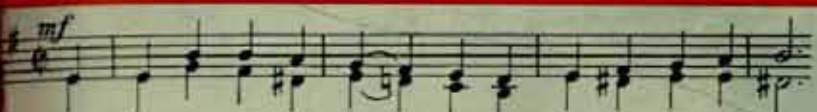
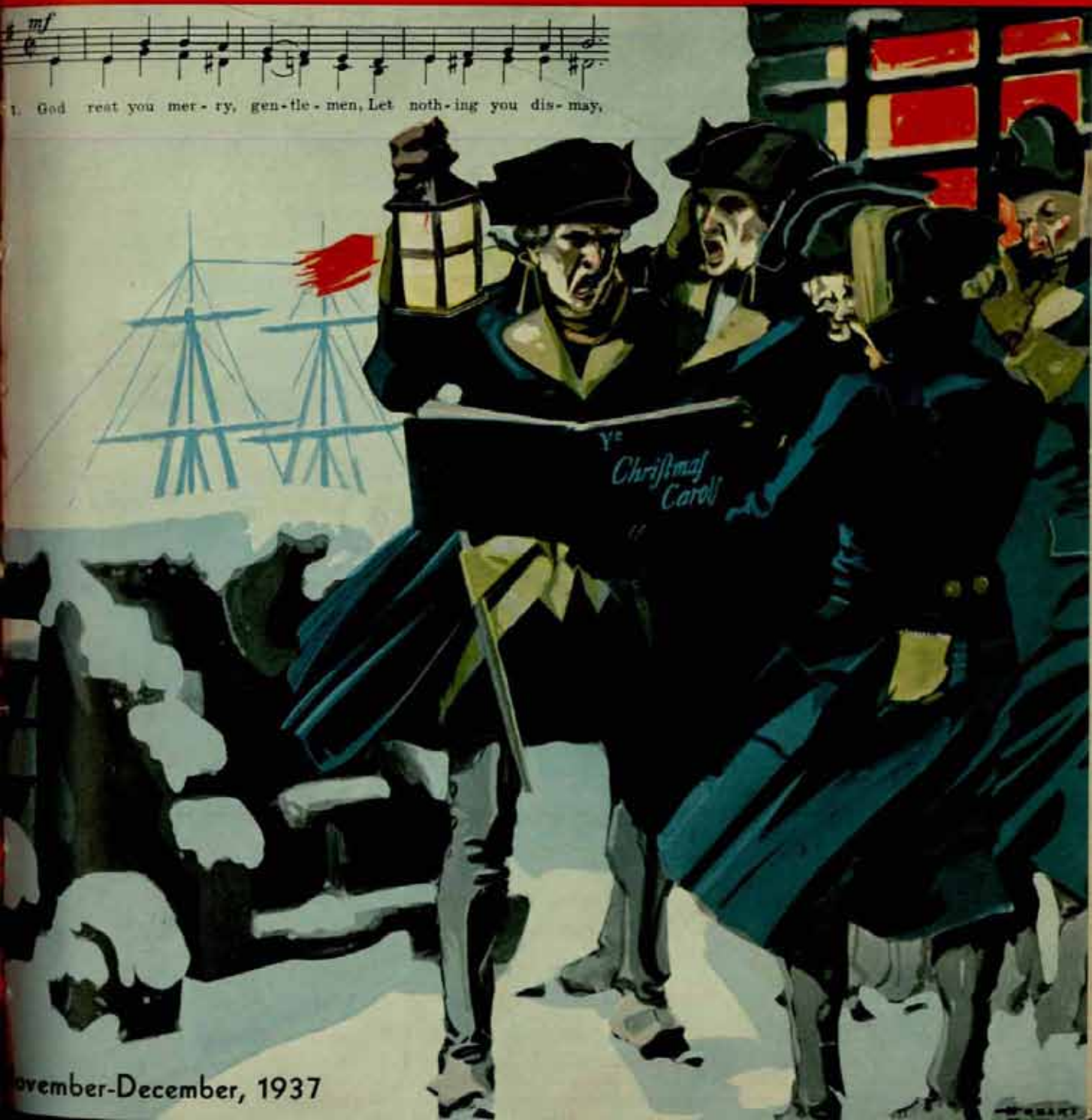


