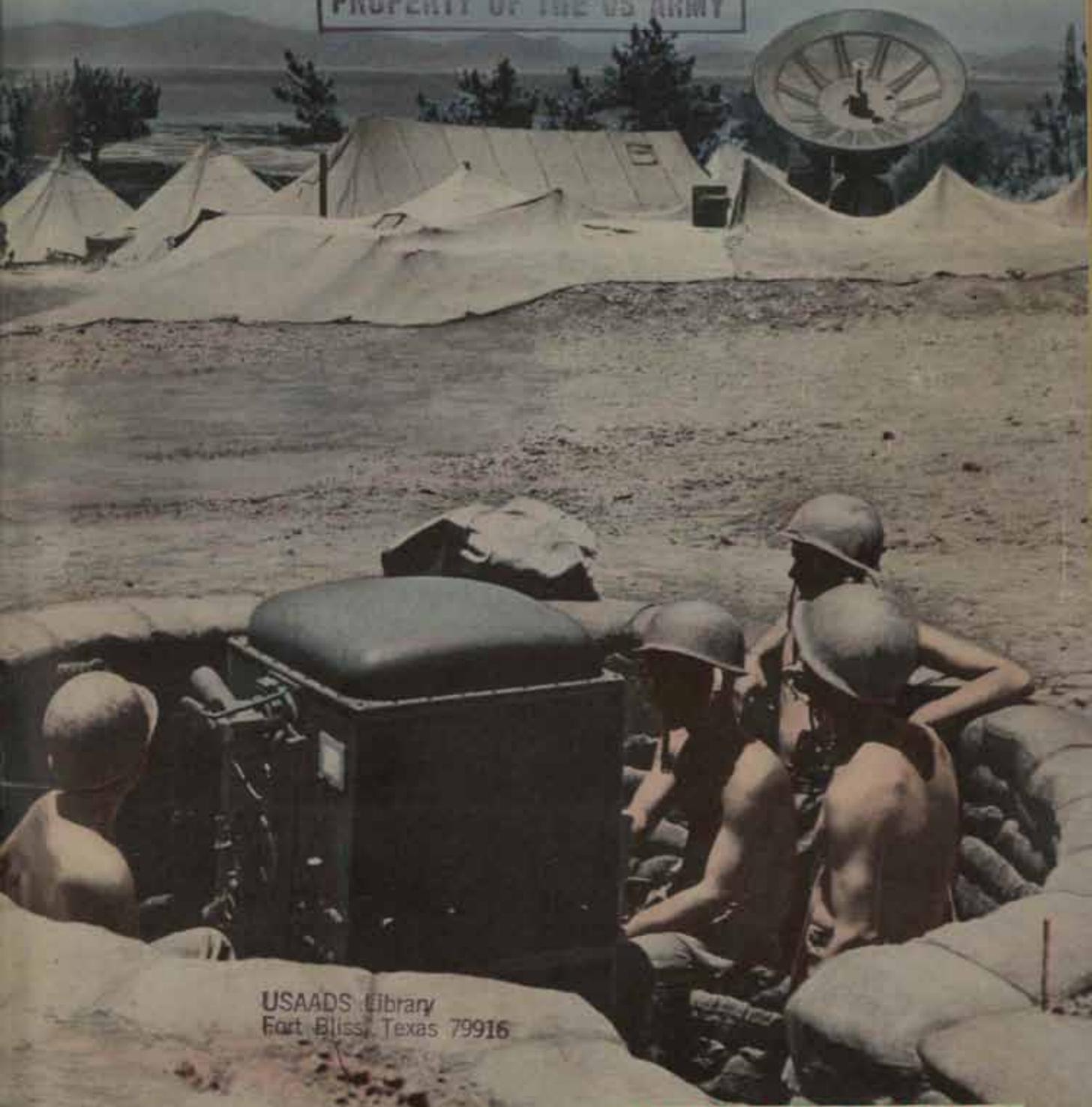


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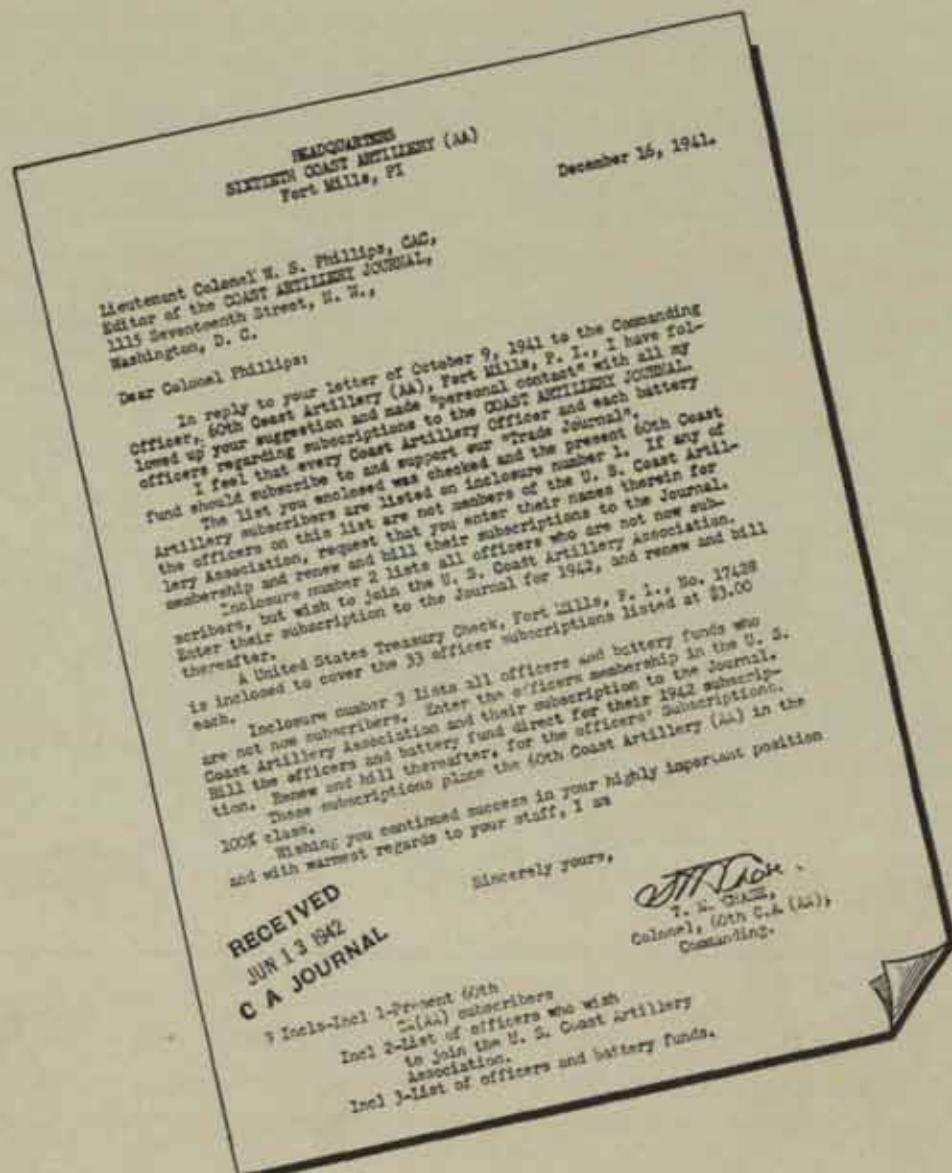


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BRADDA



THE development this war has produced that is of most direct significance to the artilleryman is radar. Radar's impact on modern warfare has been tremendous because it has virtually eliminated the element of surprise due to concealment in darkness, fog, cloud, or artificial smoke.

Radar is an "eye" which can see farther than visual instruments or sound locators and which is unaffected by darkness, fog, or smoke. While it may be said that World War I was a chemist's war, certainly the atomic bomb and radar made this one a physicist's war.

A *Collier's* correspondent when questioning a Jap pilot recently asked why Jap two-engine planes always sounded like washing machines. The pilot replied that the motors of Japanese two-engine planes were intentionally out of synchronization to deceive our sound locators.

Let's take a closer look at this new gadget that made sound locators obsolete before Pearl Harbor. Many conflicting statements have been made about radar and the origin of it has been claimed by many parties.

Individual radar sets vary a great deal, from a 100-pound set carried in a fighter plane to a 175-ton set used for long-range early warning. Despite the great physical diversity of the forms in which radar is used a common set of principles is back of every radar, and once these principles are recognized radar is understood.

This article will discuss radar in three sections: History of Radar; Theory of Radar to include IFF (Identification, Friend or Foe); and Future of Radar.

HISTORY OF RADAR

The beginning of interest in radio detection as a military device can be dated from communication experiments carried on (circa 1922) by two civilian scientists working for the United States Navy. They suggested to the Navy that, with radio detection equipment, ships on a line a number of miles apart could be immediately aware of the passage of an enemy vessel between any two ships on the line irrespective of fog, darkness, or smoke screen.

The principle of determining range by sending out pulses

or bursts of radio energy which characterizes modern radar was first used in 1925 for measuring the Kennelly-Healy layer, part of the ionosphere.

Radar was born when it occurred to different inventors independently in America, England, France, Germany, and perhaps also in Japan that the pulse technique could be used to detect objects such as aircraft and ships.

In the summer of 1930 the art of radio detection took another step forward when United States Navy scientists discovered that a pattern of radio waves showed considerable interference when a plane passed between the transmitter and the receiver. Since by this time airpower's threat was so large, any means of early warning had vast potential. Up to this time, however, regular radio waves rather than pulses were used, necessitating bulky equipment and considerable distance separating the transmitter and receiver. Problems of increased power output, shorter wavelength directional antenna systems, building a receiver which would not be blocked by the transmitted pulses and which could pick up those extremely short echo pulses, and designing cathode-ray tube displays for the received pulses were problems which were solved in the next few years.

About 1932 the Army Signal Corps began experiments which by 1936 resulted in an experimental model, SCR-268. This was the first United States set. Simultaneously the United States Navy installed its first shipboard model on the old four-stack destroyer *Leary*.

By May 1937 a successful demonstration was given at Fort Monmouth in which radar not only detected aircraft but passed on information about the azimuth, elevation, and range so that searchlights were pointing precisely the right point when the aircraft came within range. By this time the art had reached the development point of using a wave length of one and one-half meters (one of the latest sets uses a wave length 1/50th of this). Each successive decrease in wave length has meant, in general, greater accuracy and less susceptibility to jamming.

Also in May 1937 the Air Corps, after watching demonstrations, formally asked the Chief Signal Officer to take development of a "long-range detector and transmitter." A complete set was demonstrated in 1939 which showed a range of one hundred miles against bombers. The

R A Subway

By

Lieutenant Colonel Leonard M. Orman

Coast Artillery Corps

ing the Army Air Forces have come to be a large of radar. Requirements subsequently set up have re- in the development of many additional radar devices e Forces use. Ground or Ship Control Interception, Beacons, Aircraft Interception, Navigation, Alti- Meteorological Storm Warning, and Bomb Control examples of Air Corps uses of the new gadget.

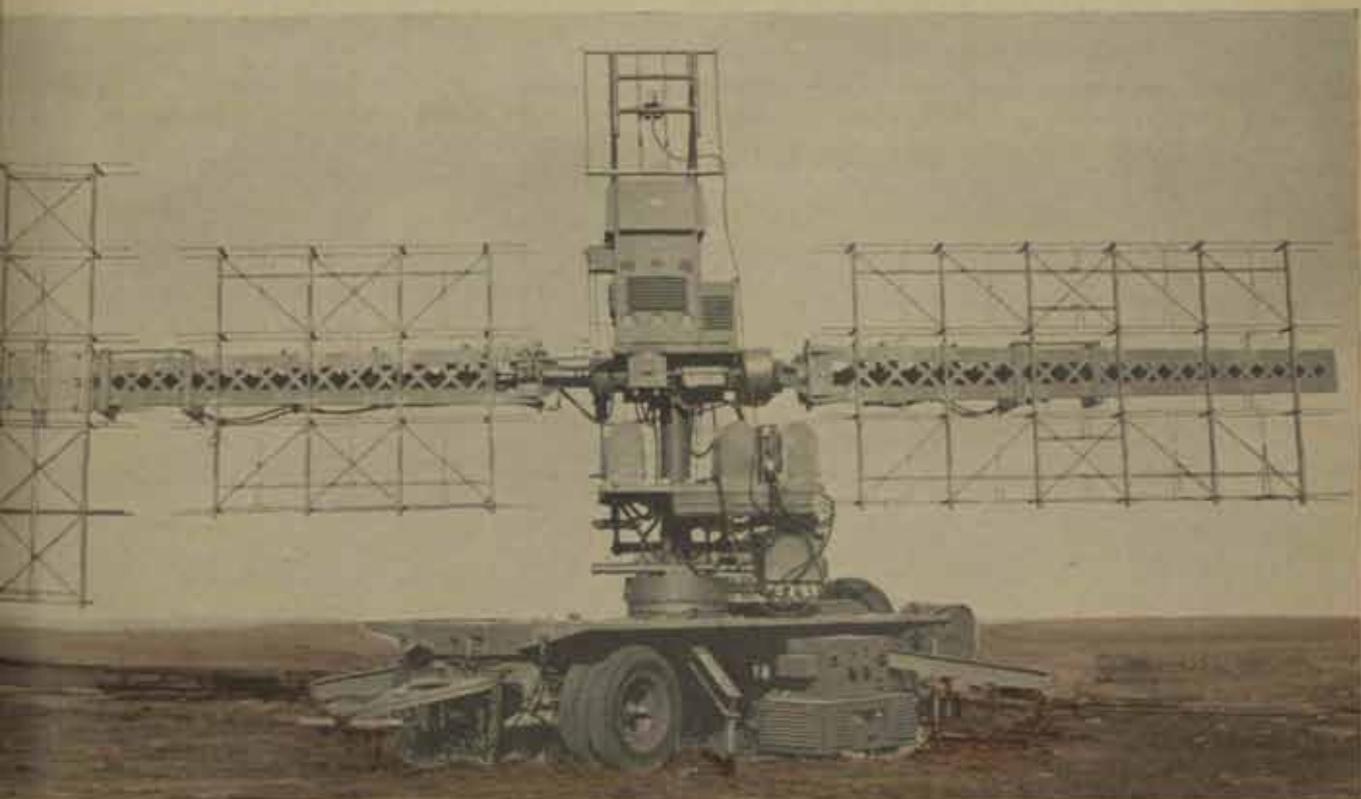
y requirements have concurrently increased from the radar installed on the destroyer *Leary* to twenty-two ets used on a modern battleship.

1938 the equipment was given exhaustive tests by the Artillery Board at Fort Monroe, Virginia. During tests, in addition to locating planes for ground bat- radar showed new possibilities. The set detected anti- artillery shells in flight, and also guided back to a

safe landing an Army bomber which had been blown out to sea. The bomber was picked up by radar and directed back by radio directions.

The progress of radar in the United States owes much to the constant support, both moral and financial, given to the Signal Corps project at this early stage by farseeing officers of the Coast Artillery Corps.

British radar was developed at about the same time as the American systems but at a somewhat faster pace under the immediate threat to Britain's security. Demonstrations were sufficiently advanced to warrant a decision to establish a chain of five stations on the east coast of England in December 1935. At the time of the Munich crisis the whole east and southeast coast of Great Britain was manned. Since Easter 1939 a twenty-four-hour radar watch has been kept



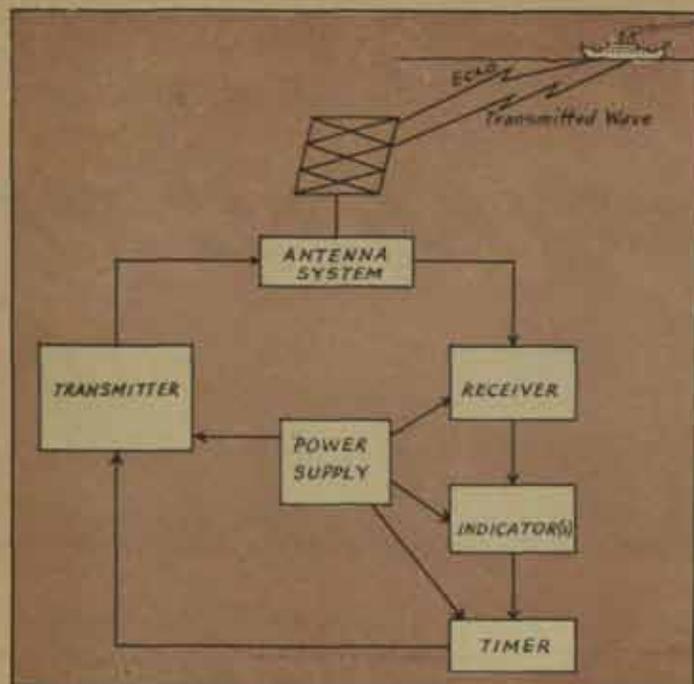


Figure 1. Block diagram of radar system.

on the North Sea approaches. Soon after the outbreak of war additional radar stations were established and the "invisible bastion" was complete. By 1940 radar art was sufficiently advanced to give British pilots a three-dimensional location of the enemy—range, azimuth, elevation—and an estimate of numbers. An equipment for detection of aircraft from night fighters was simultaneously developed. This gave the Royal Air Force all the essential data to enable them to win the Battle of Britain against the great numerical odds of the *Luftwaffe* and to deserve Churchill's: "Never have so many owed so much to so few."

The efforts of American and British laboratories were combined in 1940. Mutual disclosures were made of British and American accomplishments in radar up to that time. The best civilian brains were enlisted in the quest for better equipment through the National Defense Research Committee, later part of the Office of Scientific Research and Development. By the time of the Japanese attack on Pearl Harbor the Navy had already installed on key ships not only radar for aircraft warning, but also radar for surface search and fire control, while the Army had in the field numbers of long-range aircraft warning sets, as well as antiaircraft and searchlight batteries equipped with radar.

Today Army and Navy radar requirements are coordinated to the point where many sets and nearly all component parts are made interchangeable between the services. The original Signal Corps and Navy nomenclature has been superseded for new equipment by a joint "AN" (Army-Navy) system in which all sets or components developed for either service are given the same nomenclature in the supply catalog of both.

From our enemies, no new principle or radio device has emerged, and for the most part, both Germany and Japan have been content to follow industriously in the footsteps of the Allies, literally "picking up" what inevitably has come into their possession from time to time. Our lead in the field

of radar over Germany is attributed to the fact that our scientists concentrated on other projects from 1918 to 1944. However, by V-E Day the importance of radar had been realized by the Germans and they were rapidly catching up with us in this field.

THEORY OF RADAR

Massachusetts Institute of Technology, one of the foremost in the field of radar, offers this definition of radar: "The art of determining by radio energy the presence of objects, determining their direction and distance, recognizing their character, and employing the data obtained in the performance of military or naval action."

The official U. S. derivation of the word "Radar" is that it means *R*ADIO *D*ETECTION AND *R*ANGING.

A radar set accomplishes the detection of targets by sending out pulses of ultra-high-frequency radio waves from a high-power transmitter. These pulses are directed into a beam (similar to a searchlight beam) by a directional antenna. When the transmitted energy strikes an object, a portion of it is reflected in much the same manner as the sound waves echo from the face of a cliff. The echo energy is detected by the receiver through its antenna and is translated into usable information on indicator panels. The fact that radio waves travel at the constant velocity of light enables us to determine the range, and the fact that the receiver antenna is directional enables the determination of azimuth and elevation.

Components.

While there are many different types of radar sets, essentially they all consist of six essential components (see Figure 1).

1. *Transmitter*—Transmits the ultra-high frequency, short, powerful pulses.

NOTE: In any discussion of radar considerable mention is made of frequencies and wave lengths. Often the two are used interchangeably. A definite relation exists between the two, which may be expressed in the following formula:

$$f = \frac{300}{\lambda} \text{ where } f = \text{frequency in cycles per second and } \lambda = \text{wave length in meters.}$$

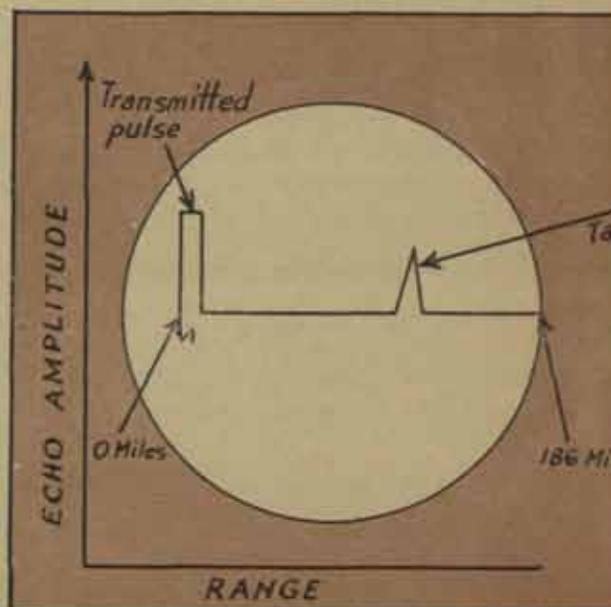
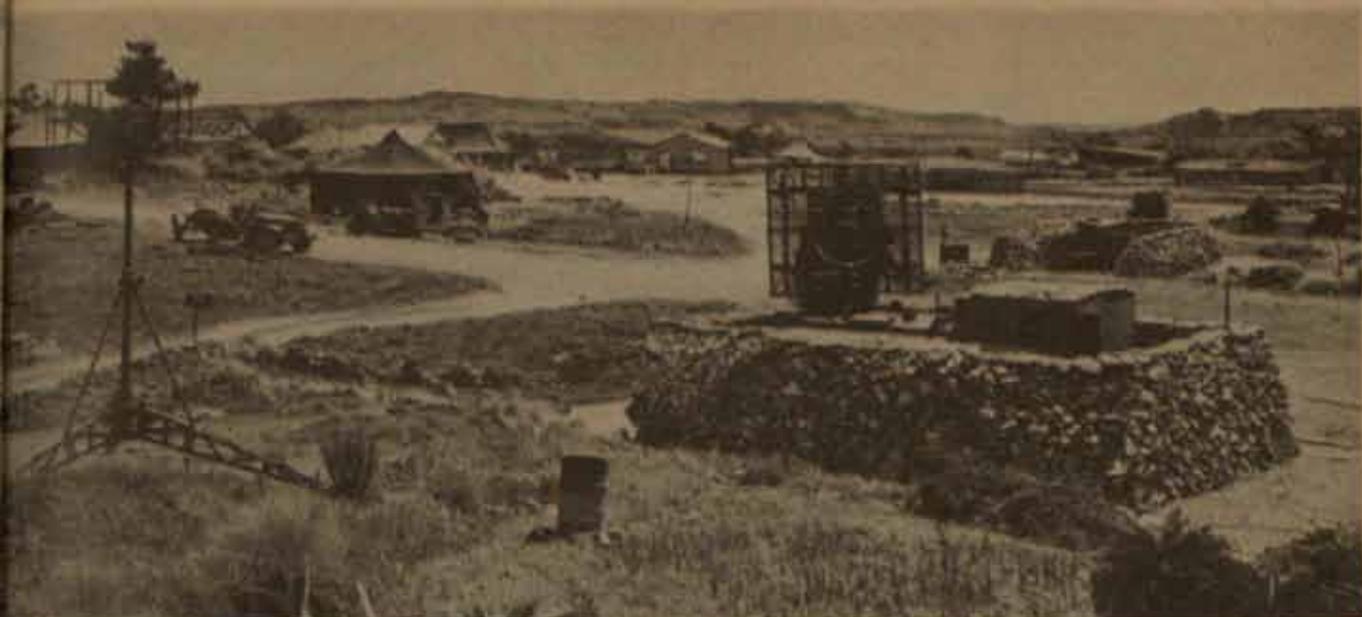


Figure 2. "A" Scope. The target "pip" is illustrated.



SCR 545, with IFF, on Okinawa.

Receiver—Receives the weak echoes returned and passes them to the indicator(s).

Antenna System—Takes the energy from the transmitter, radiates it in a directional beam, receives the echoes and passes them to the receiver.

Indicator(s)—Produces a visual readable indication of echoes.

Timer—This is the synchronizer of the whole system which times the transmitted pulse and the indicator.

And, of course, a **Power Supply** is essential.

In radar, unlike conventional radio sets, the transmitter and the receiver are located at the same place. Prior to the discovery of radar many successful experiments had been made with radio direction-finding. However, in these trials a distant object had to send radio waves to one or more distant radio stations. They could then fix the position of the distant object. Obviously, such a system has little application in the detection of targets under battle conditions.

Range Determination—How Radar Works

As has already been made of the fact that range is determined by the measurement of the time taken by a radio wave to be transmitted and echoed back. This in itself is comparatively easy to understand. However, the method of doing it is more complex or perhaps radar would have been developed much sooner.

The cathode-ray tube is a special type of vacuum tube which acts as an electronic stop watch. The electrons are directed into a narrow beam so that the cathode-ray tube acts like a hose directing the stream of electrons at a screen which glows at the point where the electrons strike. The beam of electrons is made to sweep across the fluorescent screen in much the same way as a hand sweeps across the face of a clock. Just as the second hand of a clock completes its sweep of the face in sixty seconds, the electron beam can be made to travel across any desired portion of the fluorescent screen in some predetermined interval of time. For example, we assume that the maximum range of the radar set we are discussing is one hundred eighty-six miles. Then if the electron beam is made to travel across the screen in 1/500th of a

second and put "0" miles at one end and 186 miles at the other end of the sweep.

We know that radio waves travel at 186,000 miles per second. The distance traveled by a pulse to and from a target is twice the actual distance to a target since we must allow equal amounts of time for the initial transit and the echo. In the case of our set with a target at maximum range

this will be $186 \text{ miles} \times 2 = \frac{372 \text{ miles}}{186,000 \text{ miles/sec}} = \frac{1}{500}$

second. As the waves travel at a constant speed, we can graduate the whole line into a uniform scale of miles. Actually, we will not be able to detect such a sweep across the screen since the eye cannot detect such a rapid movement. The screen is of a persistent nature so that it glows for a time interval after the beam has passed to another portion of the screen. Because the sweeps are so rapid the beam is repeating the sweep before the glow dies out and a single solid horizontal line is presented to the eye.

The returning echo is picked up by the sensitive receivers and makes the electron beam deflect as it sweeps across the screen. This makes a "pip" in the line at a point representing the time for the echo to return. This type of scope is called an "A" scope. (Figure II.)

The accuracy with which time is measured determines the accuracy of the range. To obtain a range accuracy of three yards, time must be measured to an accuracy of a hundred-millionth of a second. When time is measured to this accuracy the range is then accurate to three yards regardless of whether the range is thirty or 30,000 yards. This

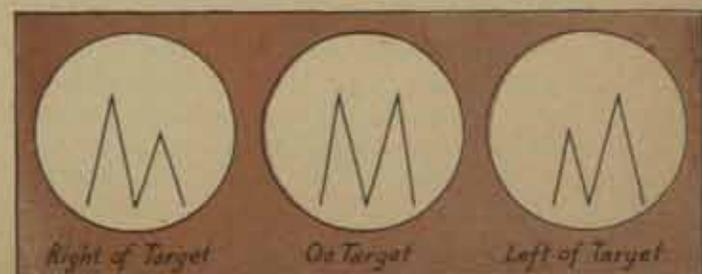




Figure 4. PPI presentation. Compare aerial radar scope photo with actual chart of island (Nantucket). Land, ships, aircraft appear white. Bright spot in center is position of plane which took picture.

is in contrast to most other types of range finders which have a constant percentage error in determining the range.

Azimuth and Elevation Determination

The use of timed pulses, as we have seen, gives a simple means of measuring range. How then is the direction in which a target lies determined? This is done by providing the radar with a directional antenna, which sends out the pulses in a narrow beam, like a searchlight. Since azimuth and elevation determination are similar, only azimuth determination will be discussed here. There are in use two systems, the single lobe and double lobe.

Single Lobe System

Here all energy is directed in a single lobe. The antenna may be rotated as the pulses are sent out, and we get back a "pip" when the antenna is pointed toward its target. We get the strongest pip when the beam of energy sent out by the radar is pointed directly at the target. The azimuth of the center of the antenna gives us the azimuth of the target.

Double Lobe System

The method used in the SCR-268 and several other sets for azimuth determination is a double lobe system. Two identical lobes whose axes are displaced by some fixed angular distance are used. The two lobes intersect at only one point, known as the crossover point. Each lobe receives a pip from the target. When the two pips are of equal size the antenna is pointed directly at the target. The use of two lobes instead of a single lobe greatly increases the precision of azimuth measurement because the operator has a more sensitive indicator to show whether or not he is off target. (Figure III.) In addition, it provides the operator with a sense of direction. If the antenna is off target the inequality of the pips shows him the direction to turn. These advan-

Hence the single lobe system is most often used in sets while the double lobe system is usually employed in fire control systems.

The problem of antenna design is one of the major problems in radar, incomprehensible as this may seem to the operator of a home radio receiver who finds a few yards of wire strung up on his roof adequate for his purpose. An antenna must possess the following characteristics:

a. It must be directional; that is, it must concentrate radio energy into a definite beam. All of the power should go into this beam and none should leak off into "side lobes" in other directions, for such side lobes may be fatally confusing.

b. It must be capable of being directed from a remote place and must be stabilized on board ships and aircraft to take out the motion of the craft itself.

Antennas are made directional by building them up of an array of small antennas suitably spaced and timed to concentrate the energy in one direction, or they may be based on a searchlight principle of spraying the energy into a large parabolic reflector which focuses the energy into a beam.

Indicators

Two principal classes of indicators are used in radar meters and cathode-ray tubes.

Meters have been used principally for azimuth and elevation indication; the needle deflecting to one side when the antenna was off target. However, meters present two principal disadvantages (1) their slowness of reaction and (2) their inability to distinguish between multiple targets.

The cathode-ray tube indicators may be subdivided into two general classes. In one, termed "deflection modulation," the echo shows as a deflection in a bright line. The type of presentation was illustrated in Figure II. There

Scope used on the SCR-584. A circular time base is in the J-Scope and range is measured around the circumference of the circle. On a given cathode-ray tube trace on the J-Scope can be made almost three times the length of the straight trace "A" type.

The second, termed "intensity modulated," is exemplified in the A and B Scopes.

The PPI (Plan Position Indicator) shows in polar coordinates, a radar map of the area being covered, with the center of the screen. Range is indicated by the distance from the center of the screen at which the target appears. (Figure IV.)

The B Scope also presents range and azimuth on the same scale. This type is used in the AN/MPG-1, the latest sea fire control set. (Figure V.)

In intensity modulated scopes echo signals are made to appear as bright spots. It is not like television; the blobs do not look like ships or planes, but they are interpretable as such by a trained operator. Other types of indicators have been developed and are in use but these are the most frequently encountered types.

The first necessity after determining the position of an aircraft is to ascertain if it is hostile or friendly. Unfortunately, the pip received from a target bears no relation to the nationality of the target. A series of devices had to be developed to enable recognition of friend and enemy. These devices are called IFF—(Identification, Friend or Foe).

Initial attempts were made to have the friendly target send a response back on the frequency of the interrogating radar. This proved to be impractical since a single plane had to answer several radars operating on different frequencies. To do this would necessitate carrying a pro-

hibitive amount of equipment in a plane for this purpose. As a result a universal frequency band is in use separate from that of the radar sets on which the echoes must be recognized.

Components

These components make up a complete IFF system:

1. *Interrogator*—A radio transmitter which transmits on an IFF frequency and which is associated with the parent radar set.

2. *Transponder*—This is a combination receiver and transmitter carried in friendly craft, which receives a challenge from a radar set and returns a signal to it. The form and duration of the reply may be altered to conform to the code in use.

3. *Responder*—A radio receiver, associated with the radar set which receives the reply returned from the transponder and produces a signal either on the radar's indicator or on its own indicator.

Both the interrogator and the transponder require antennas separate from the radar antenna although frequently that of the interrogator is synchronized to turn with the antenna of the parent radar set.

The transmitter of the transponder is normally dormant and the receiver is ready to receive. Whenever a pulse is received the set automatically transmits a reply; operating personnel need only turn the set on.

Limitations of IFF Systems

IFF systems of recognition are a negative process. A properly coded reply indicates that a craft is friendly. However, the lack of a reply is not a positive indication of an enemy craft. The IFF of a friendly plane may be inoperational or simply turned off.

In addition, an enemy radar system may set off an IFF transponder. This is a very great advantage to an enemy since it extends the range of his radar for detecting our planes.

FUTURE OF RADAR

From the viewpoint of the artilleryman the principal uses will continue to be the same as they have been in the war—surveillance and fire control, with improvements made in increased accuracy, longer range, less susceptibility to jamming, greater mobility, and better separation of multiple targets. Radar chronographs issued perhaps on a battalion level and radar meteorological sections will soon find their way into Tables of Organization. Other branches of the service are finding applications to aid them in their own particular field of warfare.

Radar has definitely made sound locators obsolete and is rapidly putting all visual methods of tracking, warning, and recognition in the same category. As with the atomic bomb America definitely was the leader in the radar field as of V-J day. However, as with the atomic bomb, our enemies were quite close behind us. If we should allow all our best brains to return to strictly civilian pursuits and not follow a vigorous research and development program we might fall to second place in the race for technical superiority. And this is an expensive race to place second in.

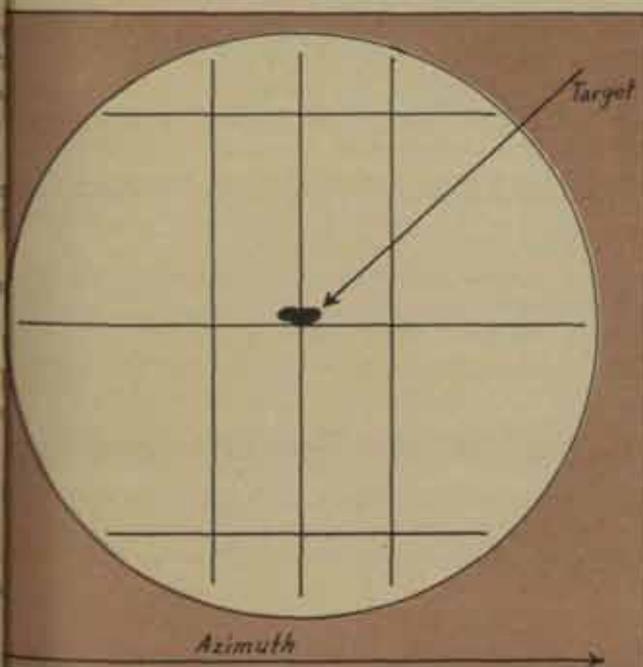


Figure 5. An example of the "B" Scope, similar to that of the AN/MPG-1. The horizontal lines represent, from top to bottom, +1000 yards, zero range, and -1000 yards. The vertical lines indicate 5° left, 0°, 5° right.

THE GERMAN GENERAL

By Colonel Truman Smith

Abolished



Keitel, chief of the high command, survived the many purges and remained Hitler's Chief of Staff to the end.

Whenever, in the future, historians try to write objective and dispassionate military analyses of the German defeat in World War II, one question is bound to arouse a great deal of discussion: Why did the German General Staff lead us in for the fatal Russian campaign, which was without doubt its crucial blunder?

There have been many stories current to the effect that important German generals and general staff officers had loudly protested against Hitler's Russian ventures. The

The contents of this article do not necessarily reflect the opinion of the War Department, G-2, or the Military Intelligence Service.

Historians will feel in duty bound to find the objectors and record the protests.

But they can save themselves their efforts. Protest after protest there were at all, never penetrated the inner sanctum of Hitler's headquarters. Officers close to Hitler and members of the inner coterie of the great German General Staff, since Germany's surrender, have cleared up the mystery and revealed the common guilt of Hitler and the General Staff for the attack on Russia.

No true opposition was raised by the General Staff against Hitler's decision in the autumn of 1940 to declare war on Russia the following spring. And while there were undoubtedly generals and general staff officers who felt that an attack on Russia was a mistake, not a single man of name and prestige spoke in protest.

What is the explanation of the doglike acceptance of Hitler's gamble with the fate of Germany by these conscientious soldiers? How was it possible that not one of them demanded that the Führer review the basic premises leading to his fateful decision? Behind this humble silence of the German generals lies a tale that reveals like no other the deterioration of the military tradition and military integrity that so long characterized the Prussian army, and that reveals the moral and psychological causes of Germany's destruction.

Why did the German General Staff, to lead the Wehrmacht

AL STAFF *cates*

There are a great many things for which we can blame German generals in the course of history, but humbleness of spirit is not one of them. Whether the political master of Germany was Bismarck or the Kaiser or Brüning, the generals were ever impervious to political pressure, and at times they fought ferociously for what they considered their primary necessities. Nor did the advent of the Third Reich first change their attitude. All through the years from 1933 to 1939, the General Staff warned repeatedly, though cautiously, against the tempo at which Hitler pushed his political program. It was terrified at each successive coup, warning each time that this move would prove the final step to involve Germany in a hopeless war. In succession, the General Staff raised a cautionary voice against the introduction of conscription on March 16, 1935, the militarization of the Rhineland in 1936, the annexation of Austria in the spring of 1938, and the subjugation of the Sudetenland in the autumn of that same year.

But as each political crisis passed without war, Hitler's political prestige grew. By the summer of 1939 most of the generals believed that Hitler was a political genius—but not a political genius, mind! In military matters the General Staff, in 1939, on the eve of war, still considered the Führer a rank amateur, a dilettante, who knew no more about war than any average private veteran of World War I. They had no intention of letting Hitler meddle in military matters. In their opinion, it was Hitler's task to guide Germany politically, theirs to plan and fight the campaign.

Then what happened between the eve of war and the successful autumn of 1940, when the Russian campaign was decided upon, to change the attitude of the General Staff radically that it submitted to Hitler's military decisions without raising the slightest opposition?

It all started with a great clash between the Army and Hitler over the military plan for crushing Poland.

In drawing up the plans for war with Poland, the General Staff had decided to go about crushing Poland in an orthodox, methodical fashion. General Franz Halder, the chief of staff, conceived a double envelopment of the

allow Hitler, a military dilettante, to lead the fatal Russian Campaign?



The Führer danced with joy when France fell in 1940.



Halder



Von Brauchitsch

Polish armies in the Vistula bend, to the west of Warsaw. To accomplish this envelopment, a German pincers was to close around the Poles, one arm being launched from Pomerania in the north, the other from Silesia in the south. Two, or perhaps even three months' fighting Halder thought, would be needed to bring about the defeat of Poland.

When Hitler saw this strategical plan of his General Staff, he was furious, stormed at the generals, called them prosaic numskulls who still understood war only in terms of 1918, and who did not understand the full potentialities of the tank and the airplane. Hitler wanted a much more rapid tempo. He insisted Poland could be crushed in a few weeks, not months.

In successive conferences, Hitler sketched for his General Staff his own plan of campaign. There should be two double envelopments, one inside the other. The orthodox envelopment west of Warsaw, was to stand as it was. Hitler's proposal was for a second envelopment executed simultaneously. The arms of these pincers would join far east of Warsaw. The northern arm of the pincers in Hitler's plan was to drive out of East Prussia; the southern arm from the

The cool and calculating German generals, Von Brauchitsch and Halder, were aghast at this flight of imagination. They wanted something more conservative, something involving no unnecessary risk. They protested and were promptly overruled. Hitler's own plan was to be carried out.

The result is history. Hitler, the rank military dilettante who made war by intuition, who knew no more about war than any average politician, had nevertheless made a better guess than his experienced generals at what the weapons of warfare could accomplish.

The plan for Poland was a good Hitlerian guess; yet it might have been better for Germany if Hitler had guessed wrong, on this his first opportunity to display "military genius."

Next came Norway. This time the General Staff decided the campaign wasn't going to be prosaic. It would be orthodox with a vengeance. A great double amphibious landing operation was planned against both sides of the fjord. Nothing like it had ever been tried in all German history. The navy, army and air force were to act as a team. Just to be sure, however, that Hitler would not call the numskulls again, the General Staff added a few minor

away, among them Bergen and Trondheim. This done, the plan was submitted for approval to the Führer.

Hitler stormed once more. His soldiers and sailors were dolts. They had missed the most strategic point in all Norway. He wanted Narvik, and he wanted it whatever the risks of the gamble might be.

This time the German admirals protested. Narvik, they felt, was out of the question. The iron ore port was 1,200 miles from the nearest German harbor, and halfway between, in their secure anchorages in the Orkney Isles, lay the British Grand Fleet. The admirals told Hitler flatly that they couldn't move an expedition overseas to Narvik without being detected by the British, and once detected, they were as good as lost. The admirals' protest was of no avail. Hitler stood firm. The Narvik expedition was added as an integral part of the campaign.

After the success of Norway and Narvik, the German generals began to revise their ideas about Hitler. The Führer was still a rank amateur and they were still not convinced he was a military genius. But he was lucky! It would take the French campaign to teach them doglike devotion.

The General Staff plan for the French campaign was a variation of the Schlieffen "envelopment through Belgium" concept of World War I. This time, however, the main

attack was to pass through the Maastricht neck of Holland. Holland was to be overrun, and then the German armies would turn the right flank of the Allied armies by swinging sharply south between Liège and Antwerp. It was expected that the first great decisive battle would be fought on the plains of Brabant, near Brussels. The General Staff hoped that there would be a German victory. If it occurred, it saw no reason why the war with France couldn't be finished by Christmas.

Hitler didn't like this plan any better than he had the Polish or Norwegian plans. It wasn't his idea of rapid war. It seemed to him again prosaic, orthodox, typical of his numskull generals. He ordered that the plan be torn up. He would write his own.

In his headquarters in Germany, working feverishly, assisted by only a few of his officers, those who happened to be fanatic Nazis, Hitler sketched his plan for the Sedan breakthrough, the fifteen-day dash to the Channel coast, the crushing of France in three months. This outline for a campaign he sent to the General Staff as an order. It was to be its task merely to execute the Führer's dream.

The General Staff accepted the Führer's plan reluctantly. It did not believe the dash to the Channel coast had more than a faint chance of success. It didn't seem possible that the French could be overrun as Hitler expected.

Von Kluge



Von Reichenau





All the Nazi hierarchy were as one with the German General Staff in displaying doglike devotion to the Führer.

It is known now from reliable sources that in every German army group and army headquarters, in the first week of May 1940, just a few days before they jumped off, gloom and pessimism were the rule. Of all the commanders who were destined to assist in the conquest of France, only Generals Kluge and Von Reichenau thought that the Führer's plan would be successful. The others thought that, at most, a minor initial success could be achieved, and that winter would find their armies locked again with the French in trench warfare somewhere in Flanders, Picardy, or Champagne. In their opinion Hitler still wasn't a soldier, but a reckless gambler, risking the existence of the Reich at the behest of his intuition. Yet in France, too, Hitler succeeded.

And here is why the German generals and the German army never lifted their voices in the autumn of 1940 in protest against the Russian venture. Three Hitlerian successes in a row were too much for them. Even the still skeptical among them thought it wiser to keep silent. The Nazi generals *knew* Hitler was a genius, the cooler generals *thought* he might be one, his enemies *feared* he was.

In reality, Hitler was at best a gifted dilettante, with a flair for dreaming correctly what tanks and airplanes could do, but so far he had been operating against much weaker foes. Russia was something altogether different.

It is a matter of record that the German General Staff

had no illusions about the difficulties of a Russian campaign. World War I had left it with a wholesome respect for the toughness, fighting spirit, and patriotism of the Russian soldier, and for problems of a geography and climate which had broken the back of Napoleon's Grand Army. Moreover, recent reports from German military air attachés had consistently warned them against underrating the equipment and strength of the Russian army and air force. But Hitler paid no attention to these sound intelligence estimates. Russia, to him, had always been *number one*. He had set his heart on defeating her from the moment he came to power. The Russo-German Pact of 1939 had never been anything but a temporary expedient to his hands free in the west. But what gave his desire to attack Russia now decisive urgency, was his growing conviction that the Russians would attack Germany unless the Germans attacked first.

Blinded by passion and wishful thinking, he made himself believe that the Russians lacked military leadership and equipment, that political dissatisfaction would at once lead to large-scale army rebellions; in short, that Russia was a soap bubble ready to burst at the first prick. He declared to his generals that the Russian campaign would be won in three months. And here, what one might call the self-betrayal of the German General Staff takes

course. On the strength of his three previous successes against their better judgment the generals threw military integrity overboard. They trusted the luck intuition of a dilettante rather than their sober solid sense of the facts.

The first stages of the Russian campaign evolved about as planned by Hitler and the German General Staff. In this the Russians, by throwing overboard the old Tukhachevsky defense plan for a delaying action deep in the interior of their vast steppes, aided them. They concentrated their armies too far forward. In consequence a number of Russian armies and army groups were rapidly surrounded and destroyed in Poland, Galicia, and the Baltic states. The German armies rushed eastward but their speed of advance fell below that which they had reached in France. Grievously hurt as the Russians had been, their armies resisted with greater tenacity than the French. The vast Russian spaces required time to traverse. The short Russian summer was running to an

end. The same, Hitler and his generals were still sure that they would be out of the war by Christmas, so sure in that—incredible folly!—no preparations whatever were thought necessary for a winter campaign. No warm clothing, no fur jackets, no winter oil for the motor transport provided.

Early in November came, and the seemingly victorious German armies stood before Moscow, Leningrad, and Rostov, a hundred miles west of Moscow, they had just encircled and destroyed a Russian shock army at Vyazma. The defense of Moscow appeared to be weakening fast. The German armies, however, were exhausted, too. What with the hardships in the preceding months heavier than could be expected, the soldiers tired, the matériel situation critical, the German General Staff began to lose its blind faith in Hitler's military genius. Von Brauchitsch and Halder considered the situation coolly and grimly. They did not like the look of things. Winter was not more than ten weeks away. Their armies would suffer grievously if zero weather should descend on them before they had erected shelters and gone into winter quarters. They knew how unprepared their soldiers and motor vehicles were for the coming Russian cold. Approaching Hitler, not without misgivings, they proposed that the German armies should where they were, pass to the defensive, build trenches and shelters, bring up supplies, and prepare to resume the offensive the following spring.

