned collectives. In this way, the original owners are liquidated. A certain number of collectivized farms have been established and in every case the manager is a Communist.

Conversations with Germans, a few of which were unobserved by the Russian guard, showed a general belief that the Russian administration sought to completely destroy the original German civil government. Territorial boundaries have been changed. The post office and railroads have been liquidated as well as all business and labor companies and organizations. In place thereof new agencies have been established, all headed by Communists.

Germans have been able to compare conditions in the Russian zone with those existing in adjacent British and American zones. All can see that Russian domination has resulted in a marked reduction in standards of life. The telephone and telegraph, street lighting, heating of homes, etc. have been discontinued. Coupled with the seizure of their young men as slaves, the Germans detest the Russians. Still the general opinion was, that just as many Germans became Nazis in order to live, so many will join the Communists to do likewise.

INDIA

This great country with a population of some four hundred millions is next to China, the most populous in the world. It materially exceeds China in industrial and military development. If China is recognized as one of the five great Powers, why not India? That country wants independence.

The British are willing to grant independence. There is at least one major difficulty.

India contains about 90,000,000 people of the Moslem faith. Over 300,000,000 belong to Hindu faiths. Besides religious differences, there are cultural ones. Moslems agree with Christians that all men are created equal. Hindus deny this and have a complicated caste system. They rate Moslems as below all castes—untouchables. The Moslems are warlike; Hindus are largely pacifists.

The Moslems occupy a belt extending generally from Baluchistan across north India to Bengal, both inclusive.

They desire independence from the British as a separate state. The Hindus wish independence for India as a single state including the Moslems to whom they are willing to grant suitable rights as a minority. The Moslems reject this on the ground that they will always be a minority and presumably subject to various disabilities.

Until the Indian Mutiny in 1857, India never had been a single country. It has been so only through British rule. The nearest previous approach to an Indian state was the Mongol Empire (Moslem) established early in the 16th Century. The Moslems were conquerors and rulers for over a thousand years preceding British arrival. They find it hard now to yield to Hindus who although over three times more numerous never were able to govern themselves and were constantly a subject race. It would mean a reversal of the relative position of the two races.

If the Moslems are granted a separate state as they insist will be the only acceptable solution of the problem, a powerful Moslem state will have been established. In Bengal are the largest steel works in the British Empire. The Moslems can and would manufacture any kind of military weapon and munitions. They are excellent fighting men and are the backbone of the present British India Army. They have an Air Force—some naval ships, all of which can be produced locally. In view of the fact that the Moslems previously conquered most of India, they might do so again.

The Moslems might ally themselves with the Moslem states to the west—Iran, Turkey and the others which make a solid belt all the way to Morocco. The Arab League is making considerable progress in attempting to establish all Arabs under single rule. If Moslem India joins the Arabs a new strategical situation of utmost importance would result for Moslem India has the people and the industrial capacity for a first-class Power.

In view of this situation, it is not surprising that the British prefer to unite the warlike Moslems into one state with the pacific Hindus. Otherwise a new and a powerful new Moslem state is almost certain to arise. With 90,000,000 people, only the United States, Russia, China and Hindu India would exceed it. China is a Power in name only. Hindu India is not likely to become an aggressive Power notwithstanding that it would have the second largest population in the world. Moslem India might well become a third great Power within a very few years.

The solution to the antagonisms of Moslems and Hindus might appear unsolvable. The British do not think so. They claim Canada as a precedent. In that case they united into one Dominion a country split between two races—British and French, and two religions—Protestant and Catholic. The solution lies in writing a constitution which will protect both parties and which cannot be amended without the consent of both parties. It would seem practicable to write such a constitution for India and the effort is now under way.



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COLONEL HOBART HEWETT

COLONEL W. I. BRADY

COLONEL ANDREW P. SULLIVAN

COLONEL E. GRAHAM MARTIN



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

News and Comment

Meet the New Associate Editor

Lieutenant Colonel Donald MacGrain reported for duty as Associate Editor of the JOURNAL 20 April 1946. The JOURNAL is fortunate to have the services of this officer who combines an outstanding combat record with training and experience in the publications field.

Colonel MacGrain took the 413th AAA Gun Battalion overseas in 1943; the unit was assigned to the First Army upon arrival in Britain. The battalion made the assault on Omaha Beach on D-Day with the 1st Infantry Division, the first AAA Gun Battalion ashore. In July the battalion was attached to the 3d Armored Division in a tank-destroyer rôle. Colonel MacGrain was wounded by mortar fire on the morning of 16 December 1944, while he and his battalion were becoming involved in the Ardennes fight.

The 413th was attached in turn to the following units: 1st, 2d, 9th, 29th and 104th Infantry Divisions, the 3d Armored Division, and the III, V and VII Corps; all of this added up to eleven months of continuous combat.

In July 1945 Colonel MacGrain became executive officer of the 49th AAA Brigade; he returned to the States in January 1946.

The new Associate Editor graduated in 1936 from Michigan State College, where he majored in Journalism. He took graduate work at the University of Detroit.

Troop Duty for All Officers

The War Department and Ground Forces have prepared excellent school programs which allow ample time for the all-important duty with troops. While it is not desirable to prescribe the curriculum for all officers for a major portion of their service, we do believe it is of primary importance for every officer, early in his career, to develop an affection for soldiers. This is not inherent in most officers and must be acquired through duty with troops. Therefore, in addition to a school program, we believe the War Department should prescribe a Duty with Troops Program. Senior officers who have had little duty with troops and yet fortunately developed early in their career a love for soldiers, might not appreciate the necessity for such a program.

It is considered absolutely necessary for an officer to serve at least three years in a line company of battery. This time is required during peace to permit three periods of field training. The love of soldiers is not ordinarily acquired in barracks, because some of the best field soldiers do not show up to advantage in garrison. Their untidiness or excess energy is a constant source of annoyance to the battery officers.

To better understand how the metamorphosis of attitude of the young officer occurs, let us take him along with his troops on a hypothetical maneuver in the field and follow through his career as a battery officer.

On the first tactical problem for the young lieutenant, a truck or tractor breaks down and the lieutenant leaves

Jones, a mechanic, to fix it. About midnight he is awakened by a truck coming into the battery area. He says to himself, "I guess that is Jones." Then he goes back to sleep. About 1:00 a.m. he is awakened by someone outside his tent. He inquires and finds it is Smith installing his telephone. He is awakened again at 5:00 a.m. for breakfast. When he returns from breakfast, Smith is disconnecting his telephone and two men are taking down his tent. At 7:00 a.m. the Battery is on the road.

Throughout the day Jones is occupied making minor adjustments on the vehicles. Late in the afternoon a truck stops and again Jones is left behind to fix it. About midnight the Lieutenant is awakened by the truck Jones has repaired. About 2:00 a.m. he is awakened by Smith installing his telephone. Thus, for a period of one month he observes Smith, Jones and others who had been, prior to the tactical problem, poor, or at best only mediocre, soldiers.

During the next eleven months in barracks he is willing to put up with Jones' untidiness and Smith's intermittent squabbles with the MPs in town, trying harder than ever to correct them, making progress because he understands them better and realizes their potential worth to the service.

After another month in the field, Jones, Smith and some of the others again come to his attention as outstanding field soldiers. Upon return to barracks he recommends Jones and Smith for privates, first class. Prior to leaving the battery six months later he is proud to see Jones promoted to a Tec.5 and Smith to a corporal, upon his recommendation.

On the lieutenant's next duty with a battery he is a battery commander. During the next maneuver, or two, while he is a battery commander, he becomes acquainted with another "Jones" and another "Smith" in his battery and it is needless to say that he has grown to love them.

During his last tour of duty as a battery commander, he stands a formal inspection on the parade ground for a senior inspecting officer. For this inspection, Jones has made a special effort. His clothing is clean, although he isn't smartly dressed, his shoes are shined, his equipment is clean . . . but he is skinned for a frayed tie. When the inspector says that Jones' tie is frayed, the battery commander says to himself, "I don't care what you think of Jones, that boy is a real soldier." Upon return to barracks, the BC looks up Jones (he does not send for him) and says, "Jones, I think you looked fine. I wish I could have told the inspector that you are one of the best soldiers in the battery; but you know I couldn't do that. Anyway, forget it."

This particular battery commander is now qualified for staff duty. He cannot write an order that will irritate troops. The only additional troop duty he will need will be at least one year in command of larger units in turn to acquaint him with the successive problems of commands of all echelons.

To Instruct or To Inspect?

The traditional system of conducting formal inspections might well be given careful consideration and review during this period of reorganization and reconstitution of the Army.

The formal inspection has long been a bugbear to the battery commander who has a multitude of duties demanding both the attention of his men and himself—duties which

are much more important to the professional efficiency and morale of his command.

So much emphasis in the past was placed on this formation that its importance, in the eyes of the men, erroneously overshadowed the other phases of their training.

It is not the intent of the writer that we should ignore deficiencies in the care and maintenance of personal clothing and equipment but only that this subject be taught intelligently, and that inspections be conducted accordingly.

A formal Saturday morning inspection utilizes time which quite often might be devoted to training. (Friday afternoons are usually devoted to preparation for this inspection.)

The real discrepancies are usually not noted. The rifles of the men on pass, kitchen police, or in the hospital remain in the supply room or in the rifle racks, yet these are the rifles that need attention. The inspector learns whether or not each man has a dress uniform but he does not learn whether or not each man has suitable and sufficient clothing for field duty.

Commanding officers are meant to be leaders and instructors but under past practices they became inspectors, with a consequent loss to the service of their experience and a lowering of the morale of their men. Senior commanding officers can accomplish more for the welfare of their command by making informal visits to the areas of subordinate commanders and making recommendations in the form of friendly advice for the correction of observed irregularities and deficiencies. The C.O. must be the Old Man, with all the connotations this term implies.

Inspections should be conducted in a battery, including the battery commander's inspections, not more often than once a month. In brigades, groups and battalions, inspections should be conducted by the executive officers rather than by the commanding officers.

The writer has observed battery and battalion commanders making every known effort to reduce venereal rates of their batteries or battalions but with little success. Never has he known of a senior commanding officer making any helpful suggestions or offering advice. In most cases he would inform the battalion commander that the venereal rate was an indication of the discipline of a unit, and he would generally require the battalion commander to report by indorsement why he had such a high rate.

The writer would recommend the following procedure for the commanding officer senior to the battalion commander when he discovers a particularly high venereal rate in the battalion.