The
Coast Artillery
JOURNAL



1. God rest you mer-ry, gen-tle-men, Let noth-ing you dis-may,



November-December, 1937

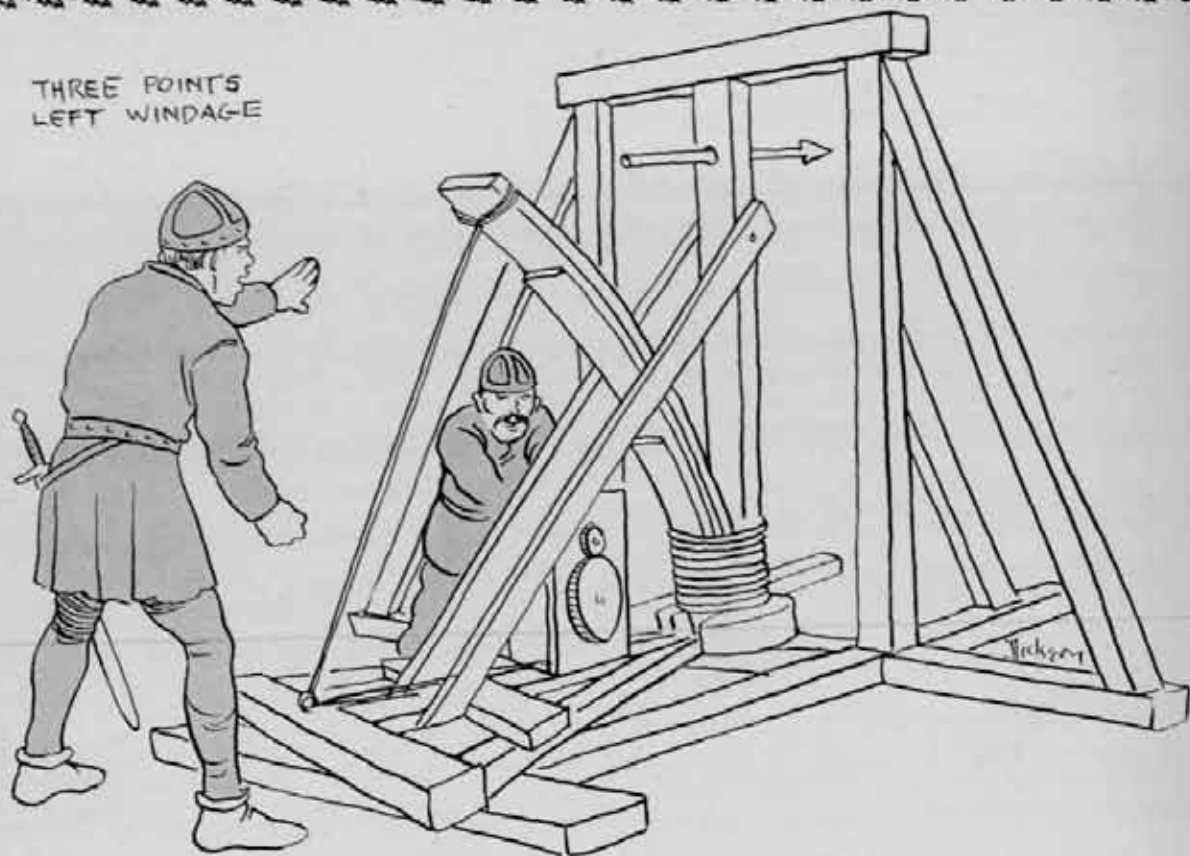
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THREE POINTS
LEFT WINDAGE



A chapter in the story of war

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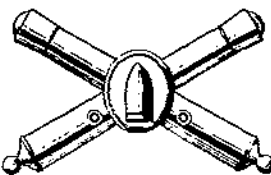
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*Season's
Greetings*

FROM THE CHIEF

Industrial Preparedness

By

THE HONORABLE LOUIS JOHNSON

The Assistant Secretary of War



COAST ARTILLERYMEN of the World War learned from their experiences on the Western Front, the tremendous importance of supply to the success of their operations. Certainly we agree that without rations, ammunition, gas masks and other supplies, all our expert training in gunnery and ballistics would have availed us nothing.

To conduct a modern war successfully, a nation must provide for three basic factors. First, the fighting manpower must be raised and trained; second, the fighting manpower must be equipped and supplied with fighting materials and transportation; third, the fighting manpower must receive the loyal and wholehearted support of the civilian population behind the lines. National defense, therefore must include a plan to provide for each of these three essential and interdependent requirements.

Let us now consider to what extent the War Department has covered each of these three necessary objectives.

First, let us consider manpower. In this phase of national defense, the United States is potentially the strongest among the nations of the world. By manpower, we mean something more than mere numerical supremacy. If numbers alone counted, the history of the last few months in the Orient might never have been written. Only men of strength, of intelligence, and of skill should be included in measuring manpower.

Due to our training and our education, we have men of a high degree of intelligence. Due to our scientific agricultural methods, we can spare a greater human reserve for military effort than any other nation. To feed ourselves, the United States requires for work on the farm but twenty-two out of every one hundred of its population. To keep from starvation, Germany needs thirty-eight out of every one hundred, France forty-five, Italy sixty-five, Japan seventy, Russia eighty, and China eighty-five to ninety. In short, we excel the world in the potential

reserve of manpower that can be released for war effort.

Since our plan of preparedness is surely defensive in character, our program of mobilization of manpower follows the same general pattern. With a small force of less than one-half million men ready in case of immediate emergency, we can not afford to rush them all out at once. We are confident, however, that if war should come tomorrow, we would be ready to put into the field 300,000 of them to resist the first shock of invasion.

Thirty days later, we hope to have available a force of 500,000. At the end of four months, we expect that 1,230,000 men will be in uniform and under arms.

How long these soldiers could be maintained presents another problem. With the beginning of war shoes wear out, buttons fall off, tools break and other incidents of wear and tear occur.

Due to careful planning, we have enough of the ordinary supplies to take care of our soldiers for a period of six months. The same can not be said, however, of weapons and equipment developed since the World War, such as airplanes, antiaircraft and long-range guns, gas masks and other more modern and essential accoutrements of an efficient military machine.

Our efforts must be directed to build up, in time of peace, a reserve of raw and fabricated war materials sufficient to take care of our army in all its needs until industry, mobilized for war purposes, can convert plowshares into swords and pruning hooks into spears. The change of industry from a peace to a war basis is slow and difficult. It will take weeks, perhaps, and in some cases it may take a year or more to produce some of the delicate machinery required in the production of war matériel.

The effort to build up reserves is part of the program of industrial mobilization which represents the second of the basic considerations in any national defense plan.

The War Department has made a survey of American

We possess the strongest industrial structure in the world

resources and has found that we are provided by nature with the strongest reserve of raw materials of any nation. We have in this country ample resources for our full military and civilian requirements of food, coal, petroleum, power, iron, steel, machinery, chemicals, copper, lead, nitrates, silver, zinc and phosphorous. No nation in the world can match this list.