But if the generals had ceased to believe in Hitler's military genius, he himself had not. As optimistic and invariable as ever, he bluffly told them to stop being prophets of doom. Russia, he said, was still a soap bubble which would burst at a prick. Russian armies were even more exhausted than the German. Just one more little push and the plain would be in German hands. Was it entirely irrational that Von Brauchitsch and Halder were swayed by Hitler's enthusiasm? True, they suspected now that he was not military genius, but hadn't he been right in Poland, France, and now, perhaps he was right again. Throwing overboard all their fears and worries and their sound military

judgment as well, the generals ordered the German armies forward unprepared as they were.

December 2, 1941 was Russia's day of crisis and Germany's day of destiny. On December 2 the German armies stood just west of Moscow and also to the north and southeast of it. The Russian armies were resisting with fanatic courage and patriotism, but German pressure was great and it seemed at times that the Russians were about to be engulfed.

That night and the following day General Winter took a hand. Subzero weather descended on the Moscow steppes. During the night of December 2-3 the thermometer read 18 degrees below zero. No such temperatures had been recorded in early December for a dozen years.

Throughout the following weeks, catastrophe engulfed the German armies. The soldiers, in their light summer clothes, froze and died by the thousands. The motors, without winter oil or antifreeze, stopped. Neither food nor hot coffee could be brought up to the front.

The Russians, sensing the plight of their enemy, called on their tired though warmly clad soldiers and ordered the counteroffensive. The German armies melted away westward before the onslaught. Moscow was saved. Though neither side was then aware of it, the Second World War had been decided in favor of the Allies. Hitler's star had sunk forever.

Something snapped in the German armies on December 2. Disaster was apparent to everyone. If the Russians had possessed the leadership and the military skill in December 1941 which they acquired by 1942 and 1943, the war might well have ended before a single American division had set foot in Europe. Respect for the skill of the German army, however, caused the Russian generals not to press home their final blow. The Germans, therefore, managed to rally on a line 100 miles west of Moscow.

What the German defeat before Moscow destroyed once and for all was the faith of the German General Staff in Hitler. But it was too late now to save the army—or Germany.

Hitler, furious at the catastrophe and in need of scapegoats, dismissed Brauchitsch and Halder and assumed both nominal and actual command over the German armies.

It is not possible to overestimate the effect of the Russian victory before Moscow on the subsequent course of the war. The German army was never the same again despite occasional victories and some further gains of territory. Ceasing to be a well-oiled machine, it became an army of fears and hatreds. The generals, the General Staff, the higher officers in the overwhelming majority saw clearly at last that their initial suspicions of Hitler had been correct. He was a lucky dilettante. Now his luck had played out. The famous intuition which had brought him three spectacular victories destroyed Germany on a fourth gamble. By abandoning military integrity and bowing to political pressure, the German General Staff played a sorry rôle both in the three previous victorious campaigns and in the Moscow catastrophe. The Allies propose to destroy the German General Staff. They can save themselves the trouble. Hitler and his generals between them did it in this grim winter week before Moscow in 1941.



from the **FIGHT**

Airfield Defense in a Hostile Country

By Lieutenant Colonel Dallas F. Haynes, Coast Artillery Corps

The defense of airfields in Germany presented certain problems not previously encountered. To meet these conditions, the role of Antiaircraft Artillery was changed to a considerable degree and wide departure was made from established tactics.

The decline in strength and activity of the German Air Force brought about by attrition, lack of gasoline, and loss of bases decreased the likelihood of enemy air attack. On the other hand, the fact that airfields were located in the midst of an unfriendly populace increased the danger of sabotage and the problem of local security took an added importance.

Preparation of Air Field Y-94 for occupation by two fighter groups, the 366th and the 408th, was started one

day after Münster was captured. Armored and Infantry elements passed through the area in which the airfield was located so fast that there was little mopping up possible. When the reconnaissance party from the 852d Engineer Aviation Battalion, which had been given the assignment of repairing the airfield, came on the field the Germans hastily touched off final demolitions, set fire to gas stores on the opposite side and departed. One RAF pilot who had been held prisoner by the Germans was set free by Company "C." During the first few days of work on the field thirty-one prisoners were captured in the vicinity.

All buildings on the airfield had been wrecked by Allied bombing and by German demolition. Runways were marked by bomb craters and littered with the wreckage of burned-out German aircraft, among them JU-88s, ME 109s and HE 219s.

The Engineers worked night and day to get the airfield ready by 14 April, at which time the first fighter group was scheduled to occupy it. In spite of the fact that several German aircraft came over practically every night and dropped flares and bombs, the work was completed on schedule and the field was ready when the aircraft of the 366th Fighter Group landed at the new base after completing their mission of the 14th April.

Defense of the field Y-94 was assigned to the 78th AAA AW Bn., operating under the 74th AA Brigade, and the 105th AAA Group. The above were members of the Air Defense Command, which was responsible for the operation of the bulk of the AA units in the ETO.

The IX Air Defense Command had adopted the policy of committing an AA brigade with each tactical Air Command long before D Day. The brigades carried the p



AAOR, kitchen, and living quarters at Y-94.

NG FRONTS

Further, attaching AA groups and battalions to air and squadrons. Many of these units had worked in glove since the arrival on the Continent, with both training from the close liaison and knowledge of each thus gained. At the time, the 784th AAA AW Bn. providing AA defense for the 406th and 366th Fighter Groups at their home base at Y-29 in Belgium.

With this assignment the normal role of AAA was reversed to place first priority on local security, with AA Defense a secondary mission.

Advance information was available on the scheduled movement of the fighter groups in time for a complete reconnaissance. In addition to the regular recce party, the Liaison Surgeon was taken along to check sources of water and to advise on health hazards which might exist in the vicinity of CPs and bivouac areas. All positions were marked and staked out prior to the arrival of the first guns in order that no time would be lost in occupation of the airfield. The 784th AAA AW Bn. was relieved at Y-29 by another AA unit and furnished sufficient trucks for the movement by the 74th Brigade.

Three batteries, "B," "C," and "D," with battery "A" of the 357th AAA Sl. Bn. less the first platoon, detached, were assigned to defend the airfield. This afforded a total of twenty-four 40mm guns, twenty-four M-51s, and six searchlights. Guns were deployed about the airfield in a perimeter defense, with 40mm guns and M-51s approximately dispersed in a circle from 150 to 250 yards apart, depending on terrain. (See sketch.) All searchlights were deployed within the ring thus formed to facilitate local security. This was in direct contrast to previous employment of guns and searchlights in defense of airfields by this unit.

Air defense in the ETO has been a constant struggle between the law of supply and demand and the textbooks on an AA defense. The classic examples of airfield defense use at least one AA Battalion per field—students at classes on the subject will recall the map overlays handed out with instructions to "Place six batteries in defense of this airfield." Many times we did some wishful thinking over here when A-3, Colonel Brady, would get a teletype, "Provide AA defense for airfield Y-68 and POL dump located at ——— without delay." In many such cases it was a matter of splitting a battalion into batteries, and sometimes a battery into platoons. The treatment of the M-51 as an entirely separate fire-unit has helped immensely in the solution of this problem. PRO, IX ADC.

The usual method of employing searchlights was to place them in a circle about 3,000 yards from the center of the

field—these being the lights equipped with SCR 268, with three carry lights set up inside the perimeter of defense where they could be used to illuminate the runways and as "homing beacons." (See page 27, March-April (1945) issue of the COAST ARTILLERY JOURNAL.)

An AAOR was set up near the center of the field by Major Mark S. Cox and Captain Julian B. Crayton, Jr., Battalion S-3 and S-2 respectively. A prefabricated German building was obtained and erected to house this installation. Tents were set up and a mess established to accommodate personnel engaged in operating the AAOR.

Six visual OP's equipped with SCR 543 radios and telephones were put out two and one-half to four miles from the airfield. Telephone circuit from OP's was connected to an SCR 593 used as an amplifier in the AAOR. This was another departure from previous policy for it had been the practice in the past to put OP's out from seven to ten miles from the defended target; the increase of manning personnel necessary to provide local security made the new tactic necessary.

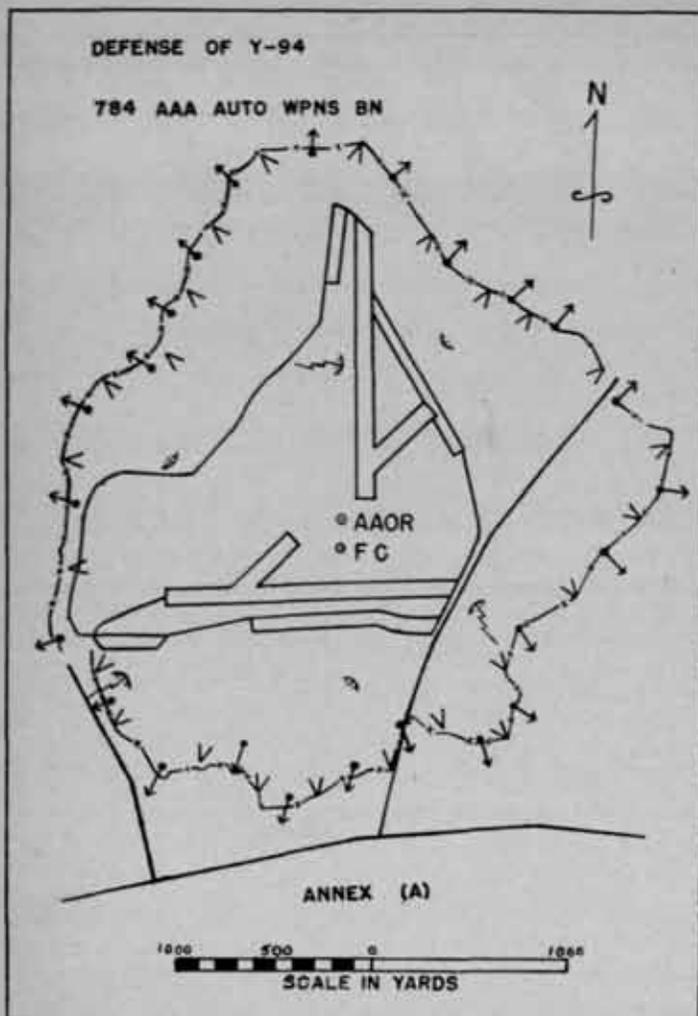
All guns of each platoon were placed on a telephone loop terminating in the AAOR. Each battery kept a telephone operator at the AAOR at all times, equipped with a head and chest set. His duty was to monitor all gun loops and to pass early warning information and orders to the gun sections.

In addition to gun loops, direct lines were laid to flying control and combat operations of both fighter groups for the purpose of liaison with the Air Force. These lines were connected to a switchboard which also had a line running to battalion switchboard for administration.

Early warning was received over a teller line from Tacti-



Tec. 3 Boettcher and Tec. 4 Hansen disarm a German 20mm Flak gun.



cal Air Command. This line was connected to an SCR 593 radio used as an amplifier to receive data and relieve the plotter from the necessity of wearing a head and chest set. An SCR 543 radio, tuned to the frequency used for broadcast of early warning by T.A.C., was set up as a stand-by in event of failure of telephone line.

Personnel required to man AAOR were one AA operations officer, one telephone operator for each battery, one plotter, and one switchboard operator to handle liaison switchboard and OP's. During hours of darkness, the searchlight platoon kept a plotter and an officer or qualified noncommissioned officer in the AAOR to control the searchlights.

The apparent simplicity of this system is misleading. The author neglects to state that the men of his unit, faced with the defense of the airfield against hostile ground attack as well, put in incredibly long hours under conditions that were not conducive to keeping one's youth. This is inserted out of admiration for the officers and men of the 784th AAA AW Bn. PRO, IX ADC.

To improve local security, a barbed-wire fence was erected by battalion personnel. This fence completely encircled the airfield, the AAA installations and the OP's.

For construction of the fence, captured German concertina wire and wooden poles were used. Two rolls of wire, one on top of the other, were placed to make a rather formidable barrier against entry by saboteurs. Around the

airfield itself the fence was strung between gun sections except in cases where local terrain features made it desirable to run the fence in front of the guns. Gun sections were responsible for the maintenance of the fence, each section running the wire to the next section in a clockwise direction.

All roads, except those used as main entrances to the airfield, were blocked off with barbed wire. The main entrances were guarded by fighter group attached MP's. A battalion constructed fourteen road blocks.

The wire itself was rather difficult to obtain. The sergeant in charge, Captain Harold L. Dorman, located several dumps about fifty miles from the field. A total of 200 rolls of wire and 1,350 poles were used. Fifty-five truckloads of material were hauled to the field to complete the project.

When airfield Y-94 was occupied by the 784th AAA Battalion, it was discovered that there were a number of German AAA guns on the field; in very good condition and apparently intact. Realizing the danger that a fanatical enemy might slip in and use them—and also aware of the sometimes dangerous curiosity of American troops regarding enemy weapons, the battalion commander decided to disarm them. T/3 Ewald P. Boettcher, fire controller, and T/4 Donovan G. Hansen, artillery mechanic of Battery B, were given the task. Both of these men attended the disarmament school conducted by the IX Air Defense Command. Equipped with a map of the field showing the plot location of flak positions, the two men started the work of rendering the guns incapable of being fired in accordance with instructions passed on at the disarmament school. The work proceeded without incident until they reached the sixth gun. On this weapon, a 20mm single mount, a bolt in the chamber exploded when they attempted to remove the bolt. Shrapnel struck Hansen and Boettcher in the arms, shoulders and legs. It is believed that the gun was boobytrapped. After receiving first aid treatment they proceeded to complete the disarmament the following day.

The disarmament school mentioned above was conducted by the IX Air Defense Command. Their object, which was attained, was to train at least two men in each battalion in the disarmament of German weapons. The course lasted a week, in which time the student soldiers were made familiar with every type of German flak weapon from the collection assembled early in the campaign in Normandy. The training proved extremely useful to the AAA battalions. Many of them were engaged in this type of work for weeks after V-E day.

German guns disarmed included the following:

Two 37mm guns, three 20mm guns (single mount), thirteen 20mm guns (triple mount), three .30-cal. machine guns (quadruple mount).

A coordinated ground defense plan, employing Air Force and AAA personnel, was prepared by the battalion as follows:

1. Fields of fire were determined for each AA gun to provide complete coverage of the airfield fence line without endangering friendly installations. The plan involved, in general, that each unit would defend itself, with a reserve available to be employed at the direction of the

Liaison was established with other troops in the area with Ninth Army reserves.

Civilians living within the boundaries of the fence evacuated.

The AAOR was designated as the battle headquarters the AA communications system used for coordination control of Defense Forces.

The defense of airfield Y-94 as described above was a real departure from established tactical principles. Such a defense is obviously not the best procedure for an AA base, however the fact that the field was not seriously

attacked from the air after the arrival of the AAA would seem to justify the risk taken in this respect.

The area in which the field was located was thickly populated with German civilians and displaced persons of all nationalities. At the time the field was occupied these people were wandering all over the countryside, wearing nondescript dress and parts of uniforms, thereby making local security very difficult to attain. The type of defense established proved effective in preventing unauthorized entrance to the field, and, under the circumstances, appears to have been a sound employment of AAA troops.

Flak Analysis, ETO

By Major John B. B. Trussell, Jr., Coast Artillery Corps

It is well known that throughout the late war Antiaircraft Artillerymen were called upon to display their versatility by performing a wide variety of duties which were unrelated to their own arm—at various times and in various theaters they acted as Infantry, Field Artillery, Engineers and as laborers. The work they did as Antiaircraft Artillerymen is better known. But there is still another duty, unfamiliar to the Antiaircraft but completely unpublicized, which was performed—flak analysis.

Flak analysis is a specialized type of Intelligence work for the Air Force. It came into being when, during the bomber operations over Europe, flak was beginning to show its full proportions as a threat to our fliers. Some previous attempts to counter the effects of antiaircraft fire had been made by the Air Force during the African campaigns, when officers of neighboring AA units were asked for advice on approaches to certain important targets, but it was not until the summer of 1943 that Antiaircraft Artillery officers were attached to the Air Force with the primary duty of analyzing enemy AA defenses. The efforts of these Flak Officers met with sufficient success to warrant the special training and assignment of Antiaircraft officers as advisers to all Air Force echelons down to and including Wings. Before June 6, 1944, all the Air Forces in Europe had been supplied with Flak Officers.

The newly assigned Flak Officer was faced with a considerable number of problems, not the least being a precise definition of his duties. He knew that his purpose was to reduce losses from flak. For this he was equipped with a technical knowledge of antiaircraft tactics and technique, with instruments with which to compute the probability of damage to an aircraft approaching a target on any heading, provided the location and strength of the enemy's AA defenses were known. Fortunately, in most cases this information was already available; part of Air Force Intelligence had long been devoted to the determination of flak data. Without going into too much detail as to the uses of these data, the primary method of learning the location of each enemy AA battery was by the interpretation of aerial photographs. Systems for the rapid interpre-

tation of photographs and dissemination of the findings, then, were already set up.

The Flak Officer had still, however, to determine the best uses to be made of the data at his disposal. But before he could do anything, he was faced with the necessity of convincing the Air Force officers with whom he worked that he had any sort of solution to the flak problem, for despite the fact that the higher commanders believed in flak analysis, many of the lower echelons still had to be sold on it. For this reason, and also for the reason that one of the best ways to understand a man is to share his difficulties, most Flak Officers made a point of flying combat missions as soon as possible.

An additional approach to the problem was made by careful study of all details of each loss to flak. In most cases these studies merely verified what a knowledge of the capabilities of AA fire would have led the Flak Officer to consider bad tactics, but some new facts were revealed. More important, many instances of the existence of misunderstandings of AA potentialities were also revealed. For example, the belief was widespread at one time that if a flak burst missed a plane, the pilot should fly to the place where the burst occurred, as that was the one place in the sky where the enemy, having missed, was certain not to shoot again. No account was taken of the rounds which were still on the way!

This research naturally led to the propagation of the best methods of evasive action and the instruction of pilots in the least vulnerable tactics. Thus, one duty of the Flak Officer came into being.

Another duty was to advise the commanding generals in the writing of field orders, so that the most flak-free routes from base to target and back could be selected. As field orders were normally written at headquarters of division or higher level, this duty devolved only on the Flak Officers at the higher echelons; there, however, it was of considerable importance, and in some units the Flak Officer's opinion was regarded so highly that he had, in effect, the final say in whether or not a given target would be attacked.

The third duty of the Flak Officer was to make a detailed,

mathematical study of the target's defenses and, on the basis of this study, to make recommendations as to the best headings for the actual bomb runs into and out of the target area. This information was secured after the route to the target had been selected, and was sent directly to the groups which would fly the mission. In this manner, the Flak Officer had a hand in the instruction of pilots before they flew a mission, a voice in the selection of targets and of routes to the targets eventually selected, and the determination of the least dangerous headings for the bomb run. He had done everything within his power to safeguard the planes from flak.

On the other side of the ledger, by careful study of flak loss and damage Flak Officers were in a unique position to increase their knowledge of their own arm by observing the effectiveness of various types of antiaircraft tactics and equipment employed against our Air Force. On the basis of seventeen months' experience as a Flak Officer with Air Force units in an active theater of operations, the writer can make the following suggestions:

1. Camouflage of our own AA positions should be emphasized; the enemy makes every effort, by photo interpretation or other means, to learn the location of our guns. He is sure to try to take advantage of the weak spots in our defense—and they will almost invariably exist. Anything which hampers him in determining the location of our guns is to our advantage.

2. The doctrine of training gunners to stand by their guns and "shoot it out" with enemy aircraft, even when under direct attack, is extremely wise. Our antiaircraft automatic weapons are universally able to commence accurate, effective fire against an aircraft at a range several hundred yards greater than that of which the aircraft's guns are capable. Furthermore, the deterrent effect of AW fire should

not be underestimated; aircraft can frequently be driven by the sight of tracer and self-destroying bursts into numbers. A strafing pilot is usually more concerned with intensity than with accuracy of fire.

3. Point-blank fire of AA guns against strafing or bombing aircraft can be very effective. Although aim is not precise, the large lethal area created by a bursting shell counteracts the lack of exact accuracy. Again the deterrent effect of shell bursts is considerable.

4. High-altitude barrage fire, while it is spectacular, undoubtedly has a psychological effect, pays relatively small dividends. Not once during the operations of the Eastern Air Force, with which the writer is most familiar, did man anti-aircraft fire prevent the bombers from hitting their targets. It is suggested that, while no anti-aircraft defense can be completely impenetrable, a great deal more damage might have been done had the Germans made more universal use of continuously-pointed or predicted fire. However, although barrage fire was relatively ineffective, the larger the concentration of *predicted* fire, obviously the greater the chances of making hits.

Probably never during the war did American AA units have targets comparable to those with which our Air Force furnished the enemy. Before that would be possible the enemy would have to gain command of the air—an impossibility with our fighter aircraft and our Antiaircraft Artillery. That fact is a testimonial to the superiority of our equipment and training. Further, the enemy in this theater did comparatively little damage to us, despite the good targets we unwillingly but unavoidably furnished; part of the weakness of his reaction was almost certainly due to the effectiveness of our analysis of his flak, and of our efforts to exploit his deficiencies by attacking where his defenses were weakest.

The Long Wait*

Preventive Maintenance Pays Dividends

Ask any veteran antiaircraftman what plagued him most about service overseas and he probably won't mention the desolation of far-flung Pacific outposts or the discomfort of slush-filled gun pits in Belgium; he won't complain of insects or disease, mud, rotted food, rain, or heat or cold. These things he expected and suffered as a matter of course. But just let him get started on the months of inaction, the long night hours of alert when he stood to his weapon and no enemy came, the day-after-day, monotonous labor of care and maintenance. He was prepared for that, too, in a way, but he never got used to it, and he certainly never came to like it.

Drill, drill, drill. Clean, clean, clean. Orient and synchronize. Static checks. Dynamic checks. Exercise the director. Exercise your oil gears. Practice searching and

tracking with your radar. And then take everything apart and clean it and oil it again.

It's necessary, sure. In AA, you have to train for months to get in a few minutes of shooting. And if you're not in perfect condition continually, if your equipment isn't in perfect operating condition *all the time*, when that few minutes does come, your months of training aren't worth a single, solitary shot. It takes a very high type of soldier to stand the monotony and still maintain the critical level of efficiency demanded in AA.

Let us tell you a story which appeared in Etoussa's Notes, the story of a man whose example should furnish an ideal for every antiaircraftman.

Staff Sergeant James R. Brown is a motor sergeant in the 455th AAA AW Battalion. He is good at his job, a Bronze Star Medal he won for outstanding performance in duty will testify.

*Prepared at AA Command.

Now a motor sergeant in a mobile AW battalion has plenty to do, but Brown always found time to devote to cleaning, oiling, and becoming familiar with the caliber .50 machine gun on the ring mount of his wrecker. There isn't a better kept weapon in the outfit. The only trouble is that he never got a chance to fire it at anything, enemy planes or ground targets. The rest of the battalion saw it in enough, but somehow Brown always had to be away from his weapon when the shooting was going on.

He was actually getting downhearted about it toward the end of the campaign into Germany when the battalion was accompanying a Field Artillery group supporting the 1st Armored Division. Then, on Friday the 13th of April, it happened.

Sergeant Brown was riding in his wrecker at the tail of the column with Headquarters Battery. It was just a routine march, with the main body of the enemy miles away. As the battery approached the Gera overpass of the *autobahn*, two German vehicles loaded with personnel rolled into sight on the road leading south from the *autobahn*.

An engineer officer called from his jeep for caliber .50 rounds on the Jerries. Brown swung his wrecker into a favorable position, jumped up into the ring mount on top of his gun, fired a short burst for adjustment and then poured 125 rounds of ammunition into the hapless German vehicles. The Krauts scattered in all directions, those that were left of them, and as the vehicles began to burn Sergeant Brown proceeded down the highway to rejoin his column. Well, that felt pretty good. At last Brown was really fighting in the war. He didn't know his lucky streak was entirely on the up-grade. This was Friday the 13th—lucky for the *Luftwaffe*.

The battery mess truck developed a flat tire. Sergeant Brown stopped to help change it. He was nearly finished with the job when he spotted five enemy aircraft coming directly toward his vehicles!

He made a wild dash for the wrecker, scrambled into the cab and up in the ring mount, and whipped his .50 around to engage.

The planes each made a separate pass about one minute apart as if to strafe. The first one came in about a hundred feet off the ground, head on, and seemed to be flying right down Brown's gun barrel. No lateral lead was required as the sergeant opened up; he could see the hits as the plane's motor conked out. It crashed and burned about 300 yards from the wrecker.

The second plane met a similar fate, and crashed about 300 yards beyond the first.

The third plane flew very low, directly down the *autobahn*, and as Brown opened fire it veered sharply to the left, its underside offering a beautiful target for the machine gun. This one went down in flames over some near-by woods and crashed about one kilometer north of the *autobahn*.

The fourth plane received hits around the cockpit and fuselage, and disappeared from view smoking badly and losing altitude.

The fifth plane took a hint from the fate of the others and stayed well out of range of Sergeant Brown's gun.

Singlehandedly, Brown had accounted for three Category I's and one Category II out of five enemy aircraft. So he merely climbed out of his cab and finished changing that tire, and gunned his vehicles along to catch up with the rest of the column.

How he felt then probably no one else will ever know. Triumphant, certainly. But thankful, also, for the hours of care and maintenance which had kept his weapon always in condition for such an opportunity.

What had happened was not an accident. This was Brown's first chance to engage the enemy, a chance for which he had had to wait a long time. But his gun was ready, so it did not jam. And his ammunition was ready—and Sergeant Brown was ready.

Battlefield Illumination for the Infantry*

By Lieutenant Perry Reed McMahon

In the Pacific War, from Guadalcanal up the Solomons, to Port Moresby up New Guinea, and to a lesser extent in Leyte up and down the Philippines, much of the battle has been waged in jungle growth, with the Jap utilizing his cunningness to maneuver and attack.

A new use for Antiaircraft searchlights in the Pacific theater may ultimately change* one of the Jap's primary fighting tactics which carried him with such speed through China, the Malay States, and generally everywhere in

his Greater East Asia plan until he met his match with American jungle fighters.

These tactics included infiltration, both by day and by night, suicide charges, encirclement over almost impassable terrain, and consequent disorganization of the opposition.

After many years of first training and then fighting in the jungle, he became an expert in cover and concealment. He was a first-rate night fighter.

Superiority of air and artillery in the Philippines has now prevented his movement in any considerable force during



daylight hours. Liaison planes hovering over his lines watched every move so the Jap went back to his night fighting.

An experiment in the use of searchlight batteries to manufacture artificial moonlight has proven so successful it may well become another link of the Antiaircraft Command with the Infantry.

After a two-week trial period of a searchlight battery in the Ipo Dam section of Luzon, during which time a flood of twelve billion candle power was reflected off the clouds onto the Jap lines from nightfall to dawn, the AA was credited with being largely responsible for the following:

1. The halting of a banzai night attack on the perimeter of an infantry company, with the Japs leaving fifty-eight of their dead before making a hasty retreat out of the artificial moonlight.

2. The saving of a 30-man patrol, which, cut off and surrounded by Japs, had enough light to fight their way clear, and later direct artillery on the Japs. They freely gave credit to the boys who manned the searchlights.

3. It was possible with use of the light for medical aidmen to carry the wounded from the battlefields at night. Previously they had been forced to render what first aid they could on the spot, and wait until morning to carry litters back.

The infantry turned reports of these results over to the AA with thanks for the help given.

Our first meetings with the enemy on Guadalcanal revealed his previous training and the Americans had to learn from experience. By the time we reached Bougainville we were learning much. There in the dense tropical growth, huge trees of teak and mahogany, rattling bamboo, and lush tangle of vines and shrubs, the Jap continued with his peculiar type of warfare.

He strung vines along the trails he used. At intervals he smeared them with phosphorus, and at night he launched his attacks along those trails.

He was tough and practically—so it seemed—immune to

the interdiction of such tactics. He could keep it up after week, constantly a threat and a menace.

To combat these tactics the Americans from the evolved the simple procedure of throwing up perimeter night, digging in, and then watching all sides in a long vigil—one man out of each two alert—the other snoring his two hours of sleep while his companion stared into the blackness, listening, tense, his finger on the trigger.

After a few experiences of Japanese banzai attack night the jungle could become a terrifying place. Noises of the insects and small animals, the crackling of the bamboo, the falling of some huge tree, succumb at last to the fungus of jungle rot, added to the illusion of the constant threat.

There was considerable psychoneurosis from this alone. Combat fatigue from lack of rest at night combined with almost constant rain, was part of the problem. Within the closed perimeter was the best counter-tactic available. It left room for improvement.

Our inner perimeter at Empress Augusta Bay on Bougainville was only seven miles long and five deep. Within the perimeter, characteristically, the Americans built a town of their own, with airfields, wide streets, theaters, athletic fields, all cut at enormous physical effort out of the forests that came down to meet the sea.

Lights flared at night—except during the interval when the Japs were sprinkling the area with artillery.

It was there quite by accident, with no detailed plan, that searchlights set up for Jap plane detection were first used for the infantry in the South Pacific.

While the technique was not perfected, there was no comment as to its possibilities. On two or three occasions during the March 1944 attack in the Second Battle of Bougainville, the surrounding mountainsides were illuminated by reflected light of the plane seeking beams. Japs made attack after attack there losing some 8,000—*the artificial moonlight aided our infantry.* However, the scope of the jungle war gradually decreased on Bou-

and with it the use of searchlights. Also we didn't have many searchlights to experiment with at that time.

Nor was the technique used in the New Guinea campaign, partly because of the nature of battles, and partly because SWPA had no excess of searchlights.

On Luzon the situation was different. There was more aerial on hand. The Jap air attacks on Leyte had brought an increase in the searchlight strength.

The Jap rapidly withdrew to the wild areas of Luzon, beginning this maneuver immediately after the Sixth Army landed in Lingayen Gulf. The Japs, according to the Yamato plan, withdrew to the north, the south, and the flanks, realizing as that general pointed out, that they could not beat the Americans frontally, and would retire to the mountains to await happier days.

Here the Jap, utilizing caves already present, dug deeper and deeper. It was a continuation of his defense developed in his fanatical fighting in the Marianas and Biak and improved in the Bonin and Ryukyu groups.

He tried the same on Luzon. He dug in so only direct shots of our artillery and bombs could blast him out, and using the precipitous cliffs, often his redoubts were impossible to reach by bombing.

It was a job for the infantry. The infantry went in after him and the Jap did not experience *ennui* in his wait for happier days—but it was tough, hard fighting to dig him out.

Thus the 43d Infantry Division had been busy for weeks, despite nearly four months of fighting by the Sixth Army from Lingayen on to Manila, and then, from Lingayen up, and from Manila down, by May the Jap was still in control of the area about Ipo Dam—some twenty-seven miles from the outskirts of Manila—and part of the watershed that supplies that city with water.

It was in this area that battlefield illumination was first used on Luzon, or for that matter, in any complete planned experiment in the Pacific War.

Battery A of the 227th Battalion, part of Brigadier General Charles A. French's 68th AAA Brigade, was sent into the area with ten lights gathered up from air strips where they were no longer needed due to our air superiority. This was to be an experiment, and the AA command was proceeding with that in view.

The battery, under command of Captain George T. Macklin, Jr., was drawn into the line and each light well-defiladed and reveted in, because the Japs from the heights were able to shell the lower terrain.

Lights were emplaced from 2,500 to 4,000 yards from the Japanese lines and the experiment began.

From a distance the play of the beams over the mountains looked like the aurora borealis, and could be seen as far away as Manila.

The seven-man light sections had their hands full. Being close to the Jap lines there was constant threat of infiltration, and as the sections were dispersed over considerable area, isolated, a machine gun had to be manned constantly, and guards had to be alerted on the flanks, leaving an operator for the power plant, a man to operate the lamp, and a communications man. They slept in shifts, and got longer periods of rest during the daylight hours.

Rations were a problem, and sections were fed by the closest infantry or artillery unit, but this system had to be augmented by issues of field rations, since when the rains came hot food could not always be carried over the roads which had been bulldozed through terraced rice paddies, and along goat trails. But regardless of the difficulty the mess sergeants did their usual job, and while sometimes they ate late, the section crews always ate.

Lights, after emplacement, were turned on at dark, usually about 1930 and continued on until 0530, dawn. At first they were traversed, but in later practice a steady beam was used, turned skyward over the crests of their emplacements, reflecting downward from the clouds and lighting the area desired with a varying amount of light.

On dark nights, with a heavy overcast sky, or during rains the lights worked better than when the sky was cloudless. This was a boon, for the Japs usually chose such a night to attack. On Luzon the sky is usually overcast particularly during the rainy season. On one occasion when the ceiling was high a plane was sent over to cast smoke; the result was good, but not as good as against the clouds.

Beams were from five to seven degrees, and each light with its 800,000,000 candle power focused into the stream of the sixteen ultimately used, brought a combined candle



power of twelve billion which could be diverted to any desired position.

Decision to increase the number of lights came after the infantry, well pleased with results, asked for more. According to Captain Macklin the light result over a wide area was equal to three-quarters full moon.

Results were amazing from the very first. Primary plans called for general illumination of the area, later specific sections were lighted up according to the wishes of the infantry battalions. Control was such that should the lights illuminate our own troops too well they could be swung away immediately.

Lt. T. B. Work of the Infantry battalion which had two companies on the ridge most affected by the light believed it increased the efficiency of his troops greatly.

Up on the ridge where the infantry was dug in, Technical Sergeant Rollie C. Clark, a member of I Company, had a platoon gathered about him. They were eating a mess of C rations, and later that afternoon were going to attack (with other troops) Jap positions athwart the Metropolitan road.

There had been a 100-plane air strike only a few minutes before in which many tons of gasoline-jell bombs had been dropped. These fire bombs had burned about the mouth of the caves, and now the artillery was blasting the caves.

"I'd say that morale goes up about 60 per cent when the lights are on," said the Sergeant. "It's just like hunting coons on a moonlit night."

Another infantryman with a bushy black beard had good word for the lights. "It cuts away that inky blackness when you can't tell a body from a cow," he drawled.

"Yes," agreed another, "and it cuts down the chances of one of our own fellows tossing a grenade in your hole when he hears a noise."

Then a wizened little fellow, who looked like he had been fighting the Japs firsthand for many months, spoke up. "The best thing it does, it lets a man get out of his hole if he has to get up at night and no one is going to take a pot shot at him, thinking he's a Jap."

Universally the infantry soldier wanted the lights to continue. "Keep them on every night," was the consensus.

AA Searchlights on the Normandy Beachhead

By Captain Frederick W. Eggert, Jr., Coast Artillery Corps

To the 225th AAA Searchlight Battalion was assigned the mission of furnishing illumination for the air defense of the entire Normandy beachhead. Although the organization had been extensively trained in fighter-searchlight tactics in the United States, it had considerable experience in gun tactics while participating in the Air Defense of Great Britain and consequently was prepared to operate in conjunction with automatic-weapon and gun units in the defense of the beachhead.

The advance party began its reconnaissance of positions on D plus 6, confronted by sniper and land-mine difficulties. Of the two, mines were the most serious for the positions selected were principally in the heavily mined areas. The defense contemplated in the original plans called for a normal circular defense of one battalion with lights 6000 yards apart. This presented an unusual problem in that it assigned to a single battalion an area normally covered by several searchlight battalions. The circle was to consist of two concentric rings, 6000 yards apart. All radar-controlled searchlight sections were to be on the outer ring, the inner ring consisting of searchlight sections only. The normal ring defense contemplates a defended object no greater than 2000 yards in diameter. Here the area was approximately 18000 yards by 12000 yards. Atmospheric conditions in this part of France being somewhat unfavorable, it was realized

that no great concentration of light could be placed on any one given point in the entire defense. With these problems in mind the reconnaissance proceeded and all positions were selected.

It was determined that this attempt to defend the entire beachhead with a single battalion was impractical and would be accomplished by restricting the objective to several small but vital points. Highest defensive priority thereupon given to airstrips then operational or in the course of becoming so. It was anticipated that any enemy air attacks would be directed at these strips and that such attacks would be executed from very low or low altitudes or would be in the form of strafing attacks. To accomplish this one platoon was to be deployed about each airstrip thus insuring a maximum of six lights per airstrip although more than three lights would be used on any single airstrip. The platoon organization was well fitted to this plan and by eliminating the normal 6000-yard interval a compact and effective defense could be attained.

Since the type of enemy attack anticipated was from a low level there would be no necessity of gun-searchlight operations. Consequently searchlight illumination was to be used in conjunction with automatic-weapon units so that at a maximum slant range of 8000 yards. This being the plan, one platoon could illuminate all avenues of approach

approach and effect an illumination well before the hostile plane reached the defended point.

The tactical disposition of the elements was built about offset triangles. The inner triangle was to consist of three searchlights only. At either end of the airstrip, 200 yards from the landing mat a carry light was placed. The third carry light was placed to the airstrip flank, 800 to 1000 yards from the center of the strip. The lights at the ends of the strip were placed well to the flank and subsequent incidents justified the necessity for this. No possible obstruction to landing or departing aircraft could be permitted and though caution was used in placing these lights to the side, on several occasions bomb-laden fighter bombers barely missed these lights by a matter of feet.

From the disposition of the three carry searchlights it was possible to obtain complete coverage of the strip and the adjacent area. If necessary these three lights would place a copy of light over the strip either to home a lost aircraft or to furnish illumination for automatic-weapon fire. Another function of these lights was to illuminate the strip proper if so requested by the airstrip commander.

The three radar-controlled searchlights of the platoon were to be placed in the outer triangle and, if possible, were to offset the inner triangle searchlights. The radar-controlled lights were to be approximately 2000 yards from the strip with the same interval between lights. By offsetting the outer lights any possible dead or obscured avenues of approach were eliminated.

The main difficulty in siting these radars was that considerable mutual interference was to be expected. Later events showed this fear to be wholly without foundation for the sets operated extremely well under the circumstances. The absence of interference may well be due to the density of the now famous Normandy hedgerows which would have been more accurately described as tree rows. The advance party in selecting these radar sites did its utmost to find those having a certain amount of terrain mask but the flat nature of the countryside made this almost an impossibility. A few sites had some mask but the great majority had nothing but flat, heavily wooded terrain.

To appreciate the problem of preparing positions is to understand the nature of the well-known Normandy hedgerows. In fact, they are not hedgerows in the American sense of the word but rather a line of thick, close trees and bushes. Every field is bordered with them. The trees are by no means small, often towering to seventy or eighty feet. A natural line of sight was therefore difficult if not impossible to find. Cutting down a single row of trees would not solve the problem, for beyond that row were more fields with more rows of trees. To overcome these obstructions and to obtain a five-degree line of sight which would permit illumination of low-flying aircraft at maximum range, towers were erected for both the searchlight and distant electric control station.

The towers for searchlights were four feet in height; those for the control station were six feet. Construction of these towers was mostly of sandbags with a center of short logs. A number were erected by building a platform across the hedgerow using the stumps of fallen trees as columns. The searchlight was rolled into a truck or prime mover

which in turn backed up to the platform and the searchlight was rolled on to it. The control-station towers were built with sandbags in the center of fields and securely wired down to prevent toppling.

Though much hard labor was necessary to build these towers, later results fully justified the effort for the five-degree line of sight was obtained. Many of these excellent results would not have been attained had it not been for the cooperation of the Corps of Engineers in furnishing the services of their bulldozers and power-saw units. Their invaluable assistance enabled the rapid construction of these towers and made it possible for this organization to become operational with the least possible delay at a time when illumination was urgently needed.

ENEMY ACTIVITY

Upon becoming operational on D plus 12, it was discovered that the initial estimate of the enemy's probable tactics proved to be incorrect. Contrary to expectation most enemy activity was from intermediate altitudes and on a few infrequent occasions from low altitudes. This also was a change from the earlier enemy tactics in Normandy when more attacks were executed from very low level with little concern about cloud cover.

It is not possible to disclose the number of illuminations of enemy aircraft made by this organization. However the number was not great due to the enemy's failure to fly on clear and cloudless nights and his wide use of natural cover. If the night was clear there was very little enemy activity. When a plane ventured from cover and was illuminated, violent evasive action was taken immediately. A prolonged illumination under these circumstances was extremely difficult. Once the plane entered the cloud bank the cloud's density prevented further illumination. The distance a hostile plane stayed from his cover was small. On one occasion an enemy aircraft was illuminated for an instant and immediately dove vertically into a cloud bank.

During the first two weeks of the Normandy campaign the greatest number of enemy attacks occurred at either dusk or just before dawn. In the beginning it was virtually S.O.P. for the enemy to appear at the moment our fighters were landing at their bases. Later on, however, this activity greatly declined.

Experience in this campaign has shown that the German pilot has a far greater fear of searchlights than American pilots. The latter do not become as panicky as the enemy nor are their evasive actions as violent as those of the enemy. Evidently the German pilots still remember their costly encounters with searchlights during the Battle of Britain. It is often a trait of human nature to overestimate one's own accomplishments, but from enemy activities before and after the arrival of searchlights this organization cannot help but believe that it materially contributed to rendering ineffective enemy activity over the Normandy beachhead.

Another escape used almost as widely as cloud cover by the enemy was that of "window" which is simply the dropping from aircraft of strips of tin foil which interfere with radars by clouding the scopes. On nearly every occasion that enemy aircraft was present in the area window was detected in the same vicinity. These attempts at interference had little if any effect for this organization had been

well trained in countermeasures while operational in the Air Defense of Great Britain. Interference countermeasure training more than proved its worth, for the primary purpose of window, the element of surprise, was totally absent.

The continuous flow of intelligence is a matter of vital importance to higher echelons. This battalion by its dispersed setup was able to observe all activity in its area and the intelligence furnished by it proved to be of considerable value. Frequently data was reported well before any notice thereof was given by other echelons or by long-range warning systems.

Whether or not the further development of radar will eliminate the necessity for searchlights is a matter for future study. However, the role played by searchlights in the Normandy campaign and subsequent campaigns has more than warranted its presence in this theater. Many AAA outfits can boast of the number of enemy aircraft destroyed by them, but few can lay claim to having saved as many of their own planes as this battalion. These searchlights have been welcome sights for many an American pilot lost or in distress. Its contribution to the discouragement of German pilots was material and its facilities for transmission of "on the spot" intelligence were of no mean importance in determining the nature of any activity in the vicinity. Considering all of its diversified activities, the searchlight played a major role in making the defense of the Normandy beachhead impregnable.

LESSONS LEARNED

1. Automatic weapon and gun units must be impressed with the necessity for fire discipline when operating in conjunction with searchlights. It was found that frequently when a searchlight went into action on an air target many fire units immediately commenced firing as a matter of course even though the target had not been illuminated or if illuminated, had not been definitely recognized as such. This was especially true when two lights formed an intersection with or without an illuminated object. Fire units must hold fire until recognition is assured.

2. All AAA units equipped with radar must be trained in operating in the face of enemy attempts at interference. Such training should be a prerequisite for combat unit training, for it was observed that enemy air activity invariably accompanied by some attempt at artificial interference with radars. There will be little, if any, success upon the units operating personnel if this anti-interference training has been adequate.

3. Units in training must be impressed with the importance of clear, concise and rapid transmission of intelligence regardless of how important or unimportant an incident may seem to the individual observing it. Higher echelon may be able to fit the seemingly unimportant elements of information into a clear picture of some enemy endeavor. Many troops are prone to transmit only that information that seems important to them personally.

Mopping Up By An Army AA Unit

By Lieutenant Edward R. Neuwald, Coast Artillery Corps

Rather unique in the operational history of Army Anti-aircraft Artillery units was the secondary mission of combat patrolling assigned to the 64th Antiaircraft Artillery Gun Battalion. This unit disembarked on an island in the Western Pacific just one month after organized resistance had ceased and was prepared to assume its normal tactical responsibilities in connection with the air defense of projected installations on the island. During the weeks that followed, due to the relative uncertainty of the location of the proposed airfields, the battalion set up a temporary bivouac.

Although roughly 11,000 Japs had been killed up to and including the date on which the island was declared secure, there still remained a large but undetermined number of scattered enemy forces located principally in the northern portion of the island. During the assault phase, the enemy had concentrated his forces in the central part of the island, but the overwhelming superiority of the American forces forced a general enemy withdrawal. The Jap commander

elected to retreat northward through the relatively flat jungle covered plateau.

It was for this reason that during the early stages of the mopping-up phase the scattered enemy groups were largely concentrated in the northern area. The dense jungle foliage of this region afforded an ideal hide-out for the enemy forces. Available to the Jap was an abundance of food in the form of native fruits consisting of bananas, coconuts, papayas, breadfruit, and taro. Furthermore, in spite of the fact that there were no perennial streams, and extremely few springs, water provided no serious problem for the enemy. Green coconuts were everywhere for the taking, and it is doubtful that any of the enemy suffered from thirst to a great extent, even during the relatively dry winter months.

During the initial period of the mopping-up phase, the northern half of the island was patrolled by elements of a Marine division which had taken part in the general assault. In spite of the attendant difficulties in making enemy contacts these Marine patrols were eminently successful.

erecting out and destroying a large number of scattered enemy groups.

During this initial mopping-up stage the 64th Antiaircraft Artillery Gun Battalion occupied two bivouacs in the northern region. Provisions for local security were made and liaison established with the Marine Sector Commander, permission was obtained to operate daily security patrols. These patrols were, however, limited to an area, the radius of which did not extend beyond five hundred yards of the perimeter of the battalion bivouac.