The senior visits the battalion commander and states to him in substance, "When I had command of a battery I was confronted with the same problem. I went practically out of my mind trying all means and methods at my command. Finally I assembled the NCOs and told them I was at the end of my rope, that I needed their help and I asked for their suggestions and support. No immediate response was forthcoming but when the meeting ended, I knew they were on my side. That night I assembled the entire battery, including the NCOs, and told them substantially what I had told the NCOs, and again asked for assistance. I received it. Shortly thereafter I was informed that one of the sergeants was in league with a house of ill repute in the neighborhood and had been taking men to it in his car. Since

that day, in time of trouble I appealed to my men. I know your problem is causing you great concern but if you can persuade your battery commanders to take their problem to their men, I believe you can lick it."

Unit Histories

The following unit histories have been received at the Journal office:

- 32d AAA Brigade
- 52d AAA Brigade
- 29th AAA Group
- 45th AAA Group
- 54th AAA Training Battalion (*)
- 387th AAA AW Battalion (SP)
- 486th AAA AW Battalion (SP)
- 555th AA AW Battalion
- 601st AAA Gun Battalion (*)

(*) Copies may be obtained through the Editor, COAST ARTILLERY JOURNAL.

Other units that have published histories or contemplate doing so, are urged to send copies to the JOURNAL for our permanent file which will be used as a readily accessible source of CAC history.

In the last issue we erroneously reported the receipt of a unit history of the 75th CA Battalion. This should have been the 75th CA AA Regiment.

To Former Members of 14th AA Command and Task Force 45

The COAST ARTILLERY JOURNAL is preparing histories of the 14th AA Command and Task Force 45 for publication in book form. It is hoped that the price of these books can be set at \$3.00 per copy; this figure is contingent upon the number of copies that can be sold.

Former members of these two outstanding commands are requested to send their names and addresses to the Coast Artillery Journal, 631 Pennsylvania Avenue, N.W., Washington 4, D. C. This listing will entail no obligation; it will merely place your name on a mailing list to receive descriptive material about the books, including the date of publication and the price when finally set.

ROTC

Since publication of the March-April issue of the JOURNAL, the ROTC program has been approved with certain changes. Coast Artillery Corps Officers detailed for ROTC duty will now attend a 28-day indoctrination course at Fort Bliss, instead of a 10-day course at Fort Belvoir and a 21-day course at Fort Bliss as was previously contemplated. The first course began 20 May while others will be held on 24 June and 29 July.

During the interim period and prior to the permanent postwar period, about five hours of the CAC ROTC curriculum will be devoted to Seacoast Artillery; the balance of

the time will be devoted to Antiaircraft and branch immaterial subjects.

Lieutenant General Lutes Writes USMA Cadets

The following extract is taken from a letter written by Lieutenant General LeRoy Lutes to graduating cadets of the United States Military Academy who are to be commissioned in the Coast Artillery Corps.

"It has been proposed by the War Department that the Coast Artillery Corps and Field Artillery be merged into one Artillery arm. This can be accomplished as a temporary measure during a period of declared national emergency by an Executive Order of the President but must be confirmed by an Act of Congress to become permanent. It is anticipated that some action may be expected on this proposal in the near future. This merger should be welcomed by all members of both arms, since it will not eliminate either arm but will assure better understanding and closer relationship between all artillerymen in the research, development and employment of similar weapons.

"Regardless of the outcome of the above proposals, tentative plans call for an expansion of the Coast Artillery Corps in the National Guard and Organized Reserve Corps, to include 72,236 antiaircraft artillerymen and 14,134 seacoast artillerymen in the National Guard; 10,771 antiaircraft artillerymen and 5,662 seacoast artillerymen in the Organized Reserve Corps. Plans for the ROTC have not been



Another rocket weapon of the war. The rockets fired by this gun carry into the air long wires supported by parachutes which hold them suspended. It was one of the British merchant Navy's surprise weapons in the early stages of the war.

completed but it is believed that additional AAA units will be activated at universities and colleges." The remainder of the General's letter is similar in gist to an article on the future of AAA which appears in this issue of the JOURNAL.

Extended Active Duty

The War Department has announced that active duty is now available for qualified officers within the quotas designated to fill existing vacancies.

The Deputy Chief of Staff, Commanding Generals of the Army Air Forces, Army Ground Forces and Army Service Forces have been delegated the power to decide whether or not a National Guard or Reserve officer will be granted active duty in their commands.

Officers volunteering for duty must meet certain requirements such as the following before being selected: All officers selected must agree to serve in a category I or volunteer status and must have an efficiency index of 40 or better for all active service subsequent to 16 September 1940.

Applications should be addressed to The Adjutant General where eligibility will be determined. This policy is to remain in effect until the Army attains permanent postwar status. It is applicable to National Guard and Reserve officers who are on terminal leave or have been relieved from active duty.

The O.R.C. and N.G. in Postwar Defenses

Coast Artillery Journal

Gentlemen:

I understand that the War Department is now studying the reorganization of the National Guard and the Organized Reserve Corps.

I wonder if the powers that be are considering Anti-aircraft Artillery in relation to its true importance to our future security, particularly in view of the development trends in rocket and guided missile warfare.

In my opinion each major industrial and coastal city must be adequately provided with AA defenses; be they guns, guided missiles or rockets.

The Regular Army cannot hope to provide this protection effective M-Day or even soon thereafter, and in the future there will be no opportunity to spar for time. The knockout punch will be delivered in the first or second round. The trained and prepared will survive, the untrained and unprepared perish.

The answer lies in the organization of strong National Guard and Organized Reserve Corps units.

In the past the Organized Reserve Corps has existed only on paper with but a small percentage attending the annual summer camps. Here, time and space were factors which precluded the attendance of many officers.

However, if units are organized in the vicinity of their homes, and equipment immediately available for instruction, there is little doubt that a great percentage of men in the National Guard and officers' reserves will be more than willing

to devote two or three hours a week to training. Particularly when they know and feel they have an important job to perform in the national defense system both active and passive.

The responsibility for the passive defense of large communities and industrial centers is every bit as important as the manning of the weapon defenses. None are closer to this problem and know more about the various implications than the men who will be affiliated with the National Guard or Organized Reserve Corps in those areas.

Passive defense encompasses a magnitude of undertakings, and the efficiency with which it can function if the civilian populace is organized, was well illustrated during the blitz period in England. Some of the more important activities are: camouflage and camouflage discipline; alarms and alarm systems; damage control including fire extinguishing and repairation of utilities; defense against chemical attack, gas proofing and gas detection; dispersal of industries and population; bomb disposal; counter-subversive measures; plans and preparation for the destruction of vital equipment and machinery in the event of imminent capture. All of the above must be organized without the aid of active Regular Army participation. Because of their military training and experience combined with the knowledge of their community's utilities there can be no other logical selection for this assignment but the local National Guard and Organized Reserve Corps units.

The National Guard also must be issued complete modern equipment and though only state-wide in organization must have strong War Department and national support.

Initially it might be necessary for the National Guard units to cooperate with the Organized Reserve Corps in the use of armories, etc., but this should present no great difficulty when the over-all mission is kept in mind.

If the War Department will provide the means for such a plan, rest assured the National Guard and Organized Reserve Corps will execute it.

LIEUTENANT COLONEL,
CA-Reserve.



U. S. Navy Photo
Naval AA gun crews test winter clothing in the North Atlantic. The Army likewise is experimenting with clothing and equipment in subzero weather.

Future Articles on Guided Missiles

The following foremost authorities in the field of guided missiles have consented to contribute articles on this new development for future issues of the JOURNAL: Major General Leslie R. Groves has promised an article on atomic energy. Dr. R. W. Porter of the Aeronautical and Marine Engineering Division of the General Electric Company has chosen for his subject, "The Propulsion of Guided Missiles." "The Launching Problems of Guided Missiles" will be discussed by Doctors R. E. Gibson and A. Kossiakoff of the Applied Physics Laboratory, Johns Hopkins University. Mr. G. E. White of the Sperry Gyroscope Company has elected the "Stabilization of Guided Missiles" as his topic. "The Methods of Observation of Guided Missiles in Flight" will be covered by Dr. Lewis A. Delsasso of the Ballistic Research Laboratories, Aberdeen Proving Ground. Dr. Theodore von Karman of the Guggenheim Aeronautics Laboratory, California Institute of Technology will feature "Aerodynamics" in his treatise. Mr. Julian M. West of the Bell Telephone Laboratories has selected "Fire Control Problems for Guided Missiles" as his topic.

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Crossed Cannons In the Closet

Coast Artillery Journal

Gentlemen:

The crossed cannons which we wore so proudly for more than three years have (temporarily, at least) retired to the family closet. Along with us, our insignie will probably remain on inactive status until more definite orders arrive concerning our future duties as members of the Officers' Reserve Corps. Although the separation centers have already become just shadowy recollections of the past, those "brass skeletons" in the closet will always be there to remind us of an association with a cross section of this nation's finest fighting men.

Our memories of that association will never be dimmed by the passing parade of years. The cocky sergeants who were chiefs of gun sections; the young lieutenants who organized and trained the gun crews, the dour, sage-looking colonels who inspected and inspected and then inspected some more—these were just a handful of the types of soldiers who formed the Coast Artillery Corps. Their names?—Just good American names, which means names ending with *Owski* and names beginning with *O'*, names easy to pronounce and names impossible to pronounce, names which smacked of Wales and names first heard in Naples, the names which are on the pages of every telephone book in the Ex-Zone of the Interior. But the names won't be remembered; neither will the places from which those names came. Only their deeds will remain—the deeds which give Guadalcanal, Normandy, Anzio, the Bulge, Buzz-bombs, and the Rhine a special and glorious meaning to Coast Artillerymen.

World War II was splattered over a huge canvas. A single reporter was unable to see more than a speck of the whole picture. Men fought and died unaware of events taking place less than a mile away—men fought and lived unaware of battles in the same war being waged on the other side of the earth. So it is easy to understand why members of one

Coast Artillery unit often knew little or nothing about those men who were their comrades-in-ARM. Yet, as the war years piled on top of each other and as the legends of the coast artillery rôle throughout the world grew mightier and mightier, men of the corps began to feel a pride and brotherhood that girdled the globe. Standing in bold relief in our memories of the past is that transformation from scattered, separate organizations into a magnificent team of artillerymen which provided one of the heaviest punches in the United States military line-up.