We found, however, that certain raw materials essential to the needs of the fighting forces of our nation are either entirely lacking or are produced in very limited quantities, incapable, in time of war, of marked expansion. We need manganese, a metal used in modern steel making for the purpose of cleansing and deoxidizing machine steel. We are short of chromium, a mineral essential in the manufacture of rust-resisting alloys. We lack tungsten, which is indispensable to the production of high-speed tool steel. Our supply of tin, necessary for solder, bearings, and linings for metal containers, is inadequate. For these, and a few other items, we must depend upon foreign sources.

In the event of war, our access to these supplies may be cut off. Consequently, every effort must be made to conserve and build up a reserve of these strategic materials.

Our national efforts along this line include an act of Congress forbidding the export of scrap tin. We look to the accumulation of discarded tin cans as our best secondary source of this strategic item of supply. Congress also has authorized the Navy to purchase some strategic materials for purposes of reserve. The Military Affairs Committee of the House of Representatives has acted favorably on a similar provision to acquire manganese, chromium, tungsten and tin for the reserve of the War Department, and I trust this bill, so essential to our program of industrial preparedness, will be passed during this session.

After a study of the production capacity of twenty-thousand individual plants, we have found that we also possess the strongest industrial structure in the world. Those engaged in the manufacture of food, clothing, shoes, automobiles and similar products in ordinary use, can meet the increased demand of war by speeding up production and by a certain degree of expansion. Factories employed in the production of articles not essential in time of war, can be converted for the manufacture of guns, recoil mechanisms, ammunition and similar items not strictly commercial in their nature. For the production of explosives, propellants and the assembly of ammunition, for which there are no comparable peacetime activities, an entire industry may have to be built. On the whole, it is safe to say that American industry is capable of bearing the load of any major war effort.

Our problem, therefore, becomes the distribution among our manufacturing plants of this load without confusion, delay and uncertainty that the absence of a definite plan entails. We must always keep in mind our primary purpose, to save valuable time, which in turn will save millions of dollars and thousands of precious lives.

Our plan of distribution takes full cognizance of both civil and military demands in time of war. It considers not only the needs of the Army, but also those of the

Navy. Certain articles, such as armed vessels, torpedoes and depth bombs, only the Navy needs. Plants manufacturing these items have been assigned exclusively to the Navy. Factories making mobile anti-aircraft guns, 155-mm. guns and howitzers and their ammunition, products strictly for Army use, have been allocated to the Army. Facilities for the manufacture of machine tools, propellants and explosives, shoes, blankets and other items needed by both the Army and Navy, have been distributed between the services so that each may have its requirements filled.

Ten thousand manufacturing plants of the country have been allocated, or assigned, to one or more of the supply branches to produce military necessities. Each has been given a wartime task. Factors of time and quantity have been fully considered. The majority of these plants have agreed to perform the allotted work. The agreement has no legal status and is binding neither on the government nor on the industrial plant. It simply means that the plant has cooperated with the government in studying and analyzing the war load that may be placed upon it and is prepared to carry this load in time of war.

There are other details to the industrial mobilization plan which I have not the time to develop. Let me merely add that we plan a super-agency, national in character and administered by outstanding civilians, to coordinate this tremendous industrial effort. The War Department is unalterably opposed to the militarization of industry.

In developing our plan for this phase of mobilization the War Department has received the hearty cooperation of both industry and labor. If war should come, we feel confident that this friendly relationship will continue. United, we may reasonably expect to realize the third of our major objectives in our program and receive the wholehearted support of our civilian population.

The principal obstacles that warring nations in the past have encountered toward the mobilization of a united public opinion behind the lines, has been the matter of excess profits. In war, the increased demand and competition between government agencies usually has resulted in higher prices. Higher prices with a rising market brought undue profits, not only for industry but for every holder of any material used by the nation. There have been undue profits in food, in farm products, in raw materials and in the manufacture of munitions.

Competition between government agencies for materials, as a factor in excess profits, will be eliminated by our method of allocation and distribution of procurement. When supplemented by fair government contracts, together with the power of price-fixing and a fair excess profits tax, the possibilities of profiteering in war will be reduced to a minimum. Without profiteering, the prospect of maintaining a high morale among the civilians behind the lines appears excellent.

In conclusion, let me say that, although we have worked out the general provisions of our plan for the mobilization of manpower, and of industry, and of public opinion, we all sincerely hope and pray that the occasion may never arise when it will have to be put into full effect.

GUNS IN

SPAIN



By An American War Correspondent

"THREE-HUNDRED yards beyond the next intersection are the Red trenches," said the driver of the press car. We were doing a forty-mile clip on a one-way road through a steep valley. Theoretically, we were in Nationalist territory, but we wondered just how sure the driver was of his distances. In too many transportation pools we had seen cars with windshields pockmarked by bullet holes—a grim reminder to be sure of where you were going.

A quick thrust of the driver's foot, brakes screamed—we came to a back-jerking halt. In a grassy hollow to the right we caught, amid the camouflage of green branches, a flickering glimpse of a six-inch howitzer, its crew stripped to the waist. Beyond lay other guns.

Whang-woosh-oom-oom!

One gets an uncontrollable hollowness at the beltline when unexpected firing occurs right within earshot. However, quick echoes from all sides made that first single shot sound like a popgun. Fieldpieces roared a steady crescendo. Such was my introduction to war—War in Spain.

* * *

The Spanish War offers many contrasts, but nowhere are these so strange as in artillery practice and weapons. For instance, in the Nationalist army we find some artillerymen depending on light fieldpieces, long-range rifles, mountain guns, and heavy howitzers, of designs in use a quarter of a century or more. Again, we see the German allies of the Nationalists, training young gunners in the use of the most modern antiaircraft quick-firers and, inciden-

tally using the theatre of war as a proving ground for other weapons which have had no prior battle test. One might mention also the Italians, linked with the Nationalists, who content themselves by backing up infantry with field guns of the same make and calibre used by the Italian army during the World War.