The entire northern area of the island was considered generally dangerous because contacts with enemy individuals and groups could be expected almost anywhere. It was believed at the time that the remaining enemy forces were in a highly demoralized state and were not seeking to encounter our patrols. It became generally evident that escape was uppermost in their minds rather than a desire to close with our forces. Nevertheless, aggressive action on their part always remained a distinct possibility making it necessary to take all normal security precautions. American personnel were strictly forbidden to leave their bivouac areas except on assigned missions, and, in the latter event, when they did so they were always armed. Motor vehicles always carried one or more guards.

The danger to lone trucks was enhanced by the extremely poor roads. In almost all instances, they were nothing more than bull-cart trails which had been cut laboriously through the tangled jungle growth. The thick vegetation formed a green wall on each side of the road. Terrain of this nature afforded ideal concealment and a perfect setup for an enemy ambush. Since the rainy season was at its height roads were usually hub-deep in mud, forcing vehicles to maintain a snail's pace. It would have been a simple matter for a hidden Jap to deliver small-arms fire or toss grenades at a passing vehicle and make good his escape. For some unknown reason, the Jap failed to take advantage of this golden opportunity, for ambushes under these circumstances are extremely rare occurrences.

During the time that the 64th Antiaircraft Artillery Battalion occupied its two bivouac positions, security patrols of the battalion accounted for twenty enemy killed and six captured. Furthermore, as previously stated, these patrols were confined to an area which did not extend beyond five hundred yards from the bivouac perimeter. The wily Jap, in order to avoid the regular Marine infantry patrols, apparently sought refuge in the dense thickets adjacent to the battalion bivouac, after observing that Marine patrols were circumventing the area. This proved his undoing with the resultant casualties being inflicted upon him.

Since it was obvious that the Jap could approach unseen and, in most instances, unheard to within a few yards of the bivouac area during the hours of darkness, it was necessary to provide a strong perimeter guard. Later, when the batteries moved into tactical positions, single- and double-strand barbed-wire fences were constructed to lessen the danger of night infiltration. Enemy individuals were constantly attempting to work their way past the guards ostensibly to raid food stores. Although a number of alarms were sounded it is not believed that any of these raids were successful, nor went undetected by, the 64th Antiaircraft Artillery Gun Battalion. To add to the difficulties which already

confronted the guards, numerous dogs, cattle and pigs, the property of natives, wandered through the jungle at night. It was difficult at times to determine whether a near-by noise was made by an infiltrating Jap or by one of these animals.

The enemy was constantly on the move. Causes contributing to this fluid enemy situation were the constant patrolling by the Marines during the early mopping-up stage and the need of the Jap, impelled by hunger, to seek new sources of food. Some of the enemy apparently had the foresight, during their general retreat, to cache quantities of food supplies and were able to return weeks later and find them intact. Others, not so fortunate, were forced to subsist on native fruits and livestock which they could kill. Some were able to adapt themselves to primitive living much more readily than others. This became strikingly evident when some Japs were killed or captured bearing a close resemblance to living skeletons, while others of the enemy who became casualties were in excellent physical condition. On the whole, however, the majority of these enemy remnants managed to do more than merely sustain themselves. They did, however, suffer extreme discomforts which tended greatly to lower their morale.

In the matter of weapons the Japs were forced, almost without exception, to depend on small arms and grenades. Due to the necessity for their remaining on the move, they soon had to abandon all weapons which they could not readily pick up and carry away quickly. They were greatly hampered by the lack of cleaning and lubricating materials. The assault phase had begun just prior to the advent of the wet season and the mopping-up phase began with the rainy season at its height. This island has a relatively high humidity throughout the year and, without proper maintenance, weapons were prone to deteriorate with extreme rapidity. A survey of enemy casualties showed that about one out of every five was equipped with a serviceable rifle. But the mere fact that any enemy group encountered might have one or more of these weapons available for use meant that all of the normal precautions of combat patrolling had to be taken.

The Japs on this island placed great faith in the grenade as a weapon. Almost to a man, they were found to carry one or more. This was due in all probability to the fact that serviceable rifles or pistols were scarce. The grenade, on the other hand, could be depended upon to function with greater certainty since it withstood the ravages of the weather. It also provided a ready one-way ticket to the "Yasukuni Shrine," should the ever-suicide-conscious Jap elect to depart this unhappy world.

These were the conditions generally existing approximately three months after the island had been declared secure. At that time Marine infantry units which had been patrolling the northern regions of the island were relieved of their mission to take part in extended operations elsewhere. Under orders of the Island commander, Lieutenant Colonel Armand F. Hoehle, commanding the 64th Antiaircraft Artillery Gun Battalion, assumed the duties and responsibilities of ground defense commander of the North Sector, an area comprising roughly sixty square miles. Two other antiaircraft artillery battalions were attached for operational control.

Considering the fact that the area to be patrolled was so vast and the number of men available for this task was so small, it could not be expected that the region could be as thoroughly searched as it had been previously. Although on the date that Colonel Hoehle assumed command 17,180 Japs had been killed and 457 had been captured, it was evident that a large number of enemy fugitives were still at large and were roaming more or less freely over the island. Accordingly the commanding officers of the two attached antiaircraft battalions were made sub-sector commanders and the North Sector was divided into three parts. In making these divisions, existing road nets and trails were used as sector boundaries thus enabling patrols to avoid moving beyond the limits of their assigned sectors.

It must be remembered that this region was a plateau with exceedingly few distinguishing landmarks and that it was covered with thick jungle growth. In many places it was so thick and tangled that it could be almost considered impenetrable except for a man crawling on all fours. Knowing this, it can be more readily understood why it afforded such a wonderful refuge for these enemy fugitives.

Each component element of the three battalions was assigned a number of smaller areas and each was charged with the mission of patrolling these smaller sectors at least once a week. These small patrol sectors were numerically designated on overlays furnished by the 64th Antiaircraft Artillery Gun Battalion to subordinate and attached units. The choice of sectors to be patrolled on any particular day was left to the discretion of the sub-sector commanders. Patrol schedules were then forwarded to and coordinated by the North Sector commander.

The number of men making a patrol varied from time to time, but twelve was the usual average. Due to the particular type of terrain, it was necessary to vary patrol tactics occasionally. There were few well-beaten paths through the jungle and, of those that did exist, almost all were extremely narrow and winding. Consequently, the patrol leader, in order to maintain contact, was forced to keep the patrol point and rear guard relatively close to the main body of the patrol. In most instances, it was impossible to assign men as flank guards because the denseness of the adjacent growth would have prevented them from keeping up with the main body. This of course increased the danger of an enemy ambush, but in most cases, there was no alternative.

The time of day for patrolling was continually varied. The Jap, by studying the movements of early patrols, established their characteristic habits and took evasive tactics by foraging for food at times when the patrols were least expected. When this fact became known through interrogation of prisoners of war, countermeasures were taken, with patrols changing their starting times.

No night patrol work was conducted but infrequent night ambushes were tried and met with mild success. These were usually set up when a trail showed recent evidence of having been frequently used by Japs or when Jap marauders were continually attempting to raid food stores of various camps and other installations. Since the enemy remnants were so widely dispersed, it did not appear feasible to wait for hours at one point for one or more Japs to pass by except in specific instances.

Fire fights between patrols and aggressive enemy bands were very much the exception, rather than the rule. Factors contributing to this were many. In almost all instances the Jap was strongly motivated by a desire to escape rather than to stand and fight. He fully realized that he faced a rule an enemy who was superior both in numbers and in weapons. He also possessed an amazingly strong belief that the Jap fleet would return to retake the island and effect a rescue. This was evident from diaries captured months after the island was secured. Of course this hope must have progressively faded as the weeks and months went by, but it further discouraged his hopes in that direction, leaflets were scattered over the island informing him of the latest reverses suffered by the Jap fleet and the Imperial army. Though he may have read these news summaries with some skepticism, he must have believed them to a partial extent.

Encounters with enemy individuals and groups were usually of a short duration due principally to the nature of the terrain and the characteristic attempts at flight made by the enemy. Contacts always had to be made by utilizing the element of surprise. By employing a stealthy advance, patrols were often able to approach within a few yards of a hidden Jap bivouac before an enemy alarm was sounded. The Jap almost invariably did one of the two things. Either he reached for a weapon if he had one or made a mad dash for the cover and concealment afforded by the dense jungle. In either case he was cut down by small-arms fire. Attempts by patrols to capture unwounded Japs always ended in considerable failure. They simply refused to surrender to a patrol even when they must have realized that they would be killed down if they attempted to flee. Obviously they preferred death to the disgrace which the Japanese attach to surrender. On a number of occasions, wounded Japs committed suicide with their ever-present grenade when patrol members closed in. Jap soldiers have always been taught that they would be tortured and killed after capture and consequently preferred a quick death to one which might be lingering and excruciatingly painful. Added to this was their belief that if captured they could never return to Japan because of their dishonored status. In the eyes of those at home they were nonentities and had ceased to exist as an individual. Inspired by such teachings, one can understand more readily why they chose the course of action that they did.

While fire fights were more the exception rather than the rule, there were a number of instances where an aggressive enemy did attempt to inflict casualties upon our patrols. In most cases, however, the alertness and quick action of patrol members prevented the Jap from achieving his objective. To cite an example, on several occasions a wounded Jap tossed a grenade at patrol members, but fortunately in each case, the denseness of the jungle cover provided a shield sufficient to enable the patrol to escape injury. On a few rare occasions when enemy individuals or small groups attempted to return rifle fire they were usually so confused and surprised by the suddenness of the patrols' attack that they were annihilated before they could inflict any harm.

Only on one occasion was a patrol forced to withdraw in the face of enemy resistance. One morning a patrol of ten men encountered a well-armed enemy force of unknown size along a rugged cliff section of the island. The patrol point, consisting of two men, sighted three Nips through the undergrowth just as the latter were in the act of set-

either a mortar or machine gun, the tripod of which was partially visible through the thick foliage. These two opened fire immediately and all three Japs were believed to have been wounded. At that same instant fire from numerous points ahead was directed at the Americans. Apparently this enemy band had been forewarned of the patrols' approach and were attempting to set up an ambush. The patrol took cover immediately and was pinned down by scattered rifle and automatic-weapons fire. When several of the Japs were heard working their way to the flank of the patrol over higher ground along the heavily forested cliff, the Americans withdrew with the Nips continuing their fire from our forces from unseen vantage points. When they had withdrawn a considerable distance from the original point of contact, three explosions occurred in rapid succession about one hundred yards from the patrol. It was thought that they were mortar shells. The patrol, without suffering any casualties, returned to its own area for reinforcements.

Shortly thereafter a reinforced patrol of sixty men returned to the scene of the morning's encounter where they found an enemy bivouac which had been occupied by more than a dozen Japs. The latter had evidently left in great haste for they had abandoned a rifle, a sword, several grenades, and a supply of ammunition as well as any number of articles of clothing and food supplies. The patrol was divided into two sections. One section returned to its area without further incident. The other, after rounding a rocky promontory along the cliff at a point not far from the site of the original encounter, discovered five Japs who but a short time before had killed themselves. The suicide weapon for four of their number had been a German Luger pistol while the fifth had pressed a grenade against his midsection. It is quite possible that these were part of the group encountered earlier in the morning, who, upon having their hide-out discovered, had been overcome with a sense of futility and had committed suicide as a result. This same patrol, later that same afternoon, made contact with and killed six additional Japs.

It is a remarkable fact that the 64th Antiaircraft Artillery Battalion suffered only one casualty during the numerous months of its patrol work. This lone casualty was the result of a brief but lively skirmish between a patrol and three Japs. The patrol leader at the head of the column had entered a trail leading away from a small clearing when he suddenly sighted three Japs at a distance of not more

than twenty yards. Each of the enemy was armed with a rifle. The latter apparently saw the patrol at the same instant. The patrol leader was the first to open fire and the leading Jap fell wounded. The remaining two Nips made no move to flee but returned the fire. Immediately after shooting the first Jap, the patrol leader moved to cover at the side of the trail. The second and third men in the patrol column moved up quickly seeking a better position from which to take offensive action. The third man while moving up was hit by enemy fire, the bullet ricocheting off his weapon and thence into his stomach. The remaining two Japs were killed by patrol members when the former disclosed their position by firing. Prompt medical attention fortunately saved the wounded American and he was later restored to full-duty status.

About six months after the battalion had undertaken this patrol work, four war dogs were secured by the unit. After a brief period during which dog handlers were trained and became accustomed to the individual characteristics of their dogs, the latter were sent out with patrols. The terrain with its dense foliage was not admirably suited to working these dogs on a leash, but by releasing the dog and allowing it to range on ahead and to the flanks of the patrol, the latter was able to cover more ground with greater rapidity than was ever possible theretofore. These dogs were instrumental in leading patrols to bivouacs hidden in the most dense type of cover.

They were almost uncanny in their ability to make known to patrol members the presence of a Jap or his bivouac. Thus, a patrol, forewarned, could approach a suspected area with greater caution and be ready to take action on an instant's notice. Perhaps a truer appreciation of the full capabilities of these dogs could have been realized had these dogs been available earlier in the mopping-up stage.

As a result of all patrol work accomplished by this battalion during its stay on this island, a total of four hundred and seven casualties were inflicted on the enemy. Of this total, twenty-one were prisoners of war and eight were civilians interned. The remainder were killed. Bearing in mind that this achievement was attained in the fulfillment of a secondary mission, and that the mission was one for which the unit was not trained primarily, it was a rather remarkable feat. Subsequently, the battalion received a commendation from the Island commander who termed the performance of this duty an outstanding accomplishment.

A Record of Ground Action

By Major Francis J. Roddy, Coast Artillery Corps

The 441st AAA Battalion (SP) was attached to the 1st Infantry Division on 16 September 1943. The primary mission of the battalion under this attachment was anti-aircraft protection for the Division Artillery. At times when it was thought necessary however, the priority was given to other installations in the division area.

Members of the G-3 section of the 3d Division were interested in the possibilities of using our fire power to assist an attack by the Infantry. But the first step along this line was taken at a tangent. In preparing for the break-through from the beachhead, a provisional machine-gun battalion was set up by the Division.

The battalion consisted of eighty .50-cal. machine guns on ground mounts. The personnel was drawn from expert .50-cal. machine gunners throughout the division. The 441st AAA Bn. supplied twenty gunners for this provisional battalion, and the gunners were given instruction in indirect fire at ground targets. In the attack the machine guns were emplaced and firing orders and data computed. The machine guns fired on prearranged targets with very good effect.

* * *

During one phase of the Colmar campaign a battalion of the 15th Infantry was scheduled to make an attack. The battalion commander briefed his company commanders, and then turning to the company commander who would spearhead the attack he said: "You have the rough assignment. You can have your choice of support weapons, tanks, T.D.'s, flakwagons." The Company commander answered: "I'll take the flakwagons."

* * *

Throughout the period from 1 October 1944 to 6 May 1945, elements of the 441st engaged in 174 separate ground actions. The duration of these actions varied from a few minutes to several hours. However the figure 174 doesn't give a true picture of the situation because this figure represents only that part of our activity which resulted in actual firing of some kind. In addition to these actions the sections fulfilled many missions of a defensive character that did not result in the necessity of firing.

During the same period the battalion, or elements thereof, engaged in seventy-two separate air actions. The character of these actions was such that the weapons we had deployed for antiaircraft defense were adequate to accomplish satisfactorily the mission of the battalion.

The narrative reports of a few actions in which the sections engaged will serve to illustrate how our sections operated under the varying conditions.

Second Section of "C" Battery—Lieutenant Sanford Satuloff

The second battalion of the 15th Infantry had defensive positions in the town of Etival-Clairfontaine, France. The 7th and 30th Infantry Regiments were scheduled to cross the Meurthe River, while the 15th Regiment was to conduct harassing fire to divert the enemy from the actual crossing sites. A half hour of fire by all units attached to the 15th Infantry was to begin at 0630, the day of the attack. The S-3 of the 2d Bn. assigned targets to us for the half-hour "shoot," consisting of a main road, enemy supply trails, and intersections. Reconnaissance was made the evening preceding the attack, and the halftracks were brought up during the night to their firing positions. Company outposts were along a row of houses two hundred yards from the river's edge, and made excellent cover for the flakwagons. The M-16 was given all firing data for interdiction of the targets assigned by the S-3 for the half-hour "shoot." The M-15 fired horizontally within a certain radius during that period at an area that held enemy machine guns and troops. After the "shoot," all targets were on call, and missions were given to us by the 41st F.A. observer, infantry outposts, and the G Company commander. After firing, 'tracks pulled behind their respective

houses and reloaded. The 37mm gun was used to effect against snipers in second-story rooms, as snipers' rounds were directed into the rooms themselves due to closeness of the targets.

Third Section of "C" Battery—Lieutenant John P. Her

About 10 kilometers southeast of Mamberg, Germany we saw two columns of German infantry moving along an open plain some 2,000-3,000 yards away from us on the other side of the river in what was another division's sector. I attempted to bring artillery fire upon it but all artillery batteries were already on fire missions. I then opened fire with my AA halftracks. Although the range was less than 37mm fired killed five horses of a six-horse team drawn to a 105mm artillery piece in such a manner as to cause the gun to be overturned. The fire of the .50-cal. machine guns on the quadruple mount caused the enemy to disperse and flee in all directions, and caused many casualties. Later this day at about 2000, we fired upon another horse-drawn artillery convoy, and with 37mm H.E. shell and .50-cal. knocked out a 170mm gun and caused other casualties.

First Section of "C" Battery—Lieutenant Robert A. M

The Seventh Army had swept up to the Meurthe on a broad front. The plan to cross was already made and consisted in part of vigorous patrolling and fire previous to the crossing. In this capacity flakwagons were useful to increase the volume of fire. At Nompatalize, about 20 kilometers from the Meurthe, I found a ruined building where I installed an M-15 in firing position. We used rubble to build protection for the bogies and by liberal use of lumber from roofs we fashioned a lean-to next to the house which perfectly camouflaged the halftrack. The other halftrack was placed behind a near-by building in firing position and was camouflaged in the same way. I laid out a fire plan which consisted of interdiction and harassing fire on P.O. houses and what were thought to be German supply routes. To test the accuracy of my calculations I laid my guns, then arranged telephone communications with an artillery F.O. who observed and corrected my fire. I was able to fire the positions for thirty-six hours before prudence dictated a move.

Third Section of "D" Battery—Lieutenant Herbert E. Schiedel

On 28 April 1945, a task force of the 30th Infantry's Battalion was moving down the autobahn near Bernau, Germany, with "L" Company leading the advance. As leading patrols approached a bridge, small-arms and machine-gun fire was encountered, the fire coming from a wooded hillside about 300 yards from the right side of the autobahn. After a reconnaissance was made it was decided to send the 'tracks down the autobahn and to continue while moving. As the first 'track moved forward it drew small-arms fire, but the second 'track that was about 200 yards back was able to locate the source of the firing and return it. Thus while the first 'track fired over the whole area, the second 'track was able to fire on single targets. A total of 2,300 rounds of .50-cal. was fired. After the area had been thoroughly covered it was found that five of

enemy had been killed, two wounded and over fifteen taken prisoner.

Second Section of "B" Battery—Lieutenant Benjamin J. Fislser

The halftracks, commanded by Tec. 5 Louis Stadler and Leonard DeRienzo, Jr., and driven by Tec. 5 Harold Adel and Tec. 5 Robert P. Sansone, moved out as ordered. When they approached the ditch they heard a cry for help. Although they were fully aware that this exposed position was under enemy observation, both 'tracks stopped to render aid to some wounded soldiers who had taken cover in the ditch. Immediately an enemy machine gun opened fire, bullets hitting the road around the 'tracks and grazing the 'tracks themselves. The 'track commanders quickly ordered the 'tracks to return the fire forcing the enemy to cease his fire and withdraw into the concrete emplacement. Notwithstanding the probability of receiving bazooka fire in this open position, the halftracks continued the fire for approximately ten minutes, keeping the enemy holed up until all the wounded could be evacuated from the ditch. At the same time, under cover of this fire, a tank destroyer was brought into position to fire point-blank into the emplacement of the emplacement.

As a result of this combined action our infantry was able to assault the emplacement, capture sixty-five PW's, thereby clearing the road of fire, enabling our forces to move forward unmolested.

Second Section of "D" Battery—Lieutenant John A. Kennedy

On 17 December 1944, after traveling over mountain trails and cutting down trees to make a field of fire, two halftracks were moved into position on a mountainside to give preparation fire for an attack. "G" Company of the 30th Infantry Regiment was to take Hill 616 with mortar and machine-gun fire as preparation fire, due to the difficulty of bringing artillery fire on the objective. At 0940 hours the 'tracks opened fire in front of "G" Company and continued firing as they advanced up the hill. After firing 2,660 rounds of .50-cal. and 63 rounds of 37mm, orders were given to cease firing. The area was well "hosed" and the company commander reported the fire very effective, causing many of the enemy to disperse and run in confusion, thus aiding them to take their objective without delay or heavy losses.

Third Section of "D" Battery—Lieutenant Walter D. McGee

At 1410 hours 29 March 1945 two halftracks operating with "L" Company of the 3d Battalion, 30th Infantry, were ordered to fire into a wooded area in the vicinity of Reichelshausen, Germany. The two halftracks, one M-15 and one M-16, were set up as roadblocks on the outskirts of town. The infantry was in position 300 yards from the woods, with a listening post 200 yards from the woods. The infantrymen at the post heard talking and rustling of the brush and captured one prisoner. The prisoner stated during interrogation that there was approximately a company in the area. A reconnaissance of the area was made and the M-16 was called and placed into firing position approximately 150

yards from the woods. The area was sprayed with 800 rounds of .50-cal. and five prisoners were captured. No enemy fire was encountered. The guns were reloaded and 850 rounds were fired into the area again. Thirty prisoners were captured, five of them wounded.

First Section of "B" Battery—Lieutenant Oscar B. Roberts

In positions just north of Strasburg with the 3d Bn. of the 7th Infantry, a new type of firing was tried—adjusted fire by an OP, on a well-used intersection across the Rhine River. After adjusting the fire, a direct line from the OP to gun positions was put in so that whenever traffic was observed on the road the OP could call and get fire immediately; also during the hours of darkness the road was interdicted once an hour. The results of this fire were such that after two days the traffic on the road had ceased. Ammunition expenditure averaged around 2,000 rounds of .50-cal. per day. The enemy countered with heavy machine-gun fire and searching artillery fire.

* * *

The best test of the effectiveness of a supporting arm or weapon, it seems to us, is the testimony of the supported troops. With this thought in mind, we sought to get the view of the Infantry after the Colmar pocket had been eliminated.

We were of the opinion that reports from the Infantry might be more objective if they were made to the Division rather than to us directly. In other words, if the support didn't satisfy them they would express themselves fully to Division, whereas, from a mistaken attitude of politeness, some defects might be suppressed in a report to us.

Obviously such a biased report would be useless to us. We therefore requested the Division G-3 to get a report from the regiments in the name of the Division. Specifically the regiments were asked to express their opinion as to the effectiveness of the support and suggest changes they desired.

The replies from all four regiments (the 254th Infantry Regiment was still attached to the division) were very favorable to the program as we were handling it. As these reports were substantially the same only one is quoted here:

Headquarters 30th Infantry
APO No. 3

3 February 1945

SUBJECT: Use of Flakwagons with Infantry Battalions.

TO: Commanding General, 3d Infantry Division.

1. The following are examples to illustrate the use of flakwagons with Infantry Battalions both in the defense and in the offense:

a. During the attack on Le Tholy, France 28 September-10 October 1944, our flakwagons were used extensively to support each attack from hill to hill, firing overhead fire into the wooded terrain as our troops approached in the assault. As positions were seized the flakwagons moved up to cover flanks and gaps caused by extremely wide fronts assigned. Each attack is normally followed by an enemy counterattack, and in every case the flakwagons materially

assisted the Infantry in stopping these counterattacks and inflicted heavy casualties on the enemy. Several times during these attacks all ammunition was fired. PW's verified the effectiveness of this fire.

b. During the MORTAGNE Forest operation from 25 October to 11 November 1944, the flakwagons were used offensively and defensively by each battalion. Our sector was so extensive that platoon positions could maintain contact only by means of patrols. This enabled the enemy to infiltrate behind our forward elements and cut our supply line. An attack was launched to drive out this enemy group, the flakwagons participating. Prisoners stated that the tremendous firepower and striking power of the flakwagons was too much for them. The enemy was driven from our positions. A similar incident occurred in another sector of the forest and was similarly handled. The fire of multiple .50-caliber guns and automatic 37mm is so great that it has a terrifying effect on enemy morale.

In a later phase of this same operation the town of SAUGERAY was attacked. The flakwagons were used to support the attack and were extremely effective in driving enemy personnel from buildings into the open where they were quickly killed or captured.

c. During our attack 15-19 December 1944, one battalion was held up on the high ground north of KAYSERSBERG, Alsace. Artillery and mortar fire were not too effective because the enemy used concrete shelters for protection. An attack was successfully executed against these positions by using flakwagon fire for close-in support. The fire was continued until the advancing Infantry was only a few yards away. When the Infantry was ready to assault, fires were lifted and the enemy was caught coming out of his dugouts to man guns. Such close support is not possible with artillery and mortars in wooded terrain. As a result of this action fourteen enemy machine guns were knocked out or captured, fifty enemy killed and 100 captured. Two flakwagons fired 2,700 rounds of .50-caliber and 100 rounds of 37mm.

2. Notes:

a. Our troops have developed a confidence in the tremendous firepower of the flakwagon. It is now a morale factor in our battalions.

b. With shortages of mortar and artillery ammunition the flakwagons have been used to excellent advantage for interdicting enemy rear areas. Statements of PW's verify their effectiveness in this rôle.

c. The incidents mentioned above are only a few examples of the use of flakwagons with Infantry Battalions. Many more similar stories could be told. Flakwagons have become a vital part of our battalions and their importance to the Infantrymen is immeasurable.

For the Regimental Commander,

R. H. NEDDERSEN,
Lieutenant Colonel, 30th Infantry,
Executive Officer.

* * *

COMMENTS AND CONCLUSIONS

Our operations with the infantry have resulted in many lessons learned. Some were lessons driven home in con-

firmation of standard tactical doctrine. Others were entirely new to AA troops.

What we consider the more important lessons learned may be of interest and help to other AA units undertaking a ground-support rôle.

1. The most important thing is close liaison. This liaison must be maintained at all times, not only with the infantry battalions, but equally important, with the tanks, TD's, AT elements operating with the battalion, and at times with individual company commanders.

2. The AA Officer must be well informed on the location of all friendly troops and their anticipated moves. He must also gain knowledge of enemy positions and areas from which counterattacks may be expected; or from which movement and observation by the enemy may be anticipated.

3. The AA Officer should use the information he obtains to suggest missions for his weapons. He knows best what he can do effectively. He must be aggressive and not wait for the infantry to call upon him. This line of action will not only insure the full utilization of the weapons in common effort, but will insure that the missions are correct ones for our equipment.

4. Where possible follow the attached armored elements. This will give added protection against antitank fire and land mines.

5. Extensive reconnaissance should always be made. Reconnaissance should be made on foot if time and conditions permit.

6. Camouflage is very important. It has been found, however, that natural camouflage is better suited to the situation than the issued nets.

7. The use of radios in night movements has proved helpful in directing the 'tracks thru difficult roads. The AA Officer leading in the jeep transmits advice of holes, low trees, mud holes, etc. as he proceeds.

8. It is not possible to expect the 'tracks with the infantry to participate in antiaircraft defense. Many times the missions are at night and they need the day for rehabilitation. Often the 'tracks must be well concealed, prohibiting a field of fire for air action. However, on occasion, 'tracks while with the infantry have engaged aerial targets with good effects. For this reason, they should never be permitted to forget they are AA troops with AA weapons.

9. AA troops with the infantry should be utilized in the battalion AAAIS net and should give warning of enemy planes.

10. When the mission is such that the enemy may be expected to return fire with artillery or mortars, be prepared beforehand to move out immediately after firing. In connection, don't pick a firing position in close proximity to friendly troops or they will unwittingly receive return fire.

11. On some occasions defensive missions such as mining roadblocks or filling a gap in the line have been assumed. Little firing is expected on such missions unless enemy counterattack develops. However, extreme care to camouflage, concealment, and the proper behavior of troops in such a situation cannot be overstressed.

12. Other pointers for tactical operations: a. Back up firing positions you want to leave quickly. b. Have a man on the ground in front of the turret to keep 37mm fire

jamming the gun as it accumulates on the tray while firing at low angle. c. By running the front wheels uphill onto a ramp of logs or stones, elevation below horizontal may be obtained with the 37mm gun. d. The M-16 is capable of carrying four litter cases and several additional walk-around wounded for evacuation over roads that are impassable to ambulances and jeeps. This has been done several times, notably in the Vosges. e. Incendiary bullets fired at night look like flashlights blinking as they strike against buildings in timber and thus provide a method of fire control. f.

Constant check should be made as to the movement of infantry troops for frequently they do not follow expected routes or fail to reach specified objectives at the expected time. g. Don't go out on patrols. h. Don't get out in front of the leading elements. i. Don't wait to be told what the infantry wants you to do. j. In a fast-moving situation carry infantry troops on your tracks. This has the two-fold result of helping to keep the action accelerated by moving the infantry quickly, and also offers protection against pockets of resistance.

Fire Control for Indirect Ground Fire

By Captain Gerald F. Muething, Coast Artillery Corps

In the campaigns of the Vosges, Colmar, and Germany a part of our battalion was used in the support of the Infantry Regiments of the 3d Infantry Division, to which we were attached. At times the infantry desired indirect fire placed on a target. Calls for this type of fire would be made during a static or semistatic situation, for a river crossing, or an assault on a fortified line.

The first time this type of fire was delivered by us was when the 3d Infantry Division, with two regiments abreast, crossed the Meurthe River, France. As the infantry was enthusiastic over the results of this action, refinements and changes were made to improve the accuracy and eliminate as far as possible time lag from the time a mission was called for and fire delivered.

First it would be well to state that two types of missions are normally fired: 1. missions prior to H-Hour, i.e., preparatory missions. (These were in conjunction with the regular artillery, though not necessarily at the same target.) 2. call missions, ordered by the infantry commander as the tactical situation dictated.

The preparatory missions have for their objective, inflicting casualties on the enemy, demoralizing him by a heavy stream of fire, and keeping him under cover or from routes of approach, in order that our infantry might attack effectively. In this type of mission areas to be covered with fire are designated by the infantry commander. Each area is given a call number, and a fire plan overlay is prepared as an annex to the Regimental Operation Instructions. On these missions calculations can be made several hours before the actual firing; thus when the shift from one area to another is accomplished rapidly, the gun crews do not have to wait for the computations to be made for the new area.

Call missions have for their objective the neutralizing or the destruction of a specific target as demanded by the immediate tactical situation. These missions are called for by the infantry commander to the AW Battery C.P. On call missions separate calculations are required for each mission, and a short time lag is thus introduced between receipt of orders and the execution of fire.

The following method of directing and controlling indirect ground fire from AAA self-propelled mounts has been found satisfactory. However it should be stated here that

fire-control devices for ground firing should be installed on new models of AA weapons. The only fire-control instruments we have with our M-15's and M-16's are a lensatic compass and a gunner's quadrant.

The problem consists of the computation of firing data for firing azimuth and quadrant elevation at a fire direction center (FDC), as in Field Artillery procedure, for point or area targets as rapidly as possible on orders from the infantry commanders. Our normal method of communication is by radio, but when time and facilities permit, wire communication is preferred from the Regimental OP or CP to the AW Battery CP where the computations are made. The computed data is transmitted by SCR 508 to the firing positions, and fire is commenced on the order of the officer in charge of the section. Usually the mission is given as a three-, five- or ten-minute light or heavy concentration. The section officer controls the duration of the actual firing, except when the fire is stopped through the FDC or on order of the infantry commander.

Data for both types of missions are calculated as follows:

(a) Firing Azimuth— A_z —The azimuth from the firing site to the target area can be read to the nearest mil from the issued Engineering Set protractor, with corrections added or subtracted for a West or East magnetic declination from magnetic North. A 1/20,000 or 1/25,000 map must be used to obtain the necessary degree of accuracy.

(b) Firing Elevation— ϕ_r —is computed easily from standard cal.-50 range elevation tables. If, however, there is an appreciable Vertical Interval (VI) between gun site and target, ϕ_r involves more than reading off the correct elevation from the range table. A VI of plus or minus 5 yards between gun site and target requires further calculation. In such cases a trajectory chart which plots a trajectory curve for ϕ_r in increments of the range ordinate and VI abscissa is used. Since ϕ_r can be set with exactness on the guns by means of a gunner's quadrant, it is important that the ϕ_r be computed as accurately as possible, both to increase the accuracy of the problem as a whole, and to eliminate as far as possible the chance of fire falling on friendly troops. This aspect is especially important because the flat trajectory and high muzzle velocity of AA weapons will, with slight variations in elevation, have proportionately large range variations in ranges between 1,000 and 2,000 yards. The VI

is read or interpolated from the contour lines on large-scale maps.

Having the range and the VI, the next step is to plot their intersection on the trajectory chart, and interpolate between the overlaid ϕ curve for ϕ_r . If the R:VI intersection is, for example, .8 of the distance between the 10 mil curve and the 20 mil curve, the ϕ_r would be 18 mils; i.e., it would be .8 of the difference between 10 mils and 20 mils, or .8 of 10 mils which is 8 mils. This interpolated increment is, of course, added to the value of the lesser curve if the distance from the curve to the intersection is measured from the curve of lesser value.

When firing in hilly country, consideration must also be given to masks between the gun site and target area. In these cases a check must be made by using the trajectory chart to ascertain whether or not the lowest shot at the required elevation will clear the mask. If not, the proposed target cannot be fired on. In making reconnaissance for gun sites for indirect fire, terrain features which might mask fire on a possible target should be considered.

With practice, the calculation of Az_r and ϕ_r requires no more than one minute before the data can be transmitted to the gun sites. It is advisable to use SCR 508 at both the CP and gun site for transmission of data and orders. The relay should be as close as possible to the actual gun site.

The Az_r is set on the guns by lensatic compass; the ϕ_r by gunner's quadrant. For preparatory missions such as those appearing on an OI Fire Plan, aiming stakes may be set for

the necessary Az_r , leaving only the ϕ_r to be set on the for each target.

In the case of call missions, both Az_r and ϕ_r must be rately set on each gun for every target.

The transmission of data to the gun site is done in clear for speed. The following form for transmission has been found very satisfactory.

"Section I (II or III), FIRE MISSION

One-, Three-, or Ten-Minute, Light or Heavy Con-
centration.

Azimuth _____

Elevation _____

FIRE" _____

"ON THE WAY" and "MISSION COMPLETE" usually reported to Regimental CP or OP. After a mission is completed and word on further missions is not immediately forthcoming, "STAND EASY" is given the section.

The value of a central FDC lies in the speed with which computations can be made, especially at night, because lighting and other facilities that are more easily available at a CP than at gun sites. Records of missions fired can be kept completely, and are available in the event that a re-mission is necessary. Records of ammunition expended and consolidated action reports can be kept concurrently with the firing. Lastly, the central FDC relieves the section officer of the extra work of computing data and permits him more freedom in the control of the firing sections.

Guam—No More Banzai!*

By Pfc John P. McCormick

Uninteresting, boring, devoid of glamor and glory, every word in the books that is descriptive of the aftermath of battle is applicable to the forward area Coast Artillery Battery. With the exception of the fighting, the scourges that beset the combat trooper beset the Coast Artillery soldier: dengue fever, mosquitoes, wasps, flies, ants, mud and dust, rain and sun, and even Japs.

All Coast Artillery batteries send out patrols against the Japs who are still alive and free on this island. The danger that is attached to this type of work can be attested by the number of Purple Hearts that have been awarded to men on this Island since the occupation. The Jap is a wily fighter in battle, but now, since the defeat of the major part of his Army here he expects, with stoic fatalism, that he will be killed if he is captured and with this frame of mind he fights with all the jungle cunning at his command. This is the enemy we patrol against, the enemy who fights back with grenades and high-powered rifles from valleys, gullies and caves and every conceivable spot that will give him cover. His ability to hide in the forest has made him bold, bold enough to sneak through garrison areas right under

the very noses of the guards. This is no reflection on guards, for these loose Japs have developed the ability to creep and crawl silently, and a seemingly powerful will to live. They sense danger instantly, and though only ten feet away when spotted, just as instantly they disappear into the jungle. Those Japs who are still alive have months of experience living in the raw jungle, depending constantly on man's greatest instinct, the law of self-preservation—for food, shelter, and safety. They are now the most intelligent jungle animal in the world.

Perhaps our jungle animals came to see the movies. Our standard gag on Engebi used to be, "We had a couple of Japs in for breakfast this morning, it was too dark to see who was around." Since the same conditions prevail at our movies it is not an illogical assumption. However, though they are considered better jungle fighters than the Coast Artilleryman, they are being hunted down and killed off by being taken prisoners, though prisoner seems to be the thing that most of them will not be.

The boring part of occupation comes when a few months have been spent on the particular rock to which you are assigned. Then you know the whereabouts of the Japs and stop worrying on that score. You relax and stop worry-

* (This description of Coast Artillery life on Guam was written in May, 1945.)

out one thing and start in worrying about the heat, the mosquitos, and what your next detail is going to be. With the exception of patrols and ambushes, our routine conforms more or less with the Garrison routine of the Mainland.

Some Coast Artillery batteries walked into prepared positions, other batteries had to clear their own little part of the jungle. Walking into a prepared position may sound as though some men really got the break of breaks, but prepared position is a very misleading statement. All the work that went into preparing our prepared position, was that men had the courage to live there before we arrived, and that is all. Jungle still must be cleared in order to set up a battery area, and as in the case of most Coast Artillery batteries specifically, sharp, jagged coral had to be blasted before any sort of road could be put in. Latrines had to be blasted on these particular points, and as in the case of our own battery, urinals even had to be blasted. Using the very primitive methods of clearing, digging, etc. the work goes on at a very rapid pace, camps are becoming more like a place to live in, moving-picture screens are up, and stage shows and boxing matches are becoming more and more common, and more and more popular. However, the Seabees have the best theaters, and it is generally to one of their theaters that we go to see either a stage show or a boxing match. Clearing land with a machete, a pick, and a shovel is a gruelling work at best, and with sweat, dust and rain to contend with, not to mention mosquitos, is it any wonder that we can be perfectly satisfied to have a theater with a screen and some seats and no stage?

Boredom sets in like rust in a damp climate and men do all in their power to offset it. Recreation takes almost all shapes and forms down here: volleyball, baseball, softball, poker. Even whittling has been revived. Weightlifting is in vogue, as are also other and varied forms of keeping in shape. Some men follow an artistic bent, and the artist at least has done some fine work, his "Raising of the American Flag on Guam" is exceptionally fine. Reading and study fill out the bill.

The All-Guam Amateur Boxing show brought out some

fine talent, and packed houses to every elimination. It was a grand sight to see the crowd of Seabees, Marines, sailors and soldiers who packed the open-air theaters, grand once more to hear a fight crowd yell themselves hoarse.

But one thing that is generally reserved for the combat soldier was passed on in part to us. The loose Japs had been raising particular hell on the south side of the island, and the Coast Artillery battalions on the island were elected to go out and quiet them. Hundreds of Coast Artillerymen found themselves on a three-day patrol against these Japs who had decided that living in the jungle was preferable to captivity. Most of these men had been out on day patrols before, but with the exception of the more seasoned troops who had been on the Marshalls, none of them had stayed out all night. But things went off well, only one patrol was ambushed, and our outfit was fortunate enough to raid a little village that the Japs were building in a glen. After killing off the Japs we went about the huts destroying everything eatable and scattering their clothing to the four winds, lest other Japs come and make use of it. One of our men found among the effects of the dead men the regimental flag of this particular outfit all nicely written over with Japanese characters. A souvenir.

Coming back to the battery we were all in high spirits, even if some of us did have a touch of dysentery, and we decided to display the trophy on a flagpole on the truck. A piece of bamboo acted as the pole and shoelaces were used to tie the flag in place. People stared in wonder sometimes as though not sure of themselves, others laughed with joy. But in Marizo we were fed the words that sort of made us happy deep down inside as though we had done more than our share. The people are handsome and kindhearted, and when they were aware that we were a party of Americans they cheered us and bowed in derision toward our bit of cloth. But the cup was hardly filled yet and a lad of not more than fourteen or thereabouts filled it to the brim. He was on a veranda when he spotted us, and with a gay laugh yelled out derisively, "No more Banzai! No more Banzai!" The shout was taken up by both young and old, "No more Banzai! No more Banzai on Guam!"

Battlefield Illumination in the Colmar Pocket

By Colonel John C. Henagen, Coast Artillery Corps

This is a report of searchlight operations with the 3d Infantry Division for the period 4-8 February 1945. The searchlights were used for battlefield illumination in an offensive operation in the Neuf-Brisach area of the Colmar Pocket. Because this operation was so successful and because it is believed the first time that antiaircraft searchlights were used on almost table-top flat terrain so far forward to the front

lines, it should be of interest. The 3d Infantry Division was selected to spearhead the operations of the U. S. XXI Corps which was assigned to the First French Army for the liquidation of the Colmar Pocket.

PREPARATION

One platoon (6 searchlights) of the 353d Searchlight

Battalion, under command of First Lieutenant John F. Welch, was sent from the Seventh Army Area the night of 3 February 1945 and arrived in XXI Corps Area (rear) 040400A February 1945.

Major Raymond J. Alberts, S-3 of the Fifth Antiaircraft Artillery Group, and Lieutenant John F. Welch, platoon commander of the searchlights, reported to the 3d Infantry Division and received the following instructions from the Chief of Staff and the Assistant G-3.

1. The 7th and 15th Infantry Regiments were to attack abreast on a line running east through the town of Bushiem attacking to the south to cut the road from Neuf-Brisach east and cut the Rhine River bridges. The 30th Infantry Regiment was to attack from the edge of the forest below the town of Widensolen in frontal assault on Neuf-Brisach.

2. The lights were to be so positioned as to illuminate the area to a line running 5,500-6,000 yards south of the Line of Departure.

3. Lights were to be in position to be used at any time after 041630A February 1945.

4. Control of lights would be by platoon commander on direct order from G-3 of 3d Infantry Division.

5. Communications both by wire and radio would be established with the advance CP of 3d Infantry Division. A radio to be furnished by Division tuned to the Division command set.

OPERATION

The terrain in which the offensive was made was a flat tableland cut through with drainage canals and interspersed with scattered patches of forest. In selecting a proper site consideration was given to a position that was well forward and yet would provide sight defilade to prevent silhouetting the attacking infantry and to prevent enemy observers from pinpointing the source of light. A position was selected that placed the most forward light about 1,500 yards behind the infantry elements. Because of the need of adequate mask the lights were not placed parallel to the Line of Departure but ran on a line quartering to the northeast. The lights moved into the position area at 1530A and were operating by 1830A. The assigned coverage was a front of 5,000-6,000 yards and five of the six lights were in operation continuously, one being recarboned. All lights used the focus beam and were at approximately 400-500 mils elevation. The beam was raised high enough over the mask level to prevent illumination of the treetops to prevent location of the source of light.

The infantry reached the Line of Departure at 050015A and jumped off in the attack. The lights were turned on and operated until 0140A. At 0140A hours the Infantry, attacking on the left, requested a shift in the lights to the left to give them more illumination. A change in azimuth was made on four lights, two beams straddling the Rhine at Brisach, Germany. The lights were kept on continuously at these azimuths until 0600A hours.

On the night of 5-6 February the searchlights were again used from the original positions from the hours of 2130A to 0655A. On the night of 6-7 February searchlights were used from 2100A to 0630A hours. The azimuth of lights 1 and 2 were shifted at 2400A hours to give more illumination to

the 75th Infantry Division attacking on the right flank of the 3d Infantry Division. On the night of 7-8 February three lights were moved to new positions. The lights were on from 1945A to 0645A hours. At 200A hours the azimuth of light #1 was changed to increase the illumination for bridgebuilding in the 75th Infantry Division sector.

During the period 4-8 February 1945 the sky was generally overcast both day and night with intermittent clouds. The cloud formations were low and dense enough to give a good mirror effect. The focus beam of light reflected off the clouds diffused to give the effect of pale moonlight which was desired.

DISCUSSION OF OPERATION RESULTS

The call for battlefield illumination using antiaircraft searchlights came suddenly and the employment of searchlights was done on a "rush call" basis. Searchlights had previously been used in offensive action but generally in terrain that allowed complete defilade for the lights. In this action, the lights were used in a table-flat terrain. A leafless forest about 800 yards deep at the narrowest spot was the best that could be found in the area close enough to the Line of Departure to give illumination in depth. To be effective battlefield illumination for offensive action must light the area behind the objective which can be done only by use of focus beam light.

The reaction to the searchlight by the regimental commanders of the 7th, 15th, and 30th Infantry Regiments was very favorable. Information obtained from these units indicates the value of the searchlights in this action is as follows:

1. Greater lateral control by company, platoon, and squad leaders made possible.

2. Terrain features outline allowed for more rapid movement to objective and greater ease in orientation.

3. Light mask was adequate; source could not be pinpointed.

4. Comments from the regiments are quoted:

7th Infantry: "The lights helped particularly in controlling our formations, maintaining contact within the battalions, and recognizing terrain features. In attacking from Biesheim to the Neuf-Brisach railroad station the artillery light allowed us to move with less effort and greater speed than we could have done without the lights. During the attack the searchlights made it possible to pick out certain terrain features, especially groups of buildings and wooded areas which could be seen plainly because of the light against the background, and thereby enabled us to go directly to our objective. Fire was received by follow-up supply trucks and the drivers blamed it on the presence of the searchlights."

15th Infantry: "It is recommended that this means of illumination be used whenever possible on moonless nights. The advantages gained from this illumination (improved control, speed of movement, facilitated supply operations, increased efficiency of outposts and guards, decided advantage in night driving, visibility of targets and landmarks, and the natural confidence produced with the increased visibility) more than offset the disadvantages."