We have written this letter because we're on the other side of the fence now, and we thought you might like to know how we feel about the old outfit. We've tried not to beat around the bush—the truth is that we have left a way of life which had become more than pleasantly familiar. To those of us who are members of the Organized Reserve, the "feel" of still being a small part of the Coast Artillery is tremendously important. We want you to know that we have infinite faith in your ability to keep the CAC an outstanding team in the United States Army—we stand ready to help you in that task whenever you call upon us. Our pride in the Coast Artillery is matched only by our pride in our country. Good luck to each one of you—keep 'em shooting straight!

MAJOR,
CA-Res.

We Regulars have received numerous criticisms from civilian soldiers, many of which are warranted and desirable, but such an expression as this brings joy to our hearts and helps to reinforce our slightly shaken pride. We know that the writer of this letter and thousands of others carried on and brought credit to the CAC in spite of the handicaps and obstacles that were strewn in their paths, especially during training days. The bitterness that taints the memories of some of our cohorts in arms has been magnified out of proportion. All was not smooth, but the faults and the glories can be attributed to all who served.—Ed.

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Staying Home Tonight?

Many of us cultivated the reading habit during the course of the war and in response to this newly acquired or further developed trait, as the case may be, publishers have outdone themselves to supply a greater variety of magazines and books to the public.

In this issue of the JOURNAL are listed some of the best sellers as an aid to the selection of reading material for those "at home" hours.

These and a great variety of other books and magazines may be obtained through the JOURNAL and to members of the Coast Artillery Association, liberal discounts are granted on all but government publications regardless of whether transactions are cash or charge.

Instead of paying dividends on the purchase of books as in the past, the JOURNAL now offers Association members a 15% discount on orders amounting to \$2.00 or more. However, all outstanding coupons will be honored in making future purchases but don't delay—increase your library now. All orders are given immediate attention.

AAF Invests In Ordnance V-2 Tests

Army Air Forces, vitally interested in the guided missile program, is investing heavily in the firing of captured German V-2 guided missiles at White Sands, New Mexico, under the direction of the Army Ordnance Department.

Cooperating with the Army Ordnance Department, Signal Corps, Ground Forces and Navy, the Air Forces is furnishing approximately 450 men, including scientists and technicians, and large amounts of matériel.

Under the direction of the Air Matériel Command, the AAF participation has included arranging contracts with the University of Michigan and the Watson Laboratories for furnishing scientist and radar tracking equipment. Personnel and equipment from the AMC's Electronics Division, Equipment Laboratory, Personal Equipment Laboratory and Pilotless Aircraft Branch will take part in the tests.

Radar sets to be used at numerous range stations in the vicinity of the tests are being furnished by the AAF in cooperation with the various services involved in tracking the V-2 missiles.

Alamogordo Army Air Base, a former bombardier training school located 40 miles north of White Sands, has been activated so its facilities may be used by the numerous AAF personnel taking part in the tracing and detection of the V-2s.

Airplanes will fly from this air base prior to each V-2 firing and while in flight they will be used by Army Air Force personnel for adjusting and calibrating radar tracking

Information obtained from the V-2 firings will be used to advantage in conducting the various guided missile firings by the Army Air Forces at Wendover, Utah.

Special NCO Course

Headquarters Army Ground Forces has directed the Anti-Aircraft School to establish an eight-week Special Noncommissioned Officers' Course.

Forty hours will be devoted to matters pertaining to civilian components to include the mission, organization, regulations and policies of the National Guard, Organized Reserve Corps, and Reserve Officers' Training Corps.

Excess noncommissioned officers on duty with Army Ground Forces units and those on duty or who will be ordered to duty with the civilian components will attend.

The NCO National Guard Instructors' Courses scheduled to start 3 June-17 June are suspended and personnel will attend the special eight-week course instead.

The course will start on 17 June with an enrollment of 100 students.

Activation of AAA Units

Headquarters Army Ground Forces has issued instructions to activate Hq and Hq Battery 267th AAA Group and the 322d AAA AW Battalion (SP) at Fort Bliss.

These units will be assigned to the Replacement and School Command. They are General Reserve Units and it is intended that they shall serve within the continental

Coast Artillery Journal

Gentlemen:

In reading the March-April 1946 issue of the COAST ARTILLERY JOURNAL I was pleased to note a great improvement. Past JOURNALS have contained much material which was of little interest to AAA officers like myself.

I believe you have made a step in the right direction by publishing in addition to technical articles, articles as "Jap Prisoner of War Diet Adequate?" and "What You Need When You Need It." Articles such as these will appeal to enlisted men as well as officers. After all, our enlisted personnel should keep up to date on trends not only in AAA but in the rest of the arms and services. By publishing articles which the average enlisted man finds interesting you will also promote reading of technical articles which he would not otherwise read.

When overseas I let my subscription to the JOURNAL lapse because many copies contained dull and uninteresting material. Having seen the forward strides recently taken and the new vigor of the magazine I am enclosing three dollars for a year's subscription. If possible I would like it to start with the March-April 1946 issue.

Wishing you continued success with the JOURNAL I remain

Very truly yours,

PAUL A. ANSON,
Major, CAC.

Even though we are all black and blue from the effects of other letters we still have strength enough to print letters such as the above. The fact that we are bloody but unbowed is due to the ever so occasional encouragement like this. Now we have strength to bear the wounds of further assaults, so bang away.—Ed.

Ship Losses*

The war against Japan cost the Army a total of 200,058 ship tons of cargo lost at sea—the equivalent of twenty full loaded Liberty ships—in thirty-one vessels sunk and two vessels damaged while en route from the United States to the Pacific, Alaska, and India theaters.

Army cargo shipped to these areas in the forty-four months of the war totalled 43,520,000 ship tons. Those supplies lost at sea, therefore, represented only 0.46 per cent of the total amount shipped. This means that for each 10,000 ship tons of cargo sent from the United States to the Pacific, forty-six were lost at sea.

When losses in the Pacific are added to the previously announced 537,656 ship tons of cargo lost on outbound moves from the United States to the European, Mediterranean, Middle East, North and South Atlantic, and Latin American areas, a total war loss of outbound Army cargo at sea of 737,714 ship tons is obtained.

Since the total Army cargo exports from December 1941 through July 1945 amount to 119,169,000 ship tons, the percentage loss for shipments to all overseas theaters is 0.62, or a loss rate of sixty-two out of each 10,000 ship tons exported.

SEACOAST SERVICE



TEST SECTION

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

Items pertaining to Antiaircraft Artillery should be sent to the Antiaircraft Test Section, Army Ground Forces Board No. 1, Fort Bliss, Texas.

COLONEL R. E. DINGEMAN, Director

LT. COL. JAMES T. BARBER

LT. COL. WILLIAM R. MURRIN

LT. COL. GEORGE B. WEBSTER, JR.

LT. COL. FREDERICK N. WALKER, JR.

MAJOR DALE W. OLSEN

MAJOR JOHN C. LINDERMAN

CAPTAIN C. W. ZIEGLER, O.D.

The next issue of the JOURNAL will find the Seacoast Service Test Section in its new home at San Francisco. Scheduled to depart from Fort Monroe about 1 June, it is expected that the Seacoast Service Test Section will be in operation again by 31 July. Tentative plans are to locate the Seacoast Service Test Section at Fort Baker, occupying the old dispensary building.

Seacoast artillery firing by offset methods. A project involving seacoast artillery firing by offset methods is under study by this Section. Some advantages to be gained through offset firing are greater target speeds, greater target maneuverability, better radar return, and greater availability of targets since several types of naval vessels, Air Corps crash boats, or other high speed craft could be used. Any system of firing to be satisfactory should have the following characteristics: mathematically accurate; reasonably realistic as seen by observers and battery personnel; provide for accurate spotting and adjustment of fire; provide safety equal to that obtained with towed targets; and provide for accurate analysis of practice. Should any reader arrive at a satisfactory plan for offset firing for either radar or visual means of position finding and spotting, it is requested that an outline of the plan together with comments be forwarded to this Section.

Dry cell illumination of sighting equipment for 155mm gun carriage. Three-volt dry cell lighting equipment for illuminating the cross level vials on the Telescope Mount M43, the scales and reticle of the Panoramic Telescope M8, and the scales of the Elevation Quadrant M1 have recently been tested. Included in the tests was an adapter for mounting the Panoramic Telescope M12 in the Telescope Mount M43. The lighting equipment was adaptable for use with the M12 telescope. The equipment as tested was satisfactory and standardization was recommended. This illuminating equipment is powered from two BA-30 batteries which replace the Edison battery. The only requirement to change from the present 6-volt to the 3-volt system is the addition of the dry cell batteries and the change of the 6-volt lamps

The adapter for mounting the M12 panoramic telescope was also recommended for standardization. Such an adapter has been needed by 155mm batteries for use with the M12 telescope in landward fire missions.

Shields for 16-inch Barbette Carriages M4 and M5. The tests of the shields for the 16-inch Barbette Carriages M4 and M5 have been completed recently. The shields do not provide adequate protection for either the matériel or personnel within the gun emplacement. Four areas which comprise several hundred square feet are not provided with protection. These areas are, namely, the spaces on each side between the shield and casemate, the two sight ports, the area above the shield, and the gun aperture. It was recommended that all above areas, with the exception of the gun aperture, be provided with protective shields which were to be bulletproof and splinterproof. Previous action had been taken to build pilot models of closure plates for the areas on each side of the shield and to build a pilot model of the shutters for the sight ports. The entire program for providing additional protection has been deferred pending clarification of the major caliber armament program.

Seasonal tests of equipment, Winter 1946-47. Under tentative plan recently set forth by Headquarters Army Ground Forces, various items of Ground Force equipment and matériel will be tested under arctic, cold-wet, and heavy winter conditions during the winter of 1946-47. As currently planned, the Seacoast Artillery Detachment will be complete 155mm battery, equipped with Radar Set AN/MPG-1, as shown in T/O & E 4-157, which consists of seven officers and 183 enlisted men. An officer from this Section as well as radar and computer specialists will be assigned to the Detachment Commander's Staff and will assist in the tests.

The test site for the Seacoast Detachment has been tentatively decided on as Adak, in the Aleutian chain of islands. This will also be the test site for all other items to be tested under cold-wet conditions. The tests will be of approximately six months duration, lasting from October through

Specific items of seacoast matériel to be tested will include the M8N data computer, Radar Set AN/MPG-1, Data Transmission System T21, 155mm Gun M2, with carriage M1, M10 target, and Azimuth Instrument M2A1. **Hydraulic boom control.** A hydraulic boom control has been installed on the USAMP MAYBACH for service test. Two hydraulic motor-driven cable drums are mounted on a shelf on the forward end of the deck house about ten feet above the main deck. The operator's controls are suspended from this shelf. The matériel is safeguarded against excessive stresses by relief valves. The boom control operates the hoists and swings the boom thus performing the operation previously done by using the two capstans located at the foot of the main mast. The personnel required to operate the boom is reduced from six to four. Faster and safer handling of heavy loads under severe sea conditions is assured. The Seacoast Service Test Section recommended that this boom control be installed on all M1 class mine planters.