It will be remembered that since the end of the World War, Spain had been involved in severe conflicts in Morocco and in a consequence had assembled a considerable amount of artillery. These guns were still on North African

soil when the present strife began. After Alfonso was deposed General Franco went to Morocco to reorganize the army under the Republic. So outstanding was his work that the Madrid government transferred him to the Canary Islands as Governor General, for fear he might start something in Morocco. The gesture was futile because when the industrialists and financiers of Spain decided in 1936 to do something to halt the leftist trend, they sent for Franco. He flew from the Canary Isles to Morocco, where he found 18,000 troops ready to obey. At once he began the transfer of men and guns to Western Spain.

At the time of this writing, Generalissimo Franco commands 400,000 men, and additional Spanish recruits join him daily. This tabulation includes both combat and labor echelons, and his allies. Numbered among his allies are 60,000 Italian troops—infantrymen, artillerymen, transportation and aviation personnel. The German forces include 10,000, divided among artillerymen.

FRANCO



aviation, transportation, communication and technical personnel.

The rough terrain makes the mountain batteries the most popular and most used. These short-range weapons are known as "four-mule"—the number of animals needed to convey a team from fight to fight. One full-sized army mule carries the five-inch tube, another the trail, a third the breech, the fourth the wheels. Other mules carry supplies and ammunition. Once the guns are in position the ammunition is brought forward by oxcart from the nearest head of motor transportation. Although mountain guns played an important part in the advance on Toledo and Madrid, they played an even greater rôle in the Bilbao campaign, for Bilbao is nestled in mountains that range twenty to thirty or more miles in every direction. The defenders dug in and resisted at crest after crest, only

and in places as many as eight lines deep. Strong-points included reinforced concrete machine-gun posts and rifle pits. Barbed-wire fences and entanglements ringed the whole area.

Plans for this attack on the Bilbao defenses were worked out by General Emilio Mola, commander of the Army of the North, in conjunction with technical advice from a German artillery general. After all was in readiness there came a period of foggy weather with visibility zero in the mountain areas. The bad weather ended after two weeks; and the guns which had been lined up almost hub-to-hub, opened up on the first clear morning. Fire was directed on a section of the ring between Larrabezua and Goldacano. The defenders took it for granted that an attack was to be launched on the north of Larrabezua and rushed men to that vicinity. However, after an hour of fire,

bombing planes destroyed a section of the ring near Goldacano, and the Nationalist infantry walked through virtually untouched. This phase of the attack lasted less than twenty minutes. The penetrating force spread out, attacked trenches from in rear, and within a few hours three or four miles of this great system of defenses had been taken.

Other Spanish guns support the balance of the 700 miles of front. In the holding operations before Madrid, heavy batteries—both rifle and howitzer—are so well camouflaged that a visitor to the famous Cerro de



Mountain batteries en route to the front

to be driven out by the accurate fire of Franco's mountain batteries. One of the major counterattacks by the defenders took place at Mount San Pedro late in May. Over 2,000 Basque and Asturian troops of President Aguirre's army attacked at dawn and might easily have broken through the small force of Nationalists but for the concentrated fire of a battalion of mountain guns. Those who reached the wire were met with the bayonet and hand-grenades. None got through.

It was in the Bilbao campaign that the largest concentration of Spanish Nationalist artillery occurred thus far. Morocco had been drawn on for batteries of six- and eight-inch howitzers, light fieldpieces and six-inch long rifles. These were supplemented by Italian and German guns and enabled Franco to destroy or force the retreat of defending batteries in every battle. It was reported that in organizing the major position for the attack on the so-called "Iron Ring" of Bilbao forts that the Nationalists had sixty batteries in support of its storm troops. The guns were in position two weeks before the attack.

The Iron Ring was a circle of trenches from three to six

las Angelas, (three kilometers south of Madrid) has difficulty in locating the positions. The Cerro itself holds a few mountain guns, kept in reserve against an attempt to storm the hill, but thus far the Madrid forces, recognizing the inevitable losses attendant upon the long advance across open country necessary to reach the Nationalist front-line, have made no attempt upon the Cerro.

At Toledo, more or less continuous counter-battery goes on. The front is but eight miles east of the "city on a hill." For several months the lines were closer and the inhabitants soon became accustomed to stray shells. With the fighting now out of machine-gun range, no one pays attention to Nationalist shells roaring overhead on their way to the Government trenches. Motion picture theaters give two shows a night, three on Saturday, the street lights burn all night, and life goes on in its accustomed way.

It is obvious, however, that much of the line in inactive areas is held only by rifle units, augmented by machine-gun detachments. Activity in these areas is met by bomb-

¹General Mola lost his life while flying from Victoria to Burgos before the attack was launched.

ing raids from near-by air fields. The use of planes to assist the ground troops made possible the concentration of Nationalist artillery in the Bilbao campaign.

Officers of the Army of North pay high tribute to their German allies and credit their antiaircraft artillery with destroying the enemy aviation at Bilbao. The Germans are also credited with supplying a battery of heavy howitzers which played an important part in bombardment of strong-points.

During the early part of the campaign the defenders of Bilbao had an air force, but it was non-existent when the city fell. The business men of the captured city told the story of what happened. The defense planes were being flown by French aviators. To begin with, the Frenchmen were living at a hotel south of the Nervion river and came in for criticism, because they dined on beefsteaks and full course dinners at a time the rest of the soldiers and civilians in the beleaguered city were on rations. Shortly after the campaign started, Nationalist airplanes began a dawn-to-dark watch of the Bilbao airport, and news of every Government take-off was instantly radioed to artillery headquarters in Victoria. Thus warned, German antiaircraft crews were on the alert and opened a withering fire upon the first sight of the fliers. Planes came down out of control, some in flames. Later on when the defenders abandoned the offensive in the air, they nevertheless still made efforts to spot Nationalist batteries by the use of observation aviation. Then the battle was carried right to the Government airdrome and bomb attacks destroyed the planes before they could leave the ground. After that Bilbao was without "eyes in the air."