30th Infantry: "During the attack the lights were invaluable in assisting unit commanders to maintain control of their units, keep direction and orient themselves when

highly recommended by this headquarters that the use of anti-aircraft searchlights for night operations be continued."

CONCLUSIONS

From information obtained from the Fifth Antiaircraftillery Groups initial use of AA searchlights for battle-illumination the following facts stand out as being worthy of consideration whenever a plan for searchlight use is made.

1. In an offensive action lights should be placed far enough forward to illuminate all initial objectives of the infantry.

2. In an offensive action it is not feasible to attempt to employ searchlights and keep the battlefield illuminated

if the infantry maintains a rapid advance and the situation is fluid.

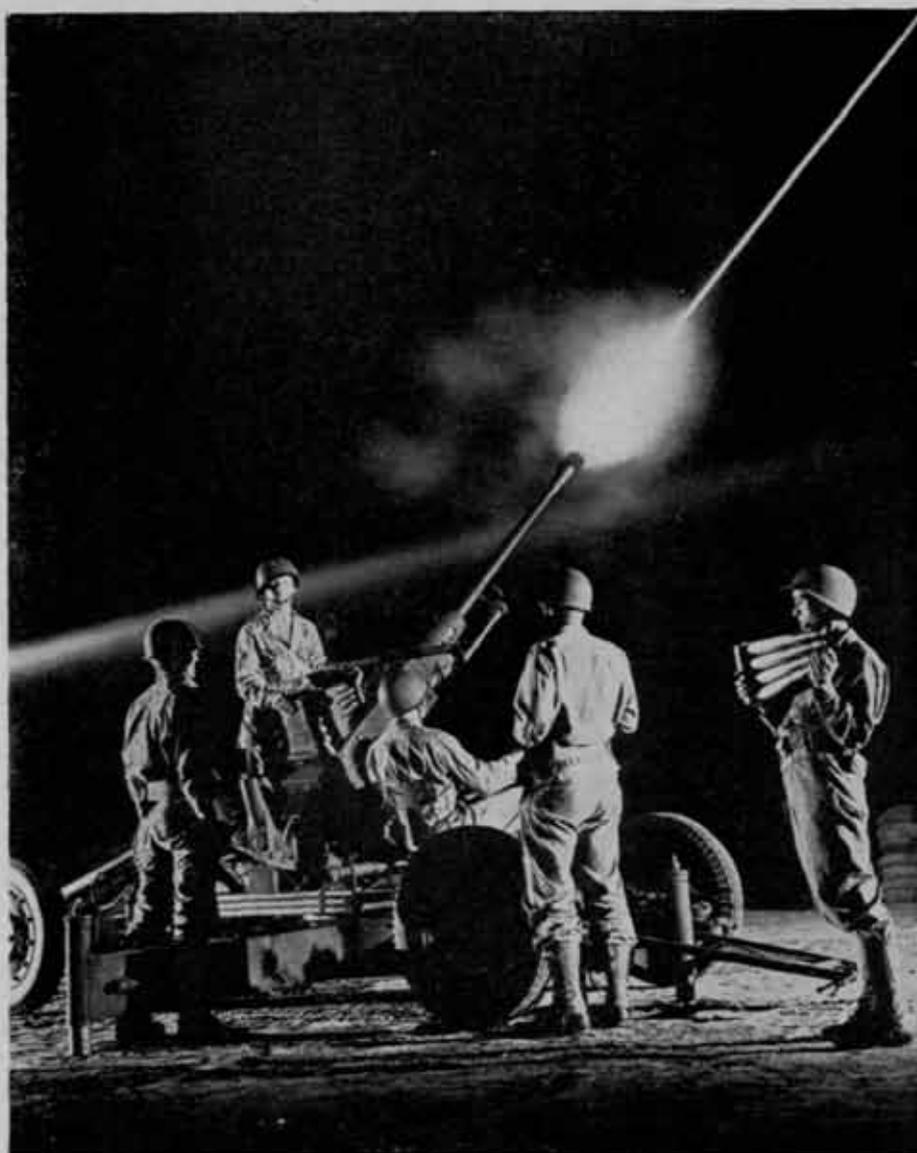
3. A platoon of searchlights is the minimum necessary to cover a division front.

4. Both radio and wire communications to the Division CP are necessary.

5. Searchlights should be used prior to the night of the attack to avoid alerting the enemy.

6. Infantrymen should be oriented prior to the initial use of the lights. Lights used in defensive operations prior to offensive use would illustrate to infantrymen the amount of his exposure as the attacker.

7. Flat terrain offers no outstanding hazards to employment of lights as long as proper sight mask is obtained. Wooded areas are excellent.



A Single Department of National Defense

Unification of our armed forces in a single department of national defense with land, sea and air power as coequal partners offers the only sound basis on which to build future national security. It provides as coordinating head of these three forces a single civilian secretary empowered to organize them into a balanced fighting team.

Integration of our military strength thus afforded would insure the continuance in peacetime of unity of direction, a principle so successfully demonstrated in the fighting areas during the past war. Just as total war demands the use of combined arms under a single command, so does the single problem of national security call for unity in shaping and directing the armed might that must protect the nation in any future emergency.

Unification does not mean a merger wherein the present fighting forces lose their identity or specific functions. Rather the integrity of each force would remain unimpaired. Each force would retain maximum autonomy consistent with economy and efficiency, yet each would develop its full coordinate strength within the framework of a single structure of national defense.

WHY UNIFICATION IS NEEDED

Most observers agree that any future war will be waged simultaneously on land, sea and in the air. If war should come, it will strike swiftly, probably without warning, affording our fighting forces no opportunity to improvise a combat organization while the battle rages.

These prospects, plus the frightful destruction threatened in any war fought with atomic missiles, demand that the nation perfect in peacetime the military organization it will require in the event of war. As President Truman stated in his message to Congress on December 19, 1945, "True preparedness now means preparedness not alone in armaments and numbers of men, but preparedness in organization also."

In the summer of 1944 the Joint Chiefs of Staff organized a special committee to obtain the views of combat commanders on the question of a unified department. Composed of two admirals and two generals of long experience, the committee conducted hearings for 10 months, visiting commanders in Europe, the Mediterranean area, India-China, and the Pacific theaters of war. Upon completion of its hearings, the committee, with only its senior naval member dissenting, recommended the establishment of a single department of the armed forces.

In reaching this conclusion, the committee indicated that the fundamental lesson of the past war, learned from hard and costly experience, was that there must be single direction of the land, air and sea forces.

In 1941 when Germany and Japan declared war on the United States, the nation had two services, the Army and the Navy, each with its independent field of operations and its independent mission. No unified over-all command ex-

isted, short of the President as Commander in Chief. For service had developed the type of organization that it believed essential, with little or no collaboration or consultation with the other. Each service guarded its own prerogatives, and there was no way of compelling cooperation, the exchange of information, except by the President himself.

When war came there was no adequate cooperation between the two services, no plans for a unified command in the field, and air power functioned as an auxiliary to the Army and Navy. The prewar and early war period brought efforts to overcome these defects in our defense structure. Within a month after Pearl Harbor the President created the Joint Chiefs of Staff, an agency designed to exercise control over world-wide military operations on the basis of mutual consent. On the industrial technological and scientific side, a multitude of joint boards and committees were formed in an attempt to bring coordination in these fields. But, for practical purposes, mutual agreement normally involved long and costly delay in these organizations, had improvised as many of them were, and in some cases differences never could be satisfactorily resolved.

As war progressed, it became readily apparent that a military effort of consequence required unified control to exploit the maximum capacity of ground, sea and air forces. This led to the appointment of supreme commanders who were responsible for the employment of all forces within their theaters of operation.

However, the unified direction so necessary to wage war successfully was limited largely to the strategic and tactical employment of the major forces overseas. Unity did not extend to the elimination of many duplicated facilities and lines of supply overseas. And in Washington, of course, there was no single over-all command of the President himself.

ORGANIZATION OF A SINGLE DEPARTMENT

The War Department's plan calls for a single Secretary of National Defense, a civilian of cabinet rank serving under the President as Commander in Chief. The Secretary's principal civilian assistant and executive would be an Under Secretary with stature and responsibility similar to that held by the Under Secretary of State. The department would be divided into three coordinate branches, one for land forces, one for sea forces, and one for the air forces, each under an Assistant Secretary. In addition, the Secretary of National Defense would be assisted by three or more Assistant Secretaries appointed on a functional basis who would be responsible for such vital matters as coordination of scientific research and development, supervision of procurement and industrial mobilization, and legislative affairs and public information.

On the military side, the principal advisor and executive to the Secretary would be the Chief of Staff of the Army

He would supervise the field forces and operating agencies which would include in addition to the three major branches, a Directorate of Common Supply and Hospitalization, and the overseas theaters and areas. Each of the major branches would be headed by its own commander.

While the Chief of Staff of the Armed Forces would be the principal military advisor to the Secretary, the War Department's plan provides that there should be nothing to prevent the President or the Secretary and his civilian assistants from communicating directly with the commanders of any of the components of the Departments on such matters as basic military policy, the division of the budget, and other equally important subjects.

The Chief of Staff of the Armed Forces would have a staff to assist him in the establishment of over-all policies in personnel matters, military intelligence, joint training, logistics, war plans, research and development. This staff should not be permitted to develop into a large operating group. Once policies and directives are laid down, their execution should be carried out by the staffs of the three components.

To guard against any one component dominating the military thought of the single department, the War Department has suggested that the Chief of Staff to the President and the Chief of Staff of the Armed Forces should at no time come from the same component. It may also be considered advisable to provide by law that the tenure of office of the two officers should be limited to two or three years. Similarly, the commanders of the major components might be limited to four years in office.

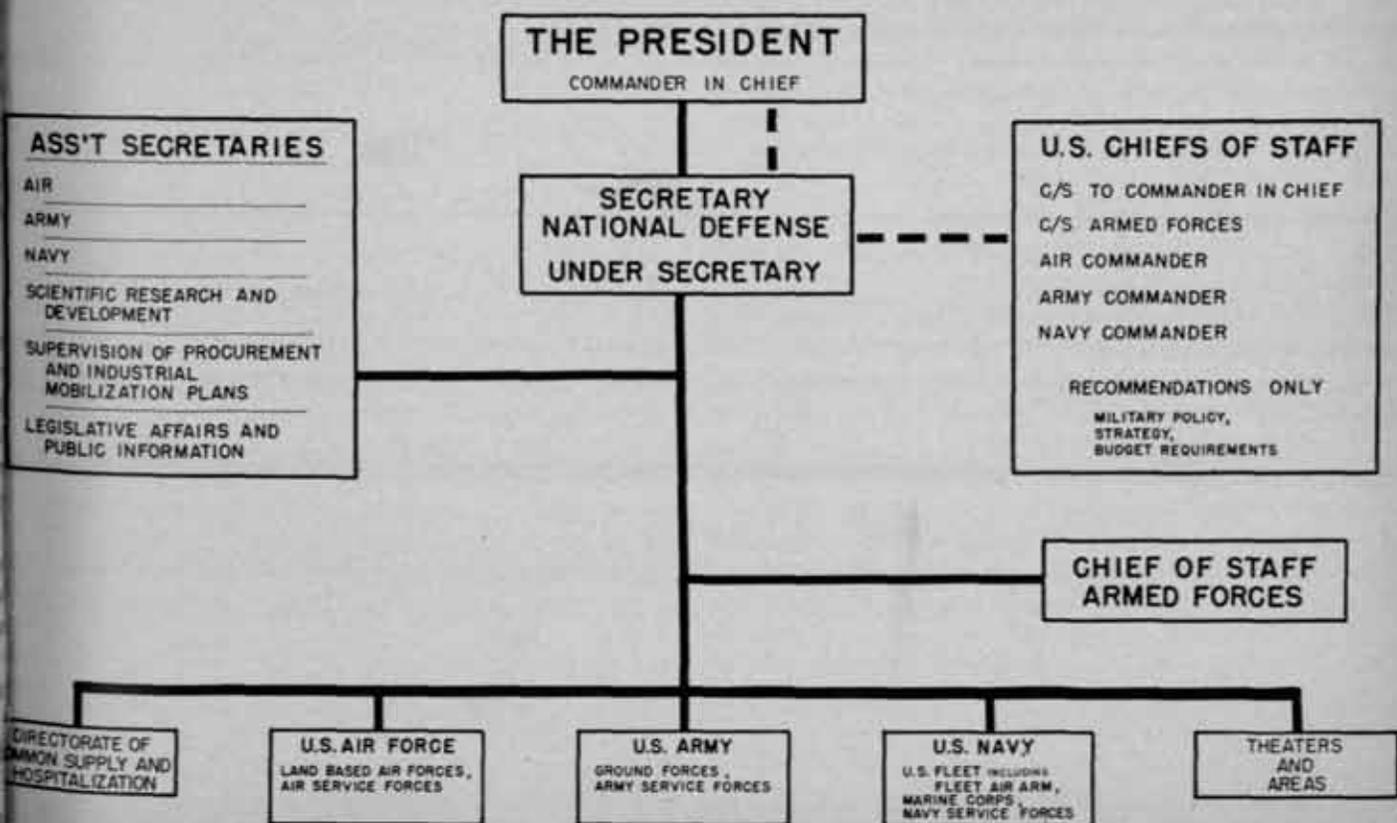
Recognizing the extremely useful service performed by the Joint Chiefs of Staff during wartime, the War Depart-

ment's plan would retain this advisory body to the President under the name "U. S. Chiefs of Staff." The new group would be composed of five senior officers: the Chief of Staff to the President, the Chief of Staff of the Armed Forces, and the commanders of the Army, Navy and Air. Its responsibilities and duties should be fixed by law to include recommendations only as to military policy, strategy and budget requirements.

(In his message to Congress on December 19, 1945, the President did not mention a Chief of Staff to the President. The War Department believes that such a liaison officer to the President would be valuable but not absolutely necessary. The appointment of such an officer is, of course, a matter for decision by the Chief Executive.)

PREPARATION OF BUDGET REQUIREMENTS

In peacetime one of the most valuable functions of the U. S. Chiefs of Staff would be the development of a balanced military program. Under the War Department's plan for unification, the over-all military policy would first be submitted to the President for his approval. Budget needs to implement an approved policy would be initiated by the three components—the Army, the Navy and the Air Forces—essentially as at present. These requirements would be placed before the U. S. Chiefs of Staff for review and coordination. The commander of each service would be expected to present his supporting arguments with full freedom and vigor. Conflicting requests would be resolved by the U. S. Chiefs of Staff in arriving at an integrated program of over-all requirements for submission to the President. In the event that the U. S. Chiefs of Staff



could not reach unanimous agreement, any dissenting member would be required to submit a minority report as a part of the final recommendation.

The recommended budget when finally approved by the U. S. Chiefs of Staff would be submitted to the Secretary. These recommendations together with the Secretary's budget for the Department of National Defense would be transmitted to the President. This would insure that the unaltered advice of the country's leading military experts was received by the President as Commander in Chief of the armed forces.

In the event of any Presidential change in the budget request transmitted by the U. S. Chiefs of Staff, it would be returned to that body for adjustment. Here the revised budget would be studied and fitted to the over-all military plan. The revised budget request, when finally approved by the President, would be transmitted through the Secretary to the various components and echelons of the Department for the preparation of detailed estimates for presentation to Congress.

This procedure offers distinct advantages over the current method whereby each department submits its separate budget to Congress for hearings and consideration before separate committees. Under the single department plan, the Congress could act on the budget with the knowledge that it had been given consideration by the nation's top military minds, working together in the best interests of over-all national security.

In addition, the Budget before Congress would have been reviewed as an integrated program by the executive branch of the Government, including the Bureau of the Budget, under the direction of the President. The handling of an over-all budget is, of course, a matter for that body to determine. It is to be expected that Congress would fix the manner and purpose for which each item in the appropriation could be spent, as is done now. This would prevent the transfer of funds from one component to another without the express approval of Congress.

EQUALITY FOR AIR POWER

Air power has emerged from the war as the nation's first line of defense. War proved that the air arm has developed to a point where its responsibilities now are equal to those of land and sea power, and its contributions to future strategic planning are great.

Because of its versatility and its ability to carry out independent strategic assignments, air power has earned coordinate status in military thinking and organization. This was recognized early in the past war when the Army Air Forces were given semi-autonomous status within the War Department. In the absence of new legislation, the Army Air Forces will lose this position six months after the official end of hostilities and will revert to its prewar status as one of the arms and services of the War Department.

In devising a defense against any future aggressor, military planners must look to air power to control the skies over our own nation as well as over any country that might launch an attack against us. The importance of air security is further accentuated by such developments as the atomic bomb, and rocket-propelled and radio-directed missiles.

SCIENTIFIC RESEARCH AND DEVELOPMENT

Science presents a field where major advantages can be realized through unification of the services. The War Department's proposal provides for coordination of the military program of scientific research, through the Assistant Secretary for Scientific Research, with any Federal research agency that might be established and with the great civilian laboratories of the nation.

Each of the three services should retain its own research and development unit to insure that its special problems are fully investigated. This also would provide the healthy competition so desirable in the field of scientific development. However, the Assistant Secretary would coordinate the efforts of the individual services and their relations with other scientific agencies. On many occasions the armed services have sought the advice and assistance of private research agencies in the development and improvement of weapons and munitions. With one directing head of scientific work within the three services, such requests could be coordinated and duplications and waste avoided.

In addition, the War Department recognizes fully the advantages to be gained through parallel research programs directed toward solution of a problem common to two or more of the armed forces. This procedure would encourage maximum freedom and competition within the command endeavor to develop new methods of scientific warfare. Moreover, unification would assure that the discoveries and improvements in techniques and weapons by one component are shared by the other.

PROCUREMENT AND INDUSTRIAL MOBILIZATION

In supply and related fields, many instances of duplication and conflict between the services occurred during the war. Some were resolved by committee action and by procurement agencies, but these groups lacked an over-all plan and the single direction that would have speeded the supply processes and reduced duplications with resultant substantial savings.

For instance, combined procurement would have eliminated such situations as existed when one service purchased items at a time when the other had an excess supply. Instances occurred where war contract plants were divided in their production between Army and Navy type shells, requiring the setting up of different production lines. If procurement had been coordinated and concentrated with one type to a plant, it is reasonable to believe that increased production often would have resulted. In other cases, manufacture was delayed because of the different requirements for tooling, the differences in materials specifications, the increased over-all stocks had to be maintained in the field and the complications involved in the supply of spare and replacement parts.

Parallel production, transportation, and storage systems established by the two-services required extra overhead. Frequently, Army and Navy inspectors were present in the same plant to inspect articles identical in performance and even identical in specifications. Repeatedly during the war storage facilities were established in a single strategic location by several of the armed forces. This resulted in stiff competition for the local labor market, duplications in organization of administrative overhead, and waste of

storage space through maintenance of separate reserves where one coordinated reserve would have sufficed.

Because the two services are not fully informed of each other's needs, there has been actual conflict between them endeavoring to obtain certain types of real property. Such competition not only created confusion and antagonism but resulted in increased prices, since the two services were placed in the position of bidding against each other to the benefit of the landowner and to the detriment of the taxpayer. Moreover, lack of common standards for building construction in the fighting areas resulted in many different types of living quarters and supply facilities in the same area.

As envisioned by the War Department, unification of the armed forces would provide for over-all supervision of all procurement and the preparation of mobilization plans for industry in the event of another war. Coordination of these matters would be afforded by an Assistant Secretary for Procurement. Working closely with the Director of Common Supply and Hospitalization, the Assistant Secretary would be responsible for eliminating duplications in the business management of the department. He would lay down policies governing procurement by the services forces of the Army, Navy and Air components, and by the Director of Common Supply and Hospitalization.

The Director would be charged with the procurement of all items of common supply, such as food, blankets, motor vehicles and the like. He also would supervise hospitalization within the Zone of the Interior (the United States) and perhaps within the base sections of the communication lines overseas (rear areas). The Assistant Secretary, with the approval of the Secretary, would determine which items should be classed as in common supply. As the organization gained experience it is possible that new duties would be assigned to the Director. He might, for example, be charged with supervision of the construction of military housing facilities in the United States. But since such matters can best be worked out by a process of gradual evolution, the War Department's plan suggests that at the outset only indisputable items of common supply and hospitalization be assigned to the Director. The Director's personnel would be drawn from the Air, Army and Navy, thus bringing to the centralized procurement office their experience and knowledge of the special problems of their own services.

The War Department's plan would continue the present practice by which the service having the predominant interest is charged with the procurement of items used to a lesser degree by other services. The Navy might be charged with procurement of all ships and small boats, whether operated by the Navy or the Army, and the Air forces could be made responsible for the purchase of all parachute equipment, whether used by the Air Forces or the Fleet Air Arm.

INFORMATION SERVICES

The War Department's unification plan groups all legislative affairs and public information services of a single department under one central agency. The plan proposes a civilian Assistant Secretary of National Defense to head this agency. This would assure a sound public relations

program, giving the public all possible information except that having to do with military security.

CENTRAL INTELLIGENCE AGENCY

Intelligence activities embrace a field in which close integration of effort is essential. While the scope of a central intelligence agency is debatable, the best military thought tends toward the conclusion that the military intelligence should be centralized under the Chief of Staff of the Armed Forces and should be an integral part of the over-all military structure. Coordination of the military intelligence with other intelligence agencies outside the Armed Forces or with a central agency if one is established would be through an Assistant Secretary.

NEED FOR COMMON PERSONNEL POLICIES

Differences in personnel policies and practices between the Army and Navy have been not only a source of major problems to each of the services but also have led to public misunderstanding and criticism.

These differences cover a wide range of personnel administration, from recruiting and procurement through such matters as promotions, allowances, manner of selecting officers and integrating reserve officers, awards and decorations, to the discharge point system and demobilization policy.

In personnel procurement, lack of a common system and standards gave rise to duplication of operating personnel and facilities, as in the case of duplicate aviation cadet selection boards and separate recruiting stations. There has been sharp competition between the services for various scarce categories of skilled manpower, as illustrated by the race between the services to commission doctors.

Congress provided the services with an effective and adequate system of Selective Service. Nevertheless, both the Army and Navy continued direct, competitive and unrestricted recruiting, each with its own recruiting establishment, until a Presidential order in December 1942 stopped all recruiting among men of draft age.

Military manpower problems begin in peacetime. They continue through all the stages of preparation for war, through initial to total mobilization and until the war is ended. The War Department believes there must be some one authority in the planning stage, in the initial mobilization and throughout the emergency, who can resolve the differences between the services, who can weigh their demands for men, and make final determination as to the number each shall have and the standards under which they shall be selected and assigned. There was no such authority during the war, and although many problems were solved by mutual agreement, satisfactory solution to many never was obtained.

Should all the armed forces be organized within a single department, there could be complete coordination on matters pertaining to personnel, and recommendations to the Congress as to the strength of the forces to be maintained would be closely coordinated with respect to their peacetime and initial war missions.

The public would have had a better understanding of demobilization had a single agency been responsible for developing plans for the return of soldiers, sailors and

marines to civilian life. The existence of different point systems, of different methods for operating separation procedures at different installations and the uncorrelated demands upon the nation's transportation system are today an indication of the disadvantages which arise when two different and independent organizations are carrying on demobilization simultaneously.

ORGANIZATIONAL PREPAREDNESS—COMBINED TRAINING

Prior to World War II there was little teamwork between the Army and Navy insofar as actual preparations for combined operations were concerned, although all the Army's war plans called for landings on foreign shores. Not until war arrived was there any appreciable joint training in amphibious operations.

The value of thorough training in combined operations was demonstrated forcefully in the Normandy landings where there was the closest coöperation. Training for this gigantic assault was organized and carried on in England during the months of preparation after the war began. A future war may not give our armed forces time for such transitional training and joint preparation. Certainly the nation should not count on any such period but should provide a system whereby adequate combined training can be perfected during the years of peace.

The War Department believes that a single department can best produce and administer an integrated training program, conduct joint training activities, and permit officers to be assigned in such a way that an individual officer will have an understanding of other Services besides the one in which he has specialized. It is a safe assumption that without unified direction—and specific appropriations to make combined training possible—each service will revert to its former practice of concentrating on the training and development of specialists in its own type of warfare. Thus joint training and operations would assume a minor rôle in the postwar military establishment, and there would be danger that the nation would repeat the mistake of training separate units to be committed to combat as a hastily organized team.

ORGANIZATION OF THE THREE MAJOR COMPONENTS

The unification plan establishes the three components, Army, Navy and Air, as coequal members of a single department. Each would be headed by a commander who

would be responsible for the internal organization and conduct of his service, and for the organization, development and training of the military elements under his direction.

1. The Air Force should include all land-based combat aircraft except those allotted to the Army and Navy for reconnaissance, spotting of gunfire, command and messenger service. The Air would retain its own specialized service forces.
2. The Army should include all combat ground forces other than the Marine Corps and would have its own specialized service forces.
3. The Navy should include the United States Fleet and its air arm, the Marine Corps, and its own specialized service forces.

Efficient conduct of operations requires that each component retain its own specialized service forces. This means, for example, that the Navy would construct its own ships and would supply and evacuate its own combat personnel. The Army would maintain its own repair facilities in the field for tanks, trucks and like equipment. The Air Force would have a complement of ground crews for maintenance, repair and service of planes. There will always be a need for such special service forces, particularly with the combat echelons of the three major components. However, as a single department accumulated experience, many common services and functions could gradually be shifted to the Director of Common Supply. Such consolidations would effect substantial savings in money and could be accomplished without interfering with the efficient development of functions that should rightly be retained by the individual components.

With regard to overseas theater and area commanders, the War Department believes that the system of unity of command which assured the coördination of the efforts of land, sea and air forces in the field should be continued. The commanders who served in the past war were named by the President on the recommendations of the Joint Chiefs of Staff. They operated under directives prepared by the Joint Chiefs and approved by the President. The War Department feels that there always should be one top commander in each theater and that this commander should owe his allegiance directly to the President rather than to any component of the armed forces.

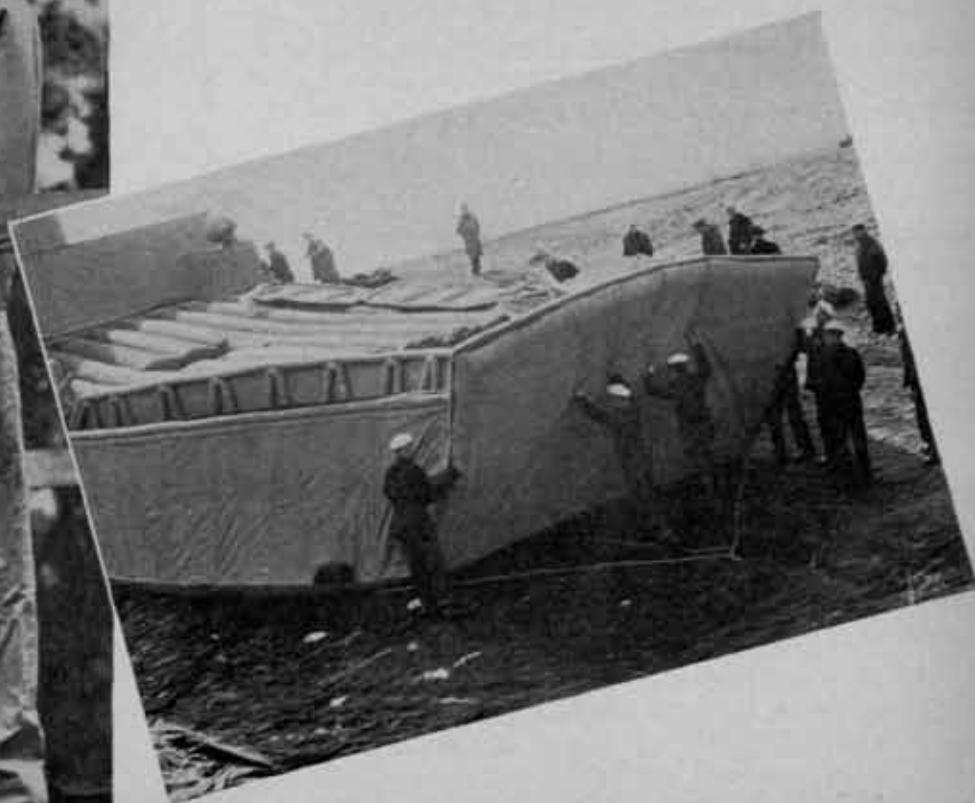


Anything that is wrong with equipment should be remedied as quickly as possible. The longer you let a defect go—even though it may be a very minor one—the worse the damage it will do, and the harder it will be to fix it in the end.

Decoys

Artillerymen have long been familiar with decoy guns and other installations used to draw fire or to bluff the enemy. The labor-saving decoys illustrated here have several advantages, including ease of transport and speed of erection. They are rubber, and may be inflated by almost any type of air compressor. The project was so secret that information was not released until 5 December 1945.

Signal Corps



The Antiaircraft Defense of Munich

By Captain Dan H. Barbour, Coast Artillery Corps

The antiaircraft of Munich was seldom the same two months in succession, especially after early 1942. The ever-increasing frequency and ferocity of Allied Air attacks, together with the pressure exerted by Allied ground forces, caused the Munich defenses to be changed frequently both in reference to troops available and to their disposition.

With the possible exception of the anti-buzz-bomb defense in the Antwerp sector, the AA defense of German cities was somewhat different from the AA defenses established by Allied troops on the continent. No target defended by our troops was ever subjected to the large number of mass raids, of ever-increasing intensity, which the large German cities were subjected to. Consequently, most of the AA defenses established by our troops were of a temporary nature, while those of the Germans were more elaborate and more permanent.

Inasmuch as the AA defenses of Munich were changed frequently, it is difficult to select one set-up and to call it "The AA Defense." Therefore, the sites located after the American troops occupied the Munich area gave little information as to the set-up in the past. In order to procure information about the past history of the Munich defenses, it was necessary to interview former officers of the AA defenses of Southern Germany. Two officers were interviewed and both were very cooperative. It is believed that the information given by them is completely reliable.

The AA defense of Munich was a part of the air defense of Southern Germany. This sector included the cities of Munich, Augsburg, Nürnberg, Innsbruck, and Salzburg, but did not include the defense of Berchtesgaden, a duty taken over by special SS troops.

EARLY WARNING SYSTEM

The standard early warning system used throughout other sections of Germany was also used in this sector. The Air Warning Service operated by fighter divisions of the *Luftwaffe* was available to all AA units through liaison officers stationed at fighter control centers. In addition to this service, ground radar units were used in air surveillance and information was sent both to higher and lower commands. These ground radars were of two types; the long-range, and gun-laying units. Ground observers were also used to provide air warning service to all units concerned.

The German procedure for the distribution of air raid warning information was for the detecting unit to notify fighter control headquarters where the data was plotted on the air situation map and then relayed to all other units. In addition to the units immediately concerned, all other units along and adjacent to the path of flight of hostile air-

In order to distinguish between friendly and enemy planes, friendly aircraft were required to submit flight plans or follow prescribed courses. As an additional precaution, friendly flights were tracked and the flight plotted on the air situation map at the Fighter Control Center. The Germans also used radio identification which was separate from the radar unit. Under this system, friendly planes transmitted a coded signal which was picked up by the ground receiver station. At the end, the Y system utilizing radio apparatus FUG 16 ZY, was used.

DEPLOYMENT

The German concept of AA defense was basically almost the same as ours. The position of heavy flak batteries was determined primarily by the expected speed and altitude of the attacking planes. The avenue of approach was also considered, but in the case of Munich, this was a minor factor because approaches to the city were not channelized. F



In the early years of the war, the gun ring was located about eight kilometers from the center of the city, but as the altitude and speed of the attacking planes were increased, the ring was moved to twelve kilometers from the center of the town.

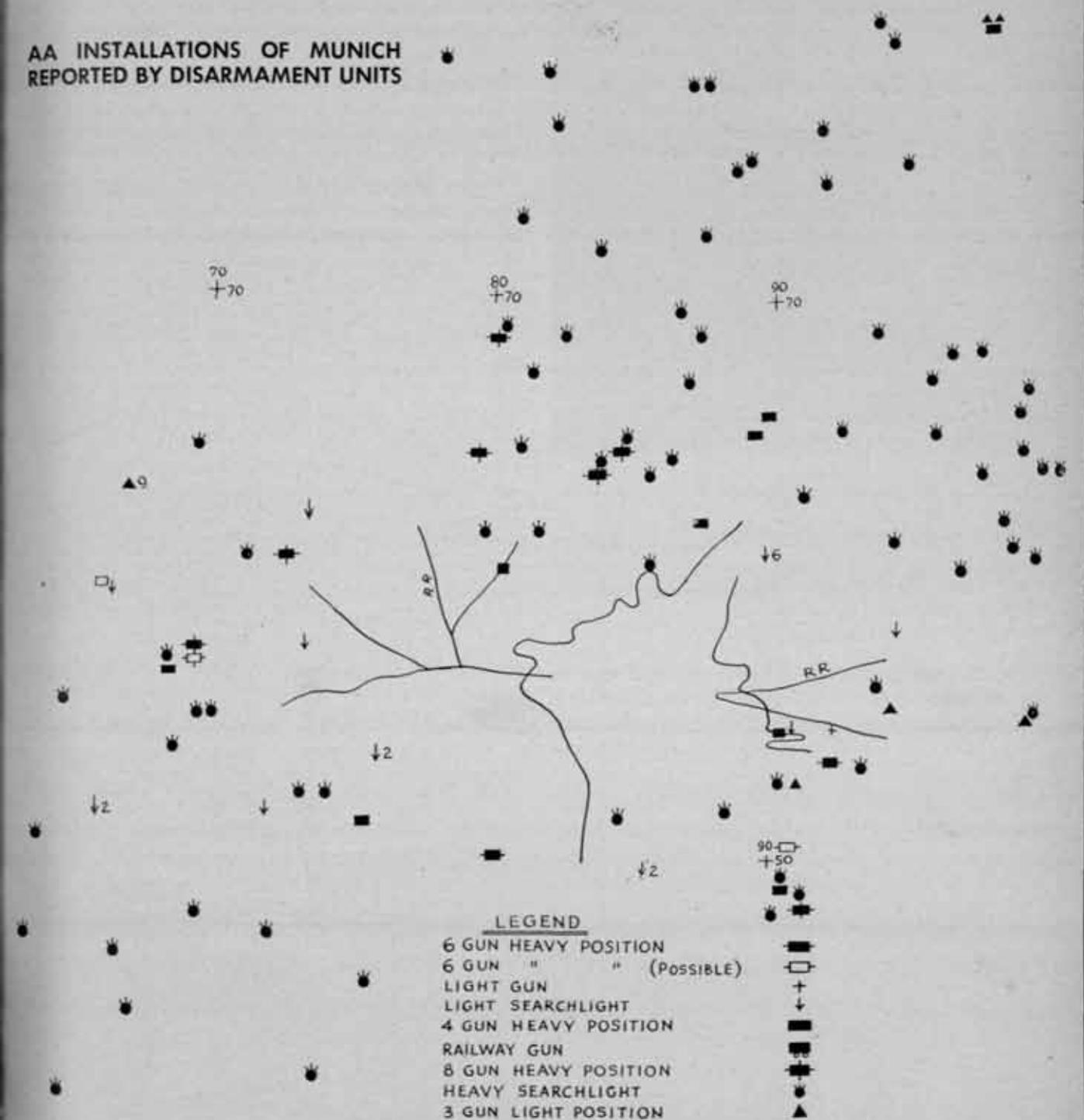
The Germans also used the priority system of target protection. Although the Air Defense Command was charged with the general anti-aircraft defense of the city of Munich, highest priority was given to manufacturing plants, transportation facilities, and airfields.

The light guns were deployed in and around the high-priority targets, and the city in general, to protect them from low-altitude attack.

Lights, employed much more frequently by the Germans than by Allied AA troops, were placed around the city to illuminate aircraft attacking at night. According to the PWs questioned, these lights were not used for homing lost or disabled planes.

Smoke companies were also an integral part of the Munich defenses but were used only to prevent reconnais-

AA INSTALLATIONS OF MUNICH REPORTED BY DISARMAMENT UNITS



SCALE 1:100,000

MAP OF MUNICH AND VICINITY
Sheets X-6, X-5, W-6

OVERLAY PREPARED BY 133 AAA GUN BN.



20mm flak 30.

sance planes from making damage-estimate photographs. Smoke was permitted to be used only where the wind velocity was between two and six kilometers per hour.

MATÉRIEL

The well-known 8.8cm flak gun was the backbone of the Munich AA defense. The Model 41 was considered the most satisfactory and it was the hope of the AA com-

mander finally to equip all 8.8cm batteries with this model. Just how far the change-over had progressed is not known, but it was stated that the bulk of the 8.8's in this sector were Model 37.

A maximum of three batteries of 10.5cm flak guns were used in the Munich defense. While the gun was not generally popular with flak troops, the Munich commander indicated that he considered it a satisfactory weapon and would have liked to have had more of them.

There is no indication that 12.8cm flak guns were used in the permanent defenses of Munich. However, on special occasions some batteries on railway mounts were incorporated into the city's defenses. This gun, the 12.8, was considered the most satisfactory of all heavy guns in the defense of large cities because of its longer effective range and the greater destructive power of its projectile. Its lesser degree of mobility and great weight were not considered important in the defense of cities.

In the field of light flak, the most popular weapon in defense against low-level attack was the 2cm Flakvierling 38. Not all light batteries were equipped with this model and large numbers of older models were still in use at the war's end. The 3.7cm flak gun was not used in very large numbers in the early years of the war, but the number increased toward the end as the number of attacks increased.

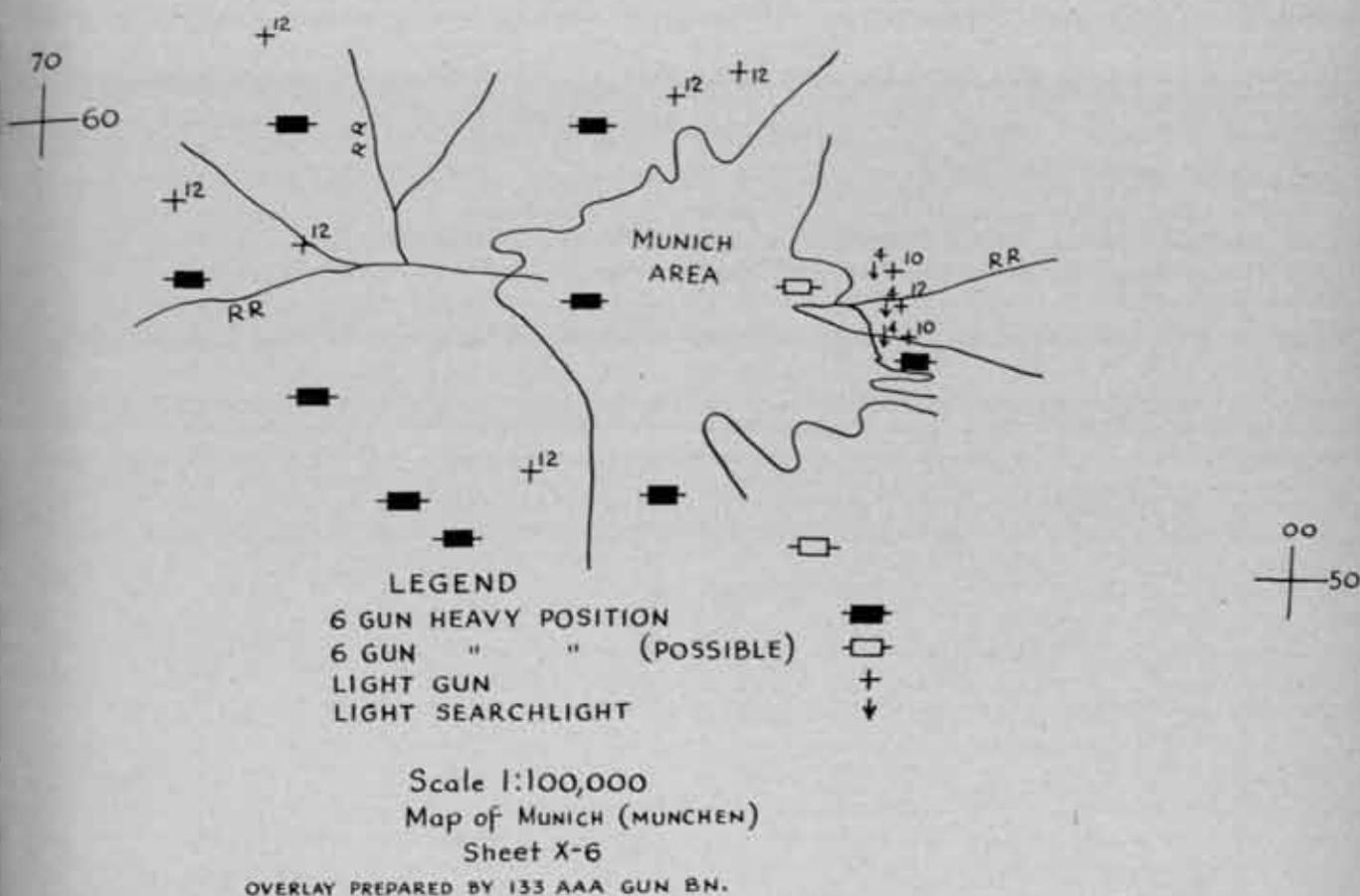
Radar was not available to the Munich AA defense until 1941. In that year the Wurzburg C Model was issued on the basis of one to each three or four heavy gun batteries. The radar was emplaced near the center of the battery and the data from the radar was telephoned to each battery. The battery was responsible for calculating the data for its own position. The maximum distance from the radar under this set-up was seven kilometers. As more radars became available in 1942, each battery was equipped with one unit. In 1943 the Wurzburg D was substituted for the C Model and an attempt was made to equip each 200cm searchlight with the late model detector.

The Freya long-range sets were used to provide early warning data for all units in the Munich area.



A mobile "88" and prime mover.

GERMAN AA DEFENSES OF MUNICH JULY 1941-OCTOBER 1942



TACTICS

Since fighters usually attempted to intercept attacking planes, a flak ceiling of 5,000 meters was established. Later this was increased to 8,000 meters. Above this altitude fighters engaged all attacking planes, and if they came below this altitude in close pursuit of a hostile plane, the AA unit was required to hold fire.

Generally speaking, the control of AA fire was left to individual units after clearance of fire had been given by the Flak Liaison Officer at Fighter Control Headquarters. However, if a large number of planes was approaching, units could be ordered to engage a certain target (generally by sector) or to hold fire, according to the situation's demands.

The standard operating procedure called for batteries to open fire at a maximum range of 8,000 meters and to continue firing until bombs were dropped or until the midpoint was reached, after which further firing was considered a waste of ammunition.

It is of interest to note that in the early stages of the war the primary duty of German AA was the protection of the target, with the destruction of the attacking planes as the secondary mission. During this period barrage fire was used. Later the destruction of attacking aircraft became the primary mission and barrage fire was outlawed as ineffective and wasteful of ammunition. It is believed that this change of primary effort had a great deal to do with the formation of the gross batteries.

The gross batteries were first used in the Munich area in 1943 and were formed by combining two to three four- or six-gun units, emplaced about 500 to 700 meters apart in a triangular formation. These gross batteries were deployed in such a manner that the fire of at least three batteries would intersect at the bomb release line, and it was not considered important that the arcs of fire intersect over the city.

Radars were used for gun laying when visibility conditions were poor, but visual tracking was used when possible. Allied counter-radar measures were very effective; it was stated that airborne jamming had been the most effective.

Normally each gross battery was equipped with two radars of the Würzburg type. One of these sets was used for tracking while the other remained in surveillance. When used in this manner, the time required to change was greatly reduced.

The officers interviewed stated that rockets had not been used in the defense of Munich and to date no evidence of rockets having been used has been uncovered by American AA troops. These officers added that rockets were frequently used in the AA defense in Western and Northwestern Germany and in high-priority targets such as Berlin, but not in Munich. This is contrary to a statement made by an American flying officer who had been in on several of the Munich raids. This officer stated that he had seen a number of rocket-like projectiles fired at American planes during

raids on Munich and that he had watched these projectiles climb from about 10,000 feet to the height of the formation flying at approximately 28,000 feet. This apparent discrepancy may be explained by the fact that the Germans at one time had a large rocket research station at Garmisch Partenkirchen and it is possible that some experimental rockets were fired by men from this station even though they were not an integral part of the Munich defense.