Submarine Mine Cables T5E5 and T5E6. The T5E5 cable is the Cable, Single-conductor, Submarine, M4, modified by substituting synthetic rubber for the natural rubber insulation. The T5E6 cable is a single-conductor, synthetic rubber-insulated, steel wire-armored, submarine mine cable. It has a smaller diameter and is lighter in weight than the T5E5 cable and is designed for ease of handling and for the prevention of kinks during handling.

These cables were tested in the Harbor Defenses of Boston, Delaware, San Francisco, and Cristobal. Based on reports from these harbor defenses, the Seacoast Service Test Section recommended that the T5E6 cable be standardized for shore and mine cable in advanced base mining; a cable, similar to the T5E6 but having a synthetic jacket, be used as shore cable in permanent harbor defenses; the M3, Type I, cable be used for mine cables in permanent harbor defenses.

Distribution Box Release Buoy M1E1. This release and buoy were developed to overcome the shortcomings of the Buoy Release M1. These defects included the usual crushing of the buoy when mine number seven was fired, the frequent failure of the complicated release mechanism, and the use of a Navy primer. The new release uses a rupturing link to couple the buoy to the distribution box. This link is rup-

tured by a standard blasting cap thus releasing the buoy. The buoy has been enlarged and strengthened. There were no failures of this new release and buoy during their service test. Action has been taken to standardize this release and buoy and to classify the M1 buoy release as limited standard.

Seacoast Target Towing Kit T24. The Towing Kit T24 was developed for the Radio Controlled Target (JR) Boat when towing the M17 (AW-AMTB) target and the T12 (high speed radar) target. It consists of a hand-operated winch, 1800 feet of 1/8-inch preformed aircraft cable, a cable grip, and skuff bars. The winch is mounted just forward of the aft lifting ring. The cable grip is fastened to the aft lifting ring and rides on the forward skuff bar. The second skuff bar is mounted across the stern of the boat to prevent the towing cable from damaging the stern. The swivel on the tow cable is fastened to the target's bridle and the cable is payed out using a hand brake to control the winch. When sufficient cable is out, the cable is inserted in the jaws of the cable grip thus taking the load off the winch while towing, the last 100 feet of cable remaining on the winch is painted orange as a warning. The cable is recovered by removing the cable from the grip then reeling in with the winch hand crank. A level wind mechanism assures proper lay of the cable on the drum. The Seacoast Service Test Section has recommended the standardization of Towing Kit T24 and recommended that its basis of issue be one kit per JR boat.

It is desired to point out that the majority of subjects handled by the Seacoast Service Test Section are classified and that information pertaining to them cannot be published in the JOURNAL.

The following tabulation shows the number of projects and subjects which were handled by the Seacoast Service Test Section during March and April:

Number on hand 1 March	31
Received during March and April	65
	—
Total	96
Completed during March and April	79
	—
Number on hand 1 May	17



Changes of Address

Since the last issue of the JOURNAL was mailed out, 200 copies were returned because addresses were not up to date.

We make every effort to get the JOURNAL to you—but you must cooperate.

LET US HAVE YOUR LATEST ADDRESS!

AA Service Test Section Notes

By Major A. R. Badger, Coast Artillery Corps

The activities of the Antiaircraft Artillery Board have been missing from the COAST ARTILLERY JOURNAL for the past four years due to classified nature and tremendous volume of work performed during the active war years. Many changes have occurred to both personnel and organization during this interval.

In the autumn of 1944 the Antiaircraft Artillery Board was moved from Camp Davis, North Carolina to Fort Bliss, Texas, occupying buildings adjacent to the Antiaircraft Artillery School, but remained directly under Headquarters, Antiaircraft Command. On 1 October 1945, the Antiaircraft Artillery Board was discontinued and its function was assumed by the Antiaircraft Service Test Section of Army Ground Forces Board No. 1. This entailed no change of station, personnel, or property, but added Guided Missiles to the sphere of activity.

Army Ground Forces Board No. 1 is located at Fort Bragg, North Carolina under the guidance of Brigadier General Guy O. Kurtz and acts as the control and administrative headquarters for the several test sections assigned to it. These Service Test Sections are: Airborne, Field Artillery, Communications and Electronics, Maintenance and Supply at Fort Bragg, North Carolina; Air Support at Orlando, Florida; Seacoast at Fort Winfield Scott, California; Antiaircraft at Fort Bliss, Texas. Colonel Parry W. Lewis, CAC, is the Antiaircraft Artillery Control Officer and Colonel Peter S. Peca, CAC, is the Guided Missile Control Officer on Board No. 1.

There are two other Army Ground Forces Boards. Board No. 2 at Fort Knox, Kentucky has the following Service Test Sections: Automotive, Engineering, Weapons and Fire Control, Maintenance and Supply at Fort Knox, Kentucky; Amphibious at Fort Ord, California; Animal Equipment at Fort Riley, Kansas. Board No. 3 at Fort Benning, Georgia superseded the Infantry Board and covers all man-carried weapons with accessory fire control equipment, individual clothing and equipment, Ground Quartermaster equipment, Ground Chemical Warfare equipment and allied maintenance equipment.

All projects are assigned by the Development Section of Headquarters, Army Ground Forces to the appropriate Army Ground Forces Board No. 1, 2, or 3, which in turn assigns the project to one or more of the various Service Test Sections under its control. Anyone, military or civilian, may submit recommendations for the initiation of projects to Headquarters, Army Ground Forces. All requests with reference to development, improvement or testing of equipment should be addressed to the above Headquarters.

With the rapid demobilization of the Army, the Antiaircraft Service Test Section has had a complete turnover of officer and enlisted personnel during the past year. However, the high standards of service-testing matériel established by the Antiaircraft Artillery Board have been preserved by the foresight of the Director, Colonel Milo G. Cary, CAC, who caused the compilation of monographs to include the detailed test procedures employed and a brief

history of the development and tests of each major item Antiaircraft Artillery equipment. These monographs are inestimable value in training newly assigned test officers the test facilities include many specialized items, some which have been designed especially for the recording data and solution of problems peculiar to Antiaircraft Artillery equipment.

The present internal organization of the Antiaircraft Service Test Section, with names of Section Chiefs, is follows:

- Director—Colonel Milo G. Cary
 - Executive—Lt. Colonel William H. Hubbard
 - Secretary—Major Anderson R. Badger
 - Gun Section—Lt. Colonel F. M. McGoldrick
 - Automatic Weapons Section—Lt. Colonel John J. Lane
 - Radar and Communications Section—Major W. E. Heinemann (Acting)
 - Guided Missiles Section—Major W. E. Heinemann
 - Instrumentation and Analysis Section—Major H. E. Osthus
 - Ordnance Department Representative—Lt. Colonel W. Shumate
 - Radio Controlled Target Section—Captain A. R. McC
 - Enlisted Detachment—Captain T. R. Wiley
 - Supply Officer—1st Lieutenant T. E. Patrick
 - Motor Transportation Officer—1st Lieutenant E. W. DeMerritt
 - Administrative Section—CWO J. R. Delorey
 - Signal Corps Representative—vacant
 - Barrage Balloon Section—vacant
 - Machine and Carpenter Shop—vacant.
- Present authorization is for 36 officers, 4 warrant officers, 200 enlisted men and 18 civilians.

During the war the number of projects before the Antiaircraft Artillery Board often ran as high as 100 or more. This has been gradually decreased to the 29 now before the Antiaircraft Service Test Section.

The unclassified projects completed recently are:

1. *Projectile Knock-out Tool for 120-mm Gun M1.* At the request of the Chief of Ordnance, a Head, Rammer listed in ORD 7 SNL D-32, 120-mm M1 matériel OSP E, dated 28 July 1944, was service tested to determine the feasibility of its use as a projectile knock-out tool in lieu of special unloading rammer. As a result of the tests, it was recommended that no production be undertaken of Unloading Rammers M10 or M10B1 and that the parenthetical expression "unloader rammer" be entered after the listing of Head, Rammer in the next revision of ORD SNL D-32.

2. *Dial Quadrant Elevation Modification Kit for Directors M9A1 and M9A2.* The standard directors M9A1 and M9A2 compute elevation in terms of breech quadrant elevation and the Firing Tables 90AA-B-3 present elevation in terms of dial elevation. The subject kit consists of the neo

resistors to alter the QE computing networks to cause the director to compute dial elevations. As a result of tests, it was recommended that the modification kit be standardized, that present Directors M9A1 and M9A2 be modified by incorporation of this kit as soon as possible, that all M9 type directors procured in the future be designed to compute dial elevation instead of breech quadrant elevation, that new log books be published for use with the modified directors, and that TM 9-671, Directors M9, M9A1, M9A2, and M10 be amended accordingly.

3. *Prediction Spot Modification of Directors M9.* It was proposed that arbitrary prediction spots be added to Antiaircraft gun directors which would increase prediction when evasive action by straight line acceleration was encountered. When an aircraft goes into a glide from straight flight, actual prediction lags correct prediction by time of flight at the start of the glide, plus settling time. It was proposed that this settling time lag be compensated for by use of "down" parallax spot, applied during the settling time. From the tests it was found that while it is theoretically possible to install and apply predetermined prediction spots with M9 type directors, it was not practicable since it is not possible

to predict what form or magnitude of evasive action a target may take. It was recommended that prediction spots not be used to counteract evasive action, that prediction spot modifications be removed from any directors so equipped, that parallax spots not be used during the settling period when an aircraft goes into a glide or dive from level flight, and that any training literature on the installation and use of prediction spots be rescinded.

4. *Firing Table Format for Antiaircraft Artillery Guns.* The increasing use of Antiaircraft Artillery gun units for terrestrial fire indicated a need for changes in ground firing tables which should be brought into agreement with Field Artillery gunnery methods. As a result of discussions, this organization was directed to make a study of existing firing tables and to set up a standard form of presentation of all future Antiaircraft Firing Tables. A proposed format of firing tables has been submitted which is now under consideration. It was also recommended that no consideration be given to the publication of separate antiaircraft and ground firing tables for Antiaircraft Artillery weapons, or to the publication of a single ground firing table for all weapons of the same caliber.