An examination of Nationalist air defense showed several types of AA guns. There are two sizes of rapid-fire cannons, said to be 20-mm. and 38-mm. respectively. But most interesting, and claimed to be the most effective, are batteries of 88-mm. quick-firers, which are the guns credited with forcing Government aviators to avoid Nationalist positions. An appreciation of their value may be gained from the following description by an eye-witness:

The sound of distant firing convinced the correspondents that at least twenty-four guns were firing. The location of these guns seemed to be about a mile in the rear of the observation post. Passing through the support lines only a single four-gun battery was found, four miles back. Actually the battery had fired twelve shots every four seconds. The firing was so rapid that it appeared to be in rotation: 1,2,3,4-1,2,3,4-1,2,3,4. Each blast was accompanied by a flash of yellow flame extending sixty feet from the muzzle of the

piece. The flame was bright as a magnesium flash and faintly tinged with green. There was an immediate echo for each shot almost equal in volume to the original detonation. The echo apparently came from the ground in front of the gun, and at a distance gave the impression of twenty-four shots instead of twelve.—A most impressive sight.

These guns were then firing at a land target. The Spanish officers report that their vertical range is over 20,000 feet and their horizontal range over 16,000 meters.

The one handicap of the 88-mm. gun is that apparently it cannot be hidden because of the flaming discharge. Against an alert and strongly-armed opponent it would be necessary to frequently move the batteries to avoid their being the object of counter-battery fire or aerial raids, unless flashless powder or flash hiders are used.

Persons other than Germans are brusquely ordered to stay away from the batteries and the order is enforced.



A field battery in action.

Supplemental German equipment includes communications trucks with telephone, radio, and telegraph material and wire and cable-laying equipment of the latest design. Reels of gutta-percha covered cable containing several wires enable rapid establishment of multiple telephone service between batteries and headquarters. The reels have two compartments, the larger of which carries 100 meters of cable with male connections at each end. The smaller compartment holds a double female connection enabling an instant hook-up between sections. Twisted feeder wires lead from the end of a cable to various batteries and observation posts. One of these communication trucks was operated as a combination radio, telephone and telegraph exchange, providing instant communication between observation planes and O.P.'s, the battery commanders, and higher headquarters.

Air fields along the main highways from Victoria to Caceres are protected by 20-mm. and 38-mm. AA rapid-fire automatic cannon. These smaller guns are found either in partly camouflaged positions or out in the open. They are equipped with range finders with a mirror ar-

rangement so that the gunner looks directly ahead through a wide eyepiece instead of at the plane. He sits in a swing seat with his feet resting on controls which are part of the aiming devices. An ammunition handler feeds shells into a frame-work hopper from which they go into the firing chamber in the manner of a machine-gun feed. The 38-mm. guns were mounted on small caterpillars and are apparently mobile enough to be quickly transferred to new positions.

The 88-mm. quick firers observed were usually in semi-fixed positions, surrounded by sand-bags for defense against rifle or machine-gun fire and were well camouflaged to avoid detection from the air. However, it is evident that on account of the tell-tale flashes described, it is difficult to hide positions of this gun for long, either from enemy lines or from spies. This is borne out by the following incident related by various officers in an effort to spur a continuous search for spies.

A bombing attack at an airport near an important city resulted in such damage that the AA batteries were ordered to new positions. The change of position was to take place between 5:30 and 6:30 on a certain morning. While the movement was going on enemy planes bombed both city and airport from an altitude so low that the authorities were convinced the fliers knew the AA batteries were being moved and were temporarily out of action.

Because this conflict stretches over 700 miles and because of the constant movement of guns from sector to sector it is not possible to estimate the numbers of the German AA guns, but the impression gained is that there are not enough of the 38-mm. and the 88-mm. guns as are needed to provide complete protection. There seemed ample number of the 20-mm. guns at Nationalist airports to make the Government fliers keep away, barring an occasional surprise attack. Enemy patrols give a wide berth to towns protected by these types of guns.

Examination of the bases of the 20-mm. and 38-mm. AA guns show that although they were standing on the ground or emplaced in fixed positions, they could be mounted on motor trucks. The guns said to be 88-mm. were all mounted on two-wheeled trails. The guns of one battery, seen en route, were being carried on low-bed pneumatic-tired trailers, each hauled by a Diesel driven truck with facilities for carrying ammunition—in effect, a caisson and truck combined.

The Italian guns noticed were so well camouflaged as to make any detailed study impossible. One large group of Italian artillery seen on the move included batteries of light field guns of about four-inch calibre; batteries of howitzers of six-inch calibre and one battery of long rifles of the same calibre. The gun crews were well equipped.

It is interesting to note that of the three nationalities serving guns in the Nationalist army, the Italians were most consistent in the wearing of steel helmets while in action. On the other hand, the Spanish and German gunners tend to go bare-headed. The Italians were almost always fully clothed while the Germans and Spaniards stripped to the waist. However, it must be noted that

very few of the Spanish artillerymen had steel helmets, but those who did had laid them aside when in the heat of steady firing.

Now, let's take a look at the guns of the Government forces.