A SHORT HISTORY OF THE MUNICH AA DEFENSES

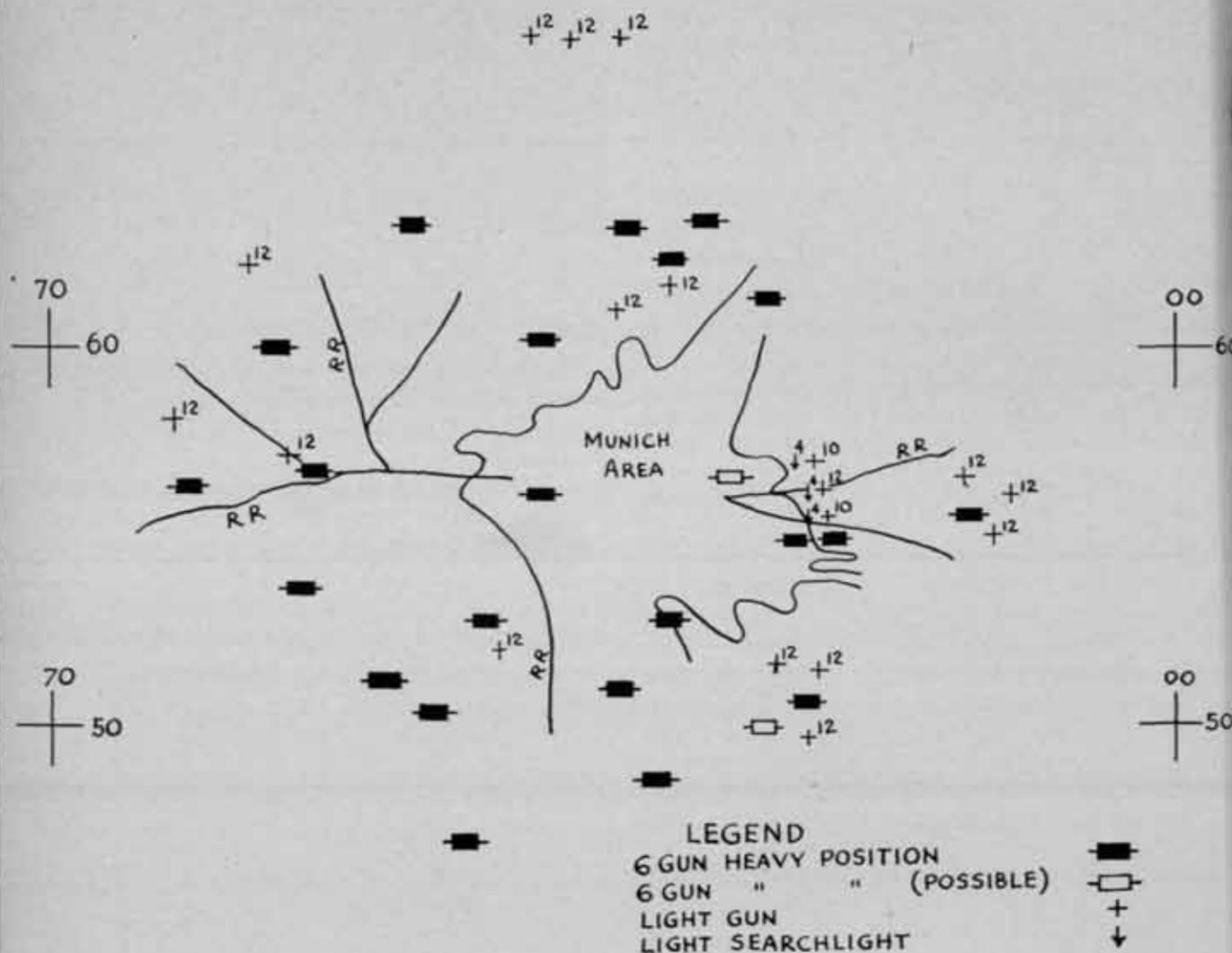
During the early stages of the war the Germans believed their air force strong enough to repel all attempts of Allied Air Forces to raid deep in German territory. Consequently, the AA defenses of Munich were not as strong as might be expected. As equipment and more trained personnel became available early in 1941, the Munich defenses were strengthened considerably. At this time the following arma-

ment, with operating personnel, was deployed in and around the city.

Type of Battery	No. of Batteries	Armament for Batteries
Light	6	12-15 2cm flak guns and 4-6 6cm searchlights
Medium	2	9-12 3.7cm flak guns and 4 60cm searchlights
Heavy	11	4-6 8.8cm flak guns and 2.2cm flak guns

There were no searchlights larger than 60cm used up to this time. Whenever Hitler came to town to meet one of his underlings the AA defenses were reinforced by two heavy and four light railway flak batteries.

GERMAN AA DEFENSES OF MUNICH 1942-1943



Scale 1:100,000
 Map of MUNICH (MÜNCHEN)
 Sheet X-6
 Overlay Prepared by 133 AAA GUN BN

About the middle of 1942 when it became evident that the Allies were not going to be a pushover, the Munich defenses were strengthened by twelve heavy gun batteries, two light gun batteries and ten batteries of searchlights. The searchlight batteries contained twelve 150cm and ten 200cm lights. The lights were deployed over a circular area about forty kilometers in diameter.

The first large air raid on Munich was made by the RAF during the night of 19 September 1942 and these continued periodically throughout the winter into the spring of 1943. Early 1943 saw the formation of gross batteries in an effort to make these night raids so costly that they would have to be discontinued. These batteries were formed by increasing the number of units available to the Munich commander. During this time the increased speed and altitude of the attacking planes forced the ring of heavy guns to be moved further from the center of the city.

Beginning with the spring of 1944, the Allied Air Forces really began to pour on the heat and the pressure was reflected in the changes of the Munich defenses. The status of the Munich area command was raised to a flak division and the number of heavy gun batteries was increased to a total of fifty. The amount of damage caused by raids was indicated by the change in the disposition of the light flak units. According to one of the German officers, the loss of light flak personnel was so high that the remaining units were removed from the manufacturing areas and railways and moved to the airports and factories which had not been moved from the city proper. Searchlights were redeployed to the south and southeast in an effort to increase the chance of interception over the German lakes in this section, for visibility was much better there.

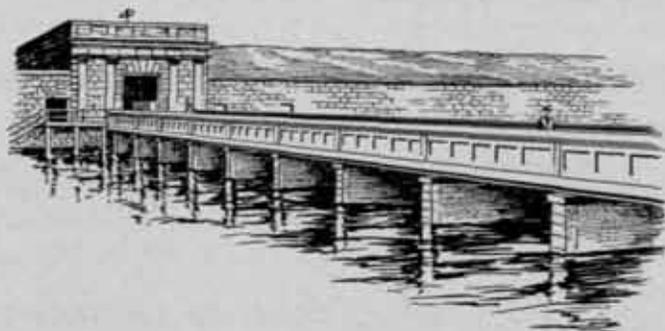
As the American armies rolled eastward across the border, the Rhine and finally into Western Germany, the Munich defense changed constantly. Troops were sent to the front and were replaced by troops who were badly in need of rest and refitting. At the end the fate of these AA troops was

obscured in the confusion of bitter defeat. Some remained behind to aid in the defense of the cities while others withdrew into Austria to continue the fight; the remainder were less fortunate.

MISCELLANY

During the last stages of the war a new type 8.8cm ammunition was used in the Munich area and the figures for the "Cat I" obtained with the old and new are little short of amazing. According to the Plans and Operations Officer of the Munich defense, the standard ammunition was equipped with a time fuze only, and an expenditure of approximately 4,000 rounds was required to bring down one plane. The new ammunition was equipped with a contact fuze and only 2,000 rounds were required to bring down one plane. This 100% increase in effectiveness of AA fire was not attributed to better weather, more experienced crews, or better range equipment, but solely to the addition of the contact fuze to the otherwise standard 8.8cm projectile. The officer was explicit in his denial that the new fuze was of the sonic, magnetic, or proximity type, but that it was definitely of the contact variety. The explanation given for the increased efficiency was that they had been getting hits all along, but the standard 8.8 projectile was so stable that it was not detonated when it passed through the thin skin of a plane. Furthermore the use of the contact fuze, in effect, placed all aircraft of a formation in the same horizontal plane and therefore increased the possibility of a hit. When it was pointed out that even this failed to account for the increase in "Cat I's", the interrogated officer stated that nevertheless it was true.

The former AA commander estimated that not less than eighty gross batteries would have been required to provide an adequate defense for the city of Munich. Some idea of what induced this estimate can be deduced from the commander's estimation that 2,500 to 3,000 persons were killed per heavy raid on this city.



Airborne AAA in New Guinea

By Captain Robert Marye, Coast Artillery Corps

In April of 1942 at Fort Bliss, Texas, volunteers were called for the formation of a group of Automatic Weapons Batteries, Airborne; and from these volunteers, a group of men were chosen to compose units which were to be subsequently among the first to operate in the New Guinea campaigns. One of these, the 709th, was commanded by 1st Lieut. Thomas H. Corey, with 2d Lieuts. Wm. Gribble, Thomas J. Patton, Earl J. Carlson, and Robert Marye as battery officers.

On June 27, 1942 we set up our bivouac near the Townsville, Australia airport from which we were to jump off later for Port Moresby and Milne Bay, New Guinea.

For six long weeks we lived a life of physical hardening, of studying the possibilities of our weapons, and of our men. Each day a twelve-mile hike through jungles and up and down the sides of mountains served to remind us that action was close at hand; that officers and men were in top physical condition and no weaklings were left.

At the Townsville airstrip and seaplane base we practiced loading our battery equipment on Sutherlands, on Catalinas of the Australian Navy, and on U. S. Lockheed-Hudsons, B-24's, B-17's and C-47's. After a week of this work, we considered ourselves well enough trained to meet any loading and unloading operations in which we might be called upon to engage, by day or by night. Subsequent operations justified every hour we spent on this phase of our work.

Along with the practice of loading and unloading, we continued our 12-mile hikes, with full packs and equipment; we fired thousands of rounds from our tommy guns and small arms; and we were finally judged ready for combat.

With our period of waiting and training completed, on 17 August we were alerted, packed our equipment, and prepared our men for take-off to battle. On the 17th, our first two Sutherlands got off the waters of the harbor with our battery commander, Capt. Corey, and two squads with two .50-caliber antiaircraft machine guns. Each man was limited to 250 pounds of equipment including food, ammunition, weapons and miscellaneous gear, which made it a tight squeeze for some of the larger men. These first Sutherlands, incidentally, were piloted by civilian pilots from one of the Australian Air Lines, and the aircraft were unarmed. At this time there was no great importance placed on how men were brought to battle lines; we were needed, and needed as quickly as possible, hence none of us were surprised to see a civilian ferrying service in operation.

The second Sutherland flying boat was loaded with another squad and its guns and some extra supplies, and they too skimmed off the peaceful waters of Townsville Harbor, taking off for Carins, Australia, the next stop on the way to Port Moresby.

At this time Port Moresby, New Guinea, was being subjected to vicious Jap air raids, and to avoid being attacked by them on the way in, we left Carins in the very early

afternoon. This timing would enable us to reach Moresby in the late afternoon and slip into the harbor at dusk, which seemed the least active part of the day insofar as sneak raids were concerned.

At Port Moresby the battery settled itself as comfortably as possible under rather trying conditions. Part of our battery was still back at Townsville, so far as we knew, waiting for additional air transportation.

After a night at Moresby we were briefed and ready to leave. Again an early morning take-off was ordered, and the first two Sutherlands got off between the take-off flares in good shape.

As luck would have it, however, the third Sutherland in which I was traveling with part of the battery, rocketed off a reef, and we had to pull up for an inspection of possible damage to the hull of the plane. We had not been damaged, luckily enough, and we were taking in no water. Flares were lighted a second time and we burst through the ground fog, and off and up into the early morning.

The first two Sutherlands reached Milne Bay on schedule. We unloaded by RAAF crash boats at Gilli Gilli which was used in the prewar days as a trading post landing for itinerant "luggers," the two-masted schooners which plied the coast of New Guinea before the war.

The third Sutherland flying boat missed the Milne Bay landing in a heavy fog and we flew up the coast, hoping to see something which would put us on our course. There was no "beam" to follow and navigation was risky at best with the pilots depending more on instinct than directional instruments. Eventually we spotted a "lugger" hugging the coast, and decided to drop down through a hole in the fog to ask directions. We swung in to a perfect landing, and a boat put off from the lugger, with two natives and a white man aboard. The white man turned out to be an Australian government man who, it seemed to us, was taking chances navigating his lugger in such dangerous waters. The nervousness of the Japs did not seem to bother him, however, and he directed us to Milne Bay, which we had passed in the fog, some sixty miles back. The Sutherland again roared off, and up into the comparative safety of clouds and mist, hoping to hit Milne Bay on the return trip. At least we were headed in the right direction this time!

We swung into Milne Bay finally in the late afternoon when the clouds parted momentarily, and we were all relieved to see the docks at Gilli Gilli loom out of the green brush which surrounded the little harbors.

There are two seasons in New Guinea, the rainy season and the "wet" season. We were in the middle of the rainy season, and as we approached the dock to meet part of the battery that preceded us, we found them a wet, sad and sorry-looking crew. The night before they had been flooded out when the rain came in torrents, swept away their tents and sent what sparse equipment they had floating off into the jungles or into the ocean. We were treated to a sample of what they had the night before just as we got ashore, for



Practice-loading a searchlight in New Guinea.

Signal Corps

the heavens opened up, and in just a few minutes we were standing in the middle of a streaming sheet of water which turned the entire area into a sea of mud and confusion. Anything not tied down floated away, either off into the jungle or into the sea.

There were no cots. The pup tents were sodden masses of canvas that could not be used. The only shelter available was a native hut hidden back in the underbrush, which we took over. The men had spent a punishing few hours the night before trying to keep from being swept away, and would unless properly housed present a health problem, for their clothes were soaked and their equipment dripping, and they were most unhappy. We managed to sleep some eighty men in this native house, by sleeping side by side, and not breathing too deeply. If anyone on the edge "rolled out of bed," he rolled off the platform and down into damp ground, a distance of six feet! We had no mess equipment, no large stoves, and very little with which to make conditions livable. However, we had an adequate supply of "C" rations, and each squad had a small emergency stove which served to take the chill off the canned rations. Tired, wet and depressed at our first experience with Milne Bay, we finally slept.

The following day, we found an Engineer company, which was building the first air strip we were later to defend against the Japs, and they fed us for a week until additional supplies arrived by boat and aircraft. It was a rough few days, however, since they did not have too many rations themselves—but they fed us and made us comfortable, with that hospitable camaraderie one finds among troops who are far from civilization and living under difficult conditions. Major General Cloves, of the Australian Army, was in command at Milne Bay, and we were theoretically under his control, though actually we were operating individual units, making ourselves useful when and where we could.

The balance of the battery came in the next day, in two B-17's and one B-24. The B-24 came in for a landing with

its wheels up, but no one was hurt and the equipment, though tossed about, was all in good shape when it was unloaded. A few days after the equipment had been removed from the B-24, a hedge-hopping Jap Zero swept in, strafed the field, and set the B-24 afire and was gone before the Aussie Ack-Ack outfit defending the field could get in a damaging burst. Life moved quickly in New Guinea in those days!

In the meantime another plane had been dispatched from Townsville, with cots, to get the men off the wet and sodden ground and in some comfortable place with the tents to cover them and a few stoves. The plane arrived without incident, and was very welcome indeed. Life became more comfortable, though the rain continued unabated. Guns, equipment, ammunition, men, food—everything we had with us—stayed damp and mouldy.

One afternoon about 1500, the Australians warned us that the Japs were to land near by (a few miles up the coast), and that action would be forthcoming at any hour. Since that information came via the grapevine, we took it with doubtful misgivings, but prepared ourselves for any eventualities, nevertheless. Emergency rations and extra ammunition were distributed. We had seventy men armed with tommy guns, the weapon so dear to the jungle fighter's heart, and five officers also carried these deadly little sub-machine guns. In addition, of course, we had our .50-caliber antiaircraft guns, which are effective weapons in close combat, as we were soon to see.

Our security detachments were posted, and we awaited further information as to how soon the Japs were expected, and from what direction we might expect attack on the air strip which we were defending. Our twelve .50 machine guns were in perfect condition; we were ready for anything that might come our way—and we expected that we were in for a rough time since we had so few men. Repulsing a Jap landing party was not a pleasant prospect for green troops who had yet to see their first real action.

Since we had no tactical connections with any group on the Island, we reported to the Australian Headquarters. When they learned we were well armed with tommy guns and had .50-caliber antiaircraft guns as well as ammunition they welcomed us, for they were badly in need of supporting troops and fire power. We were given the assignment of protecting the air strip from parachute attack, and the beach from water assault.

Lieutenant Gribble took the 1st platoon, with four .50-caliber machine guns and 30 men in two 2½-ton trucks which the Engineers had given us, and made his way as far as he could drive down the air strip until he reached the edge of the swamp which lay between the end of the air strip and the beach. When his men got to the very end of the swamp they had to abandon the trucks and started slogging their way through the mud and treacherous potholes to the beach. This was the hardest part of the job, for carrying heavy ammunition boxes and machine guns over terrain like this meant, on occasion, dropping into mud holes in which men and equipment sank almost out of sight. A man might be struggling along the muddy trail when suddenly he would disappear—complete with machine gun, ammunition, or whatever else he might be carrying! Of course the men always scrambled out cursing this dense jungle in particular, and New Guinea jungles in general, for it was rough going, and with the Japs but a few hours away every delay meant precious moments lost when we might have been preparing our positions.

Lieutenant Patton and his platoon of twenty men and their machine guns forded the creek, and set themselves up to deliver fire across the air strip if necessary. The "Counterattacking Force" which I commanded set up near the strip, ready to give help when and where it might be needed; but the idea of bringing a "counterattack" group of a handful of antiaircraft artillerymen against a Jap landing force which might well be on a large scale, gave me quite a few very unhappy moments. We established walkie-talkie communications with the platoons on the air strip, but Lieut. Gribble's hand radio was soon masked by heavy jungles, and we lost contact with him and his platoon.

Late that night several Jap ships came in close offshore and shelled the entire area, but either their aim was poor or we were very lucky, for they did not score any hits in the vicinity of our guns or CP though we could hear the wail of the Jap shells as they passed overhead to land with a roar in the jungles, or blast into the sand on the beach, or drive into the Bay near the shore, cascading huge spouts of water high into the air. This was our first experience with Jap artillery—and while we suffered no casualties, we prayed that the Jap aim would continue to be poor for being shelled at night is at best a harrowing experience, particularly for men who had not been in action before.

After the shelling, the Japs landed on the beach several miles up the coast. Lieut. Gribble was informed by runner to withdraw from his beach positions to join the rest of us at the air strip, for we had learned from Australian patrols that the Japs were moving along an inland trail, with the air strip their goal. There was no further activity from the sea, hence it was assumed that the attack would be by the main body of Japs, moving down the coast.

We learned too that the Japs had landed tanks, and that

the Australians were sending us land mines to place along the only trail down which the Japs could bring these tanks toward the air strip. I had joined the platoon led by Lieut. Gribble, and as neither of us had ever seen one of these mines, let alone placed one in firing position, we "matched" to see who would take on the dubious honor of laying the mines. Lieut. Gribble "won" and he placed the land mines to good advantage.

At this point we were reinforced by a platoon of Australian riflemen, though we never found out whether they joined us for reinforcements, or for mutual morale purposes! At any rate it was a great comfort to have them with us, and their weapons added more welcome firepower, which we expected we would need momentarily. Meanwhile, hearing sporadic outbursts of rifle fire toward the Jap approaches, we assumed the Jap patrols were filtering through the Australian lines and getting uncomfortably close to our air strip. We decided to get down to the air strip, at the ocean end, to collect two machine guns which we had left down there. We did this at night. Two of us went ahead to disarm the mines we had placed in the tank path, and dug up enough of the mines to permit a man to pass through in the darkness. Then we stood with our backs to the rest of the mines and guided each man of the volunteer party through the minefield to the machine guns.

We reached the beach positions just at dawn and collected our guns. Looking down toward the settlement of Robi, which was clearly visible in the early dawn, we saw Japs burning the buildings, shooting their rifles, and apparently celebrating the lack of resistance they found there. Either they spotted us in the distance or just shot in our general direction, for we heard the peculiar whine the Jap rifle bullet makes when it passes near by, so we departed quickly.

Returning down the trail to the minefields, we guided our men back through the cleared section, re-armed the mines and set them in position, and returned to the air strip to await further developments.

Our positions around the air strip were now well consolidated, and we were ready for action. At about 0200 one morning we heard occasional splatterings of rifle fire, and about 0400, heavy firing up in the direction of the Australian CP which lay between us and the Japs, but off the main trail. We presumed that a small force of Japs had been sent to wipe out this advance outpost which lay between them and the air strip.

We lay about our guns all night without a sound, waiting for the approach of the Jap forces; and in the cold dawn with the fog just beginning to lift from the air strip and jungles, it was indeed a weird and unpleasant feeling to realize that we were being stalked, and the war was coming to us with daybreak. We could hear movement along the trail leading to the strip, then we heard Jap commands, and considerable shouting from the head of the column. We could not see the Japs, for it was still murky-dark along the edge of the jungles; but suddenly a flare went up from one of the Aussie positions, lighting up the field and the terrain leading to the center of the strip. We saw what appeared to be a whole battalion of Jap marines, marching four abreast, starting across the strip in a regular parade formation. The moment the flares went up they realized

that a fight had started, and began to break formation to get into firing positions—but they were too late, for a virtual sheet of tracer fire crisscrossed across the field from our guns and the heavy Aussie guns. The Jap bugler apparently blew a call to "Charge"—and the Japs tried to get at us. The barking roar of the .50-caliber machine guns, Vickers, Bren guns and mortars, and chatter of the tommy guns was terrific, and the screaming of the wounded Japs, shouted commands, and the noise of Jap small arms, and light and heavy machine guns, made the air strip an inferno of noise and confusion. Each time the Japs tried to set up and fire a machine gun, a blast of tracers from our .50-caliber guns hit them and decimated the crews, chewing the machine guns to bits. Each time the Japs tried a charge across the field the guns started to clatter, and the Japs were cut down. It was a ghastly slaughter, but the memory of the Jap tactics at Bataan, at Singapore, at Pearl Harbor and the Solomon Islands was fresh in our minds and we had no thoughts of mercy, for this was a battle for survival.

The Japs lacked common sense, rather than bravery, for they made repeated charges. As the sun came up the Jap bugler blew the retreat call and the Japs started to scuttle away into the jungles, murdering their wounded, ending the screams of pain with the hollow-sounding "drong" a rifle shot makes when it is held close to a man when it is fired. We took no prisoners, and no wounded Japs remained as the balance of the Jap party withdrew back up the jungle trail. When the firing died away, we took roll call and checked some of our own crews for wounded and killed, but there were neither. We had prepared our positions well and the men were well concealed during the attack. We counted 160 dead Japs on the field alone.

A detachment of Australian infantry took out after the Japs to harass them and keep them moving in their retreat, and we heard occasional outbursts of firing all morning as the Australians caught up with groups of stragglers who had become separated from the main body during the action.

The Japs left snipers tied in trees behind them as they retreated, and we had a few busy days locating these snipers and disposing of them.

With this initial threat to the landing strip repulsed the Australians expected that the next attempt upon the strip would be made from the sea, so we were requested to withdraw from the air strip and set up a defense off the beach area. We placed our eight .50-caliber machine guns about one hundred yards apart along the beach, covering the important approach to the strip. We strung barbed wire in the surf, and dug in, bringing in clerks, cooks, and truck drivers from the CP, using every available man. About 90% of the men were infected with malaria in spite of the preventive measures rigorously observed, for the swamp which backed up along the beach between us and the strip was good mosquito-breeding territory, and there was nothing we could do to drain the area. We tried to relieve our men five at a time and bring in fresh men from the CP, who had been back to rest a little, clean up, and get over the malaria shakes where possible. We were joined a little later at the beach by some Australian infantry, and as usual, we were glad to have reinforcements and company. They

were a friendly group and good company during the busy hours.

Late one afternoon a hospital ship came into the Bay and tied up alongside a freighter, which was unloading at the narrow dock. Since the hospital ship had to remain lighted up, and its reflection outlined the freighter beside her, she moved out into the Bay.

At about 2200 hours I looked out across the harbor from the CP on the beach, and was startled to see what appeared to me to be momentarily a flash of a signal light a few hundred yards from the hospital ship out to sea. Calling the Australian GHQ I was told that nothing was reported in that area, and that they had no reports of enemy subs or surface craft, but to be on the watch, anyhow.

Just a few seconds later, a blaze of searchlights swept the harbor, and I saw with amazement the outlines of a Jap light cruiser lying in close to shore. Her searchlights swept the freighter unloading at the dock, and she immediately pumped salvos of shells upon the freighter, sinking her immediately. The cruiser did not wish to linger, apparently, for she ceased firing on the freighter, and turned her lights upon the hospital ship, illuminating the clearly painted red crosses on her sides. Apparently satisfied at the identity of the hospital ship, the cruiser did not fire on it, but turned her lights and guns upon the shore, pumping salvo after salvo upon the shore and beach, straddling the emplaced antiaircraft guns by no very comfortable margin.

After a sustained barrage upon the beaches and shore installations, fortunately doing little damage, the cruiser switched off her lights and slipped quietly out of the harbor. Frantic phone calls to the Air Forces brought no response until the following morning, but shortly after daybreak, the Air Forces reported that they had intercepted the cruiser. Just what happened after the Air Forces "intercepted" it no one seemed to know, but it was reported sunk, at any rate. Being shelled by the Jap Navy was another unique experience to chalk up for our "airborne" battery!

For the next few weeks we let our men join Australian infantry patrols which were moving up the coast making occasional contacts with small Jap patrols, in infiltrating up through and close to main Jap lines. This experience was invaluable to our men, and there was always a waiting line of volunteers, anxious for a change of scenery and a chance to learn something about jungle warfare from the Aussies, who were well schooled in this type of combat. Our men were constantly eager to learn; and as they were each and every one volunteers originally, they carried through this same spirit when they had a chance to learn something about themselves or the enemy, which they might put to use later on.

On one of these excursions, one of our aid men, carrying a tommy gun since he was "off" duty, joined one of the Aussie jungle patrols, and had a quiet day, slipping through the jungles up to the coast. His group bivouacked in the evening near a swamp; and waking the next morning early, the medic awoke to see a Jap officer and two enlisted men working quietly through the jungles to a point several feet from where the Aussie patrol was still sleeping. They had gotten past the security guard. The medic quickly lifted his tommy gun and let loose a long burst, chewing up Japs and

jungles in one bedlam of sound. Satisfied, he returned to his battery the next day, but always slept lightly thereafter. The Japs move like cats through the jungles; and after a man has tangled with them a few times, he always sleeps with one eye open.

Eventually the Jap threat of attack from the sea died away, and we were ordered back from our beach positions, which we had made quite comfortable by this time, to the No. 1 air strip, for a "rest" of sorts. At the air strip we were attached to the U. S. fighter group which had moved in to relieve the Australian pilots; and while we were happy to see Americans again, we said goodbye to the Aussie pilots with some regrets, for they were fine fighting men; courageous, good pilots and fine friends. Through the original assault on the Jap air strip these Aussies had worked with us, keeping the Japs in full retreat after their early morning defeat, with strafing attacks and with light bombings. We hated to see them go.

We remained as part of the defense of the No. 1 air strip from late September, 1942 till January of 1943. For the most part our life was quiet although we had three vicious Jap air attacks from high level, hence out of range of our .50 caliber anti-aircraft guns. Australian anti-aircraft guns of a much heavier caliber reached up at these attacking Japs, however, and drove them off before they could do any damage.

Toward the end of January, one evening we were given orders to prepare for another movement at dawn the next day. We were always being moved somewhere in a hurry, hence it was almost second nature to collect our weapons and our gear, and be ready to move at a moment's notice. We learned subsequently that we were being moved to Buna, and were to take off as a group, rather than dribble through in sections as we had moved heretofore.

Thirteen transports came in at dusk in a pouring rain, and we worked all night long, loading our gear and weapons. At dawn departure was scheduled; but following tradition, the 13th transport could not get off the ground, so some of our valuable equipment and men had to be left behind.

At Buna we landed at two temporary air strips. One platoon, commanded by Lieut. Gribble, was set up to protect the air strip which was being used by observation aircraft as a base of operations. The other two platoons, commanded by Lieut. Carson and myself, set up on the second strip to protect aircraft which were evacuating the wounded from the Buna campaign, and bringing in supplies. Lieut. Patton was commanding the battery at this time, and he kept busy with inspections, insuring that the tactical dispositions were efficient and organized to meet the ever-present emergencies. The 707th Automatic Weapons Battery, Airborne, had landed just ahead of us at Buna, during a Jap air attack; and the Japs had destroyed one of their transports, fully loaded with men and equipment.

Subsequent to our leaving the Milne Bay area we learned that the Japs had thrown a full-scale air attack at the air strip and installations, reducing the place temporarily to a smouldering mass of ruins. We thanked Providence and the general order which had moved us out the day before the attack was launched, for we learned that nearly every one of our former positions had been hit. At this time our

men and our equipment were impossible to replace, hence we were glad to hear about the attack secondhand so speak, rather than to have been there in person, though the Japs might have done considerably less damage had our men and guns been there waiting for them.

Most of the time while we were at the Buna air strip we could hear the not-too-distant rattle and crack of rifle and machine-gun fire, as the fight at Buna and Soputa (near Dobudurra) increased in intensity, and from the flow of wounded who were being evacuated by air, we judged that a real battle was in progress. This was the push to clear out Buna village, Soputa and Sanananda, just above Buna. Meanwhile, we were being subjected to high-level bombing attacks, which had more of a harassing effect than anything else, for damage was very light for the most part. Often the Japs came over at night. At Ora Bay, about fifteen miles to the southeast, we watched aerial dogfights develop and swing in our direction as the Japs tried to bomb and strafe this important supply base.

During all of this time, our food, supplies, and ammunition, as well as gasoline and oil for our transient aircraft were being flown in, hence the actual defense of the air strip and the planes servicing there was of primary importance. We had lived on "C" rations for a very long time and were becoming weary of them; but gradually, as the air traffic increased, the food conditions improved, and we lived quite comfortably indeed.

June of 1943, after a few months at Buna air strip, we brought another of the now-familiar "Immediate Movement" orders, and we were ordered to return to Port Moresby. We had little time to waste, as usual, so utilizing our jeeps, and whatever other transportation we could beg, borrow or steal, we set about gathering our gear and weapons. By daybreak we were packed, had breakfast, and climbed aboard our transports for the take-off.

When we reached Moresby, we learned that we were to have two weeks of rest and briefing before our next operation, which was at that time a "Top Secret" move. For this assignment, we were attached to the "Second Air Task Force," which caused us some bewilderment, for we had never heard of such an organization. Lieut. Gribble, meanwhile, had been promoted to captain just before leaving for Moresby, while Lieut. Patton had received his captaincy at Dobudurra.

After a few weeks at Moresby, Captain Gribble and two enlisted men were ordered to the recently captured village of Tsilli Tsilli, to work with a U. S. radio and weather station there, and also to work with the Australian Infantry and complete an AA reconnaissance of the area. Captain Patton had returned from the hospital after a brief illness and the rest of the battery was now more or less intact and ready to take off again.

One morning—after another "Immediate Action" move which had to be accomplished in one night, the entire battery took off for Tsilli Tsilli air strip in one great formation. This time we had a fighter cover of about sixty fighter aircraft; and as the Jap air force was very much in evidence at this time, the fighter cover was a beautiful sight indeed as they picked us up in the early morning sun. This was only a two-hour flight, but it was over jungles and mountain

and had the element of danger from Jap attack, which made the two hours stretch and stretch.

Finally we sat down at Tsilli Tsilli air strip, where we set up a defense of this temporary strip, waiting the arrival of the U. S. Engineer battalion which was to make this a base.

No sooner had we set up our defense of the air strip and organized our security defenses and outposts than we were joined by a battalion of Australian infantry. We were glad to have them near by, for Japs were in the vicinity and we had enough work on our hands defending the air strip without having to send our security patrols out to flush Japs from the surrounding jungles.

Work progressed on the Tsilli Tsilli strip. We had our taste of action on a large scale. Some twenty-four air transports, carrying Air Corps and Service Force personnel, were coming in late one afternoon for a landing, unloading and circling the air strip, when the Japs threw a force of eleven bombers at the strip. A mile or two from the strip, however, they were intercepted by fourteen P-39's, and one of the most exciting air attacks we had seen took place.

The P-39's flew into the formation of Jap bombers like a swarm of angry hornets, and the Jap bombers scattered in all directions, jettisoning their bombs, and trying to escape. The P-39's were vicious in their attack. In what seemed a matter of seconds, eleven Jap bombers were blasted out of the air, twisting crazily to the depths of the jungles, with plumes of smoke and debris trailing after them.

One bomber, and only one, came anywhere near the strip, and it was in flames, crashing to the ground near one of the runways, but doing no damage.

Apparently the Jap fighter cover had lost track of the bombers, and spotted them only after long plumes of burning gasoline and oil smoke went up into the air, for almost immediately thirty Jap Zeros attacked the air strip and the P-39's. Outnumbered, and running short of gasoline and ammunition, the P-39's fought on as long as they could, and then either crash-landed on the strip and took their chances of getting out alive, or else hightailed for home while they had enough gas left to make it. Time and time again a P-39 would swing low over the strip, followed by two or three Zeros. Our antiaircraft on the strip would put up a protective sheet of .50-caliber tracer between the P-39 and the pursuing Japs, who usually were blasted in the air, or swung off in violent evasive action to escape at tree-top level out over the jungle. We never knew how many of them crashed in the jungles on their way home but it must have been a sizable number, for we saw smoke and smoldering signs of crashes. Two Zeros were impaled in mid-air over the strip by a lance of .50-caliber tracers from our antiaircraft guns, and they seemed to hang motionless over the field before they finally burst apart, to fall in flames.

Early the next day the Japs threw a dive-bombing attack at us, covered by Zero fighters, but this attack was dispersed by fighter planes and antiaircraft fire and from there on in, the Japs lost interest in low-level attacks on the strip.

One interesting highlight to the action of the day before was the subsequent capture of a Jap Sergeant-Pilot, who had on his person complete plans and battle instructions which outlined the "Complete Destruction" of the Tsilli

Tsilli strip; but judging from the fact that there was no further attack of any large scale, we assumed that the eleven bombers in the initial attack comprised most of the bomber group, and whatever Jap aircraft which might have remained just never had the stomach for another attack.

Jap high-level attacks kept us constantly on the alert, however, for our first warning of these attacks was, for the most part, the whistling wail of the bombs coming down. We had little in the way of observation posts out in the jungles, and radar at this time and under these operating conditions was just a word which sounded comforting and scientific, and gave promise of things to come. Primarily this air strip was used as a base for fighters who were escorting long-range bombers, hitting at Wewak. It was more or less of an emergency field, and the lack of overland transportation facilities limited all of our supply deliveries to air transport, with gasoline and ammunition taking priority. By and large, however, we were comfortable enough, and had enough action from these high-level and sneak night attacks so that the men were not bored by routine activity and actionless "alerts."

One of these high-level attacks, coming without any warning, dropped a string of bombs in our bivouac area, but fortunately most of the men were at mess in a different section of the area. Casualties were limited to one or two men who had remained behind. Tents, a jeep, and general living accommodations were damaged in this particular raid. One soldier had heard the first bombs and started running from his tent, half awake and half dressed, pulling on his pants as he ran. In the excitement of getting out of the area as quickly as possible, he decided that holding up his pants was impeding his progress, so he just took off. His pants dropped, and he tripped and fell—into a slit-trench just as a bomb dropped just a few yards from him, sprinkling the area which he had just "vacated" with shrapnel. For once, at least, being caught with his pants down saved a man's life.

One P-39, hit in its revetment during this same bombing, had a Jap bomb drop through the right wing without exploding. The aircraft mechanic, who had been sitting on the left wing, and several of the AA men from a near-by gun position gingerly pushed the plane from its spot and marked the position of the unexploded bomb. Each of these attacks seemed to have some unusual angle to it, humorous for the most part. They never became routine raids, however, for we had had our casualties and knew the damage these raids could do if we became careless.

About a month after our arrival at the air strip at Tsilli Tsilli I was given command of the battery. It was a splendid unit. From long and tedious hours together, at work and in battle, our men seemed to me to comprise the finest outfit in the Army. I was proud of each and every one of them, for we had come a long way since the days at Fort Bliss.

At last we were relieved from the Tsilli Tsilli air strip and in another "overnight move," to which we had by this time become accustomed, we flew the Markham Valley river route to Kaiapit, which had been taken over the day before by Australian infantry. This was another assignment to provide air protection for an Engineer battalion which came in the next day, and went to work. These Engineers never ceased to amaze us with their excellent performance, and

their building of air strips under very difficult conditions and with limited equipment.

The Japs had been driven out of Lae and Kaiapit, but patrols and wandering detachments and companies of Jap raiders still made conditions very difficult, insofar as security was concerned. Since there were not enough Australian infantry to defend the strip against sneak patrol raids, we were again given a dual assignment of protecting the field against air attack, and also of providing our own ground security and patrols. This placed a great strain on the men, for there was never enough time for adequate rest and relaxation. When they were not on the guns, they were out on jungle patrols. Our jungle training with the Australians while we were at Milne Bay now paid good dividends, for the men knew what to do, and when to do it. One patrol of Aussies captured a Jap alive, and he boastfully told them that a large Jap party was on the way down the valley, and that he would soon be back with his own men. Fortunately we never came face to face with the "large Jap party," although there were frequent infiltrations by the Japs, moving down the valley in small numbers. They were killed or driven off before they became a serious threat.

One large Jap patrol was sighted moving down the valley, but they were not fired on, as we did not wish to give away the location of our troops and the air strip being built to a large party, from which there might be survivors to report back. We held our fire, crouched in the jungle within shouting distance of the Japs, who finally moved back up the valley, having seen nothing of interest. They never knew how close they came to joining their ancestors, for none of us liked Japs, and they presented a wonderful target.

For some time, mail had been coming through to us addressed to the "Commanding Officer, 3d Air Task Force," and I had been holding it, awaiting further forwarding instructions to this task force, which I assumed was somewhere near by. We were startled, therefore, to learn that our battery was the "3d Air Task Force"! By this time, however, nothing amazed us for very long, and we adjusted ourselves to our new and exalted position. There seemed to be little difference that we could notice! There was just as much work, just as many difficulties, and just as many Japs.

After the Kaiapit strips were completed we moved again—in the usual "overnight" maneuver. This time we had but

a brief twelve-minute flight down the valley a little further to Gusap. Here we had the defense of another air strip which the Engineers were working on, and this time we realized that we were watching a full-scale operation. This was to be a huge base, with eleven air strips. As operations grew we accumulated many thousands of troops, and after our solitary operations of the many months past this pleasant company and excitement was a welcome change from the solitary tactical operations in which we had engaged. There were fighter groups, bomber groups, and miscellaneous groups included, and we had a small city springing up around us.

We learned subsequently that all of this operation was set up to support the Hollandia operation and to keep Wewak neutralized. The Japs must have learned of it, too, for we had a steady run of day and night bombings, strafings, and general harassing raids by Jap Zeros and bombers of all types. Several times they caught our transports landing or on the ground, with our fighter cover also landing or just about out of gas and ammunition, and neutralized insofar as defensive operations were concerned. At those times we had to depend upon our antiaircraft guns for defense of the air strip and aircraft. Against low-level attacks the battery did a splendid piece of work, although there was little we could do when the high-level bombing attacks started except dive for the slit trenches and pray. On several of these high-level attacks the bombs literally straddled our positions, doing some damage, and killing one of our men with a direct hit on a position. We were always well dug-in and reveted, and this paid off in equipment and men protected from Jap bombs, as it always does.

Eventually we left Gusap and retired to Nadzap, where the 709th trained with part of the 11th Airborne Division. Here our troops received their first instruction in glide landings and operations. Little by little, our men were being returned to the United States on rotation, and the familiar faces of the Milne Bay, Dobodurra and Markham Valley campaigns were replaced by men newly arrived from the States. I left my battery, and was returned to Finschhafen late in 1944, thence returning to the United States in December.

For their work throughout the Papuan campaign, the battery was awarded a Presidential citation, which they earned the hard way, and of course, the usual campaign stars for participation in the various operations.



To build that new world, we'll need fewer architects
and more bricklayers.—*The Slipstream.*

Little David

This new mortar, described in our last issue, can lob a 914mm (36-inch) shell, weighing 3,650 pounds, six miles.

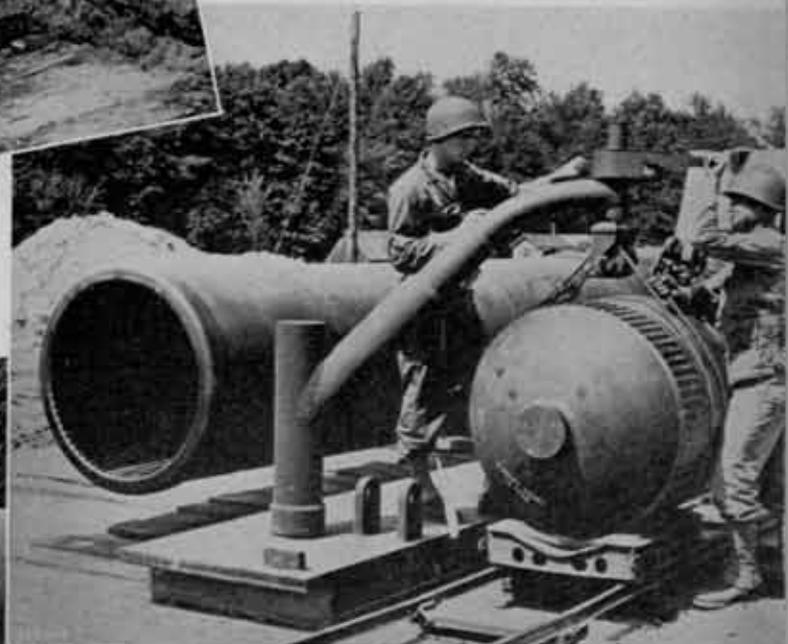


Little David at 0° elevation.

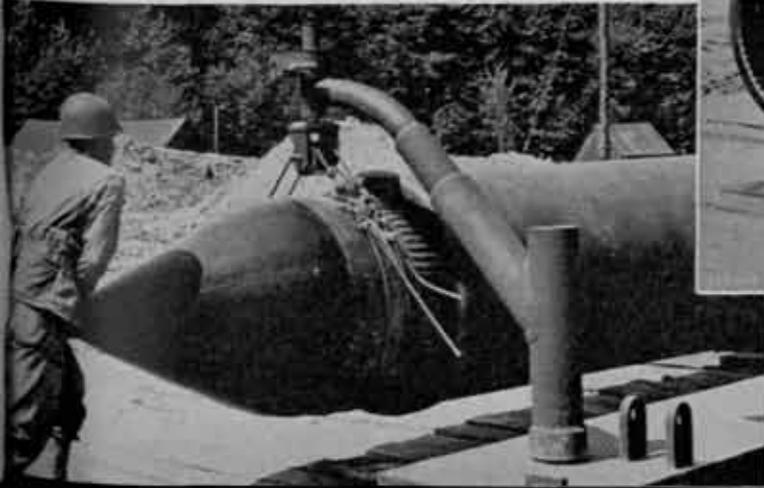
Signal Corps



Little David is mobile; this is the base assembly unit coming into position.



Rear view of the huge mortar's projectile.



Loading the projectile into the muzzle of the gun.

The Shootin' 68th*

Captain Sullivan and Staff Sergeant Mason R. Comer, Jr., had been crouched on a crag in the Maritime Alps for an hour or more, directing fire on enemy artillery positions which were shelling Menton, France. Observation was fine from this forward OP, but it was exposed. Sullivan was wondering why some sharp-eyed Jerry hadn't spotted them, when it happened.

A penetrating whistle filled the air. The two men flattened instantly against the rocks. Then shattering sounds of explosives were echoing from mountain ridge to ridge.

"Not too close," said the captain.

"Close enough for me," said the sergeant.

"Tell 'em we're under fire and lost those last rounds—stand by to adjust on a new target. I think I know where that stuff came from." Captain Sullivan crawled around to another vantage point while the sergeant spoke into the telephone which went to the radio set many feet below. Again the brief warning whistle and the explosions, much nearer this time.

Sullivan located the wisps of muzzle smoke where he had thought he would find them. A battery of 7.5cm mountain guns. In a moment he was snapping target coordinates to Comer, calling for the first adjusting rounds. It was heartening to hear the answer come back from his own 90mm battery, "On the way."

Conditions were somewhat warm around that OP, the next little while. A Jerry mortar section joined in and started lobbing ammunition over, searching through the rocks for the Yank observers.

Sullivan had the satisfaction of relaying a sensing which brought his own guns on the enemy 7.5's which were trying to blast him from his perch, but that was all. A volley of German rounds fell close, almost stunning him with the concussion. When he called, no response came from Sergeant Comer.

The captain found him bleeding from several head wounds, his right side paralyzed. The telephone was dead, the line to the radio set severed. Sullivan applied first aid, then left the shallow crow's-nest where the wounded man was lying and, fully exposed to enemy fire and observation, clambered part way along and down a forty-foot cliff so he could make himself heard by the men at the radio set, T/4 Harold W. Foster and T/5 Richard R. Lovett.

With their assistance, Sergeant Comer was finally maneuvered along a dangerous ledge and down the cliff to the base, where it was possible for a litter to effect further evacuation. While waiting for the litter, a long concentration of shell fire came down, sending large splinters of rock crashing about. With it, Jerry mortar fire burst in crevices along the cliff which had just been traversed, and on the ground at the base of the cliff, scant feet from the party.

The captain covered the staff sergeant with his own body to protect the man from further injury.

This was Captain Herbert J. P. Sullivan, commanding Battery "C," 68th AAA Gun Battalion. T/4 Foster and

T/5 Lovett are also from that organization, as is Sergeant Comer.

These four capable and courageous men are no exceptions in the 68th AAA Gun Battalion. For the job they have done during the period 19 November 1942 to 31 December 1944 (no later statistics are available) the Battalion personnel have been awarded one Legion of Merit, three Silver Stars, twenty-six Bronze Star Medals and two Oak Leaf Clusters, seventy-three Purple Hearts and one Oak Leaf Cluster, and one Soldier's Medal. Gallantry in the 68th would seem to be taken as a matter of course.

As for service the Battalion has seen, campaign ribbons in the 68th are spangled with battle stars from one end to the other. Ammunition expenditure statistics are indicative: during the period 19 November 1942 to 31 December 1944, 93,952 rounds of 90mm ammunition were fired by the battalion; 49,465 rounds in the AA role, 44,487 in the Field Artillery role. It has been subjected to 349 enemy air actions, fired in 260 air raids, and is officially credited with 57 enemy aircraft destroyed and 23½ probables. Field artillery missions to the number of 1,772 have been fired from 23 November 1943 to 31 December 1944. Practically all recent experience has been in the FA role.

SOME HISTORY

In the early morning hours of 2 November 1942 the 68th sailed out of New York Harbor, destined to be part of the D-plus-5 task force bound for Casablanca.