Standard Operating Procedure for Arranging Antiflak Artillery Fire on Medium Bomber Targets

Certain targets selected by Air Force Operations for attack by — Bombardment Division will be conditional upon the ability of ground forces to bring artillery fire to bear on flak positions at or en route to the target.

Such targets always will have originated as Army or Tactical Air Command requests and will have been forwarded by a Tactical Air Command to Air Force Operations with a request for attack by medium bombers.

If target or route flak is excessive, Air Force Operations will, before the target is accepted, receive assurance from the requesting TAC that the associated army is able and prepared to bring to bear effective antiflak fire. Probable effectiveness of such fire will have been corroborated by — Air Force Flak Section.

Coast Artillery News Letters



The Coast Artillery School

MAJOR GENERAL ROBERT T. FREDERICK, *Commandant*

PERSONNEL CHANGES

1 APRIL 1946-31 APRIL 1946

ARRIVALS

Lt. Col. Leslie M. Stewart	Operations Officer, 61st C. A.
Maj. John Christenson	Training Publications Officer, DTP, The Coast Artillery School
Maj. Charles F. Arnold	Instructor, DT, The Coast Artillery School
Capt. Steve L. Watts	Printing Officer, DTP, The Coast Artillery School

1st Lt. Stanley V. Sharris	AA Gun Unit Commander, 27th Comp, AAA Btry
1st Lt. Clark Edwards	AA Gun Unit Commander, 27th Comp, AAA Btry
CWO Frederick W. Robas	Assistant Supply Officer, The Coast Artillery School
WOJG Robert J. Dunn	Instructor DE (Surveying & Mapping) The Coast Artillery School
WOJG Frank R. Gore	Editorial Assistant, DTP, The Coast Artillery School

DEPARTURES

Lt. Col. Rowland K. Bennett	Separated from service
Maj. Winthrop M. Steele	Separated from service
Maj. Omar E. MacNutt	Separated from service
Capt. Alfred B. Cooper	Transferred to Army Inf. Scho Carlisle Barracks, Pa.
1st Lt. Alton L. Broadwater, Jr.	Separated from service
1st Lt. Richard W. Eddy	Separated from service
1st Lt. Roy Lutz, Jr.	Transferred to Overseas Repl. Depot, Camp Kilmer, N. J.
1st Lt. Walter A. Lohmann	Separated from service
1st Lt. John P. King	Transferred to HD of CB, Fort Monroe, Va.
1st Lt. William T. Romine	Separated from service
1st Lt. Thomas Le Ray	Separated from service
CWO George L. Newcomb	Transferred to HD of CB, Fort Monroe, Va.



Pennsylvania N.G. AAA Brigade

The Pennsylvania National Guard is to have a full brigade of Antiaircraft Artillery in its postwar organization. The National Guard Bureau has recently assigned the 51st AAA Brigade to Pennsylvania and Governor (former Major General) Edward Martin has named Brigadier General Charles C. Curtis to command. This is the only major element of the Pennsylvania Guard to be commanded by its wartime Commanding General. General Curtis took the 51st Brigade to the ETO in February 1944.

In the Pennsylvania National Guard, the Brigade will have attached two Groups; the 213th in Allentown and 218th in Pittsburgh. Four Gun Battalions, the 73d, 707th, 708th and 709th; two Searchlight Battalions, the 337th and 724th; two semi-mobile Automatic Weapons Battalions, the 416th and 899th, three Self-Propelled Battalions, the 688th, 689th and 690th and two AA maintenance ordnance companies complete the organization.

The 213th Group, 73d Gun, 899th AW and 337th S/L Battalions were made up from the old 213th Coast Artillery (AA), General Curtis' pre-Pearl Harbor command and

Pennsylvania's only antiaircraft unit in prewar days.

Units of the 51st Brigade will be stationed in Allentown, Bethlehem, Easton, Reading, Lancaster, Lebanon and Pottsville. These seven cities formerly were the home stations of the 213th. Philadelphia, Pittsburgh, Harrisburg, Hamburg, Tamaqua and Columbia are the homes of additional armories now assigned to the 51st. Brigade Headquarters will be in Allentown, as will be the historic old 213th Group. The 218th Group will be in Pittsburgh.

Many of the officers have been selected at this time and some preliminary work has been done in most places to secure the interest of experienced enlisted men, although recruiting will not actually begin until June.

General Curtis is hopeful that he may receive a message from as many of the wartime commanders of the attached units as possible. Such messages would be a fine gesture and help to preserve the tradition of the units. They may be addressed to the Armory in Allentown.

National Guard units will be recruited to 100% officers and 80% enlisted men as prescribed in current T/Os. When fully organized, the Pennsylvania 51st Brigade will have an aggregate strength of 6,854 officers and men. The Pennsylvania Guard will also include its old 28th Infantry Division, an air wing, a Field Artillery brigade, a large combat team and many service units.



FORT BLISS, TEXAS

COLONEL ROBERT H. VAN VOLKENBURGH
Acting Commandant

Growing emphasis is being placed upon problems of guided missiles at the Antiaircraft Artillery School.

The First Antiaircraft Artillery Guided Missile Battalion of the Antiaircraft Artillery School is the only unit of its kind in the army. The battalion is now working with the Army Ordnance Department at White Sands Proving Ground at Las Cruces, New Mexico, about forty miles north of Fort Bliss. Test firing of modified captured German V-2 guided missile rockets is being conducted jointly by ordnance and antiaircraft personnel. By close cooperation between the two branches it is planned to develop tactical units and doctrine simultaneously with the development of new weapons.

The Library of the Antiaircraft Artillery School has recently published a bibliography of its guided missile collection. The collection includes documents on both antiaircraft and aeronautical guided missiles from American, British, German and Japanese sources.

The Research and Analysis Department has been studying problems involved in the propulsion, control, and ballistics of antiaircraft guided missiles. A whole series of new ballistic problems are presented by missiles traveling at supersonic speeds at stratospheric altitudes through rarified air.

The School is proceeding with a comprehensive peacetime program despite the loss of many experienced and capable wartime officers and enlisted personnel through separation from the service.

School Troops under command of Colonel David B. South have recently been reorganized on an enlarged basis equivalent to a group or regiment in organization. The Gun Training Detachment and the Automatic Weapons Training Detachment are both the equivalent of battalions. Each has a headquarters and three lettered batteries. The Searchlight Training Detachment, the 165th AAA Operations Detachment and the Headquarters Detachment remain unchanged under the new plan.

A series of brief Orientation Courses for former American prisoners of war of general and field grade is being conducted currently. These courses cover the theory, tactics, and matériel of antiaircraft artillery as used in World War II.

Training of instructors for National Guard units and for

military science and tactics departments of colleges and universities will become an increasingly important part of the program within the next few months. It is anticipated that a number of the School's officers will be detailed to ROTC and National Guard instruction duties.

Plans are being formulated for comprehensive courses of study to replace the more brief wartime courses now being conducted here for both officers and enlisted men. It is contemplated that the new curriculum will go into effect in the fall of this year.

A series of exhibitions and demonstrations have been conducted by the School for the general public recently. A captured German V-2 rocket was displayed at Fort Bliss on Army Day, April 6. The School arranged an Army Day parade of 3,500 troops and 156 pieces of motorized equipment from local army installations through El Paso, Texas, which was witnessed by nearly 50,000 spectators. Exhibitions were also conducted at Fort Worth and San Antonio, Texas, and at Memphis, Tennessee.

First Sergeant Lawrence L. Sharp has received the Bronze Star Medal for service as chief of a gun section in the antiaircraft defense of a European seaport against German V-1 bombs early in 1945.

The following changes during the month of April 1946 occurred at the Antiaircraft Artillery School:

ARRIVALS

<i>Name</i>	<i>Duty</i>
Lt. Col. Raymond C. Cheal	Dept. of Material & Technique
Lt. Col. William F. Curren, Jr.	Dept. of Material & Technique
Lt. Col. Gerald M. Donahue	Dept. of Research & Analysis
Lt. Col. Carl Lentz	S-3 AAAS
Lt. Col. Ralph H. Pryor	Dept. of Research & Analysis
Lt. Col. C. Forrest Wilson	Division of Instruction
Maj. William Wipf	JAGD
Capt. Elwyn E. Leslie, Jr.	Dept. of Radar
1st Lt. Walter W. Long	Dept. of Flak Analysis
CWO Harry Engle	S-1 AAAS
CWO Doyle L. Woodward	Secretary AAAS

DEPARTURES

<i>Name</i>	<i>Destination</i>
Lt. Col. William A. Stricklen	284th AAA AW Bn Ft Bliss, Texas
Maj. Edward S. Mathes	Georgia Sch. of Technology, Atlanta, Ga.
Maj. Jack L. Oakey	School Troops, AAAS Ft. Bliss, Texas
Capt. Charles J. Bonney	School Troops, AAAS Ft Bliss, Texas
Capt. Harold D. Higgins	Utah State Agricultural College, Logan, Utah
Capt. Carl F. Modine	Hq. Replacement & School Command, Ft Bragg, N. C.
Capt. Steve L. Watts	Fort Monroe, Virginia
1st Lt. Walter E. Rahte	School Troops, AAAS Ft Bliss, Texas
1st Lt. Robert D. Willits	Hq. 2nd Armored Division Camp Hood, Texas

Headquarters, Panama Canal Department

It was a great day for Coast Artillery "old-timers" on a bright Canal Zone morning at Fort Amador recently. Among members of the largest shipment of enlisted men to arrive for duty in Panama since the war's end, regular army soldiers found many old buddies with whom they have served in Coast Artillery bases from New England to Hawaii; the Philippines to Panama.

During a morning inspection of antiaircraft weapons and radar equipment in the training center's gun park, Brigadier General F. P. Hardaway, Commanding General of the Coast Artillery Command, exchanged memoirs with Cpl. Edward Goodoff, who served under the General's command at Fort Shafter, Hawaii, from 1937 to 1939 and later in California when General Hardaway was commandant of Camp Callan.

Instructors of the Coast Artillery Training Center explained major points of interest concerning the equipment these men will be using when they receive their assignments as guardians of the Panama Canal. On the scene and distributing both verbal and printed information about Panama was Colonel E. M. Benitez, new commandant of the training center who is succeeding Lieut. Col. A. B. Juell, who has held that post for the past three years and will soon return to the United States.

The orientation session at the gun park followed an earlier formation where General Hardaway welcomed the troops to their new assignment and advised them to take full advantage of the educational and recreational opportunities of Panama during their off-duty time.