For the reason that most of Spain's artillery was on duty in Morocco, at the outbreak of hostilities the Government found itself with comparatively few cannon. More serious, however, was the lack of experienced gunners. Artillerymen of the regular army were either with General Franco or in defending groups in the several Alcazars² under siege in various cities. Regardless of their enthusiasm, the young militiamen recruited by the Madrid government did not know how to handle the few pieces of artillery available.

The heroic seventy-day defense of the Alcazar of Toledo is a monument to the futility of artillery fire by untrained men. The area was bombarded continuously. Three huge mines were exploded under the walls and hundreds of bombs were dropped on the ruins. So wild was the attackers' fire that buildings in a block-wide area around the Alcazar were as thoroughly wrecked as the great structure itself. The defenders sniped at attacking columns, day and night, throughout the siege, in spite of heavy salvos of cannon-fire directed at their posts. An artillery instructor among the defenders kept accurate tally on the attackers' gun-fire and his tabulations are shown below:

SEVENTY-DAY ARTILLERY ASSAULT ON ALCAZAR OF TOLEDO		
<i>Number of Guns</i>	<i>Calibre</i>	<i>Shots Fired</i>
5	15.5-cm.	3,300
4	10.5-cm.	3,000
7	7.5-cm.	3,500
?	50-mm. mortars	2,000

Another interesting sidelight on guns used by the Government was noted on the Bilbao front. A keen-eyed Basque observer, not in sympathy with the action of the "Separatists" who joined with their Asturian neighbors to fight for autonomy for the provinces of Northern Spain, kept close tab on Russian equipment delivered to President Aguirre's army. This happened in the early days of the Bilbao campaign and before the International Patrol tried to shut down on outside nations selling arms to the belligerents. He said that the Russian guns he had seen bore dates—1902. When the Asturians retreated from Bilbao, they took their artillery along.

In summing up the marked difference in results obtained by Nationalist and Government artillery, it must be reiterated that training and observation facilities are the governing factors.

In the rough terrain of northern and eastern Spain, guns are of little avail unless batteries are in constant touch with their air and land observers. Time and again, shells fired from Government batteries were seen to break far from the target, mainly because there was no air observation and the land observer was unable to see them. On the other

²Fortresses.

hand. Nationalist batteries, manned by veteran gunners in close touch with observers in the air, made every shot count. The outstanding opportunity to compare results was in the Bilbao campaign. Here, the defenders, lacking air observation, were unable to hit, or even locate, large concentrations of troops. Except for crude efforts to locate batteries by gauging the direction of the gun-fire and timing the interval between explosion and arrival of a shell they seemed helpless. From a road intersection north of Bilbao a Nationalist howitzer battery fired at the inner ring of forts from an open position for two days—without camouflage. Buildings nearby were full of ammunition. Often the roads were jammed with trucks bringing up supplies. Hundreds of infantrymen watched the show. But no counter-battery shot fell near this target. To the correspondents the activities resembled a school for artillerymen rather than war.

Two days later Bilbao was taken, and artillery commanders rushed forward to check the results of their work. They found that the forts had been pounded to pieces. So accurate had been the fire of the Nationalist batteries that only duds (which bounced off concrete emplacements) had gone into the city proper although it was right below the crests and less than a mile beyond. The effort to destroy the defenses without damaging Bilbao had been successful.

The great concentration of Nationalist artillery at Bilbao is a thing of the past. The guns, both old and new, now roar on other fronts. But the most important batteries in Spain and Spanish Morocco have yet to speak.

* * *

Midway between Tarifa and the port of Algeciras, on the southernmost tip of Spain, are the most talked of guns in Europe. Across the Strait of Gibraltar under the frowning cliffs of the Atlas Mountains are other guns of equal importance. These have not been seen in position, except perhaps by an intelligence agent of an interested power who has wormed his way past alert sentries and then gotten safely back home to report. But it is known that the batteries are there.

When General Franco found certain of his neighbors

unsympathetic to his aims he conferred with his advisors and determined to do something about control of the sea trade entering the Mediterranean; for munitions and supplies were going through the Strait for delivery to the opposition. Selecting a place where the waterway is only seven and a half miles wide he chose locations for forts on both north and south shores. At these points the Nationalist forces are reported to have mounted the guns necessary to control the Strait.

Foreigners living in nearby Spanish cities have confirmed the fact that guns were taken to the new positions. A road has been built south from the Algeciras-Tarifa highway over which mortars and rifles were hauled to positions on the North shore. Guns were also moved westward from Ceuta in Morocco. The first public notice of the matter came when Anthony Eden, Foreign Minister for Great Britain, spoke about keeping open the road to India. Autoists have noted the sentry posted at the entrance to the new road east of Tarifa and sightseers are ordered to move on. It was noised about that the Rock of Gibraltar had lost some of its importance since it is east of the narrower section and at a place where the Strait is twenty-two miles wide.

* * *

If it be true that the War in Spain is of the test-tube variety, the lessons learned will be seen in what the interested powers do by way of modification or change in matériel and organization within the next few years. If, for example, a leading army radically modifies an anti-aircraft machine-gun sight, we would not go far astray in assuming that the modification was dictated by battle experience. Again, if large numbers of tanks are suddenly junked by a major power and the manufacture of different types is initiated, we may be justified in a belief that the test of war showed a necessity for the change.

Hence, for the next few years the student will do well to keep his scrutiny fixed not so much on the Spanish armies as on those of the nations who appeared to have a major interest in the Spanish War, although not officially engaged in it. What the larger armies do—or do not do—will indicate what they learned.

IT IS DIFFICULT for an officer of high rank to get an opinion out of a subordinate. In the first place, the chances are that the subordinate has his mind on something else—that is, he is worrying about not having on his best clothes, or not being shaved, or not having his shoulders back or not having come as soon as he was sent for. Or it may be he is wondering why the general sent for him at all, whether he has done something wrong, whether there is any catch to the question, and what sort of an impression he is making with his answers. And then, in the second place, like a subordinate in any walk of life, he wants to give an answer that is pleasing to his superior.—GENERAL JOHNSON HAGOOD.