And it was there that the organization was blooded. After waiting in positions around Casablanca for more than a month, six FW 200K's finally flew over to raid the port installations in the raw dawn of 31 December. The gun battalion was officially credited with the destruction of two enemy aircraft. This was the first and last German air raid on Casablanca.

On 2 February 1943 the 68th took off for Algiers. Of the eighteen enemy air raids on the Algiers port area during its stay, the battalion fired in seventeen, nine of them being heavy raids, the others reconnaissance flights. Four enemy aircraft were here accredited as being destroyed, though the 7,000-odd rounds of 90mm fired undoubtedly did something to the six planes chalked up to the account of the port defenses generally.

The battalion settled further into its combat groove during a brief sojourn at Palermo from August to October of '43, then moved on with the tide of battle to the Naples area in Italy.

CAMINO

The move to Italy was accomplished with no waste of time. Heavy equipment (guns and fire control) having been shipped to Naples by LST, the remainder of the Battalion traveled by motor convoy across Northern Sicily to Messina, then crossing the Straits by ferry and LST proceeded up the west coast of Italy from Reggio Calabria to its destination, covering some 600 miles in six days on the road. On 18 November 1943 the 68th went into the line.

with II Corps in the Camino-Mignano-Cassino sector to provide heavy antiaircraft protection to forward artillery and lines of communication.

The Battalion fired in eleven of twenty-two enemy air actions that occurred when it was stationed on this front. A total of 114 rounds of 90mm and 5,385 rounds of caliber .50 ammunition accounted for five enemy aircraft destroyed and one damaged.

Since most of the Jerry missions in this sector were restricted to very low level bombing and strafing, and hence were essentially automatic weapons targets, it was decided to experiment with the 90mm guns in a secondary role of general support artillery. A field artillery SOP was drawn up after the experiments by the Battalion Commanding Officer and his S-3. This is believed to be the first SOP prepared for terrestrial fire with 90mm guns.

Results were excellent, particularly against enemy personnel concentrations. It was found that the 90's could deliver fast and accurate fire within a few minutes after a mission was assigned. The battalion fired 2,524 rounds of 90mm in 24 missions on this front (11 observed, 13 unobserved) and was highly complimented on its work by the II Corps Counterbattery Officer and the Commanding General of the 71st Field Artillery Brigade, through whose headquarters the Battalion fire was coordinated. Rounds from the 68th's 90's formed a part of the famous "Million Dollar Barrage" directed against enemy positions on Mount Camino.

On 31 December 1943 march order was again received, and the battalion pulled out of the II Corps sector to bivouac in the Naples area pending its next assignment.

ANZIO

The morning of 22 January 1944 found two firing batteries and the forward echelon of headquarters battery of the battalion lying off Anzio aboard two LST's awaiting their turn to land. Several landing attempts were made during D-Day, but enemy artillery fire on the port and the crowded conditions of the beaches made the attempts futile. Thus it was not until D-plus-1 that the initial elements of the battalion debarked.

Battery "D" went directly to its battle position on X-Ray Beach, and was set up and ready for action that night. Battery "A" was unable to unload until the night of D-plus-1, but was ready for action early on D-plus-2. On 27 January, forward elements of Batteries "B" and "C" arrived and moved directly into battle positions. From D-Day to 5 February, these four batteries constituted the only heavy antiaircraft in action on the beachhead.

Since the beginning the Germans had been bringing in reinforcements from France, Northern Italy, and even the Balkans. On 28 January the awaited counterattack against the beachhead forces was launched. Planes bombed and strafed the beachhead installations night and day. Enemy artillery fired counterbattery against the 90's in an attempt to silence them during air raids. Gun crews, on the alert twenty-four hours a day, were called on to sandwich some terrestrial fire missions between air raids.

On one occasion Battery "D," firing a terrestrial mission, was interrupted by an air alert. With the terrestrial mission temporarily cancelled, the battery engaged the only aerial



Newly prepared field artillery firing position.

target within range, then, having satisfied itself that no further targets were forthcoming, continued its terrestrial problem while keeping close tabs on enemy aircraft in the area but far out of range.

By 19 February the counterattack had been classed an expensive German failure. Though several other attempts were later made to push the beachhead forces into the sea and remove the ever-present threat to German lines of communication to the southern front, none proved either as formidable or as costly.

Of some 298 air attacks during the period 23 January-6 June, the Battalion fired in 224, expending 39,933 rounds of 90mm and 60,242 rounds of caliber .50 ammunition, and being credited with the destruction of 46 enemy aircraft and 23½ probables. Port defenses were credited with an additional seven enemy aircraft destroyed during this period.

At Anzio the lessons learned in terrestrial fire on the Camino front proved invaluable. The battalion fired 7,153 rounds of 90mm in general support of beachhead artillery between 23 January and 22 May, and 4,930 rounds in direct support of the 45th Infantry Division during the breakthrough 23-29 May 1944. Due to its prior experience in conducting terrestrial fire, the battalion was chosen as the controlling headquarters for all 90mm guns employed in the field artillery role on the beachhead. This consisted of coordinating the fires of four AA battalions.

On 6 June the Battalion left Anzio and proceeded to Civitavecchia, where it was deployed in an AA defense of that port. Of four enemy air actions there, two were engaged in, with no known results. But it was here that the 68th Regiment was finally broken up. The battalion had often operated more or less independently; now it was physically reorganized and redesignated the 68th AAA Gun Battalion. The youth had become a man.

From Civitavecchia the Battalion was ordered back to bivouac in the Salerno area, arriving 9 July 1944, to await and prepare for what turned out to be the strangest assignment in its career.

SOUTHERN FRANCE AND THE MARITIME ALPS

The invasion of the French Riviera, originally intended to be timed with the Normandy operation, was launched some two months later, 15 August 1944. Despite the delay,

and the fact that preparations must have indicated to the enemy that an attack was certainly coming in this region, a considerable amount of tactical surprise was achieved through the use of ruses and diversions—details of which will have to await telling. Suffice it to say that the Germans were running around like the proverbial chicken minus its top-piece, expecting the landings in a totally different quarter than where the Allied forces actually struck, in the region around St. Raphael and St. Tropez, midway between Toulon and Nice. The whole operation has been called a tactician's dream, inasmuch as a strong force, skillfully employed, struck swiftly and decisively at a weak point on the hostile coast and reached objectives ahead of schedule with a minimum of loss.

From the AA viewpoint conditions prior to the invasion were ideal. All the units involved were old hands at the invasion game. Ample rehearsals were conducted well in advance of loading for the "lift," everybody was thoroughly briefed on the well-laid, comprehensive attack plan. There was no reason for anything to go sour, and nothing did.

The 68th went in on D-Day and D-Day night (from 2245 to 0300 hours) in the vicinity of St. Raphael, and again deployed in an AA defense of a port and beach area. Opposition was comparatively light. In fact, an officer of another battalion was told by a French civilian that on D-minus-4 the Germans had pulled all their troops out of Frejus and St. Raphael and sent them west toward Toulon, leaving about 300 or 400 Czechs, Russians and Poles, officered and cadred by Germans, in the target area. The last hostile artillery fire on the beaches in the sector of the supported division ceased about 1430 D-Day. However, Battery "A" did manage to go into position in the darkness only 200 yards from an enemy strongpoint. There was minor excitement in the morning when the strongpoint was cleaned out.

Four of the five enemy flights over the area during the period 16 August-17 September were engaged, the Battalion firing 446 rounds of 90mm and 192 rounds of caliber .50 with no known results. Enemy flights over the Red Beach area were mainly reconnaissance.

Meanwhile the invasion had spread out like an inundating flood, for once leaving the 68th behind. The bulk of the Seventh Army was advancing up the Rhone Valley,

scooping in enemy prisoners on its way to a junction with the Third Army. The First Airborne Task Force, which had been dropped north and west inland from St. Raphael and Frejus early on D-Day, was moved to the east to guard the Franco-Italian border along the Var River near Cannes on a line extending from the Mediterranean to Larche Pagnon. It was with this latter headquarters that the 68th found employment.

The FABTF needed general support artillery and the 68th had the experience, so the 68th got the job. Alerted 15 September, all batteries were in position in the Maritime Alps three days later, despite the fact that many of the Battalion vehicles were on detached service and equipment and personnel had to be shuttled for the move.

This was strange country in which to operate. When the battalion and battery commanders went on reconnaissance for positions, they found the terrain was not very suitable for the low trajectory of the 90mm gun, its principal characteristic being that about half of it was decidedly "up" and the other half very much down. A pack howitzer man would have been delighted.

The positions finally selected were such that the Battalion was split into two groups, with two batteries having one field of fire and the other two having an entirely different sector to fire upon. Batteries "A" and "B" were placed on the Cap Martin peninsula, so that they could engage the German communications along the coast, while "C" and "D" went inland where they could fire up a valley toward the Sospel area and thereby bring the inland German communication lines under fire.

This was a practical enough solution of the general problem. After that, the battery commanders had to pick individual gun positions which would give them maximum defilade and still allow them to undertake all possible targets in range. In this regard somebody was always robbing Peter to pay Paul. And every time a battery displaced forward as the enemy gradually withdrew, the tactical burglary had to be repeated.

Displacement forward was not the only reason for moves, however, especially in the first week or so. Batteries "A" and "B" caught it hot and heavy from German counterbattery fire in their somewhat exposed positions on Cap Martin. Two moves were necessary to get away from it, the final positions being located on very high ground with Battery "A" 770 meters above sea level and Battery "B" 1,000 meters. Rather than proving a handicap, the great altitude of the positions added to their capacity for FA fire. When both batteries were down close to sea level, targets near the French-Italian border were masked by mountains running along the border. By moving them back a few thousand yards and emplacing them on higher ground, these targets could be engaged. Later the enemy managed to bring two 105mm guns to fire on Battery "A," but the fire was light and ineffective, most of the rounds landing on the forward slope below the position.

In any case the Battalion gave as good as it got, whether in counterbattery or support missions, and sometimes a lot better. Here are a few more of the interesting episodes.

On 25 September 1944, at 0650 hours, an air OP ("Flying Jeep" with artillery observer) spotted a train traveling west to east toward the town of Ventamilla. The observer



Snow at Piera-Cava.

called for fire, which was delivered by one battery. As the train pulled into the railroad yard in town, the spotter adjusted the battery on the yard and commenced fire for effect, at rapid rate. The fire became so intense that the train was stopped by the crew, who took cover in a near-by building. However, due to the number of buildings around the train and the size of the 90mm shell, the train could not be destroyed.

But for just such sets of circumstances Allied artillery in the Maritime Alps had an arrangement with the Navy, and the Navy was called upon to fire on the train. While waiting for a destroyer to move into position offshore, the 90mm battery kept the crew from starting the train and moving off. The destroyer's 5-inch shells turned the trick. The locomotive and a number of the cars were demolished.

That railroad yard frequently took a pasting. On another occasion, enemy troops were seen unloading from a train there, this time by a ground observer. The Battalion was called upon to deliver fire. Three minutes after the mission was assigned, fire was brought down and the troops were scattered, with numerous casualties. Renewed fire at timely intervals increased the casualties considerably.

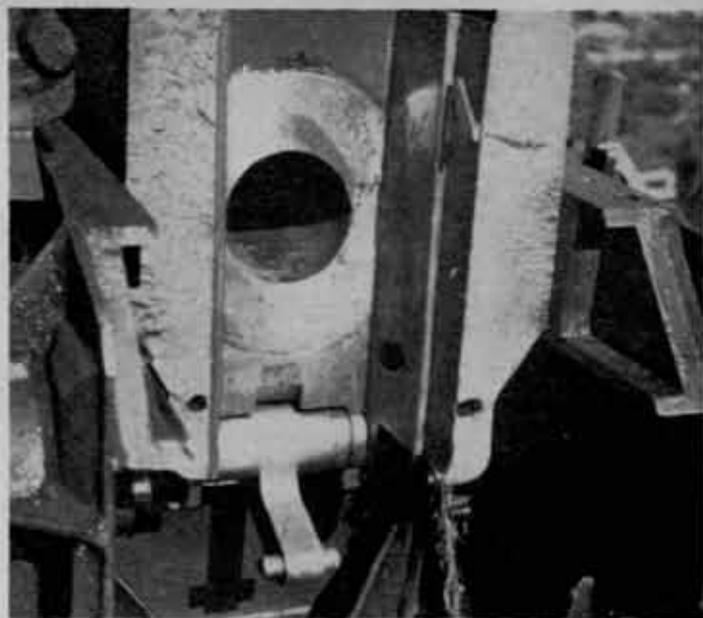
On the morning of 20 October enemy medium caliber guns were observed firing by a ground OP located on a mountain peak. The observer had reported the target when suddenly clouds moved in around him, obscuring everything. The battalion Fire Direction Center contacted an air OP by radio, requesting observation. The "Flying Jeep" took over, but when a battery of 90's had successfully adjusted on the enemy guns, two flakwagons pulled out from the area of the gun positions into a grove about 100 yards away and opened fire on the air OP. The air observer immediately shifted his fire and the grove was covered by 90mm bursts. AA fire on the air OP promptly ceased. Fire was then shifted back to the gun positions. The range to this target, incidentally, was 15840 yards.

Air observation in the Maritime Alps was difficult, not to say hazardous. The planes had to fly between 7,000 and 9,000 feet because of the mountains and hostile AA fire, and adjustment of fire using HE bursts at this height was almost impossible. Smoke ammunition was scarce, at times unobtainable. In the few cases where air OP's did adjust batteries of the battalion without using smoke, it was necessary to fire two rounds of HE ammunition for each sensing. And even in those cases there were numerous lost rounds due to the gray burst of the 90mm HE shell blending with the mountain background, or being hidden in heavily wooded areas. Hence ground observation proved more dependable generally.

Ground FO's had their headaches, too. Frequently they would be defiladed from targets. But when they could see, the Battalion could certainly shoot.

The night of 18 November a self-propelled gun was observed firing by a ground OP. Battery "A" fired the mission, getting off one round for adjustment and then going into fire for effect with twelve rounds. These were observed by the FO to crunch down just as the SP gun fired again, the rounds seeming to land right on the gun flash. No further activity from this gun.

Again, the Battalion OP observed a house being used by



The blown breech ring.

about fifteen enemy troops. Some of the soldiers would leave the house early in the morning and late in the afternoon to obtain water from a near-by waterpoint. At 1330 hours, 23 November, a battery was assigned the mission of firing on the house. It was decided to use one gun in a precision adjustment. The gun got on target with three rounds of smoke and five of HE, then fired a total of 17 rounds for effect. The last 13 rounds were observed by the OP as direct hits on the house. All HE rounds were fired with fuzes set at delay. When fire was completed the house was practically demolished. From that time on no personnel were observed in the area.

Training in forward and air observation, and in operation of the battalion FDC, continued throughout the Maritime Alps operation. All officers in the battalion attended classes covering field artillery methods, which were held at battalion CP three times a week. Instructors were officers from field artillery outfits in the sector. Battalion officers, in turn, trained their enlisted men. The battalion also sent two officers a day to fly in the air OP's as observers.

Fire direction functions were more decentralized than in the conventional field artillery set-up. At the battalion FDC, map range, azimuth and difference in altitude of targets and batteries were computed and sent to the batteries. Battery range sections computed their own firing data. Personnel for the Battalion FDC included four officers and eight enlisted men, a team of one officer and two enlisted men working on eight-hour shifts. Each battery had one officer and the necessary enlisted personnel for computing firing data on duty in the battery CP at all times, and the gun crews were split into sections so that a section was always on duty at each gun.

Wire and radio communications were established with higher headquarters (in the beginning, First Airborne Task Force; later, 44th AAA Brigade) and with the gun batteries, wire being the primary means of communication and radio being used if wire communication was disrupted. This frequently happened, as at times the Battalion was spread over a 20-mile front. Radio communication, of course, was used

between air OP's and the FDC; results were generally excellent.

The FDC was usually forced to use radio with ground forward observers, both those of the Battalion and the FA and infantry FO's who occasionally reported targets. Wire was unsatisfactory because distances were great and lines were under constant mortar fire. An idea of the observer situation may be gleaned from a few details of the battalion OP which was established 9 October 1944 on a mountain range along the border.

It was continuously manned by one officer and three enlisted men, who worked in close coordination with the infantry. The OP detail was attached to an infantry company for rations. Every five days a new officer and three more men were sent to relieve the previous detail, to get as many officers and men as possible trained in OP work. Supplies were sent in by mule train to the dismount line, then lugged by hand the last 300-400 yards, most of which was nearly straight up.

The officer at the OP controlled both 90mm and naval fire. He could call for fire on any target of opportunity he might find, the nature and location of the target being the deciding factor as to type of fire requested. Naval fire was used for targets masked from 90mm gun positions or heavily fortified. A destroyer or cruiser could swing into position and fire into the rear of such targets. Personnel, gun positions or vehicles were proper targets for 90mm fire—the number of vehicles destroyed and damaged must have given the Germans a severe headache. For the month of December alone the Battalion score was twenty-one.

The AA role was largely neglected by the Battalion, though one attempt was made to combine it with the primary ground support role. During October frequent flights were made by hostile reconnaissance aircraft over the Airborne Task Force area. The planes would fly back and forth dropping photoflash bombs, so the battalion was ordered to set up two of its batteries in a dual AA and FA role.

Due to the mountainous terrain, this proved a difficult problem. Battery "B" radar was placed in action on a mountaintop to provide early warning, this being the only site for miles around from which 6400 mils search was possible. It would have made an excellent battery position but it could not be used for that purpose as most FA targets were out of range.

Battery "A" was moved to the only other available posi-

tion on Cap Martin which was suited to any extent for AA. Happily, this was the move that placed it out of reach of counterbattery fire also. Good radar search was possible for 4800 mils, with the remaining 1600 mils masked up a line of site of 350 mils by a mountain to the north.

Battery "C" was set up in the dual role at its original position. Nothing else worth a move could be found in the area. The battery was screened by mountains on two sides and could get on target only when an aircraft was flying up down the valley. The arrangement proved so poor that the battalion commander requested the battery be permitted to revert solely to the FA role.

The battalion FDC was established as GOR. It received sound plots by telephone from surrounding units, and radar plots from "B" Battery radar. If an unidentified aircraft was detected entering the area, Battery "A" was alerted and its radar put on the air. At first the battery could open fire only on aircraft committing hostile acts. Later, battalion established direct wire communication with a new British early warning station which located in the area 16 November. The GOR was then able to receive long range plots on hostile aircraft, and could obtain clearance to fire Battery "A" on any such that might come within range.

However, the battery's employment as AA was strictly limited. Only two night missions were fired, both at enemy reconnaissance flights, with an expenditure of thirty-five rounds of ammunition and no known results. On 30 November the battery was moved, with Battery "D," to the northern sector of the front where they were attached for a time to the 601st Field Artillery Battalion (Pack), furnishing vital long-range ground support. The GOR ceased to function and the AA role was forgotten.

It was forgotten, that is, so far as 90mm guns were concerned. In this same month of November the battalion was called upon to furnish a machine-gun defense for N. Airport. Each battery supplied two water-cooled caliber .50's, complete with manning details, which were emplaced in pairs around the strip. These were replaced by four M51 quadruple caliber .50 mounts when sixteen tubes were received by the battalion near the end of January 1945. The airport defense was a daylight defense only. The battalion officer in command was in contact with an early-warning station, and had the usual hot-loop wire net to his machine-gun sections.

Aside from the brief experience in the AA role, the radar of the battalion proved valuable in obtaining data for meteorological messages. When the 68th arrived in the sector it was found there was no Field Artillery Met Section available, so that duty devolved upon the Battalion, and all artillery units in the area were supplied with met messages. This became a little difficult when the radars were ordered away on detached service with the First French Army. The met section went back to the visual method of taking met messages. This was all right in the daytime, but the service suffered when it was impossible to obtain lanterns and candles to use with the met balloons for observations at night.

Doing as much firing as they did, the 68th naturally wore out quite a few gun tubes. For example Battery "B" got its fourth set of tubes on 31 December 1944, as a slightly belated Christmas present. Each of the old tubes had fire-



Camouflage job.

2200-2300 rounds. It was one of these which was used in the precision adjustment on a building mentioned previously, in which thirteen successive target hits were observed. The tube at that time had fired about 1800 rounds. It is the opinion of the battalion that normally tubes need not be changed until they have fired about 2000 rounds. Up until then, it has been observed that fire can still be delivered with reasonable accuracy, especially between the ranges of 14000-17000 yards, at which ranges the battalion fired most of its ground missions. At 2000 rounds a tube begins to show actual signs of wear, such as small slivers of steel being torn from the lands.

It is interesting to compare this practice with that of another battalion in England, which was employed in a flying-bomb defense. Tubes were changed there every 1000 rounds. However, rates of fire were abnormally high, averaging about eighty rounds per gun per day, frequently delivered all in one half-hour period. The peak was reached one night when the battalion fired 300 rounds per gun during a twelve-hour period. The tubes got red-hot and they glowed in the dark like big sticks of candy.

The 68th had only one serious difficulty with their 90's, this with the recoil systems. In November, while engaging an enemy vehicle convoy, one of the guns of Battery "A" blew a breech ring, injuring two men slightly. On examination, the gun was found to have recoiled only one inch. The breech ring had been torn from the gun along the breech block, and the cartridge case had been crumpled up into small pieces. A similar accident had happened once before, with a gun of Battery "C" at Anzio.

It is the opinion of the Battalion that after 4000 rounds have been fired from one 90mm gun, its recoil system should be replaced. After that number of rounds it has been found the systems will begin to leak oil. This condition is impossible to remedy since packing on the recoil systems cannot be further tightened due to excess wear. The gun mentioned still has its original recoil system and has fired over 6000 rounds, though the system had been overhauled just a short time before the accident.

EPILOGUE

The desultory border war of harassment and mutual annoyance lost some of its vigor as winter snows blanketed the Maritime Alps. Missions fired by the battalion dropped from 378 in December to 243 in January 1945. But if there wasn't as much work to be done, the jobs individually were tougher.

On 19 January Battery "A" received a request from the commanding officer of an infantry battalion for artillery observers to accompany one of his patrols through the enemy lines and then adjust fire on a known concentration. The

target was described as being an enemy strongpoint containing machine-gun emplacements, pillboxes and barracks which were being used by about fifty Jerries as sleeping quarters. As the patrol would leave at 0630 the next morning, the observers had to be at the infantry CP that night. The CO of the battery requested volunteers and finally chose Staff Sergeants Foustine A. Endrizzi and Richard E. Shaffer, both men having had previous OP experience.

The patrol with the two forward observers set out in the chill gloom of early morning as scheduled, slogging over the snowy mountains through enemy outposts until they arrived at their destination about noon. Selecting a vantage point a little distance from the target area, the sergeants established radio contact with the infantry CP, which in turn contacted Battery "A" by telephone.

Fire was quickly and accurately adjusted on the target area, using a total of ten rounds. Calling for fire for effect the observers shifted it throughout the area, expending ninety-seven more rounds. Then, "Cease fire, mission complete." By this time the enemy barracks were demolished and the entire target was obscured by smoke and dust. During the fire for effect the sergeants reported twelve enemy running about the area seeking shelter.

So successful did the infantry adjudge this mission that they requested another four days later. The target this time was an outpost consisting of two machine guns and thirty-seven enemy in trenches guarding a pass. Eager for a repetition of the adventure, Staff Sergeant Shaffer was again chosen, taking with him Sergeant Edmond J. McCuin. Great quantities of snow had fallen, necessitating travel on snowshoes. The route to this second target was considerably more rugged, as well.

And the target, Shaffer found, was a much harder nut to crack. The outpost was located on the sky line of a ridge which sloped steeply down from the east and west. Any rounds falling twenty-five yards over or fifty yards left would fall in back of the ridge and be lost.

Shaffer decided to use precision adjustment with one gun, directing fire first short of the target on the forward slope, then carefully creeping up onto the target area. In all, twenty-seven rounds of 90mm were expended in the adjustment, using the one gun. Then the observer opened up with battery fire for effect, shifting it all along the ridge. At least forty of the rounds were seen to fall directly where the machine guns and trenches were located.

At completion of the mission, the observers and the patrol withdrew. Our infantry would be very little bothered with this outpost henceforth.

Since these events, the "Shootin' 68th" has gone on to greener fields. They couldn't have borne missing the big show up on the Rhine. And they didn't.



Administration in Combat Areas

By Lieutenant Roland A. Jenkins, Coast Artillery Corps

(These notes are based on personal experience, observation, and conversation with officers who have participated in various SWPA operations.)

Administration, when unqualified, can be defined as any phase of military operations not involved with the terms "tactics" or "strategy." It comprises supply, evacuation, graves registration, sanitation and myriad other allied subjects.

In presenting a broad outline of administration in combat areas minimum reference has been made to details of operation. Technical information may be obtained from existing War Department literature.

SUPPLY

The scope of modern warfare demands the accumulation of colossal masses of men and matériel distributed in theaters of action thousands of miles in extent. To assure a successful coalition of these forces it is most essential that army administrative procedure be at maximum efficiency at all times.

Perhaps the most vital administrative function in the army is that of supply. To maintain an ever-flowing stream of supplies from ports of embarkation to advance bases and beachheads it is necessary that all personnel working with supply have an extensive knowledge of supply and supply procedure.

The consensus of returnee supply officers shouts of the need for a better educational program in the problems of supply.

In the words of one battalion S-4, "Supply is abused. The answer to this is education. All officers soon after entering Federal service should have an introduction to army supply procedure methods through the medium of short but intensive courses of training. We have instruction courses for nearly all military subjects but there is no primary training for the junior officer who has been assigned the task of keeping his unit well supplied and fully equipped."

All personnel must be schooled in supply discipline and conservation. One battalion supply officer remarked, "Train all handlers of fuel oil and gas to avoid spilling when making transfers. Personnel have not been indoctrinated in the care and preservation of government equipment."

"Damaged signal and ordnance equipment and spare parts must be salvaged for repair and reissue when practicable. New stocks cannot be provided in sufficient quantity without the assistance of efficient salvage."

Ammunition supply presented a problem to some battalions in that there was no ASP within reasonable truck-haul distance. In some cases it became necessary to have battalion supply levels raised, to centralize procurement at Group or to order occasional transshipment between battalions.

A battalion S-4 who served in the Admiralties had this to say, "Essential supplies such as food, clothing and clean-

ing and preserving materials were easier to get in the combat zone than in some isolated locations behind the lines. Bad roads made camps and dumps inaccessible at times but normal supplies of three- to five-day B ration and three units of fire carried over each time."

SANITATION AND HEALTH

Malaria raised its ugly head high enough to be recognized as an enemy possibly even greater in destructive power than any human foe. Malaria control became a military problem upon the solution of which hinged the success or failure of operations.

Protective measures in conjunction with malaria control must originate with the individual and administrative control must be exercised by organization commanders responsible for sanitation within their units. Directives, posters and visual aids are constant reminders of the essentiality of strict malaria control.

Religious adherence to the daily atabrine and quinine dosage should be planted in the minds of all personnel at the start of the campaign in malaria infected areas and indoctrination will become habit in the matter of time.

Upon arrival in the combat zone medical personnel attached to the battalion must make sanitary surveys of bivouac areas for actual or potential sources of water contamination and for adequacy of supply insofar as quantity will affect the health of troops. Areas that hint of harboring such deadly characters as the typhus tick must be declared restricted zones until a determination is made.

PERSONNEL

In combat zones, administrative factors that influence



The Battle of Combat Administration

morale of troops include: correct classification and assignment; provision for pay, recreation, leaves and furloughs; and organizational solidarity that comes from success in combat.

Leaders should be sensitive to human emotions and at all times must consider the morale and health of the personnel.

MISCELLANEOUS COMMENTS

"Property books must be closed upon entry into the combat zone and liability excused, provided there is no wilful or gross negligence evidenced. For convenience, property books may be kept in pencil following a red ink entry of: ENTERED COMBAT ZONE (date)." *Battery CO.*

"Condition of roads and intensity of action were two factors influencing normal administrative procedure. Washed-out roads resulted in the tie-up of daily flow, making dumps and distribution depots inaccessible, while continual

air alerts interrupted business management and pursual of daily tasks." *Battery CO.*

"Units experienced no difficulty maintaining normal business records. At times transportation hampered courier service but in such cases reports were rendered verbally through the medium of radio and later confirmed on paper." *Battalion Adjutant.*

"Morning reports presented no problem. Sick reports were kept in normal manner. The duty roster was abandoned because the tactical situation required decentralized control by section leaders who kept informal guard and kitchen police rosters at the gun sites." *Personnel Officer.*

"There is nothing a unit can do before entering the combat zone to insure function of its administrative branch if it has not kept its equipment, radio, telephone and automotive, in top shape and carried no deadwood in its officer and noncommissioned officer personnel." *Battery CO.*



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(日、英、米、露、独、意、露、日、米)

上の英文の内容は、この人は最早敵な
く国際條約により生命衣食住は勿論
医療等が完全に保証されるべき者なりと
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戦友の一部

Signal Corps

Sample of American propaganda leaflet, used by the Japs as a surrender document.

An Incident of Fighter-Search light Cooperation

By Captain James A. Holloway, Coast Artillery Corps

One night in October, Major Keith was making an inspection of the antiaircraft operation room at an airfield somewhere in Belgium. He was commander of the AA defenses at the field.

"Major Keith, may I show you something?" asked the lieutenant on duty at the S/L operations board.

"Certainly," answered the Major as he approached the table. "What is it?"

"Well, sir, I'm not sure. The last few nights our duty radar has picked up a plane just about here," Lieutenant Summers said, indicating an area on the table. "If the weather's good, he comes in from the east, circles here a little, and goes home again. So far that's all we know, but it seems to me he must be a German."

"Hm. That's funny," Major Keith said. "One of the new rumors from Group has to do with some Germans who are supposed to be hidden in the woods just about where you pointed. Major Roberts said today that so far the security patrol hasn't found them, but it's still hunting. There may be a connection."

"If there is a connection, sir, I have an idea that I'd like to try with the night fighters. I think I can put a Black Widow on the Kraut by using the two stand-by radars and plotting right here," said Lieutenant Summers.

"Sounds like a good idea," the Major replied. "I'll check with Group in the morning, and if they say it's OK, we'll go to see Major Fox. I expect he'll be glad to give us a plane for a try. I'll let you know tomorrow, Lieutenant."

"Thank you, sir."

* * *

Two days later Major Keith and Lieutenant Summers had made their plans and were ready to sell the idea to Major Fox, the operations officer of the night-fighter squadron stationed at the field.

"This plan is Lieutenant Summers' idea," said Major Keith. "I like it and I hope you agree with it."

"We probably will," the flyer answered. "But first tell us what it's all about."

"Well, Lieutenant Summers has been picking up a German plane that comes within about fifteen miles of us every night of good flying weather. We don't know his reasons, but we want to stop him if we can. We need your help."

"I see. But how can we help?" asked Major Fox.

"That should be easy," was the answer. "But, I'll let Lieutenant Summers explain his plan."

"As you know, Major, we always have two of our radars on stand-by," Lieutenant Summers said. "Since we know this German's habits, we can pick him up at will over twenty miles if we try. That will give us time to guide one of your P-61's to him for a kill."

"I'm afraid I don't quite see it," the flyer said.

"Well, sir, I'll admit that our 268's are not built for GCI work, but here's what I want to do," said the lieutenant. "We'll put one of the stand-by sets on search for the Jerry. As soon as we pick him up, we'll call you. You put a plane in the air, and our other stand-by set will track him."

"But I still don't see how you can put the plane on the target," Major Fox said.

"That's where the experiment comes in," remarked Major Keith. "If it works, we'll have just one more point with which to sell AA to you Air Corps people."

"You don't need to convince us, Major," was the reply. "We've worked for three months with this S/L platoon and in that time it has increased our operational efficiency by at least 25 per cent. We don't have to worry what the weather will be when we come home from a mission; the lights always get us down. But to get back to the Jerry, tell me more."

"Well, sir," said Summers, "you've seen how we plot our radar data in the AA operations room. If a radar tracks your Black Widow and gives us data while another set does the same with the enemy plane, and if all the data comes in fast enough, we can figure out courses for the P-61 right on the table, give them to Flight Control to radio to the plane and hope our information will take him to the target."

"Sounds all right," said Major Fox. "What about the inaccuracy of your information due to loss of time, though, from radars to table to Flight Control to pilot?"

"I think a little practice will take care of that, sir," Summers replied. "We'll have an accurate picture of what both planes are doing and on that basis we can figure ahead enough to take care of the time lag."

"I believe he can do it, Major," said Major Keith. "At least well enough to get your pilot within his own radar's range."

"Yes, sir," said Lieutenant Summers. "We ought to bring him within a few hundred yards, and his own radar will pick up the target."

"All right, gentlemen," Major Fox said, "I'll get the Colonel's OK to put a ship and crew at stand-by for you."

* * *

To the night fighters the only unusual feature of the plan was that the radar would not be in direct contact with the plane. It was all new to the S/L platoon, however, and a good deal of practice was necessary to bring its calculations to a good degree of accuracy. The platoon took advantage of the squadron's afternoon "night flying tests" and after several unsuccessful attempts at the German it had become pretty efficient as a pseudo-GCI station.

Then one night, Captain Lee got the word to "scramble." He had been waiting for only an hour and a half, but the order was music to his ears. The night was clear and

moonless, perfect for his task. It was a matter of very few minutes until his plane was speeding down the runway.

He swung his ship out of the traffic pattern to get away from the field as quickly as possible, wondered, "How far out will I be before they pick me up?"

Control to Lee, "40 degrees, 18 miles. Trade at 1,500 feet."

"Roger." He was thinking, "Christ, that was quick. Guess I'll stay at 1,000."

Control to Lee, "37 degrees, 16 miles."

"Roger." To himself, "It's too dark for hedgehopping. Hope Jerry stays up higher than usual. Maybe that's why the other fellows missed him."

Control to Lee, "48 degrees, 13 miles. Trade at 1,200 feet."

"Roger." He thought, "Hope he doesn't lose more altitude."

Control to Lee, "38 degrees, 9 miles. Still at 1,200."

"Roger." To his radar operator in the rear compartment, "They sound good. Hope to hell they know what they're doing. Looks as if we'll need the lights tonight, too, if it continues to fog up the way it's doing. How I love those guys when I come home on a bad night."

Control to Lee, "30 degrees, 5 miles. Jerry's losing altitude again."

"Roger." He thought, "This is going to be tough."

Control to Lee, "25 degrees, 4 miles. Can you see him on your radar?"

Lee to Control, "Not yet. What's his altitude?"

Control to Lee, "Altitude about 900 feet."

"Roger. I can't go down much lower. There's a lovely fog out here."

Control to Lee, "Jerry's circling now. 28 degrees, 4 miles."

"Roger." He asked his R.O., "Can you see him yet, Mike?"

"No. At this altitude we'll have to be within only a couple of miles of him, Gene."

"OK. Cross your fingers."

Control to Lee, "30 degrees, 2 miles."

"Roger."

Mike's voice came over the intercom, "We've got him. 2,000 yards at 1 o'clock, Gene."

"Roger." He changed his course a little, checked his instrument panel and pulled out his night glasses. He was thinking, "If he stays up out of that mist, we'll get him. If he goes down, he's crazy."

"500 yards dead ahead," Mike's voice said. "You're doing about five to his four."

"Roger," said Lee.

At about 250 yards he recognized a JU-188. "I think he's ours, Mike. He hasn't seen us yet."

"Christ, I hope so. Give it to him good."

Lee waited until he was within 150 yards of his target before he "gave it to him good." The four 20mm cannon in the Black Widow's belly chopped the German to rib-



AAF Photo

Black Widow in flight.

bons. All Lee could see was a sudden flash and the next thing he knew was that there was too much wreckage all over the sky.

"We did it, Mike. Call the tower and tell them to tell the AA; they ought to get the credit for this kill."

"Roger," said Mike. "Those guys are really on the ball."

Captain Lee had no difficulty finding the vicinity of his field. If he had, he might have asked for a homing by the S/L's from 40 or 50 miles. As it was he simply called the tower as he approached the field:

Lee to Control, "Top of this fog is between 900 and 1,000 feet. What's the visibility on the ground?"

Control to Lee, "Visibility less than 100 yards, no wind. Land East to West. Over."

Lee to Control, "Wilco. Give me candles at both ends of the runway. Over."

Control to Lee, "Wilco. Good luck. Out."

Flight Control called AAOR immediately to request the illumination required by the pilot. The S/L gave the command simultaneously to the two lights concerned and in another few seconds there was a vertical beam of light, 800 million candle power, at each end of the runway. Each light was sited in the same way, 200 feet from the end of the runway and 60 feet from the edge clockwise as viewed from above. The two together provided Captain Lee with a practically perfect sighting device.

He was thinking, "There are my lights. If I can see six inches in that fog, I'm OK."

He stayed on top until he was far east of the field, far enough so that he could let down slowly and hit the end of the runway when his altimeter needle hit "zero." He lined himself up as though to fly between the two spots of light that shone on the top of the fog, made a careful note of his compass reading and let down into the fog in one easy approach. The glow of the lights was still to be seen ahead. Captain Lee's skill and his knowledge of the field combined to bring home another ship that might easily have been lost in such weather.



Wanna Buy a Truck?*

By Tec/3 Bernard L. Miller

"If I could pick up a couple of six-by-sixes, I could set myself up in the hauling business in Chicago."

"With a little fleet of jeeps, I could start a little city-delivery service in Philadelphia."

"I'm gonna get me one of them closed-body maintenance trucks, paint a sign reading 'Mr. Fixit' on it, and just travel around the West Virginia hills fixin' washing machines, vacuum cleaners—anything the lady's got that needs fixin'."

Today, many a GI dreaming of independence and a cosy livelihood wanders mentally through the rich waste of machinery left high and dry by the tides of war—generating units, metal-working tools, trucks, tractors and trailers glitter in the sun as far as the mind's eye can see.

Most GI dreams center about the Army's excess motor transport, where the surpluses are greatest and the opportunities seem the ripest. But the answer to how practical are the dreams depends on how well adapted to commercial use military trucks are.

How economically can a jeep be operated? Does the tandem axle make the 2½-ton 6x6 too expensive for commercial operation? What can you do with a Diamond T Wrecker? Find the answers and win a fortune.

Basically, it makes plenty of sense to consider military trucks in a commercial light. Army trucks and civilian trucks are sisters under the tin; practically every Army truck is an adaptation of a commercial model, if not in whole then at least in component parts. You never saw a jeep before the "emergency," but the jeep engine, axles, gear boxes and controls are all thoroughly civilian. We have few if any military freaks.

The only thing left to consider is whether the details of military design hang too big a handicap on the Army truck in the keen competition of commercial life. But even so, in many cases such handicaps may be turned into advantages by clever operators who can think of novel ways of converting military features to profitable use.

For instance, the jeep has been damned as too expensive to operate for the load it will carry; it is geared down too far, they claim. But the jeep is cute, it has won the hearts of the country—and therein lies an advertising value. Paint it red, put the name of your meat market on it in big white letters and every time you deliver two pounds of chops to Mrs. Clancy the whole neighborhood will be reminded that you are in the flesh and fowl business. The advertising value more than offsets the slightly higher cost of operation.

Accentuating the positive of jeep design, the small size of the vehicle makes it easy to maneuver in heavy city traffic, and easy to park. Time being money in business life, the jeep can thus also be a profit-saver. With the jeep, as with practically every other Army truck, city and highway work demands one major alteration; removal of the live front axle. Where there's any kind of road at all, there's no use for added traction provided by front-wheel drive. Simply operating in rear-wheel drive alone and forgetting

the front-wheel drive is not enough; power is wasted just by turning the ring gear and pinion, differential and propeller shaft, not to mention maintenance and lubrication that have to be expended on the rotating but useless appendage.

On the other hand, in all off-the-road operations, front-wheel drive is an asset. Surveyors, geologists searching for oil and mineral deposits, and timber prospectors would find front-wheel drive invaluable.

The Army's ¾-ton truck, such as the weapons carrier or command car, steps into a fast class in commercial life—it must compete with the ½-ton pickup in small deliveries and light hauling. And the ¾-ton has some very serious disadvantages for ordinary commercial work—the body styles for one. The command car has a truck engine and chassis, and a touring-car body. There seems little to do with this combination except remove the body and put on something more suited to hauling. The weapons carrier has a "soft" (tarp and bows) body that might be all right for hauling such things as garden produce, but your driver would never forgive you if you presented him with the soft top to work in. Especially if he's wearing a little gold button in his lapel. The carryall might do as a panel-delivery, but it still steers like a truck.

In a nutshell, the ¾-ton is just too much truck for the work it can do in civilian life. Its 230-cubic-inch engine is a fuel eater compared to the 216-cubic-inch engine of the usual ½-ton; engineered for a rougher existence, its replacement parts are heavier and much more expensive than the ½-ton's. A replacement engine would cost you \$316.99 compared to about \$159 for the ½-ton, a replacement steering gear is \$17.25 compared to \$11.25 for the ½-ton.

On all ex-Army trucks, this same high-cost-of-replacements stares you in the face. It's something to think of when the man with the hammer asks for your bid.

Using the 1½-ton weapons carrier for general hauling has all the disadvantages of the ¾-ton and one of its own; the tandem rear axle—it has just that many more tires to wear out. There is, of course, the faint possibility that you are in the business of hauling heavy-things-in-small-packages like metal ingots, sheet steel, or bricks, and in this case the extra brawn in the two rear axles will give you service. But like all Army trucks featuring extraordinary tractive ability, the ¾-ton and the 1½-ton seem best suited for the farm and the tall timber. In this connection, a northwestern truck distributor pointed out one special advantage of the 1½-ton that comes, strangely enough, from its low silhouette. "That low silhouette would be fine for work in orchards under the low trees, especially in combination with the load-carrying ability which you need in harvesting fruit."

The 2½-ton 6x6 has been called by many GIs "the best-engineered military truck in the world," and one middle-western commercial hauler expressed the opinion that it would be a good truck for local heavy hauling.

*From *Firepower*, by permission.

But the 6x6 suffers the same disadvantage as the 1½-ton—it's got too many feet. Tire expense would be needlessly high in long-haul operation, considering that commercial fleets commonly average 150,000 miles a year. And again, the soft cab is a disadvantage in bad weather.

Such trucks as the 2½-ton dump can jump right into civilian life without even a change of uniform. Working under a power shovel, dump trucks are normally given all the load that can be piled on. When such loads consist of broken brick and similar heavy rubble, clay or wet earth, the tandem rear axles are in their element.

The dream of some GI's is to start in with a little service station in a small- or medium-sized town and build up a number of allied services on the side. One of these would be delivering fuel oil; the 2½-ton, 750-gallon tank truck sounds right for the job. But it must be remembered that at least twice that load is normally carried on commercial tankers in the 2½-ton class without a tandem rear axle. And here it is not simply a matter of obtaining economy by overloading; the capacity of the tank is fixed.

The usual recommendation in cases like this where the Army truck doesn't quite fit, is "modify it." But the business-wise GI will tote up the cost of all these modifications, add them to the initial cost of the truck and decide whether he's still getting a bargain. It's easy enough to say, "Knock out the front-wheel drive and put on a new body," but it's hand-tailoring and likely to run into important money. In the 2½-ton and 4- or 5-ton truck tractor department,

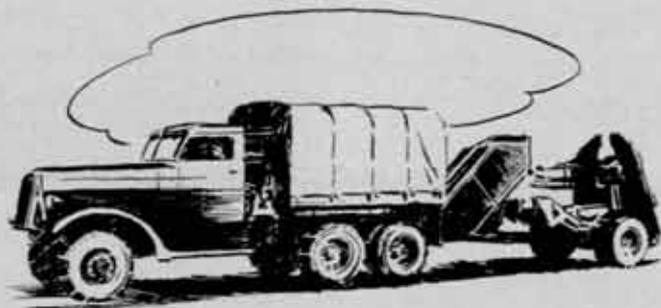
especially the 4x2's, the prospective vet will be buying right into a truck that is already a commercial stand-by. No guesswork about it; the same goes for the semitrailers they pull.

When it comes to wreckers, the opportunities are much whittled down. In the MAM company the wrecker was good for any and everything, but a sawed-off old Cadillac with a superstructure can be seen doing the same thing on smooth streets and highways. However, in rough occupations like lumbering, the wrecker many find a home.

For trucks above four tons, the field is even smaller. As a matter of fact, it gets so small that maybe it disappears altogether. A 6-ton, 7½-ton, or 10-ton prime mover is no trifling matter. A lot of truck, and unless the prospective businessman has some very clear-cut ideas on what he's going to do with it, he'll find himself with a white elephant in O.D. paint on his hands. For one thing, state weight laws put a very definite kibosh on operating these behemoths over their nice clean roads.

In the beginning, Uncle Sam designed his trucks with an eye to angle of approach and departure, flotation on soft terrain, heavy-duty pulling and carrying ability. Did all this make Army motor transport too muscle-bound for life in the smooth-roaded civilian world? The answer is yes . . . no . . . and maybe. It all depends on what you're going to do, how you are going to do it and where.

Do your dreaming with paper and pencil.



Development of Antiaircraft Artillery

By Lieutenant Colonel Louis P. Smithey and Captain Charles H. Atkinson,
Coast Artillery Corps

BACKGROUND

The purpose of this article is to trace briefly the history of antiaircraft artillery from its inception up to the present time and to correlate its development with the influences which, not only affected, but made such development mandatory.

The history of warfare throughout the centuries proves that offensive weapons and expedients of all kinds have been minimized, neutralized or rendered ineffective by development of defensive tactics, both active and passive. Very frequently the needs of active defense have resulted in the invention of powerful offensive weapons, which in turn, have become less effective as new defenses have been created. In a perfectly logical manner the course of antiaircraft artillery has run parallel to and behind the military use of balloons and airplanes.

In 1904 during the Russo-Japanese War the Russians employed observation balloons very efficiently and in the same year the Wright brothers made the first successful airplane flight at Kitty Hawk, North Carolina. From that time it was inevitable that aircraft would play larger and larger rôles in future warfare and that some form of antiaircraft artillery would be essential. Against the Russian observation balloons the Japanese used field artillery pieces very ineffectively, and the balloons were able to perform their missions and make safe returns.