Many of these men are returning to Panama for duty following wartime service in combat areas. Others are men who re-enlisted and specifically chose the Caribbean Defense Command for their next tour of duty. A few are of the younger age groups, some drafted and others who have enlisted.

Following their arrival at Fort Amador, Saturday, April 27, the men began a week end of recreational activities in the traditional "welcoming" style of the Coast Artillery Command. The welcome was arranged by Lt. Nathan Johnson, commanding officer, and Samuel Sansweet, first sergeant of Headquarters Battery, CAC.

A band concert by the 15th Naval District Band under the direction of Chief Petty Officer Symington was followed Saturday afternoon by an orientation class on Panama in its history by Colonel Juell. Later they witnessed a softball game between the Headquarters Battery and the 903d AV Battalion at the Amador field.

The Red Cross, always willing to help the Amador men feel "at home" in the camp, distributed books and sports games. The post recreation hall was thrown open to the troops with its facilities for recreation and relaxation.

Free movies at the post theater followed by a U. S. Camp show spotlighted the evening's entertainment. Among other numbers, the new arrivals were introduced to Panama's national dance "El Tamborito" presented by a group of beautiful Panamanian girls.

Sunday, after services at the Amador chapel, there were two boat trips around Panama Bay and swimming at the Beach Club.

M/Sgt. Allen F. Lloyd is representative of those non-commissioned officers who held wartime commissions and have now returned to the ranks to "see the job through" with an Army career. He led colored antiaircraft troops through the New Hebrides campaign and the battle of Munda.

Another master sergeant, Charles G. White, was formerly a second lieutenant and trained infantrymen in the use of sound detectors and locators, the first of which were used in the war's closing scenes on Okinawa. He also instructed artillery troops in the use of searchlight equipment.

S/Sgt. Harold M. Lopp, former mechanized cavalryman, and S/Sgt. Harvey DuHadway, field artilleryman, are other representatives of the cross section of army personnel who have chosen service in Panama's Coast Artillery Command as their peacetime jobs.



Headquarters Harbor Defenses of New York Fort Hancock, New Jersey

COL. CHARLES D. Y. OSTROM, Harbor Defense Commander

The term "Harbor Defenses of New York" is a new one to many of us. Most of us think of the missing word "Eastern" or "Southern." Then when we see that the headquarters of the Harbor Defenses of New York are at Fort Hancock, New Jersey, we wonder what has happened on Sandy Hook. Some time back the three old well-known harbor defenses were merged into a single command at New

The Harbor Defenses of New York offer no exception to the rule that maintenance of matériel is of prime importance. Every suitable bit of storage space is in use. The old mule shed at Fort Wadsworth now provides excellent cover for searchlight units, each stall is just the right size for one piece of equipment. The use of old hangars is obvious, but old as they are, they provide good shelter where matériel can be concentrated. At Fort Tilden the battery commander, Captain Burrell S. Barnes, has developed an ingenious rack for the storage and display of his machine-gun ammunition boxes. Power units are stored in banks connected to common exhaust so several may be exercised at one time.

The present excess of first sergeants helps to make up for the lack of junior officers. As of the date of writing, there but one lieutenant assigned to these Defenses. Completing the release of the old-timers, the Defenses have rapidly

HQ 2273d AAAC

BRIGADIER GENERAL LEONARD L. DAVIS, *Commanding*

Although plagued with the ever-present personnel shortage the 2273d AAA Command is managing to hold its own. Colonel W. L. Johnson who was Executive Officer of the 2273d AAA Group left for the mainland 28 March 1946. He had been with the command since February 1945. Colonel F. T. Folk, Executive Officer of the 2273d AAAC (HAW), who has been with the command since January 1942 returned 21 March 1946 from a well earned 45 days DR&R on the mainland.

The 2273d AAAC (HAW) matériel display was much in evidence at the two-day Army Day exhibit at Ft. DeRussy. The Antiaircraft's OQ-3 plane competed with the Air Force's Helicopter as an attraction in the exhibit and was very popular, particularly with the younger generation. The most impressive exhibit was the complete 120mm gun section with the muzzle of the big gun reaching high in the sky. A trained gun crew demonstrated the equipment periodically with a precision drill. The 40mm gun and .50 machine guns of the Auto Wpns Battalion were popular exhibits, with crews to demonstrate each weapon. The interest of the "small fry" in the multiple Machine-Gun

Mount M55 indicated that there will be no shortage of personnel on that equipment some ten years from now. The 295th AAA Searchlight Battalion used 5 searchlights for an excellent night display. Their latest piece of equipment, the searchlight radar, AN/TPL-1, which superseded the old SCR 268, was displayed to the public at this exhibit for the first time.

A Command Inspection-Instruction Team has been inaugurated by the 2273d AAAC to assist the units in training and maintaining their equipment during this period of transition. The S-1, S-3, and S-4 sections together with the engineer, ordnance and signal services are represented on the team to aid in the care and maintenance of technical equipment. The Team is operating on a continuous cycle basis and is filling the gap caused by the rapid discharge of trained specialists from the groups, battalions and batteries. Attendant with this program, consolidations throughout the Command have been made where possible in offices, messes, gun parks and motor pools in order to utilize to the best advantage the remaining trained personnel.

With the inactivation of the 223d Field Artillery Group, the AAA gained 12 officers and 56 enlisted men. Schools are being conducted at group level to familiarize the Field Artillerymen with the new and complicated equipment used in the AAA.



260th CA (AA) Regiment, Washington, D.C.

The 260th Antiaircraft Artillery Regiment, District of Columbia National Guard is in the process of preliminary organization. Under the direction of Colonel Leroy S. Mann, Group Commander, a number of National Guard and Reserve officers are meeting each Thursday night in room 3117 of the Municipal Building, Washington, D. C. Information has been received that the designations of

the various units will be the 260th Antiaircraft Artillery Group, the 260th Antiaircraft Artillery Gun Battalion, the 340th Antiaircraft Artillery Searchlight Battalion, and the 380th Antiaircraft Artillery Automatic Weapons Battalion.

Officers slated for various positions in the new organization are Colonel Leroy S. Mann, Group Commander, Lt. Col. Carl Santilli, Group Executive Officer, Lt. Col. George V. Selwyn, Gun Battalion Commander, Lt. Col. Wilmer G. Kemper, Searchlight Battalion Commander, and Lt. Col. Charles Yech, Automatic Weapons Battalion Commander.



AATC San Marcelino, Zambales, P. I.

By 1st Lt. Benjamin T. Wright, FA

The Antiaircraft Artillery Training Center has been in operation at San Marcelino, Zambales, P. I. since July 1945. It was originally established at the direction of the Commanding General, 14th Antiaircraft Command, and remained under that headquarters until its deactivation 30 March 1946. After deactivation of the 14th Antiaircraft Command the Training Center was redesignated Antiaircraft Artillery Training Center, San Marcelino, Zambales, P. I. at the direction of the Commanding General, WESPAC, and has been under the administrative control of the 86th Division Area Command. The area occupied by the Training Center was one used before the war by the 31st Infantry Regiment Philippine Scouts.

The Training Center is at present commanded by Colonel John H. Kochevar, CAC, who is also Commanding Officer of the 70th Antiaircraft Artillery Group. The Group provides the personnel to operate the Training Center in addition to its normal function of administration over its attached units.

Schools in various aspects of Antiaircraft Training have been operated at the Training Center since December.

The Training Center has served as a staging area for units that were scheduled for deactivation, and has filled the call for replacements for other parts of the theater on several occasions.

Although the units in the Training Center are at present operating just above cadre strength the mission of the Training Center has been successfully accomplished. This training has been carried on with excellent results despite the fact that the large percentage of officer and enlisted personnel have been from branches other than Antiaircraft.

Expedient service to all and 15% discount to members of the Coast Artillery Association on orders of \$2.00 or more — cash or charge.

BEST

General

THE EGG AND I. By Betty MacDonald. In 1927 the author married a man who was fired with the idea of opening a chicken ranch in the Northwest. They moved to a ranch on the Olympic Peninsula, and with a great deal of humor she chronicles her complete disenchantment with chickens and farm life. There is much, too, in her story about her neighbors, the thrifty and critical Hickses and the carefree and borrowing Kettles. *Lippincott* \$2.75.

STARLING OF THE WHITE HOUSE. As told to Thomas Sugre by Colonel Edmund Starling. Colonel Starling was a member of the White House Secret Service Detail for thirty years, beginning during Woodrow Wilson's first term and remaining through Franklin D. Roosevelt's third. His narrative gives intimate portraits of our last five presidents and throws new light on our recent national history. *Simon and Schuster* \$3.00.

THE AUTOBIOGRAPHY OF WILLIAM ALLEN WHITE. A biography of a great American liberal editor and proprietor of the *Emporia Gazette*, which he developed into one of the most notable small newspapers of the United States; friend of presidents, statesmen and common Americans. His own story is also that of his land and people. *Macmillan* \$3.75.

TOP SECRET. By Ralph Ingersoll. A frank history of the history of the Continent, with no mercy for mistakes or obstructions. His reports on the campaigns on the blunder that lengthened war by weary months, on the mishaps and muddling is interesting. *Harcourt Brace* \$3.00.

THE ANATOMY OF PEACE. By Emery Reves. This is a journey into the realm of world politics with the future of world peace at stake. Albert Einstein has called it "The answer to the present political problem precipitated by the release of atomic energy." *Harcourt* \$2.00.

PEACE OF MIND. By Joshua Loth Liebman. Rabbi Liebman correlates the findings of psychoanalysis with the basic religious teachings in order to give man a clear understanding of himself and through that understanding, wisdom and peace. *Simon and Schuster* \$2.50.

ONE WORLD OR NONE. Edited by Dexter Masters and Way. A definite authoritative analysis of the atomic bomb by scientists connected with its development plus authorities in the field of military and political science. A vivid picture of the bomb threat to world survival. *Whittlesey Paper* \$1.00 *Cloth* \$2.00.

RIVER OF YEARS. By Joseph Fort Newton. Adventurings in highways and byways of the spirit and of the world, and uneclectic autobiographical by an ecclesiastic, who is now Rector of Episcopal Church of St. Luke and the Epiphany, Philadelphia. *Lippincott* \$3.00.

BURMA SURGEON RETURNS. By Gordon S. Seagrave, M.D. Further adventures of the Burma Surgeon and his little nurses on their exciting journey back from Burma to their home and hospital in Nankham. *Norton* \$3.00.