Mastery of the Future

By MAJOR GENERAL J. G. HARBORD

TODAY, through my office window on the fifty-third floor, I hear from the trenches formed by New York's buildings the rumble on that front of a war that goes on forever in every corner of the earth. Few of the millions engaged in it in one way or another think of their part as more than "filling a job." Except perhaps in their rare romantic moments, it does not occur to more than a handful that this universal war, seldom free from monotony, is making history. Yet it does have tremendous significance, for it is the eternal fight of mankind to supply his wants; the struggle along the frontiers of environment. It began in the era of that cave man who first tried to devise ways of making his shelter more habitable. It will never cease because human needs and hopes can never all be satisfied.

A little while ago I stood with many others on one of the world's great military battle boundaries. It was the front of the nearest German advance on Paris in 1918. We had assembled there to dedicate a memorial to American soldiers, who were the final factor in deciding that this historic line should run exactly through that point—and no closer to the heart of France.

The battles that take place on physical fields like that and the struggle the rumble of which we hear daily along symbolic frontiers have much in common. Their similarities exist despite the great difference between them made by our belief—or vain hope—that all physical wars could be avoided, if all men in all warlike countries would be wiser than they show any promise of being. Lives are freely given in both the military and the peaceful engagements; in building bridges, driving delivery trucks, and through sickness contracted in laboratories where the conquest of disease goes on, as well as before the guns of armies.

Failure to take or hold a line against an environmental enemy may decide the future of as many behind that line, as it ever does in actual warfare.

If the scientists contesting the advance of influenza across America in 1918 had known how to halt this invasion finally and conclusively wherever it hit, more than a quarter of a million Americans would have been saved in that one year. Research men still are working to devise a strategy that will defeat this malady. Some day they will learn the way. Their success against other diseases which once took terrific toll is their memorial, marking a decisive step in the long, slow advance toward better, safer living.

If the Allied armies had not known how to block the advance of a war machine in 1918, the lives of millions of people living today would have been darkened. Whatever disillusionment we suffer in contemplating the existing world as compared with what idealists hoped for after the Armistice, the fact remains that without an Allied victory some countries that are free now would not be. Europe's most liberal nations would have seen their borders pushed in. And our own republic could quite conceivably be hedged on every land frontier by a ring of hostile steel.

Overcoming those real threats still seems as important to many of our citizens now as it did in 1917 and 1918. While concentrating attention on the effort to overthrow environmental handicaps and threats, I am willing to let the results of the World War speak for themselves.

How far and how fast civilization moves against its limiting obstacles depends in large part upon the quality of its men. In everyday progress personal valor becomes a comparatively small factor, for the simple reason that we are not dealing with a frontier on which guns roar. The advances here may stir a few prejudices and conflicting claims and cause some pulling back by those reluctant to abandon old ways. But by and large the unconquered areas of science and technology go—amid applause from every side—to anyone who can take and hold them. It is in the other qualities, aside from bravery, that are displayed in everyday life as well as on the battlefield, that the hope of the world lies.

I happen to have had the high honor of commanding typical cross sections of American men during a critical period in France, and I know from personal observation that those necessary qualities were there, besides unquestioned valor. They might be summed up as a combination of well placed self confidence, concentrated energy, fortitude, flashes of vision, humor, and realistic doubt.

American soldiers did not think of themselves as heroes. They were not romanticists. You did not hear from their lips ringing phrases like "a war to end all war" and "a war to make the world safe for democracy." They had a few expressions that had a ringing sound, all right, in certain situations, but these remarks were not intended for the history books. Fine sayings were tossed aside in the trench area, and left to be repeated in safety by some at home whose idea of the importance of their work did not permit them to go to war.

The boys on the line thought of their work as a job to

Wars are still won by soldiers with their feet on the ground

be done. First they had to stop an enemy. Then they had to go forward and take objectives. Accomplishing those two things was what demanded the belief in themselves, the concentrated energy, fortitude, flashes of vision, the humor, and realistic doubt of highflown dreams; as well as bravery.

The part these factors play in ordinary life is easily seen by a contemplation of the history of progress. My interest in radio communication naturally turns me in that direction for an illustration. Before the day of Marconi, men had done much talking about the theoretical possibility of sending messages over a distance without wires. Some of the principles had even been worked out on paper. The young Marconi saw wireless communication as a task to be accomplished, not as abstract theory alone. He believed he had the ability to do it, and he had the other essential qualities. The result was that he marked a new frontier of science.

Previous movements along the front on which Marconi gained this height had been exceedingly slow. Between the ancient days of the signal fire, the runner, and the tom-tom, and the year 1844 when the telegraph invented by Morse was put to work, men had done practically nothing to speed the transmission of messages. After the new impetus had been given by the land wire telegraph, the determination of Cyrus W. Field laid the first transatlantic cable. Bell's telephone was not introduced until 1876. Americans who are now little more than middle aged can remember when telephones were a novelty in most parts of the United States.

Men who doubted when Marconi announced at the turn of the century that he had succeeded in receiving a feeble wireless signal across the Atlantic, have lived to see this day in which reliable radiotelegraph communication connects America with the most distant parts of the world and with ships on every sea. The first American owned radio company capable of meeting foreign competition and guaranteeing our nation her rightful place in the use of this new medium was organized after the World War with the encouragement of our Government. Events of the war years had shown the necessity for such an organization.