After 1908 it was generally recognized that aircraft had become a military necessity and great strides were being made in the design of heavier-than-air and lighter-than-air types. The first military use of airplanes dates from 1910 when both the French and the Germans revealed them in maneuvers. When World War I started in 1914, great improvements had been made in both types of aircraft and in that year British airplanes raided the German Fleet at Cuxhaven. It was not long before the Germans began sending huge Zeppelins over England to bomb military objectives and to terrorize the civilian population.

While the military use of aircraft had become well recognized as a fact, the manner of its use was vague, indefinite and wrapped up in the customary official secrecy when World War I got under way. Therefore, it was only natural that antiaircraft defenses were far behind the improvements which had been made in the design of aircraft. Reliance for defense was largely placed in available field artillery weapons and in the use of fighter planes.

Prior to 1914 the French had developed an auto-mount 75mm gun, of which two pilot mounts had been built. Also, ten platform mounts giving an elevation of about 30 degrees to the 75mm gun had been constructed. No fire

sisted of a few rounds of incendiary shells for fire against observation balloons and dirigibles. The British had no antiaircraft artillery when World War I started and no progress had been made in the United States. The Germans had already perfected three types of antiaircraft guns: a 12 pounder of 45 calibers, a 3.4 inch of 35 calibers and a 3.4 inch of 45 calibers, but these were soon made practically obsolete by their new 4.1 inch gun of improved design.

WORLD WAR I

By October 1914 enemy aerial activity had increased to such an extent that development of defense from the ground had become imperative. Various means were improvised to increase the elevation of field guns, either by raising the wheels or lowering the trails. It was soon realized that artillery could not accomplish the dual mission of firing at both land and air targets and that it was necessary to develop special guns and special firing methods to cope with fast-moving aerial targets. It was further realized that such matériel should be manned by a separate and distinct service. Lieutenant Colonel W. A. F. Weber, RFA, wrote in an article published in 1919, "The first two months of the war taught us to fear observation by hostile aircraft and brought about the beginning of artificial concealment. There was an immediate demand for antiaircraft guns. The pom-pom arrived in September, the 13-pounder on lorry mounting in December 1914." The above quotation places the date of the British antiaircraft service.

In the meantime hostile aircraft were carrying their activities to higher and higher levels and gun elevations of 30 degrees to 45 degrees were proving inadequate. A platform mount for 75mm guns was soon devised which permitted a traverse of 360 degrees. The gun was elevated or depressed by raising or lowering the trail with a cable and winch. While this weapon had a very crude appearance, it proved to be highly efficient and for some time it was the backbone of the antiaircraft service of the Allied Nations. By this time the auto-mount had been perfected and was being produced as rapidly as possible. French 75s were rapidly installed on auto-mounts and trailer mounts. As the war progressed, improvements continued on antiaircraft matériel and its tactical use, searchlights were developed and a coordinated defense against aircraft became a reality. The British continued their production of 2-pounder (40mm) and 3-inch guns and the French investigated the question of increasing the muzzle velocity of the 75s. A 37mm automatic gun was being developed and a number of 105mm guns were being produced. The Germans concentrated on the 4.1 inch Krupp AA gun of 45 calibers which had a muzzle velocity of 2,640 f.p.s. and a

Sand-Control at Fort Story

By Anne Douglas

Back of the fore dunes at Fort Story, on Cape Henry, Virginia, the homeless sands have been brought to a permanent stand so that not only have they ceased to menace millions of dollars worth of defense structures and mechanisms at Fort Story, but have been made to produce a very verdant growth that effectively conceals their man-made might.

In 1921, when a site was selected among the sand dunes on Cape Henry for the construction of fortifications, it was thought that the dunes had stabilized. These dunes range in elevation from fifteen to ninety feet and were considered an asset to the site because of the natural protection offered. However, after about \$350,000 had been spent on defense structures, it was noted that the drifting sand was making new courses. It began to cover up the defense structures, to get into the mechanisms of the guns, into the magazines, and even into buildings. It had to be dug away from the structures before entrance could be made, and in the spring, huge quantities of sand that had drifted in during the winter had to be cleared away. In one place, at the entrance to a tunnel, from twelve to fifteen hundred cubic yards had to be removed and disposed of periodically. The situation became critical. Somebody had to do something about it.

The Engineers did. And the man who originated the plan and carried out the job was Arthur P. Ware. Mr. Ware has been working for the U. S. Engineer Department for 22 years; his father worked a lifetime for the Engineers; his grandfather, who took charge of the U. S. Engineer

Office at Fort Monroe, Virginia, in 1863, worked an extra long lifetime for the Engineers—such a long lifetime that when he reached the age of 91 the Government decided to take unequivocal action in making him retire. And did Granpa Ware strenuously object to that!

Mr. Ware knows Cape Henry, its winds, its tides, every contour of its surface, with an intimacy that comes only from long years of living and working daily on a particular bit of terrain. After studying the course of these sands, experimenting and trying out plans with beach grass, bay bushes and other native growth, he decided that the most effective results could be obtained by the use of pine needles, brush fences, black locust and loblolly pine seedlings in the following manner. An area to be fixed was laid out in blocks approximately 200 feet by 100 feet, varying with the topography. Brush fences from three to four feet high were constructed around these blocks, then the blocks were covered with pine needles. Directly behind the fences, a row of black locust seedlings was planted about four feet apart; then starting five feet back of the locust, loblolly pine seedlings were planted all across the block in rows five feet apart, in a checkerboard design.

The brush fences acted as the first echelon of defense in breaking the force of the wind. The pine needles, the second echelon, prevented the sand from drifting and blowing away from the roots of the seedlings and at the same time helped to hold the moisture in the sand. Thus the seedlings were given a chance to dig in and establish a permanent base. The black locust trees, being fast growing, were



A dune area at Fort Story, 1924.



The same area, 1941.

planted behind the brush fences for the purpose of protecting the little pines after the brush fence had decayed.

At a few particularly difficult sites, the use of Kudzu vines in conjunction with brush fences proved especially effective. These vines take root very easily and after the first six or eight months grow quite rapidly, sending deep roots into the soil and long runners over the top.

Mr. Ware's chance to direct large-scale operations for stabilizing the bulk of all the high dunes within the Fort Story boundary lines came in 1933, the year that the government changed into Roosevelt and tri-grouped letters of the alphabet. On an abrupt notice, men began streaming into his two small office rooms, reporting for work—about three hundred the first day, and at that time, activities in the Fort Story Engineer Office were geared to the regular maintenance crew which did not exceed fifteen in number. Mr. Ware called the District Engineer Office in Norfolk and was told that he was on his own. That first day he put them to work making rakes out of two-by-fours and six-penny nails, converting a storeroom space into an office, building necessary desks and furniture, and getting organized. Thus was launched Civil Works Administration Project No. 1, Sand Fixation at Fort Story, under the direction of the District Engineer, Norfolk, Va. In addition to CWA employees, CCC and soldier labor swelled the crew to approximately five hundred.

The cost to the government was held to a minimum. The project was begun with the usual preliminary expenses of planning, surveying and drafting being skipped entirely.

Through Mr. Ware's efforts and success in obtaining permission from farmers in Princess Anne County to take pine needles, cut brush and poles from their property, the materials were obtained for no cost except labor and hauling. Teams and trucks were hired at very reasonable rates from private citizens. Black locust and loblolly pine seedlings, 18 inches to 24 inches high, were obtained from the University of Virginia and the University of North Carolina for \$2.50 and \$3 per thousand respectively. No fertilizer or soil were used. The seedlings were wrapped in burlap when received, and were immediately placed in an improvised nursery until they could be planted. From five to ten thousand of these baby trees were planted a day, and from seventy-five to eighty per cent germination obtained.

During the following years of the Depression Decade, activities at Cape Henry moved at a pace just about in keeping with the growing trees. Daily progress may have been imperceptible; nevertheless by 1940 the sand dunes at Cape Henry were not only ready to protect the heavy fortifications to be placed there, but with a little extra coaxing, could effectively camouflage them. The extra frills were appended by the Camouflage and Obscurement Department, and Mr. Ware, who was now in charge of maintenance of fortifications in Harbor Defenses of Chesapeake Bay, had a supervisory hand in this work. His old methods and designs for sand fixation were elaborated into deceptive patterns. Why, who would suspect that that unshorn slope yonder might secrete a battery of guns!

COAST ARTILLERY

Citations and Commendations



Distinguished Service Medal

TO: CLARE H. ARMSTRONG, Brigadier General, U. S. Army, Garden City Hotel, Garden City, Long Island, N. Y.

FOR: Meritorious service in a position of great responsibility from November, 1944, to April, 1945, while commanding the antiaircraft artillery defenses of Antwerp against German flying-bomb attacks. By the skillful tactical disposition of his forces and never-ending relocation of units to meet threats from changing directions, he threw about the vital Belgian port a cordon which at the end of the campaign was destroying 97 per cent of all V-1 robot bombs aimed at the docking facilities which supplied the 12th and 1st Army Groups. In this operation he integrated the efforts of American, British, and Polish antiaircraft artillery comprised of three brigades totaling more than 22,000 men, molding a team which frustrated the German's all-out effort and made possible uninterrupted supply of Allied forces in their drive from the Roer to the Elbe. His great accomplishment was an outstanding contribution to the successful termination of the war in Europe.

TO: THOMAS R. PHILLIPS, Brigadier General, U. S. Army, 21 Fifth Ave., New York, N. Y.

FOR: Meritorious service as Chief of Staff, Headquarters Antilles Department, from March, 1942, to September, 1945. Serving under five different commanding generals, he provided a continuity of basic policy which otherwise would have been impossible. He rendered able assistance in connection with the expansion and consolidation of the Puerto Rican Department and Trinidad Sector and Base Command, absorption of the Antilles Air Command and Caribbean Division Engineers, reduction of troop basis following the invasion of Africa, demobilization of Coast Artillery units, and the general demobilization program following the victory. The revision of Selective Service standards in which he was instrumental made available to the Army a large force of Puerto Rican manpower. He gave valuable assistance to the Army Air Forces and the Air Transport Command in the Caribbean projects, and was responsible for much of the success achieved in eliciting the full and enthusiastic support of the Puerto Rican people in the war program.

Oak Leaf Cluster to Legion of Merit

TO: JOHN L. HOMER, Major General, U. S. Army, Gramercy Park Hotel, 52 N. Gramercy Park, New York, N. Y.

FOR: As Deputy Commander, Panama Canal Department, from February to October, 1945, he rendered outstanding services by the application of improved training methods for the ground and antiaircraft forces defending the Panama Canal. His sound judgment and foresight were factors in effecting adjustments of far-reaching consequence in matters of supply, construction, curtailment of activities, and economy in the use of public funds and materials after V-E and V-J Days. As chairman of a group of officers studying the requirements for the inner and outer defenses of the Panama Canal, he coordinated and supervised the survey and ably assisted in the preparation of a comprehensive report that permitted the War Department to proceed promptly with the completion of over-all defense plans for the area. He was responsible in large measure for the success of the redeployment program in the command, and during the difficult period of demobilization after V-J Day, he displayed initiative and resourcefulness in effecting the return of individuals to the United States. He contributed materially to the smooth operation of the Panama Canal Department.

Legion of Merit

TO: MILO G. CARY, Colonel, CAC.

FOR: Exceptionally meritorious conduct in the performance of outstanding services from 1 September 1943 to 31 December 1944.

TO: KENNETH R. KENERICK, Colonel, CAC, 72 N. Princeton Avenue, Columbus, Ohio.

FOR: As Chief, Organization and Training Section, Theater Branch, Planning Division, Army Service Forces, from September 11, 1944, to November 9, 1945, he supervised the planning of Army Service Forces staff agencies and technical services, for the organization and training of the Army, following the defeat of Germany and during the redeployment period while increased forces were brought to bear against Japan. He established the basic policy for the determination and the integration of operational project requirements from overseas theaters into the over-all supply program, supervised procurement programs for project items of all the technical services, and directed the completion of the War Department Supply Plan for Period II.

TO: MAURICE B. LAMPL, Lt. Col., CAC.

FOR: Exceptionally meritorious conduct in the performance of outstanding services from 5 June 1942 to 14 August 1945.

TO: ARTHUR L. SANFORD, Lt. Col., CAC.

FOR: Exceptionally meritorious conduct in the performance of outstanding service from 25 July 1942 to 1 October 1945.

Bronze Star Medal

TO: ROBERT T. CONNOR, Lt. Col. (then Major), CAC, 433 Seaview Ave., Bridgeport, Conn.

FOR: Meritorious achievement in connection with military operations against the enemy at Biak Island from 27 May to 20 August 1944. Major Connor's work as Operations Officer (S-3) at a task force antiaircraft artillery headquarters contributed greatly to the success of the antiaircraft artillery in the Biak Operation. He worked tirelessly in planning for the operation and in the supervision at the execution of those plans. Major Connor's superior performance of duty reflects great credit on himself and the military service.

TO: WILLIAM L. THORKELSON, Lt. Col., CAC, Racine, Wisconsin.

FOR: Meritorious service in connection with military operations against the enemy from 30 December 1944 to 8 May 1945. As a member of the Air Staff, Supreme Headquarters, Allied Expeditionary Force, Lieutenant Colonel Thorkelson rendered invaluable service to antiaircraft artillery assigned to Air Forces. He was instrumental in coordinating the air defense responsibilities of air forces and ground forces. Later, as Assistant A-3, IX Air Defense Command, he contributed in great measure to the successful defense of important air force installations against enemy aircraft and flying bombs. The initiative, efficiency and devotion to duty displayed by Lieutenant Colonel Thorkelson reflect the highest credit upon himself and the United States Army.

TO: MARVIN H. MERCHANT, Major, CAC, Chevy Chase, Maryland.

FOR: Outstanding performance as the executive officer of the 385th AAA Automatic Weapons Battalion during the war. Major Merchant contributed extensively to the high state of morale throughout the battalion and to the maintenance of weapons and equipment. When the battalion was split, he assumed command of the two detached batteries and displayed capable leadership, leading them through many difficult situations. Major Merchant's efficiency, leadership, and devotion to duty reflect great credit

upon himself and the armed forces of the United States.

TO: DONALD E. MITCHELL, Major, CAC, Benton, Washington.

FOR: Meritorious service in connection with military operations against the enemy from 22 October 1944 until November 1944. During this period, Major Mitchell assumed the position of District Executive at Headquarters District "A," Channel Base Section, Communications Zone, European Theater of Operations. His principal duty was to assist in the organization and operation of a staging area for incoming troops. This being the largest port of entry on the continent, the problem of handling thousands of troops daily with limited facilities was most difficult. During this period, Major Mitchell worked relentlessly each day as far into the night. The leadership, executive ability, and extreme devotion to duty displayed by this officer reflect great credit upon himself and the armed forces of the United States.

Unit Citation

TO: 143d AAA Gun Battalion.

FOR: Extraordinary heroism in armed conflict with the enemy from 18 to 24 December 1944. During this period the battalion was charged with the defense of an important allied city at the beginning of the Ardennes counteroffensive. When the enemy threatened to engulf allied installations, the officers and men of the 143d AAA Gun Battalion assumed an antitank rôle, successfully stemming a determined enemy armored attack after adjacent infantry and armor units had been forced to withdraw. Despite the severity of the attack, the members of the 143d AAA Gun Battalion remained steadfastly to their posts with indomitable courage and tenacity of purpose, fighting the enemy on the ground, in the air, and shoulder to shoulder with the infantry during one of the most critical junctures in operations against the enemy in the Ardennes Salient. The heroism and devotion to duty displayed by the personnel of the entire Battalion was indicative of an *esprit de corps* keeping with the highest traditions of the Armed Forces of the United States.

Croix de Guerre

TO: WEBSTER F. PUTNAM, Colonel, CAC, 621 Alcazar Avenue, Coral Gables, Florida.

FOR: Exceptional war services rendered during the operations for the liberation of France.



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 Monroe, Virginia.

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, President

LT. COL. JAMES T. BARBER

LT. COL. ANDREW W. CLEMENT

LT. COL. WILLIAM R. MURRIN

LT. COL. GEORGE B. WEBSTER, JR.

MAJOR AUSTIN E. FRIBANCE

MAJOR DALE W. OLSEN

CAPTAIN FOSTER A. HINSHAW, S.C.

CAPTAIN C. W. ZIEGLER, O.D.

Gas Generators MX-424/G. Gas Generators MX-424/G and MX424A/G, have been tested recently to determine their suitability as substitute fuel generators in remote localities. These two units are transportable charcoal gas producers which generate carbon monoxide gas. Tested with Power Units PE-197 and PE-75-C, it was determined that the two gas generators were not satisfactory because of the low percentage of rated power output obtainable from the power units. However, the tests indicated that the local production of charcoal is feasible and that, with a more efficient type of substitute fuel generator, operation of power units in localities difficult to supply with gasoline fuel will be practicable. Consequently, it has been recommended that a more efficient type of substitute fuel generator be developed.

Ventilation of Trailer V-9/MPG-1. Facilities for the ventilation of the Trailer V-9/MPG-1, in which the Radar Set AN/MPG-1 is operated, have been found by test to be inadequate. When outside temperatures reached 90° F. or more, temperatures as high as 118° were measured in the operators' space in the trailer. When these high temperatures were accompanied by high relative humidity, operator efficiency was reduced greatly and operators could work only a few minutes without relief.

As the result of action initiated by this Section, development work was undertaken by the Signal Corps, and a substantial improvement in the ventilating facilities of one of the trailers was effected. Modifications incorporated in this model included removal of obstructions in the air intake ports and the installation of louvers in the front door. It is understood that development work to provide satisfactory ventilation in the trailer will be completed, and that a model trailer incorporating the improvements will be made available for service test. It is likely that air conditioning equipment suitable for application to the trailer will be tested at the same time.

75mm Subcaliber Gun T4E1 for 16-inch Gun Mk II. The Section has recently completed tests on Subcaliber

Gun T4E1 for 16-inch Guns Mk II and Mk II, Mod. 1. The subject gun is an internally mounted subcaliber gun having ballistic characteristics similar to those of the 75mm Gun M1916, M1917, and M2. The standard ammunition, identical to that used with the 75mm Subcaliber Guns M7, M8, and M9, is fixed and consists of Shell, Inert, M48, equipped with a propelling charge giving 1,470 f/s muzzle velocity (FT 75-AF-1). The standard firing circuit and firing mechanism of the 16-inch gun are used with the 75mm ammunition which incorporates an ignition type primer. The Section recommended that with minor modifications the T4E1 be standardized and issued on the basis of one per parent gun. In addition, it was recommended that a power extractor and a combination wrench of suggested design, together with certain additional tools and accessories be furnished.

Hexagonal head screw for Telescope Mount M43. The Section has recommended that a hexagonal head screw be adopted to replace slotted Screw A46233, used on Telescope Mount M43 to tighten Panoramic Telescope M8. The hexagonal head improves the leverage and permits the screws to be tightened sufficiently with standard tools to reduce the possibility of movement of the sight in the mount during firing. With the present slotted Screw A46233 a special offset screwdriver is necessary which gives insufficient leverage for tightening the screws.

Fuze setter bracket for 90mm Gun Mount M3. Tests were recently completed on a Fuze Setter Bracket C7207147 for the 90mm Gun Mount M3 which mounts the fuze setter nine inches forward of its present position. The experimental brackets were installed on the gun mounts of Battery E, Harbor Defenses of Chesapeake Bay, and used during training and two antiaircraft target practices. The relocation materially improved the ammunition handling and reduced the interference between the gun house and the round being inserted in the fuze setter. It was recommended that the Fuze Setter Bracket C7207147 be adopted to replace the present standard Bracket D49953.

Coast Artillery Journal

Fifty-fifth Year of Publication

COLONEL W. I. BRADY, Editor

COLONEL R. K. KAUFFMAN, Associate Editor

S/SGT. JAMES W. HOBBS, Circulation Manager



The JOURNAL prints articles on subjects of professional and general interest to officers of all the components of the Coast Artillery Corps in order to stimulate thought and provoke discussion. However, opinions expressed and conclusions drawn in articles are in no sense official. They do not reflect the opinions or conclusions of any official or branch of the War Department.

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

The United States Coast Artillery Association

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

News and Comment

Journal Policy

In taking over the Editorship of the JOURNAL at this time, I realize that the end of the war requires new policies and new procedures in the conduct of the magazine.

The wartime editors had a discouraging task. Much of the information that was available to the editors, and that was of interest to the readers of the JOURNAL, could not be published due to censorship restrictions. These restrictions are being lifted rapidly—it should be possible to present more and more of the information that was suppressed by censorship. For instance, for a long period even the word "radar" could not be used. Designations of units, names of senior officers in the active theaters, and many other items including references to most items of new matériel were restricted.

One of my primary objectives is to insure that the JOURNAL belongs to its readers, and not to any particular group of officers or individuals in or out of the Army. To the extent that my efforts can make it so, the JOURNAL will be long, in aim and purpose, to the best interests of the Coast Artillery Corps as a whole.

During my term as Editor I will do everything in my power to make the JOURNAL the organ of the Coast Artillery Corps—not of the Regular Army Coast Artillery alone. I am open to suggestions from all officers of the civilian components of the Corps. I will do everything I can to give Reserve and Guard officers a proper voice in the conduct and operation of the JOURNAL. The civilian components of all ranks have earned their right to full consideration; you can be sure that the JOURNAL recognizes this fact.

A strong effort will be made to appeal to enlisted men as well as officers.

The price to organizations, formerly \$4.00 a year, is cut to \$3.00 effective immediately. Although this will result in a drop in JOURNAL revenues of about \$1,300.00 yearly, we do not feel that Battery or other Unit Funds, which belong to enlisted men, should pay a higher price for the magazine than individuals, even though a JOURNAL placed in a dayroom is read by many more people than one sent to an individual.

The JOURNAL will publish fewer purely technical articles; each article published will be reviewed with an eye to its interest to the ambitious enlisted man.

Payments to authors will be increased to at least triple, and in some cases quadruple, the rates now paid. This should result in better articles.

W. I. BRADY,
Colonel, CAC,
Editor

Crystal-Ball Department

In response to numerous requests from people in the field for information on the future of the Coast Artillery Corps, we offer the following as the best guesses:

A subcommittee of the Senate Military Affairs Committee is now drafting a bill with the aid of an Admiral and a General to establish a single Department of National Defense. A bill will probably be reported out of committee in February which is expected to conform to the President's pre-Christmas message. It should secure prompt passage by the Senate. Early in February the House Committee on Executive Expenditures will begin hearings on two bills, one to establish a single Department and the other to establish three separate departments, one each for Army, Navy, and Air.

Indications are that after considerable debate in the House the bill for a single Department will pass some time this spring.

* * *

It is believed the opinion of the majority of officers that the Coast Artillery Corps and the Field Artillery will be combined into one Artillery branch.

* * *

Plans are being considered in the reorganization of the National Guard for approximately 72,000 AAA troops and 15,000 Harbor Defense troops.

* * *

In the reorganization of the Officers' Reserve Corps plans for approximately 6,000 AAA officers and 45,000 AAA enlisted men are being considered.

* * *

Based on the above figures we believe that approximately 1,000 Regular Army Coast Artillery officers will be required as instructors for the National Guard and approximately the same number for the Officers' Reserve Corps. This means that within the next few months there should be a demand for all officers with antiaircraft experience. Refresher courses probably will be necessary for officers who have not had active duty with troops within the last few years.

* * *

Circular 300, W.D. 3 October 1945, authorizes activation of Coast Artillery ROTC units at the same twenty-five colleges and universities that had Coast Artillery units before the war. An effort will be made to publish in the next issue of the JOURNAL the designations of these units, the authorized strength of each unit, number of instructors, and any other information that is available.

* * *

Universal Military Training

One of the most ridiculous arguments against universal military training is that the principle is somehow a copy of European systems—that it is un-American. On the contrary universal military training is as American as Valley Forge or Yorktown.

An Act of Congress dated 8 May 1792 laid down the principle that every citizen of military age had the duty and obligation to train in peacetime for national defense. The Act went even further. It contemplated military service on the part of the citizens upon call for any purpose that Congress might decide was a proper use of its powers under the Constitution.

The early plans for the militia were most ambitious; they called for, in the case of Virginia alone, 85,000 men. Other states had paper armies in proportion.

In fact, according to Col. W. A. Graham, USA (Ret.), on whose recent pamphlet most of this article is based, the very ambition of the militia program caused its failure. There were too many men to be trained without a great disruption of the national life. The older members of the militia, especially, would have left too great a gap in the normal life of the communities to be borne in peacetime. Recognizing the dangers of trying to train too many men, Washington, Steuben, Knox, and Hamilton all opposed the all-inclusive feature of the Act, but Congress overruled them. These early war leaders insisted that military training be confined to the younger men.

The volunteer system has proved inadequate in every major war in which the United States has been engaged. Conscription, with its inevitable injustices and inequities, has been called to the rescue each time. Hasty training of huge numbers of men around a pitifully small core of Regular troops has resulted in near-tragedy many times.

The present plans for universal military training differ from the plan of 1792 in that the numbers to be trained are within reason, training will be concentrated on the youth of the country (as our early military leaders desired), and that training will be conducted under the Federal government instead of under the states.

The compelling reason and justification for universal military training is the national security. No other justification is necessary; no other reason need be advanced.

Many opponents of universal military training confuse "training" with "service," which indicates a lack of understanding. "Training" differs from "service" in precisely the same manner and degree as attending law school differs from practicing law.

The use of the term "conscription" to describe compulsory military training is both misleading and inaccurate. Conscription is forced military service. The word had never been employed in any other sense, whether in America or elsewhere. Military service means active duty in the Army or Navy, subject to the orders of commanding officers to move against an enemy if need be, and if need be to do or die in combat. Training means no such thing; it means simply that the men who undergo it shall be instructed as pupils, not employed as practitioners of the military art. They will not constitute "a huge peacetime Army"; they will not perform military service compulsory or otherwise; they will not be subjects of a system of "peacetime conscription." During the period of training they will not be servicemen at all.

The tempo of warfare is quickening all the time. Oceans are no longer barriers to invasion, but highways. The airplane and rocket bomb have brought the world closer and have made time shorter. There will be little or no time, in

the next war for 13 weeks basic training followed by unit training. When war comes troops will be needed immediately. Are they to be trained men, capable of fighting effectively, or will they be untrained civilians, led to the slaughter because their training was omitted because of emotional approaches to a vital problem?

There is another angle, too. A strong military and naval force is a powerful deterrent to attack by another nation. World Government, moral suasion, Christian principles, and the other measures proposed to outlaw war are probably better deterrents in the long run than a strong military force—but until some of them begin to operate we must keep our defenses strong.

The answer is up to the citizens of the United States, expressing their will through Congress. Better a year of training than the possibility of swift attack without a trained reservoir of men to counter it.

* * *

The M-5

The Coast Artillery Journal.

Gentlemen:

The M-5 Director for 40mm AA guns may have its uses, but the overwhelming consensus of those who struggled with it in combat indicates that its value does not in many cases include bringing down enemy planes.

Every unit, except a few that were forced to do otherwise by direct orders from higher headquarters, discarded the M-5 for combat use. The director will work under certain conditions and with extremely well-trained personnel. The "certain conditions" did not always apply; the "extremely well-trained personnel" were not always the ones at the director during the fleeting seconds of an AA engagement.

Now it appears that the M-5 is to be included in the course of instruction for immediate postwar training in AAA. Admitting that we have no better director at present, this is one of those cases where teaching nothing about directors would be preferable to retrogressing to the point where time and effort are wasted on this piece of equipment.

The people who have seen combat want to feel that newer equipment based on different principles is in the process of development. If these newer directors are in process and information is not broadcast for reasons of secrecy, it is a blow to the morale of those who know the M-5's limitations to insist that this disproven item be taught in postwar curriculums.

FRANK SACK,
Lt. Col., CAC-Res.,
(CO 788th, AAA AW Bn.,
3 June 43 to 12 July 45.)

* * *

It appears that the principal objection to the M-5 Director is the hand-tracking feature. The 584 radar for heavy guns will lock on the target and follow it automatically. It is believed that the future automatic weapons fire-control equipment will include this type of radar and that in addition it will compute ranges automatically.

General Lutes Moves Up

Secretary of War Robert Patterson has announced appointment of Lieutenant General LeRoy Lutes as Commanding General, Army Service Forces, effective January 1, 1946, to succeed General Brehon Somervell whose relief from this assignment pending retirement was announced last week.

General Lutes served as Director of Plans and Operations, Army Service Forces, from March, 1942, until April, 1945, when he became Chief of Staff and Deputy Commanding General, Army Service Forces Headquarters, Washington.

"It is with extreme regret," Mr. Patterson said, "that I announce the retirement of General Somervell as Commanding General, Army Service Forces. In organizing and directing the worldwide supply lines on which our troops depended for their offensive power, General Somervell performed a service without parallel in military history. He was completely dedicated to the task of winning the war in the shortest possible time and with the smallest cost in American lives, and the energy and ability he applied to his task contributed in great measure to the force of our attack and the speed of our victory. My own work in the field of procurement would have been impossible of accomplishment without his help and counsel. He has been an inspiration to all who worked with him. He will be sorely missed, but he has earned his relief. He carries with him the eternal gratitude of the Army he served so unselfishly and so well.

"The War Department, however, is fortunate in having a man on the spot qualified to step into the job as commander of the Army Service Forces. Lieutenant General LeRoy Lutes, the new Commanding General, will take the tremendous task ahead of him in stride. He has the vision, experience, training and know-how required to manage this important branch of the Army."

* * *

Anti-Submarine Rockets

The "hedgehog," a multiple rocket launcher used against submarines, has been released from wartime wraps by the Navy. Officially designated as Anti-Submarine Projector Mark 10, it consisted of a bristling array of twenty-four rockets carrying heavy charges of high explosive.

When the approximate location of a submerged U-boat was plotted, all twenty-four of the missiles could be launched in two and one-half seconds. They fell in an elliptical pattern in the target area and immediately sank, nose down.

Unlike the conventional "ash-can" depth charge, the weapons would explode only on direct contact with the target. Thus, if the listening devices picked up the "bump" of an underwater explosion the commander of the attacking ship knew positively that a hit had been scored.

The "hedgehog," originally a British invention, was adopted and improved by the U. S. Navy, and was used with great effect in breaking up the German "wolfpack" U-boat campaign.—*Science News Letter*.

"Window" off the Secret List

Narrow strips of metal foil cut in lengths corresponding with the frequencies of enemy radar and released from bombers over Germany are estimated to have reduced Allied plane losses by 75 per cent, the War Department has disclosed.

Known as chaff ("window," to AA men), this metal foil is considered to have been one of the most effective devices in the Radar Countermeasures Program, according to the Army Signal Corps. Ten million pounds of chaff were dumped in the air over Germany during the bombardment of the Reich. Chaff was used by American and British bombers to paralyze the enemy's antiaircraft fire control by "cluttering" the scopes of the German radar. Packages of the foil, released from planes, gave the same response on German radar that would be caused by bombers.

Chaff was only one of many kinds of equipment employed by the Allies as radar countermeasures. "Jammers," consisting of high-powered radio transmitters, were effective in blacking out German radar sets used by the enemy to locate Allied planes and ships, to direct German fighters, or to point their deadly flak-firing artillery.

From the time the first radar sets for detecting enemy aircraft were first devised, it was evident that radar, like radio communications, would be susceptible to enemy interference. An early directive stipulated that the first long-range radar detector should not be subject to interference, but the Signal Corps reports that up to the present it has been impossible to design any radio or radar that is free from jamming. In the battle for supremacy in the radar field, the Allies emerged victorious because they were able

to keep ahead of the enemy with countermeasure equipment.

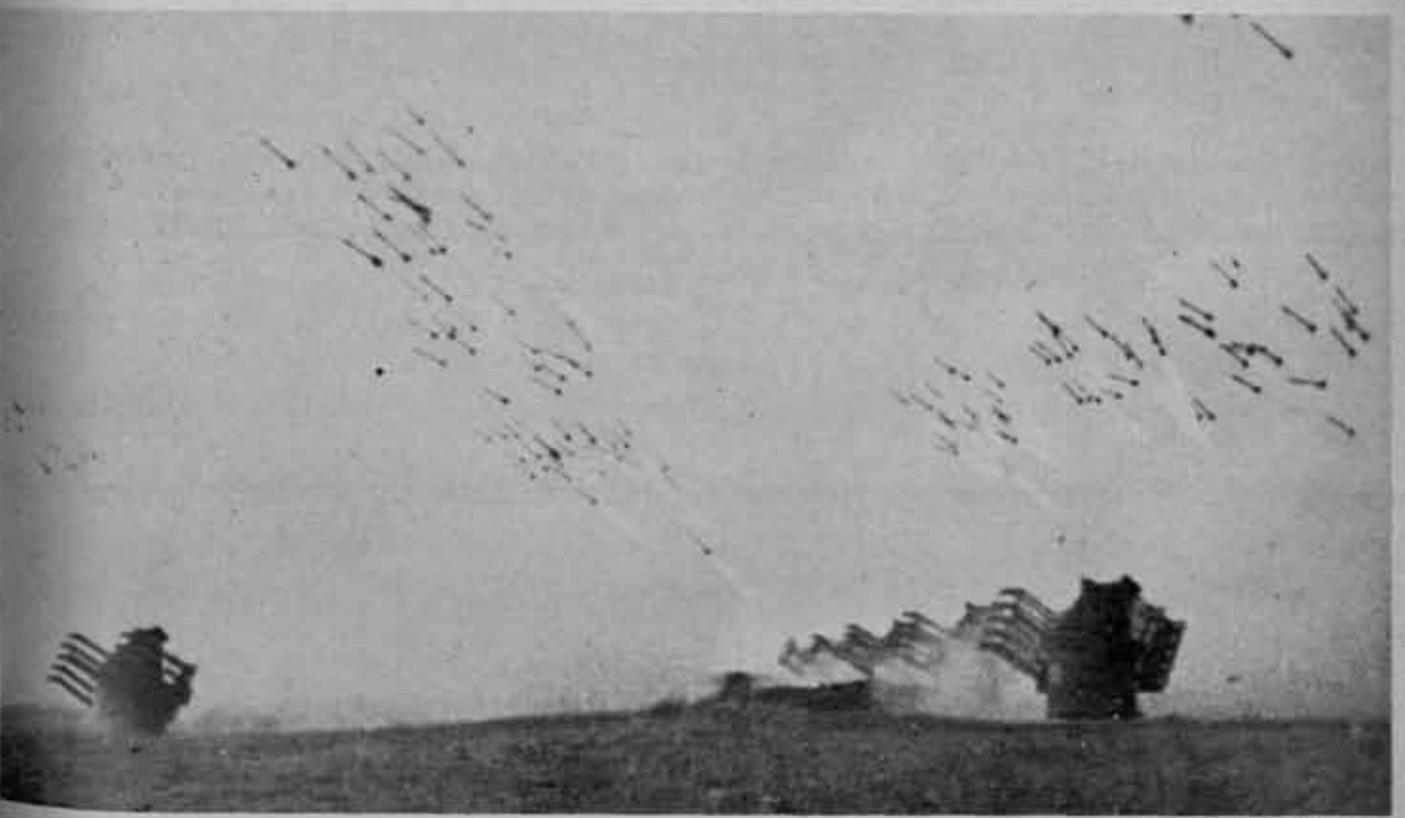
The British used some jamming devices before the United States entered the war. With these they were able to black out German coastal early-warning and gun-laying radar installations on the French coast. They hit upon the idea of dropping strips of metal foil as a radar shield for their planes, a device they called "window." The foil was pasted on paper to give it rigidity, but had limited production.

The U. S. Army Signal Corps took up the idea, and with the aid of the National Defense Research Committee, experimented with different sizes of foil. By crimping the thin metal strips, it was possible to reduce the weight to one-fourth with no loss of effectiveness. Thereafter, both Britain and the U. S. depended upon the American supply.

Biological Warfare

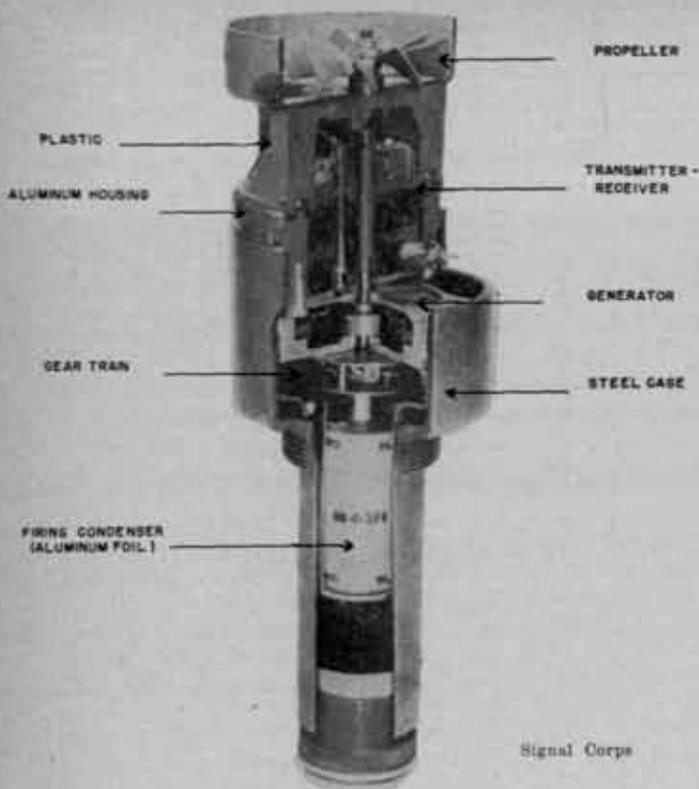
It is important to note that, unlike the development of the atomic bomb and other secret weapons during the war, the development of agents for biological warfare is possible in many countries, large and small, without vast expenditures of money or the construction of huge production facilities. It is clear that the development of biological warfare could very well proceed in many countries, perhaps under the guise of legitimate medical or bacteriological research.

In whatever deliberations that take place concerning the implementation of a lasting peace in the world, the potentialities of biological warfare cannot safely be ignored.—*From the report to the Secretary of War by Mr. George W. Merck.*



"Tonsil," the British Navy's experimental anti-V-1 rocket battery. "Tonsil" was a rush job—ordered on 11 July 1944, the launchers were mounted on trucks in two days, ready for action in four days, and by 31 July had accounted for eight V-1s.

British Official



Cut-away view of the proximity fuze.

Signal Corps

Free Ride for Long-Termers

Qualified officers who have served for long periods in the same grade will be promoted on the first day of their terminal leave period under a policy announced by the War Department. This policy will benefit many officers who have been unable to secure promotion because of lack of authorized position vacancies.

The ruling applies to second and first lieutenants who have served in one grade 18 months, captains and majors who have been in grade 24 months, and lieutenant colonels in grade 30 months. In computing the necessary service, 50 per cent additional credit is given for time served overseas in grade.

In order to qualify for the promotion officers must have an efficiency index of 40 or higher. This is an average of ratings given by commanding officers, a rating of superior having a numerical value of 50, excellent 40, very satisfactory 30, and satisfactory 20.

Officers who already have reverted to inactive status and who are eligible under the provisions will be promoted in the Officers Reserve Corps or the Army of the United States, or in the case of National Guard officers, they will be given the option of commission in the ORC or the AUS. National Guard officers will be informed that a selection of commission in the ORC will provide for automatic termination of commission in the National Guard; should they select commission in the AUS, they will be notified that such commission is temporary and terminates automatically at the end of the emergency plus six months and will not affect National Guard status. Officers presently on terminal leave will be promoted as quickly as promotions

Azon Bomb Announced

The Army Air Forces made public another one of its store of secret weapons—the "Azon" bomb. Azon is the standard 1,000-pound demolition which has a "radio brain" attached. This enables the bombardier to sight the missile on his Norden bombsight and let it go. Once the bomb is dropped the bombardier continues to guide it in azimuth by remote control.

A 1,000,000 candle-power flare on the tail of the Azon is automatically ignited by a fuze after it leaves the plane. Merely by following it with his eye, the bombardier can detect errors in azimuth (right or left) as small as five or ten feet at an altitude of 15,000 feet. He corrects them merely by pushing the handle of the control box in the aircraft to right or left.

This successful "guided missile" of the Army Air Forces was first introduced to the Japanese on December 27, 1944, when a three-span steel railway bridge on the rail line between Rangoon and Mandalay was destroyed by the Seventh Bomb Group of the Tenth Air Force.

The accuracy of the bomb did much to choke off the free movement of Japanese transportation in Burma. On seven missions, fourteen bridges, vital links in the Japanese supply system, were destroyed by using a total of 154 Azon bombs. A few of these were regarded as "wasted," since more hits were scored than was necessary to destroy the target.

While this weapon was useful to achieve its purpose during the period of its use, Army Air Forces research and development have produced and are continuing to develop newer types of guided missiles which make missiles such as Azon obsolescent.

The cost of the Azon bomb was not materially higher than the cost of the ordinary 1,000-pounder.

Counter-Radar in Southern France

How a lone platoon of American signalmen blacked out German radar defending the coasts of southern France and northwestern Italy during the critical hours of the invasion was revealed by the War Department.

The work was accomplished by a small force operating from a peak on the island of Corsica. For five months before August 15, 1944—D-Day on the southern French coast—the little band, holed up in rocky caves with their equipment craftily camouflaged, studied the output of enemy radar installations lining the hostile coasts and devised a countermeasures program. Radar was the electronic eye with which the Germans watched every Allied move.

The information compiled by the signalmen, which identified and located every enemy radar station in the area, was transmitted to the Twelfth Air Force and the Navy. American planes, guided by this accurate data, began three days before the invasion to bomb and strafe the German radar sites. Then at H minus seven and one-half hours the signalmen cut loose with a sustained jamming barrage.

By jamming every enemy frequency simultaneously, the signalmen succeeded in blacking out the warning system upon which the Germans had staked high hopes of a successful defense.

The Nazis knew the invasion was coming and had made

elaborate preparations to learn *when and where*. They had dotted the coast from the Spanish border to below Leghorn with nearly 100 radar stations. Beams from these transmitters constantly scanned the sea and skies, so that it was difficult for even a single Allied ship or plane to approach without knowledge of the enemy. To risk an invasion under the full scrutiny of the German radar would have been to invite enormous casualties if not a catastrophe.

The signalmen had taken the full measure of the German radar defense. Working night and day with direction-finding electronics equipment, they learned the location of every enemy set. They knew the frequencies employed and even the pulse repetition rate at which each transmitter operated. They charted the schedules of the Nazi stations and knew every time one of them switched its frequency or shut down for repairs.

Up to D-Day, the signalmen were on the receiving end of the radar battle. They had not given away their presence to the enemy by firing a single radar shot. But just before the troops landed they opened up. Armed with a knowledge of the German frequencies, they turned powerful blasts into the eyes of the enemy. So completely blinded were the Germans that they found their vast equipment useless. Unable to learn the location of the assault in time to spread an alarm, they could not organize a strong defense nor mass reserves. The initial Allied landings were made against weak resistance.

Army Industrial College Reopens

Ninety selected Army and Navy officers are enrolled in the first postwar course in industrial mobilization at the Army Industrial College, a joint Army-Navy school of post-graduate standards. They will analyze and interpret the supply lessons of World War II in an effort to discover error and deficiencies and their causes.

The review to be carried out by the Army Industrial Col-

lege has the mission to industrial mobilization that the critique bears to military undertakings and constitutes a forum for assaying and appraising operations, which the Army learned long ago is a profitable source for improvement.

Factors to be considered by the Army Industrial College courses are related to natural resources and raw materials, whether domestically available or obtainable from foreign sources, particularly critically and strategically essential materials. It will also include studies of industrial facilities and services, such as factories, plants and other means of production, transportation, power and communications.

The studies are to be the source for planning the organization and administration necessary to effect rapid transition from civilian production to the satisfaction of emergency requirements.

The Army Industrial College was established in 1924 as an agency to assist the then Assistant (now Under) Secretary of War in carrying out the industrial mobilization mission required by the National Defense Act of 1920.

Japs at Corregidor

Manila (Wednesday), Jan. 2 (AP).—Twenty Japanese soldiers and sailors who have been hiding out in the caverns of Corregidor island in Manila Bay since its recapture nearly a year ago surrendered today to an amazed American graves registration detail.

The Japanese group was led by an Army lieutenant, a Navy petty officer and an interpreter.

They said they were driven underground last February by the American bombardment, and had not learned of the surrender until several weeks ago when they found an old newspaper. The group had led a mole-like existence in deep recesses of a cave amply provisioned with rice and dehydrated vegetables. Doctors said they were in excellent health.



A 40mm gun of the 866th AAA AW Battalion guards shipping at Kashika, Okinawa.



The Jap battleship *Nagato* seems rather the worse for wear after inflicting total destruction upon one of our bombs.

More Fruit Salad

The War Department has authorized a new ribbon, known as the Army Commendation Ribbon, to be worn by members of the Armed Forces who have been recommended by senior officers for meritorious service rendered since December 7, 1941, or for some specific accomplishment since that time. Officers of the rank of major general or above or those commanders of installations normally the command of major generals or higher, may make the commendation.

The ribbon may be awarded for meritorious service other than sustained combat or operational duty or direct support of such duty. It is awarded under conditions where a Bronze Star Medal, an operational award, cannot be given.

The ribbon, which is authorized in the name of the Secretary of War, will be awarded to qualified personnel by including in an individual letter or certificate the statement that the "recipient is hereby authorized to wear the Army Commendation Ribbon by direction of the Secretary of War."

Only one such award can be made while an individual is on one duty assignment. For meritorious service in subsequent duty assignments, oak leaf clusters may be awarded. It is pointed out that the term "commendation" is not to be confused with "appreciation." Many commanding officers indicate their appreciation of work well done by letters of appreciation. A commendation ribbon or certificate should show achievement of distinction of the same standard for

which the Bronze Star Medal is awarded in operations. The commendation must be to an individual.