ON THE EDGE OF EVENING. By Cornelius Waygandt. The autobiography of the genial college professor and author of *The Blue Hills* and many other books. *Putnam* \$3.50.

MAN EATERS OF KUMAON. By Jim Corbett. Kipling's stories of man-eating tigers in India by a noted hunter whose name is a household word in the tiny Indian village of Kumaon where he has delivered the inhabitants from the terror and scourge of the man-eating tigers. *Oxford* \$2.00.

A SOLO IN TOM-TOMS. By Gene Fowler. A humorous autobiography in which other people are given chief attention: Al Baldwin, the high-wire walker; Jack Dempsey; the Barrymores; prostitutes and gamblers and celebrities. A picture of America from 1890 to 1938 and a personal narrative. *Viking* \$3.00.

DETROIT IS MY OWN HOME TOWN. By Malcolm Bingg. A racy informal picture of Detroit through sketches of its great figures, inside stories about titanic feuds, yarns about baseball players, and other interesting people and places. The author has known Detroit for many years as only a newspaper man could. *Bobbs-Merrill* \$3.75.

MY THREE YEARS WITH EISENHOWER. By Captain Harry C. Butcher. The personal diary of General Eisenhower's Navy Aide, old and close friend, who shared the General's quarters from the invasion of North Africa to the final surrender of Germany. Besides being an inside view of three years of war, it is also an excellent portrait of Eisenhower. *Simon and Schuster* \$5.00.

FARMER TAKES A WIFE. By John Gould. The author of *My Natal Care For Fathers* has collected a number of very New England stories of his ancestors and the queer characters of his Maine farming community. It is dry rather than uproarious humor (though there's some of that) and local color. *Morrow* \$2.00.

I CHOSE FREEDOM. By Victor Kravchenko. Kravchenko was born and grew up in the Russian revolutionary faith. He became a famous engineer and a trusted member of the Communist party. Then he suddenly quit his job and the party when he was part of the Soviet Purchasing Commission in the U.S.A. He relates the gradual disillusionment that led him to break with his whole previous life.

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WINGS OF TRIUMPH. By Erich Maria Remarque. Ravic is a human refugee doctor in Paris, just before the war, who must escape clandestinely and be ready for flight or deportation at any moment. He falls in love with Joan Madou, breaks with her because she becomes the mistress of an actor, and kills the Gestapo agent who had tortured him in Germany. With the outbreak of war he is off to a French concentration camp. The story is long, not too fast and full of philosophical conversations. Appleton-Century \$3.00.

THE KING'S GENERAL. By Daphne du Maurier. This is probably the best of the author's historical novels. After a rather movie-like prologue, it skips sixteen years and becomes a straight romantic adventure story of the English Civil War, with the spotlight on Sir Richard Grenville, arrogant General whom the Parliamentarians called "Skellum" and whom the bigwigs on his own side hated for his caustic tongue and his military brilliance. Crippled Honor Harcourt tells the story—set largely in a manor with a "ghost," a secret tunnel, etc. Doubleday Doran \$2.75.

DAVID THE KING. By Gladys Schmitt. This is a 650-page legendary story of David of the old testament. The author pictures a young David who, through his intrigues at the court of King Achish, won himself a crown; pictures his loves and hates and his gradual evolution from egoism to deep understanding and godliness. Dial \$3.00.

THE SNAKE PIT. By Mary Jane Ward. An autobiographical account of life in an asylum. She tells of wet packs, the tubs, of the sordidness and despair of institutional existence, of the gradual growth of hope. It takes place entirely in the asylum. Random House \$2.50.

WAKE OF THE RED WITCH. By Garland Roark. A romantic adventure story. It is a tale of the Dutch East Indies—of pearls and stolen treasure and merchants and adventurers and luscious beaches and killers. Little Brown, \$2.75.

THE FOXES OF HARROW. By Frank Yerby. Stephen Fox, a gentleman gambler, arrived in New Orleans penniless. By his good charm and his gambler's skill he ran up a fortune. Then he met the magnificent Harrow and married the belle of New Orleans. Duels, a quadroon mistress, a riverboat race and other spectacular details give color to this long chronicle running from 1825 to the end of the Civil War and the ruin of Harrow. Dial \$3.00.

THE BLACK ROSE. By Thomas B. Costain. A long, colorful, and well-done historical novel by the author of *Ride with Me*. This deals with the experiences of the thirteenth-century Walter of Meville, his friend Tristram Griffin, and the beautiful Marvane (the Black Rose) on the road to Cathay and back in feudal England. Doubleday Doran \$3.00.

WIDESHEAD REVISITED. By Evelyn Waugh. A long, substantial picture of English society between wars, and of a family constantly in conflict with its own spiritual urge. Charles Ryder tells of his friendship for young Sebastian Flyte, who became a deserter to escape his family; of his love for Lady Julia, Sebastian's sister, and her sacrifice of love to conscience. It is full of well-sophisticated people—wealthy, aristocratic, frustrated. Little Brown \$2.50.

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braggart and procurer is outstanding among its many colorful characters. Simon and Schuster \$2.75.

WASTELAND. By Jo Sinclair. A study of John Brown (born Jake Braunowitz), who hates his father and is ashamed of his family and his religion. Gradually his doctor and his sister Debby bring him to mental health, and give him understanding. A psychoanalytic tale with a fairy-tale ending. Harper \$2.50.

THE RIVER ROAD. By Frances Parkinson Keyes. An absorbing panoramic story of life on a great Louisiana sugar plantation Belle Heloise, in the turbulent years between the ending of World War I and the present, and of its owners, the proud and passionate d'Alvery family. A long, colorful novel filled with dramatic action, romance surprise, and suspense. Messner \$3.00.

BEFORE THE SUN GOES DOWN. By Elizabeth Metzger Howard. The story is a sort of super-Dr. Christian, "Our Town" tale, set in Willow Spring, Pa., in the 80's. Here Dr. Dan Field (who has loved Pris Sargent from afar all his life) does his best to bring the wealthy Sargents and Albrights in touch with the people of Mudtown. There is no plot—just the life of the town, the clash of prejudices, the hope in the younger generation. Doubleday Doran \$2.75.

CAPTAIN GRANT. By Shirley Seifert. The drama and romance in Ulysses S. Grant's younger and less known years are captured in an entertaining biographical novel which begins with his entrance at West Point and ends in the summer of 1861 when he took command of a regiment of Illinois Volunteers. Lippincott \$3.00.

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By Florence Marvyn Bauer. Bobbs-Merrill

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By Nancy Paschal. Nelson

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The Coast Artillery Journal

Volume 1, No. 1, 1951

COAST ARTILLERY ORDER

WD and AGF Special Orders covering the period 1 March through 30 April 1946. Promotions and demotions are not included.

COLONELS

Aasmus, Delbert, to retire.
Bates, James C., to University of New Hampshire, Durham, New Hampshire.
Berliner, Sylvan, to retire.
Blunda, Gaspare F., to GSC with troops.
Bowler, Louis J., to retire.
Bucher, Oliver B., to FTO.
Burnell, Nathaniel A., II, to G-1 Section, Hq. AGF.
Chipman, Albert D., to home to await retirement.
Cochran, Hugh McC., to retire.
Cooper, Avery J., Jr., to GSC with troops.
Cottrell, Joseph F., relieved from active duty.
Crane, Hal P., detailed in TC.
Crowell, Evans R., to HD of Los Angeles, Fort MacArthur, California.
Darrab, James T., to HD of Portland, Camp Langdon, New Hampshire.
Ericson, Richard A., to University of Minnesota, Minneapolis, Minnesota.
French, Paul A., to National Guard bureau.
Gough, A. Deane, to GSC with troops.
Grinder, Richard H., to Hampton Institute, Hampton, Virginia.
Harrington, John H., to Hq. Sixth Army, Los Angeles, California.
Hartman, Norman E., relieved from detail in GSC.
Hastings, Frank H., to School for Government of Occupied Areas, Carlisle Barracks, Pennsylvania.
Heidland, Ernest F., detailed in TC.
Hickey, Daniel W., Jr., to HD of San Francisco, Fort Winfield Scott, California.
Hincke, John I., to GSC with troops.
Hood, John H., to retire.
Hooper, Chauncey M., relieved from active duty.
Jackson, Harold R., to Massachusetts Institute of Technology, Cambridge, Massachusetts.
Jeffords, William Q., Jr., to AAORP, AARTC, Fort Bliss, Texas.
Jones, Clifford R., to Hq. 5th Service Command, Fort Hayes, Ohio.
Kauffman, Roy K., to Hq. 7th Service Command, Denver, Colorado.
Lindt, John H., to retire.
Merritt, Wilmer B., to OC of S, Washington, D. C.
Meyers, Harry F., to Hq. First Army, Richmond, Virginia.
Morrow, Samuel H., to AAORP, Fort Bliss, Texas.
O'Brien, Martin J., to retire.
Ostenberg, Frank T., to Hq. ASF, Washington, D. C.
Peirce, Christopher D., to retire.
Pendleton, Randolph T., to University of Delaware, Newark, Delaware.
Pride, Harold E., relieved from active duty.
Roth, Arthur, to Ground Development Section, Hq. AGF, Washington, D. C.
Rothgeb, Clarence E., relieved from detail in GSC.
Skene, Cedric M. S., to retire.
Sullivan, Andrew P., to GSC with troops.
Tasker, Harold P., to retire.
Timberlake, Edward W., to Utah State Agricultural College, Logan, Utah.
Waddell, James C., relieved from active duty.
Waterman, Bernard S., to GSC with troops.
Whittaker, LeRoy E., to retire.
Wildrick, Meade, to retire.

LIEUTENANT COLONELS

Agostinia, Gezman, relieved from active duty.
Baker, James L., to Alameda High School, Alameda, California.
Black, Edwin E., to AARP, Fort Bliss, Texas.
Burns, William H., relieved from active duty.
Buynoski, Adam S., to AA Section, AGF Board No. 1, Fort Bliss, Texas.

Cheal, Raymond C., relieved from detail in Infantry.
Conway, Walter C., to GSC with troops, USMA, West Point, New York.
Couch, Frank Van B., to Camp Kilmer ORD, New Jersey.
Cox, Andrew L., to Hq. ADC, Mitchell Field, New York.
Cozart, Clarence A., to Hq. ASF, Washington, D. C.
Culverwell, Joseph M., relieved from active duty.
Curtin, Richard D., to 1002d AAF Base Unit, Bowman Field, Kentucky.
DeRamus, Judson D., relieved from active duty.
Fritz, William G., to Camp Kilmer ORD, New Jersey.
Glassen, Chester E., to University of Maine, Orono, Maine.
Gardner, Harold A., relieved from active duty.
Kallis, Stephen A., to Ballermin High School, Tacoma, Washington.
Kallman, Maxwell M., to two-year course on guidance of guided missiles, Johns Hopkins University, Baltimore, Maryland.
Laml, Maurice B., relieved from detail in GSC.
Laney, James R., to OC of S, Washington, D. C.
Larner, Thomas M., to Massachusetts Institute of Technology, Cambridge, Massachusetts.
Loving, Stanley H., relieved from active duty.
MacGrain, Donald, to Special Information Section, Hq. AGF.
Marshall, Oliver K., to GSC with troops.
Marthinson, Detlow M., relieved from active duty.
Mendenhall, Clarence M., to HD of San Diego, Fort Rosecrans, California.
Moorman, Richard R., to 18-month course on Communications Engineering, University of Illinois, Illinois.
Murphy, Allen M., to Hq. 3d Service Command, Baltimore, Maryland.
McCann, James H., Jr., to Virginia Polytechnic Institute, Blacksburg, Virginia.
Oliver, Richard H., relieved from active duty.
Peay, James H. B., Jr., relieved from active duty.
Pryor, Ralph H., to two-year course on guidance of guided missiles, Johns Hopkins University, Baltimore, Maryland.
Rawls, Jabus W., Jr., to two-year course on guidance of guided missiles, Johns Hopkins University, Baltimore, Maryland.
Rehkop, Russell G., to Fort Lawton ORD, Seattle, Washington.
Ritchie, Walter P., to OC of S, Washington, D. C.
Romlein, John W., to GSC with troops.
Rothwell, Franklin G., to Camp Kilmer ORD, New Jersey.
Russell, Sam C., to GSC with troops.
Sell, Wendell B., to two-year course on guidance of guided missiles, Johns Hopkins University, Baltimore, Maryland.
Sills, Tom W., to GSC with troops.
Stillman, Edmund H., to retire.
Virag, Alfred, to HD of Portland, Fort Williams, Maine.
Williams, Robert L., Jr., to Hq. AGF, Washington, D. C.
Wilson, C. Forrest, to AAA School, Fort Bliss, Texas.
Winer, Ralph C., to AAORP, AARTC, Fort Bliss, Texas.
Witman, Clark C., relieved from active duty.

MAJORS

Amiot, Roger A., relieved from active duty.
Anderson, Leland H., AGF Liaison Officer, Hq. AAF, Washington, D. C.
Ballagh, Robert S., to Hq. AGF, Biggs Field, Texas.
Bleuchel, Herbert J., relieved from active duty.
Brown, George B., to German Military Documentation Section, Camp Ritchie, Maryland.

Brown, Harry C., to AARP, Fort Bliss, Texas.
Brumfield, Oscar M., relieved from detail in Finance Department.
Cade, Dozier C., relieved from active duty.
Castle, Edmund, to 7th Service Command, St. Louis, Missouri.
Childress, William C., relieved from active duty.
Cochran, James M., to GSC with troops.
Coleman, Irving M., detailed in TC.
Colquitt, Rawlins M., Jr., to GSC with troops.
Craig, Horace S., to GSC with troops.
Deeds, John F., relieved from detail in Infantry.
Dibble, John R., relieved from active duty.
Duckett, Alvin L., relieved from active duty.
Farrar, William L., to 213th AA AW Squadron, Orlando Air Base, Florida.
Feeney, Clinton, to CA(SC)ORP, Fort Monmouth, Virginia.
Ford, George L., to Hq. 5th Service Command, Fort Hayes, Ohio.
Gardner, Jesse J., relieved from active duty.
Gamble, William E., relieved from active duty.
Goodrick, Carl H., to 8th Service Command, Fort Bliss, Texas.
Haaland, Arne W., to HD of Columbia, Stevens, Oregon.
Hamilton, William P., to Historical Division of OC of S, Washington, D. C.
Ingalls, Norman L., Jr., relieved from active duty.
Jackson, Joseph J., to Manhattan Engineering District, Oak Ridge, Tennessee.
Janata, Rudolph, Jr., relieved from active duty.
Johnston, Harry C., to AA Section, AGF Board No. 1, Fort Bliss, Texas.
Kellerman, Jack H., to GSC with troops.
Kill, Eugene M., to AGF Liaison Officer, AAF, Washington, D. C.
Lancaster, Oscar W., to Hq. 7th Service Command, Omaha, Nebraska.
Lossen, Herbert L., to 7th Service Command, Jefferson Barracks, Missouri.
Mahaney, David W., relieved from active duty.
Mathes, Edward S., to Georgia School of Technology, Atlanta, Georgia.
Morris, Herbert A., Jr., relieved from active duty.
Noel, Wray H., to Detachment of Patients, Regional Hospital, Fort Knox, Kentucky.
Nordbeck, Theodore M., relieved from active duty.
Palmer, Eugene P., to retire.
Patton, Thomas J., to GSC with troops.
Reitz, James T., to Intelligence Division, AAF, Washington, D. C.
Rice, Edward S., to Fordham University, New York City.
Scherer, Alfred C., to Counter Intelligence Center, Holabird Signal Depot, Baltimore, Maryland.
Singles, Walter, Jr., detailed in Ordnance Department.
Smith, Calvin O., detailed in GSC with troops.
Smock, Robert A., detailed in TC.
Stiles, Byron M., relieved from active duty.
Stoll, Edwin L., relieved from active duty.
Sturdevant, William L., Jr., relieved from active duty.
Trussell, John B. B., to AAA School, Fort Bliss, Texas.
Whittaker, Alan D., Jr., relieved from active duty.
Woodford, William, relieved from detail in Infantry.

CAPTAINS

Ashcraft, John J. B., relieved from active duty.
Baine, John R., relieved from active duty.
Balding, Walter R., Jr., relieved from active duty.
Bennett, George E., relieved from detail in Infantry.
Brewster, Robert D., relieved from active duty.
Brown, Charles M., relieved from active duty.
Brundage, Lyle D., relieved from active duty.
Cornish, Edward, relieved from active duty.

Richard F., to Mississippi State College, State College, Mississippi.
 Pepper, James H., relieved from active duty.
 David E., to 4th Service Command, ASTP, Emory University, Emory, Georgia.
 Champs, Robert F., Jr., relieved from active duty.
 Swiler, Robert P., to two-year course on guidance of guided missiles, Johns Hopkins University, Baltimore, Maryland.
 Krich, Karl W., detailed in IGD.
 Walter M., relieved from active duty.
 Herbert A., relieved from active duty.
 William H., detailed in TC.
 Robert E., relieved from active duty.
 Rex E., relieved from active duty.
 Erickson, Manville E., relieved from active duty.
 Charles H., relieved from active duty.
 Harold D., to Utah State Agricultural College, Logan, Utah.
 Homer, Jr., relieved from active duty.
 James P., to Office U. S. Joint Chiefs of Staff, Washington, D. C.
 Nathaniel H., to HD of Charleston, Fort Moultrie, South Carolina.
 Howard J., to Detachment of Patients, Gushing General Hospital, Framingham, Massachusetts.
 Harris M., relieved from detail in AGD.
 Cecil G., to 410th AAF Base Unit, Rome WA-Field, New York.
 John F., to Camp Atterbury, Indiana.
 Edgar J., relieved from active duty.
 Wesley F., to Hq. AGF, Washington, D. C.
 Joseph F., relieved from active duty.

Nugent, John, to MDW, Fort Belvoir, Virginia.
 Pearson, Frank A., relieved from active duty.
 Perry, Hart, relieved from active duty.
 Plant, Ottis M., to University of California, Berkeley, California.
 Polak, Edward T., relieved from active duty.
 Raggi, Albert E., relieved from active duty.
 Regan, William C., relieved from active duty.
 Roehlk, John, relieved from active duty.
 Schneider, Harold J., relieved from active duty.
 Shaw, William G., to MIS, Washington, D. C.
 Stark, Eldee R., to University of Delaware, Newark, Delaware.
 Thomas, Otaway M., to AARP, Fort Bliss, Texas.
 Tischler, Louis N., detailed in JAGD.
 Trinter, Vernon E., to retire.
 Wigger, John H. D., relieved from active duty.
 Wiley, Theodore R., to European Theater of Operations.

Connard, Albert B., to AAARP, Fort Bliss, Texas.
 Cunyngnam, William B., relieved from active duty.
 Dickinson, Charles W., to 18-month course on Communications Engineering, University of Illinois, Urbana, Illinois.
 Emery, James I., detailed in Infantry.
 Packert, William E., Jr., relieved from active duty.
 Gable, Robert S., detailed in AGD.
 Geiger, Louis G., relieved from active duty.
 Klein, Donald A., to Manhattan Engineering District, Oak Ridge, Tennessee.
 Lowrey, Wilber C., detailed in QMC, Camp Lee, Virginia.
 Moffett, George E., detailed in TC.
 Montrezza, Rene J., detailed in TC.
 McArdle, John F. X., to retire.
 O'Bryan, William H., relieved from active duty.
 Richards, John V., Jr., relieved from active duty.
 Rossman, Kenneth R., to PMGO, New York, New York.
 Schall, Robert B., relieved from active duty.
 Schwab, Doyle S., relieved from detail in Infantry.
 Tabeny, John J., Jr., relieved from active duty.
 Thomas, Jackson C., to active duty, AAORP, Fort Bliss, Texas.
 Tise, Vernon J., relieved from active duty.
 Warren, Vandave P., transferred to Infantry.
 Weissman, Murton, to MDW, Fort Belvoir, Virginia.
 Widerquist, Vernon R., to resign.

FIRST LIEUTENANTS

Adams, Thomas T., detailed in TC.
 Anderson, Lang W., detailed in Infantry.
 Ashton, Donald M., relieved from detail in CE.
 Beam, John J., relieved from detail in Infantry.
 Beidelman, Harold E., to Detachment of Patients, Percy Jones General Hospital, Battle Creek, Michigan.
 Bond, John B., to two-year course on guidance of guided missiles, Johns Hopkins University, Baltimore, Maryland.
 Bridges, Jim L., to School for Government of Occupied Areas, Carlisle Barracks, Pennsylvania.
 Brown, Robert D., Jr., transferred to CE.
 Carter, Fred Levi, relieved from active duty.

SECOND LIEUTENANTS

Mills, Robert S., transferred to Infantry.

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