An individual who has received a letter of commendation from or in the name of a major general or officer of higher rank written prior to January 1, 1946, may obtain authority to wear the Commendation Ribbon by making application to the agency or officer originating the letter, the Theater Commander, the Commanding General of a major command (Commanding General, Army Ground Forces, Army Air Forces, Army Service Forces), or the Adjutant General, War Department. This application should include a copy of the commendation, a statement as to the date or period covered by the commendation, a list of other awards plus the dates for which they were awarded, and a statement to the effect that the commendation does not duplicate any other award.

The ribbon is a silk band, one and three-eighths inches in width of white stripes and myrtle green bands.

Unit Histories

The prize unit history received at the JOURNAL office during the past few weeks for our historical files is that of the 440th AAA AW Battalion. It has the complete history of the Battalion from the date of activation to the close of the war, contains rosters, many pictures, and maps and drawings. The book is 8x11½ inches, hard-bound in imitation pebbled leather with gold imprint.

The Rabbit Leaf, newspaper of the 455th AAA AW Battalion, includes the history of the unit as of its third anniversary. This issue, dated 1 September 1945, was published at Dingolfing, Germany.

The 45th Coast Artillery Battalion history, complete with rosters, is a mimeographed publication that covers the period 1944-1945.

The 44th AAA Brigade history came to us in the form of an article for publication in the JOURNAL.

Other units which have published histories or content plate 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.

Birds on Our Side

Radar pickups of flying birds, often made and correctly interpreted by both British and American observers during the war, were also made by German radar operators, but the Nazis never guessed what caused what they termed *Scheinziele*, or "spurious echoes." A German document on the subject has been turned up by the British investigators and is briefly summarized in the scientific journal, *Nature*, by H. A. C. McKay of the Admiralty's Miscellaneous Weapon Development Department.

The Germans noted that these "spurious echoes" came with especial frequency from the wide mouths of rivers, which of course is just where one might expect to get radar reflections from flocks of geese, ducks and other waterfowl. The document as printed gives them the improbably high speed of 600 kilometers (372 miles) an hour. Mr. McKay

inclined to regard this as a misprint for 60 kilometers (37.2) miles an hour.

How the Nazi radar experts must have groped foggily for an explanation is evidenced by one passage: "The physical origin of spurious echoes is so far unexplained. It is probably a matter of sharply bounded layers of discontinuity in the atmosphere. Charges, cloud movements, aerial vortices, as well as the boundary region between two layers of air can be suggested as possibilities."

They even planned a program of research, to locate such "discontinuities" in the atmosphere.—*Science News Letter*.

From a Letter to the Editor

"I would like to see some articles in the JOURNAL indicating, predicting or prophesying what part the Coast Artillery will play in the training for the next war. Many of us who trained for ten or more years for combat with the heavy artillery were damned to interior guard duty, supply positions in ComZ and small honor in the classification "key COs who can't be spared for task forces," etc. There are many of us so-called old soldiers who want a piece of the next business, and not through long-range speculations but the employment of adequate weapons of destruction in the forward areas. "They" said this was a young man's war, perhaps that's why so many were required to overcome ignorance, etc., that goes with youth and its inexperience. We older ones are not so anxious to live forever.

"As an ex-First Sergeant and ex-Warrant Officer of the Coast Artillery Corps, I am awaiting the forthcoming expressions of policies concerning the employment of the "excess" of the Regular Army. Perhaps the JOURNAL will carry something interesting on that subject. After nearly fifteen years of foreign service in peace and war some of us are interested in the earliest date we can ship out again and take our wives with us overseas. (My wife was a volunteer blood donor and nurse at Tripler from The Seventh, until enough nurses were found and then became PX manager at Kamehameha; they also serve.)"

The JOURNAL will publish any facts it can learn about the future of the CAC and of the Army. In the field of opinion and prophecies, *For the Long Haul*, in the November-December, 1945 issue, and *The Future of the Coast Artillery Corps*, in the July-August, 1945 issue, presented opinions. The item *Crystal-Ball Department* on page 79 should be informative.

Strength of the Army

All overseas commanders have been directed to reduce their requirements to the bone and successive revisions, both for the overseas army and the forces in the United States, have resulted in a planned strength of 1,550,000 (including Air Forces) for July 1, 1946. This represents a reduction of about 400,000 from estimates of September, 1945.

The proposed distribution is as follows:

Overseas	
Europe (including Italy)	335,000
Pacific	375,000
Other Areas	87,000
Filipinos Undergoing Training	50,000
Continental U. S.	
Supply, hospital and other operational personnel	360,000
Personnel undergoing training and in transit to theaters and a small strategic reserve	343,000
Total	1,550,000

Forces in Continental United States include troops engaged in training replacements, and in the operation and maintenance of Army installations, including depots, schools, ports of embarkation and debarkation, hospitals; personnel engaged in recruiting and discharge activities; personnel engaged in surplus property disposal and contract termination; personnel engaged in the supply of forces overseas; selectees and enlistees undergoing basic training and en route from induction stations to training installations and to overseas stations; hospital patients; personnel being discharged, men on reenlistment and emergency furloughs; and a small strategic reserve.

The Army is continuing its efforts to make further reductions in its manpower requirements. For example, 50,000 Filipino troops are being recruited and trained and will be used to replace a like number of American soldiers.



An LSM-load of Japanese small arms goes out to sea off Saishu Island, Japan, where the weapons will be dumped. A lot of souvenirs going to waste.

Science Review for 1945

(By the Staff of Science News Letter)

ATOMIC BOMB

Dropping of an atomic bomb on Hiroshima, Japan, was announced by President Truman on Aug. 6. A second bomb of the same character was dropped on Nagasaki on Aug. 9.

AERONAUTICS

Jet-Propelled P-80 or "Shooting Star," with a speed of over 550 miles per hour and able to cruise at 45,000 feet, was designed with a new type of wing with a knife-like leading edge.

The Army's giant B-32 bomber, equipped with eight turbo-superchargers and weighing 50 tons, was designed to fly at more than 300 miles per hour.

A new type of airplane, the Navy "Fireball," was equipped with two engines which can be operated together or separately, one of which is a reciprocating engine driving conventional propellers and the other a jet propulsion engine.

An 8,198-mile non-stop, non-refueling flight was made by a Superfortress that flew from Guam to Washington, D. C., in 35 hours, five minutes.

Radar equipment, permitting operators on the ground to see on a radarscope the actual position of all aircraft within a 25-mile radius, enabled them to direct pilots to safe landings in heavy fog or overcast.

A new instrument approach control technique using VHF, very high frequency radio waves, allowed safe landing of planes through overcast at three-minute intervals.

BIOLOGICAL SCIENCES

Several powerful new pesticides, restricted to military and experimental uses during the war, were released for civilian employment; they include DDT and Gammexane (British) against insects, 1080 and ANTU against rats, 2-4-D and ammonium sulfamate against weeds, and G-412 and G-410 specifically against ragweed.

Unexpected new sources of quinine were located in South America; some species of cinchona were found more abundant than previously believed; the bark of other species was found to produce good yields of quinine.

Large-scale soilless gardens were established in a number of out-of-the-way places in the tropics to produce otherwise unavailable salad vegetables for Air Force personnel.

Mosquito larvae were found to get cramps and drown when breeding ponds are treated with DDT.

Rubber was extracted from the leaves of *Cryptostegia grandiflora*, a tropical milkweed-like vine, through bacterial fermentation.

CHEMISTRY AND PHYSICS

Discovery of elements 95 and 96, made by bombardment of uranium 238 and plutonium 239 with high energy alpha particles, was announced, thus raising to four the number of trans-uranic elements discovered as the result of the atomic bomb research.

Automatic radar recording camera was developed that

photographs the radar oscilloscope while the operator watches it.

The proximity or VT fuze exploded projectiles on approaching a target close enough to inflict damage; a miniature radio station in the nose of the shell sends out impulses which are reflected back by a target, the frequency of the echo changing as the target is approached.

Television pictures in full color were successfully transmitted through the air by use of ultra-high frequency radio waves.

Thin stainless steel film on optical glass disks, placed before wide angle lenses, was found to eliminate the problem of "hot spots" on aerial photographs.

Sono-radio buoys, that pick up submarine noise, hydrophones and transform them into radio signals, were announced.

EARTH SCIENCE

Radar can be used in obtaining weather observations; approaching storms up to 200 miles away are indicated on a detecting screen.

ENGINEERING AND TECHNOLOGY

Radar apparatus for vessels which will detect obstacles above water through darkness, fog and storm at distances up to 30 miles was developed for commercial ships.

A turbo-charged gas-diesel engine was developed possessing a 40% thermal efficiency, delivering more power per proportion to fuel consumed than any type of engine developed.

Model of an engine with a ram-jet motor of unusual design, claimed to be the simplest engine in the world, was demonstrated.

New safety fuel for aircraft was developed that does not form enough inflammable vapors in the air to ignite even at temperatures above 100 degrees Fahrenheit.

Lubricating oils were found to be improved by the addition of small amounts of selenium compounds, reducing the tendency to oxidize and form sludge and gummy deposits in engines.

An all-electric torpedo, fired under water and remotely controlled, making no telltale wake of air bubbles to warn the enemy, was announced.

Electronic vulcanization of rubber, instead of the familiar heating method, was developed to speed production and give more uniform and higher quality products.

MEDICAL SCIENCES

Vaccine against dengue, or "break-bone fever" may result from first success in mouse passage and consequent attenuation of the virus.

The cause of toothache at high altitudes, studies indicate is a disturbance of circulation in the pulp of the teeth which prevents equalization of pressures during change of altitude.

A new remedy and preventive for athlete's foot was found in undecylenic acid, a fatty acid found in sweetgum.

Daily doses of the chemical, pregnenolone, were reported to have anti-fatigue effects.

High Altitude Radio

High altitude communication, long a serious problem for our flyers, was overcome during the war, with development of a system that kept pilots and crew members of strato-bombing airplanes in radio contact with ground stations and other aircraft.

Operating at altitudes from 25,000 to 40,000 feet, where former sets had proven ineffective, this radio communication equipment helped make our B-29 raids over Japan successful. Featuring automatic tuning with pushbutton control through eleven different channels, the system overcame serious natural handicaps of high altitude flying.

At high elevations speech difficulties are great and it is only with this long-range transmitting liaison set that proper communication is possible. The set operates effectively at 40,000 feet, whereas the radio formerly used was capable of performance at heights not greater than 25,000 feet.

Any one of the frequency channels can be tuned in approximately 20 seconds after it is selected by pushing one of the corresponding buttons on the control box. Weight and space are saved. The new set weighs 110 pounds, compared with the 215-pound old set. It is compact in design and fits into a small space. Maintenance is facilitated with plug-in units that are easily removed and serviced separately.

The set provides for transmission of the spoken word by voice as well as by Morse code signals.

—*Science News Letter.*

♦ ♦ ♦

A Sheet of Powder, Please

Powder for the Army's mortars isn't really a powder at all. It comes in thin, flat sheets that look a good deal like cellophane celluloid, that are stitched together on ordinary sewing machines in one stage of their manufacture at the Radford Ordnance Works, Radford, Va.

The sheet "powder" that serves as a propellant for mortar shells has nitrocellulose as its base. It is "souped up" with nitroglycerin, and several modifying agents are added.

In its semifinished form, the propellant looks like blotting paper. Rolled thinner, it takes on the sheet-celluloid appearance. These are stitched together and then cut into accurately measured squares, each with a hole through the middle.

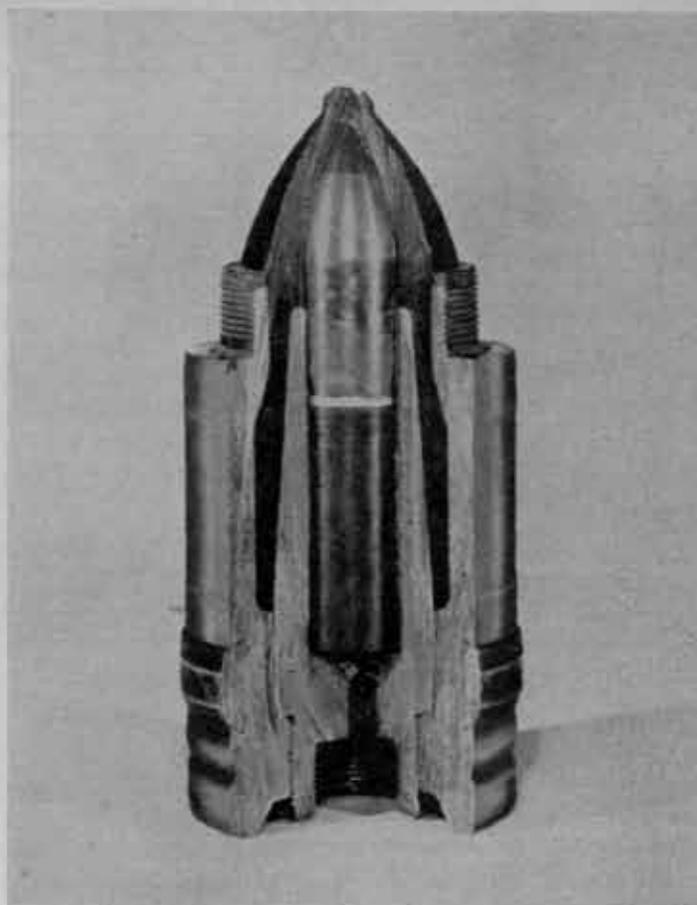
For each caliber and weight of mortar shell, a particular thickness of sheet is required, and each square must meet weight requirement with very narrow tolerance limits. This is to insure uniform burning rates, which in turn make for accurate adjustment of fire.—*Science News Letter.*

♦ ♦ ♦

Mail From Home

The JOURNAL is number three on my reading list—only surpassed by mail from home and from friends."

HARVEY J. GRAY,
Capt. — CA SL Bn.
APO 464, c/o PM
New York City



Cut-away view of the complicated and highly-machined German carbide-cored armor-piercing projectile used in the later months of the war.

♦ ♦ ♦

Smokeless Powder Without Alcohol

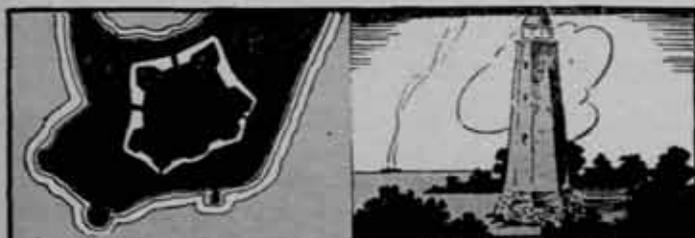
A new smokeless ball powder that is probably the teetotaler's dream because it is not only nonalcoholic but also definitely on the water wagon is described by Dr. Fred Olsen, research director of the Western Cartridge Company. Unlike most smokeless powders which require vast quantities of alcohol in their production, the new smokeless ball powder uses no alcohol and is made by a new underwater process. Speed of producing smokeless ball powder is up to ten times faster than the production of smokeless powder by usual methods, Dr. Olsen stated.

The new smokeless ball method, Dr. Olsen points out, keeps nitrocellulose immersed in water, where it is liquefied by ethyl acetate, the same material used in making fingernail polish.

The liquefied nitrocellulose then rises to the surface of the water, where it is broken into tiny globules by stirring. The size of the globules or balls ranging from six to thirty thousandths of an inch in diameter is controlled by the speed of stirring. Smaller balls are produced by faster stirring. Colloids are added while the nitrocellulose mixture is being stirred so that the balls retain their shape when the stirring is stopped.

These balls are used, like the powder grains, for small-arms ammunition.—*Science News Letter.*

Coast Artillery News Letters



Harbor Defenses of Chesapeake Bay

BRIGADIER GENERAL ROLLIN L. TILTON, *Commanding*
By Captain Alonza F. Colonna

Mindful of the fact that a trained army is a good army, the Harbor Defenses of Chesapeake Bay has instituted a training program which eventually will send to the various harbor defenses within the Eastern Defense Command, soldiers versed in the fundamentals of Coast Artillery.

Fort Monroe, headquarters for the Harbor Defenses of Chesapeake Bay, has been named a redistribution center for replacements for a large part of the Eastern Defense Command, and Regular Army enlistees as well as low point men and men with a short time of service in the army will be sent here for basic training, retraining, and simple processing.

The Harbor Defenses of New York and the Harbor Defenses of Boston also have been made redistribution centers by the Eastern Defense Command and will function in the same manner.

Those to be trained at Fort Monroe include the raw recruits who have just enlisted in the Regular Army, those from other arms who have to be converted to Coast Artillerymen, and the experienced Coast Artillerymen who have reenlisted.

Already fifty of these men have arrived at Fort Monroe and completed approximately six weeks of training. The large majority have been youngsters who have enlisted for the first time and for them the war is just starting. Once again the famous old Coast Artillery post which trained so many men during the first hectic days of the last war is the scene of recruits learning the rudiments of infantry drill regulations. Not so apparent but still the most important part of the training schedule are the hours spent learning to be crewmen on the big Coast Artillery guns. In fact every phase of being a Coast Artilleryman will be studied and practiced before these men take their places in line batteries up and down the Atlantic Coast.

Well over 1,000 of these men will be trained at Fort Monroe and subsequently assigned, with some of them remaining in the Harbor Defenses of Chesapeake Bay for replacements.

Contrary to the popular conception of a tough, hard-boiled first sergeant training rookies, the man who acts as godfather to this group is a soft-spoken, refined Philadelphian, who handles them with kid gloves that can be surprisingly firm at times. He is Sergeant William R. Gordon, a product of the University of Pennsylvania, who combined his educational background with three years experience to become an excellent soldier.

Although handicapped by the shortage of trained personnel brought about by the discharge system, the scheduled target practices for the calendar year of 1945 were completed by batteries of the Harbor Defenses of Chesapeake Bay and plans have already been made for those to be held in the first quarter of the new year, which should produce periods of good weather.

Men of Fort Story, especially those of Battery 1, reached a climax in training late in November when the 16-inch rifles were fired in a special service practice. After considerable delay due to weather conditions, the practice which was held in connection with the Seacoast Test Station, Army Ground Force Board No. 1 (the former Coast Artillery Board) took place in the afternoon of November 27.

A total of 20 rounds, six trial and 14 for record, were fired with one broadside and one bow-on hit being recorded. Other shots were plotted fairly close.

During the practice the battery commander used a New Battle Announcing System to give orders directly to the guns. This eliminated the relay and gave the commander more direct control.

Fort Story and Fort John Custis, guardians of the entrance to Chesapeake Bay, have both settled down to normal and are looking forward to the early spring months when the work will again be outdoors. Plans made for training include small-arms practice and the many other phases of instruction which can take place in the open.

With the removal of the minefields, activities at the Little Creek Mine Base, which was such a vital part of the Harbor Defenses during the war, have been considerably curtailed. Maintenance, repair and salvage are the programs stressed at this time with the usual mine planting and mine practice always evident.

Despite unsettled conditions, the information and education program is still underway and affords the opportunity for discussion of world problems as well as off-duty study and work on subjects that will be of benefit after discharge.

Antiaircraft Replacement Training Center Fort Bliss, Texas

BRIGADIER GENERAL HARRY F. MEYERS, *Commanding*

By Major Rex Ragan

Although administrative changes have taken place in antiaircraft with the end of the war, the status of the program here remains basically the same.

Brigadier General Harry F. Meyers has assumed command of the Antiaircraft Replacement Training Center which now operates as a part of the Replacement and School Command of the Army Ground Forces. The Antiaircraft Command, which formerly directed all antiaircraft, was disbanded in October 1945.

The AARTC continues to receive selective service recruits who go through a 17-week cycle of intensive training and are then sent to overseas replacement depots.

The training center has two groups, the 11th AART Group, commanded by Colonel Charles H. Treat, and the 12th AART Group, commanded by Colonel Lawrence E. Shaw. There is now a total of nine training battalions with a total of thirty-six training batteries.

The first nine weeks of the training program consist of basic military subjects which are followed by eight weeks of specialized weapon training. The AARTC Centralized Schools provide comprehensive courses of instruction in subjects requiring highly trained skills.

Antiaircraft officers arriving from overseas, as well as those who had been transferred to other branches during the war, are being returned to the Officers Replacement Pool, now also a part of AARTC, where they are reassigned or sent to separation centers.

The highlight of the year-end activity at Fort Bliss was the visit of General Jonathan M. Wainwright, who reviewed troops of the Antiaircraft Artillery School and the AARTC. Speaking to the troops General Wainwright emphasized the need for a strong military force, complimented the men upon the high state of training, and urged Regular Army enlistments. Later the general was guest of honor at a reception in the Officers Club at Fort Bliss.

Notable among the large number of decorations pre-

sented at ceremonies here in recent weeks were Legion of Merit awards to members of the Antiaircraft Artillery Battalion now operating as the Antiaircraft Service Test Section, AGF Board No. 1. Those receiving the Legion of Merit were: Colonel Milo G. Cary, director of the AASTS, who also received the Bronze Star Medal for service in Europe; Lieutenant Colonel James Nesmith II, executive officer; Major Allan A. Currie; Major Archibald D. Owen, Signal Corps member of AASTS; and Chief Warrant Officer John R. Delorey, chief clerk.

Brigadier General Harry F. Meyers received the Legion of Merit and the Bronze Star Medal for distinguished and meritorious service in Europe.

Lieutenant Colonel Leslie E. Jones was awarded the Legion of Merit for logistic planning in China.

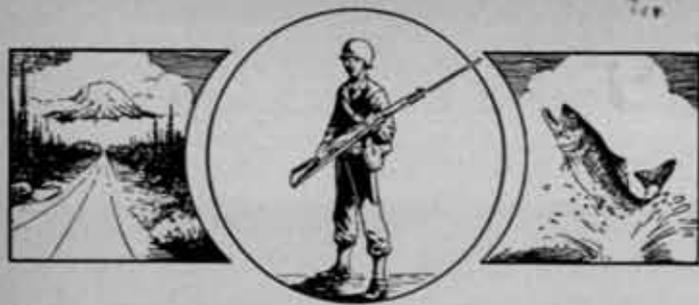
The Silver Star was awarded to Captain William C. Rounds for gallantry in action in the Normandy campaign and to Lieutenant Colonel Jesse Mechem posthumously for action in the Philippines.

The French Government has decorated Colonel Ralph W. Russell with the Croix de Guerre with Palm and Lieutenant Colonel Russell O. Utke with the Croix de Guerre with Silver Gilt Star. Colonel Utke also received the Bronze Star Medal for meritorious services as commanding officer of the automatic weapons battalion of the 62d Coast Artillery (AA) Regiment, later the 893d AAA AW Battalion.

Bronze Star Medals were presented here to Lieutenant Colonel Haywood D. Veasey for training Brazilian troops for combat in Italy, to Captain Arthur G. May for tactical judgment in repulsing air attacks in the ETO, to Lieutenant Pierce Atwater II, for work in psychological warfare in the Southwest Pacific, to Lieutenant Colonel Harlan C. Heinlen and Lieutenant Colonel Rastus A. Alford for meritorious services in the Netherlands East Indies, to Captain Arnold Herzog for support of combat operations in the ETO, and to Lieutenant Cecil C. Cupps, Jr., for heroic achievement in Germany.

An AARTC trainee, Private Dale A. Landes received the Soldier's Medal for heroism displayed last summer when he rescued a fellow soldier from drowning during a night exercise when the soldier, with field pack and equipment, fell into a tributary of the Rio Grande river near here. Landes had been in the army only forty-three days at the time.





Harbor Defenses of Puget Sound

COLONEL KENNETH ROUNTREE, *Commanding*

Brigadier General James H. Cunningham will retire 30 April, and departed from the harbor defenses on leave on 10 January. General Cunningham came to the Harbor Defenses of Puget Sound to take command in February 1939 as a colonel. In July 1941 he was promoted to brigadier general. During the war, in addition to being the Harbor Defense Commander, General Cunningham was also the Assistant Sector Commander for Harbor Defense Matters of Northwestern Sector, Western Defense Command. The Sector when at its peak was composed of three harbor

defenses; the Harbor Defenses of Puget Sound, the Harbor Defenses of the Columbia and the Harbor Defenses of Gray's Harbor. In the Harbor Defenses of Puget Sound two regiments were assigned, the 14th Coast Artillery Regiment and the 248th Coast Artillery Regiment.

Northwestern Sector was inactivated 30 November and the Joint Operations Center at Seattle was closed 20 December.

The Separation Point at Fort Worden was closed 15 December. Prior to its closure the Separation Point separated all officers and enlisted men who became eligible for discharge 1 December. The Separation Point during its operation separated fifty officers and 604 enlisted men.

On 20 December Major General Worthington, CGA, MC, MM, General Officer Commanding In Chief, Pacific Command, and Colonel Harrington, U. S. Liaison Officer at Vancouver, British Columbia, visited Camp Haystack. While there, they made an inspection tour of the batteries and installations.

During the months of November and December training schedules were reduced so as to permit the available personnel to prepare armament and equipment for minimum required maintenance.

Colonel Kenneth Rountree, CAC, who was transferred to Fort Worden from Fort Scott in November, has assumed command of the harbor defenses.



Harbor Defenses of the Columbia

Despite one of the stormiest and wettest Novembers of recent times, the Harbor Defenses of the Columbia continued with the work of returning the three forts—Stevens, Canby, and Columbia, to peacetime status. The major task completed involved removal and salvage of camouflage, barbed wire, and obstacles, filling-in of slit trenches, and returning the landscape in general to normal. Work also included continuing progress in the salvage of Battery Russell, ancient 10-inch D.C. battery which was active at Fort Stevens until just before V-J Day. The various tactical batteries have also been occupied in putting their guns, power plants, searchlights and associated equipment in proper condition for storage.

Battery No. 245, 6-inch B.C. battery at Fort Stevens, fired a special calibration shoot on 20 October 1945 to determine, if possible, the cause of very erratic shooting in the original calibration fired one year ago. Using the same powder lot and prescribed calibration procedure, a normal D.A.P.E. was developed on the latter firing and the earlier erratic shooting was attributed to the newness of the guns.

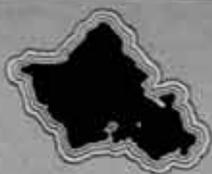
Personnel of the mine battery had an interesting detail when they were called on to destroy approximately 200,000 pounds of excess and damaged TNT for which there was no available storage space and which could not be disposed of as surplus. The entire amount was burned, as prescribed in regulations, although mass production procedure was

used. A bulldozer dug shallow, widely separated trenches along a half-mile of beach and the TNT was burned in these. The intense heat of the fires fused the sand in the trenches into glass.

In spite of loss of personnel, a vigorous inter-battery sports program has been carried on. The basketball finals to be played in the near future, match a strong Headquarters Battery team, winner of the first round, against Battery "B," HDC, victors in the second round. Battery "A," HDC, is leading the eight-team enlisted men's bowling league, closely followed by Battery "B," HDC.

Now that the fall salmon run is over, duck hunting has replaced fishing as a favorite outdoor sport. The weather this year has favored the ducks rather than the hunters and only a few favored sportsmen have returned with good results. This is in direct contrast to last year when limit bags of both ducks and geese were the rule rather than the exception.

During the quarter ending 31 December 1945, schools were conducted in the Harbor Defenses of the Columbia to train enlisted personnel as replacements for the enlisted specialists who are presently being discharged. A school was conducted to train personnel in the operation and maintenance of the diesel engine power plants at local 6-inch batteries. Another school trained artillery mechanics for maintenance of Coast Artillery installations. A third school trained selected noncommissioned officers in the technique of bomb disposal in order that they might be able to dispose of bombs which Japanese free balloons have deposited in this area of the West Coast.



2273 AAA Command

BRIGADIER GENERAL LEONARD L. DAVIS, *Commanding*

In spite of rather drastic changes in higher headquarters, and the inactivation of many of its constituent units, the 2273d AAA Command still holds a prominent position in the army's postwar organization on Oahu. Changes in command have again been effected with the result that the antiaircraft Command is headed by Brigadier General Leonard L. Davis. Shortly after assuming command General Davis was ordered to the forward areas for thirty days as President of a board of officers. Upon his departure Colonel Clifford R. Jones assumed command.

In November, Brigadier General W. W. Irvine, the former Commanding General, was called to Saipan to take over command of the Western Pacific Base Command.

With the dissolution of the Central Pacific Base Command, the 2273d AAAC was placed under the reactivated Hawaiian Artillery Command, which is one of the major echelons of the United States Army Forces Middle Pacific.

The Hawaiian Artillery Command is headed by Major General Henry T. Burgin with Brigadier General Henry B. Holmes, Jr., as deputy commander. Both brigades and three of the 2273d AAA Command's five groups are scheduled for inactivation in the near future. The command headquarters and headquarters battery have also been reduced to a minimum operating strength.

The activities of the command have been mainly centered around the Army Education Program and the restoration of former tactical positions to their prewar condition. The command's education program has received much recognition and favorable comment on its organization and operation. At the present time over 45 per cent of the command is enrolled in the Army Education Program, and an additional 105 men are attending the Army University Center at Schofield Barracks. On-the-job training has been arranged for 165 men in such jobs as auto mechanics, refrigeration engineering, welding and machinists. Two hundred and fifty-three men are enrolled in off-duty courses at the University of Hawaii and other schools.

The Command is also emphasizing basic artillery training in units scheduled to remain intact in the postwar army. The retention of men with the "know-how" of antiaircraft techniques will be an important asset in the training of regular army units. With this in mind, as many firings as possible are included in the training of these units.

Personnel in this command are given ample opportunity to participate in an extensive Athletic and Recreation program that features many competitions and tournaments. The command team recently won the championship in an island-wide touch football league.



Changes of Address

Since the last issue of the JOURNAL was mailed out, 300 copies were returned because addresses were not up to date.

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Stimulating and Disturbing

ARMAMENT AND HISTORY. By Major General J. F. C. Fuller. New York: Charles Scribner's Sons, 1945. 190 Pages; References; Index. \$2.50.

General Fuller's often unorthodox military writings have been stimulating the mental processes of military students for the past decade or two. *Armament and History* will cause the reader many a disturbing moment, primarily because it brings up subjects that the average officer never thinks about. The soldier who takes his weapons and his tactics as he finds them, and his political thinking as it is laid down for him, will pull up short at such statements as: "Clearly the circle is a vicious one: machine power induces unemployment; unemployment increases fighting power; fighting power needs an enemy to justify it; politics create him, and war systematically follows and for the time being solves the unemployment problem." Remember how Hitler boasted that there was no unemployment in Germany during our Depression?

The ancient wars, which were the activity of the ruling class, were changed by gunpowder to massed conflicts. Most new weapons increase the size of the fighting forces as well as the expense of war, bringing the reality of conflict to everybody. In this manner changing weapons require changing political structures to finance them and to raise the armies to employ them. The cannon, for instance, had a great effect on the steel industry and on mining, with resulting effect on the governments concerned.

Fuller believes that every improvement in armament is eventually met by a counterimprovement which gradually or rapidly whittles down its power—a factor which Douhet overlooked.

The book was written before the advent of the atomic bomb. Fuller's ideas on this development would have made this book complete.

Bigger and Better

A BASIC MANUAL OF MILITARY SMALL ARMS. By W. H. B. Smith. Harrisburg: Military Service Publishing Company, 1945. 351 Pages; Illustrated. \$5.00.

This manual, which was rapidly becoming a standard military book in its previous editions, has now come of age. Hard covers, more weapons, more text, and an increased price are the principal changes. The book is now as complete as it is possible to make it if any standard military small arms of any nation are missing, it takes more of an expert than the reviewer

to know to load, fire, and (for first echelon purposes) maintain the weapons. Now in its seventh large printing in less than two years, the content of the book should be stabilized for a time to come.

Front-line Theater

THE B.O.W.S. By Margalo Gillmore and Patricia Collins. New York: Harcourt, Brace and Company, 1945. 173 Pages; Illustrated. \$2.50.

When Katherine Cornell, Brian Aherne and company went off for the Mediterranean and European areas to present *The Barretts of Wimpole Street* to soldier audiences, nobody was quite sure how the play would be received. Soldiers, of course, were supposed to be interested in very light, even bawdy, entertainment. Katherine Cornell chose B.O.W.S. for her own part because she thought she could do it better than almost anybody else, but even she had qualms about its reception after the company hangers went to work with their gloomy predictions. The soldier audiences "loved" it, to use the theatrical term.

The B.O.W.S. cast loved it, too. As civilians living and working with soldiers, they had much to learn and even more to unlearn. They never could learn to enjoy some of the military forms and customs, but on the whole they had a not-too-long time, uncomfortable for varying periods, but always with a satisfying feeling that their efforts were appreciated, and appreciated by those whose appreciation meant more than that of anyone else.

There is much humor in the book, but to the military reader its greatest value is the opportunity to look at ourselves as others see us. What they saw wasn't, on the whole, too bad.

What they Did

FIGHTING DIVISIONS. By E. J. Kahn, Jr., and Henry M. Lemore. Washington: Infantry Journal, 1945. 191 Pages; Maps; Illustrated. \$2.50.

Thumbnail sketches of the accomplishments of all our fighting divisions, including Infantry, Armored, and 1st Cavalry, run about 500 words for each division in this book. Division insignia are reproduced in full color, the Order of Battle is given for the two V-Days, and a full set of maps shows the outlines of the different theaters. Much of the material about individual divisions was held back by censorship during the war; the book offers an opportunity to find out where each division fought

Seabee Saga

FROM OMAHA TO OKINAWA. By William Bradford Huie. New York: E. P. Dutton & Company, 1945. 244 Pages. Illustrated. \$2.75.

The Seabees have seemed to rate more admiration and less jealousy from other units of the armed forces than any other group. They get away with calling Marines "Junior Seabees," and have stolen much of the play from the Army Engineers. They have done their duty as sailors, as jungle fighters, and as construction wizards. Huie told all about this in *Can Do*, his previous book, and takes up the later chapters here.

Naming names of individuals and of units, the author regards the pace of the work by insisting on giving the full name and home town of every person he mentions—and that is plenty. The deeds of the Seabees in combat and in miracles of work performed do not suffer at Huie's hands; from killing Japs and building airstrips to doing their share in the big D-Day invasion, the reader wonders how we ever got along without these fighting, working, unmilitary hard cases. There is much humor in the book, most of it of a kind that is most kindly described as "earthy," but that would be at home in almost any barracks or latrine.

Salvaging Humans

WE ARE THE WOUNDED. By Keith Wheeler. New York: E. P. Dutton & Company, 1945. 224 Pages. \$2.50.

Keith Wheeler, the author of *The Pacific is My Beat*, which was one of the better books about the war in the Pacific, took a slug through his jaw, tongue, and neck during the landing on Iwo Jima. This book details his experiences as a casualty from Iwo through his hospitalization on Oahu, and tells also the stories of the other casualties he met along the way. The stories are not pleasant reading, and since they are written in plain English instead of in the Latin of the medicos, they seem worse than the same stories as they would be written in the medical journals. There is something impersonal about a fractured femur, but a shattered thigh bone (which is the same thing) seems much worse.

The men who were burned, or shot, or who lost limbs, or had messy wounds in their bodies, or whose minds went haywire under stress, took the fortunes of the war with good grace. There was pain and stench and helplessness, but there was also a spirit that made a humorous remark seem in character in almost any situation. In layman's language Wheeler describes some of the techniques used in repairing damaged bodies; in a few cases the cure seems worse than the wound. The author's verdict is that the medical services are doing a superspecial job for the casualties, all the way along the line from the front-line aid man to the rear-area surgeons.

Hiding Out

FIVE HAD IT. By Colonel Beirne Lay, Jr. New York: Harper and Brothers, 1945. 140 Pages. \$2.00.

We know that many of our flyers went down over France during the war, and that a large number of them never saw the inside of a Nazi POW camp. Nothing was said, in the few cases that received any publicity, of the methods used to keep these men out of German hands, and to return them to Allied control. Lay tells what happened to himself and another; they didn't get back to Allied hands until long after D-Day, but they did manage to elude the Germans.

Services Offered by the

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By H. D. SMYTH

Consultant, Manhattan Engineer District

(Prepared at the Request of Maj. Gen. L. R. Groves, U. S. Army)

From the Foreword by General Groves . . .

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repeated in many other cases, if not in detail, at least in substance. When their plane crashed, the Americans were hidden for a while by a fearful Frenchman, who finally sent them their way toward the Spanish border. They hid in the woods when they could, and brazened it out in the villages when they had to. With no identity papers they faced down a young SS trooper after a collaborator informed on them, and with luck they got away before the Nazis thought the matter over. Some Frenchmen fed them and sent them on their way because they were afraid to be caught harboring Allied airmen (as well they might, since execution was the penalty). Finally a young priest put them in touch with the Underground, which hid them for months until the Allies approached. The local Partisan chief who arranged for their protection was found with the radio he used to call for assistance for the Americans, and was tortured and killed.

Lay and Duer were lucky; some were luckier, and returned to fight again; others were captured or killed. What happened to any individual airman was a matter of luck in his first and subsequent contacts.

Escape to Spain

JOURNEY UNDERGROUND. By David Prosser. New York: E. P. Dutton & Company, 1945. 347 Pages. \$2.75.

Flight Officer Prosser was a navigator when his bomber was brought down near Paris, on 3 September 1944. With a hurt ankle, twelve toothbrushes, and a volume of Browning, he was taken under the care of the French Underground. The Underground hid him, fed him, and finally made it possible for him to escape into Spain.

The quiet courage of the French who risked their lives and their property to shelter downed Allied airmen is the most impressive feature of the book. The inconvenience of having healthy men with healthy appetites cluttering up their homes and devouring their expensive black-market food was bad enough for the patriot French; the constant fear of a slip, or of sheer accident that would put the Gestapo or the collaborationists on their trail, must have been most nerve-wracking.

The Underground was well organized. When it became necessary to shift Prosser and another American from time to time, new quarters were found for them with a minimum of delay. Although time passed slowly and it took months finally to get Prosser to the Spanish border, he was much better off during all that time than he would have been in a prison camp—his irritation at certain members of the Underground for petty reasons seems out of place when we consider the very real sacrifices that were made in his behalf.

Brown Derby

AL SMITH, AMERICAN. By Frank Graham. New York: G. P. Putnam's Sons, 1945. 242 Pages; Illustrated. \$2.50.

Al Smith rose from a newsboy and fishmarket helper in New York's East Side to Governor of the State of New York and Democratic candidate for President of the United States. At the time of his death he was President of Empire State, Inc., the company that owns the Empire State Building.

Living in the highly competitive East Side, as a member of the New York State Assembly, as Governor, and always as a politician in the good graces of Tammany Hall, Smith inevitably made enemies as well as opponents. That he was an able man there can be little doubt; there can be little more doubt about his integrity and his feeling for social progress. It is probably a safe assumption that his religion, the same as that of

cost him the Presidency. Even so, it is hard to believe that any man could be as infallible, as unselfish, and as farseeing as his biographer insists he was. This is hardly the last word in biographies of this undeniably great man, even though it is interesting to read and probably correct factually. The author is too obviously a Smith partisan to permit of any objectivity.

Rails West

SANTE FE: THE RAILROAD THAT BUILT AN EMPIRE. By James Marshall. New York: Random House, 1945. 339 Pages; Illustrated; Index. \$3.75.

The Sante Fe started out as a visionary dream by Cyrus K. Holliday, who in 1857 thought of building a railroad between Topeka and Atchison. By October 30, 1868 dirt was turned for construction of a bridge to connect with the Kansas Pacific Railroad. Between 1857 and 1868, and between 1868 and the present, the Santa Fe had many headaches, but little boredom.

State legislatures, the federal government, other railroads, depressions, booms, acts of God, freaks of nature, foreign governments, Wall Street, property owners along the right-of-way, and Indians were just a few of the difficulties the road met and vanquished with varying degrees of success as it gradually evolved into the continental rail system it is today. Practically every mile of expansion meant a fight with somebody, either with rifles, checkbooks, debate, or influence. The second half of the last century was a rugged period, when shrinking violets withered and brains and brawn were required to expand.

The Santa Fe created business for itself by creating towns along its right-of-way, and by aiding farmers and industries to establish themselves in Santa Fe territory. There was much trial and error in its methods; the road went broke and recovered. From a start with a \$52,000 capital stock, of which \$5,200 was put up in cash, the road has developed to the point where it owns 14,549 miles of main track, operates 15,105 miles, and has a par value stock capitalization of \$638,250,300. Colonel Holliday's dream has become a very concrete fact during the past eighty-eight years.

There is something in this book for the railfan, the historically inclined, the person interested in business and finance, or for those who wish merely to read a good adventure story based and nourished on facts.

Beachhead to Death

BEACH RED. By Peter Bowman. New York: Random House, 1945. 122 Pages. \$2.50.

Written in a form that looks, at first glance, like poetry but is actually prose, this novel attempts to portray the feelings and thoughts of a soldier during a beach assault and a subsequent patrol, up to the moment of his death. The writing is intense; "vivid" hardly describes the author's style. Bowen, according to the book jacket, originally was in the Corps of Engineers, and is now a correspondent for *Air Force*. The jacket does not mention whether he actually saw any action such as he describes so tellingly in this book, but the reader will feel that he was there. There is heavy emphasis on the mud, blood, and heat of Pacific warfare; there is little of the flag-waving type of patriotism; but the reader who knows soldiers will realize that the novel is no sensational debunking, but an attempt to tell an honest story of a very important period in the life of man. War is not usually attractive; war in the Pacific was even less so. The corporal who is the book's chief character did a necessary job to the best of his ability, and without enjoying it.

Light Poetry

WHAT CHEER. Collected by David McCord. New York: Coward-McCann, 1945. 477 Pages. \$3.50.

The introduction, and what the compiler calls an "extraduction," appearing at the end of the anthology, are at least as interesting, and probably more amusing, than much of the verse collected here. The book is labeled, "An anthology of American and British humorous and witty verse." There is so much here that every one will find much they find amusing, or witty, or

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both, and they can flip past the remainder without feeling that they do not have their money's worth. Reading *After All*, which is the above-mentioned extradition, might cause the reader to try some of the previously passed material—and enjoy it.

* * *

More Readjustment

MOM, I'M HOME! By Syd Hoff. New York: Doubleday, Doran & Company, 1945. \$2.00.

When Hoff draws a cartoon, what subtlety there is in the gag, and not the drawing. Even though his people look happily unintelligent, or unintelligently happy, they look like people, and the reader knows what their expression is meant to portray. Being happily unintelligent ourselves, we like Hoff's work because we can understand it without extensive research—and because it offers many a laugh.

Hoff is now home from the wars, and this book follows that theme. The thrill of a tile bathroom, the puzzlement of the kids, the unreasoning pride of relatives, and the joy of women at the end of the manpower shortage, as well as the obvious bedroom angles, provide Hoff with the kernel of a laugh in every drawing. Even the by-now hackneyed gags that crop up in the book are almost saved by Hoff's drawing. "With you, there will always be a manpower shortage," was our favorite, which is probably good evidence of our broken-crutch sense of humor.

* * *

Invasion Experiences

MORE LIVES THAN ONE. By Robert Douglas Skidmore. Boston: Houghton Mifflin Company, 1945. 265 Pages. \$2.50.

In this, his second book, Sergeant Skidmore makes a noble try at describing what a soldier feels during two island invasions, and the period between. His failure to put it over is not due entirely to a literary skill that is not equal to the job he attempted, but to the undeniable fact that few sensitive men really know what they feel when men are dying near by and the discomfort of tropical warfare keeps pressing upon them.

Skidmore was an Air Force administrative noncom, and he made both landings when there was little more than a beach-

head to receive him. He took his bombings, and his mud, his insects—even a voluntary few days as an infantryman—his stride. The death of men he knew, and of some he did not know, was a little harder to take. He describes very well the physical things that affected him; his descriptions of the psychological factors indicate good observation but lack of experience in evaluating them. A certain Sunday-schoolish attitude in his writing, while evidently sincere, somehow does not seem to fit—if his book is meant to portray the feelings of the soldier, as distinct from Sergeant Skidmore.

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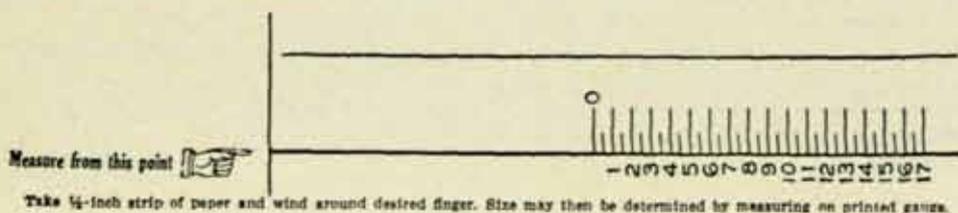
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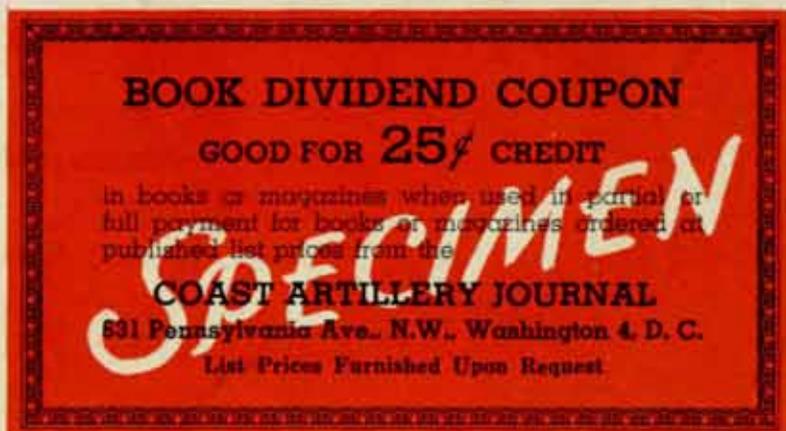
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