Belief in the possibilities of radio, research, and energy, added rapidly to knowledge. They led not only to the present high efficiency of shore to shore and marine radiotelegraphy, but also to the introduction and perfection of broadcasting, which has pushed back the horizons of homes in every city and remote section of the United States and in nearly every other part of the world.

Work in laboratories in America and elsewhere continues constantly, pressing forward into still unconquered ground of radio science. Every year sees strategic outposts attained—all of which will contribute their part ultimately in widening the daily lives of men. Television, for instance, has been taken into the field by the Radio Corporation of America for a test under actual working conditions. In the tests, through reception checked on experimental receivers in the homes of members of our

technical staff in the New York City area, many things have been learned that are vital to the creation of dependable "sight transmission." At the same time the engineers devoting themselves to the problem—as realistic as doughboys—are searching out every difficulty and flaw. They will stick to their job until television reaches a stage at which it is ready for use by the public.

The story of communications is typical of those in other sectors where advances are being made. First come the many centuries during which there seems to be little possibility of gaining desired objectives; the era of formulating a vague hope for the advance, sometimes of making a few basic inventions. Next the men of action step into the field and things begin to move. Slowly the advance comes in the early stages, but finally with increasing rapidity. In modern times there has been such a culmination of scientific and technological achievements that there sometimes seems to be no chance of going much further. Always the building is done upon the solid foundation of the experience of the past. And always—as in the case of radio—the unconquered territory ahead of the investigator holds promises of new wonders.

Not so long after Columbus in a hazardous sailing boat discovered America, the brilliant Leonardo da Vinci asserted that it was possible for a machine heavier than air to fly. He not only discoursed on the theory—painting, perhaps, the while, on the smile of Mona Lisa—but also drew a diagram indicating what he believed this contrivance might be like. Four hundred years dragged by before the first plane of the Wright brothers hopped off under its own power and skimmed a few hundred feet through the thin atmosphere above Kitty Hawk, North Carolina.

A little more than a decade after Orville Wright made that first jump, planes were swift, staunch, and dependable enough so that aviators were tilting against one another in them, high above the fields of Europe upon which knights in armor, mounted on mailed horses, had fought a few centuries before. Today, less than thirty-five years after the historic demonstration at Kitty Hawk, airplanes fly through ocean lanes, and maintain regular passenger and mail schedules across and between continents. Pilots guide their course on radio beams and carry on radiotelegraph and radiotelephone communication with land stations and with other planes in flight. Yet those who are in the best position to know, assert that the day of the plane's full glory lies still ahead.

Only a comparatively short span separates the present era from that when the best available doctors, half realistic searchers after truth and half voodoo artists, resorted to bleeding as a practically universal cure-all. The mastery of yellow fever by the research of an American Army surgeon is only one of an impressive array of victories by modern medicine. Yet a vast expanse of territory remains to be taken in this field too—a positive cure for cancer and other highly dangerous diseases, the discovery of the true function of all the glands, even a never-failing remedy for the common cold. The unconquered area in medi-

cine, despite the brilliant accomplishments of our generation, is a very large one.

Some grandsons of American pioneers who endured privations and at times a scarcity of food blame part of their present trouble on a strange new economic ill called "over production." The capacity to turn out food, houses, clothing, and other things for which men have always sought, was increased so rapidly by the machine age that distribution was thrown out of gear. While some alarmists cry that we already have reached a situation in which millions must be permanently kept out of employment, faster and more efficient machines are being perfected.

In every aspect of human achievement carping critics find something to deplore. Moans about the "impossibility" of offsetting the harm that "over production" brings with its blessings are matched by the unmanly whines of those who assert that all the advances of science and technology come to naught, in the last analysis. They speak as if this old world had run down and there were no future in employing the virtues or following the paths that have brought success in the past. At one extreme are those who are willing to halt where they are, accepting the best terms that will be granted them and sacrificing gains for which other men have died. At the other extreme are the radicals who believe they have the panacea in a departure from all previous experience—the visionaries who see impossible cloudlands ahead, to be attained by untried methods only.

"Suppose medicine has found a way to prevent plagues," say the advocates of the "world-is-run-down" philosophy. The plagues that once decimated populations were nature's device for weeding out those who were not fit to survive. Continue to protect the susceptible and the incompetent until they reach maturity and have children and you will develop a race that is pitifully vulnerable to disease. Some day pestilence will find a foothold in this throng of weaklings and mow them down. Then, in the absence of law to prevent the reproduction of the incompetent, the so called "backward races" will inherit the earth.

"Human progress is only an illusion," the most extreme iconoclasts continue. "What we have attained is only a surface glitter. The experience of countless men who have lived and died before us has taught us nothing really fundamental. In that sense, all men have died in vain."

Without tracing in detail these complaints against the contributions of those who believe in themselves and *do* things, the fact exists that the temporary upsets that come incidentally with the advancement of experience and knowledge are offset in the long run by wider knowledge itself. Granting even the doubtful premise that protective medicine will leave us open to fatal attacks by epidemic disease, it must also be apparent that the increased skill of medicine provides new ways of fighting them.

When they hear these predictions of woe, military men can think of a comparison in their own field. For years we heard the forecast that the mechanisms of destruction had reached such perfection that another war would kill

practically every man engaged in it and would leave no important building standing in the combatant countries. That was put to a test on a large scale in the World War. The losses in men and property mounted to totals that were terrible to contemplate. But the casualties in proportion to the number of men in the armies and the destruction of property in relation to the entire physical property of the embattled nations were far below that of many ancient wars.

For every device of offense produced in a scientific and mechanistic age, knowledge and skill soon creates a counteracting method of defense. Bomb proof shelters keep pace with the increased power of bombs. If motorization enables an army to assemble troops and strike quicker from a greater distance on land than ever before, radio in observation planes—the commonest of its many possible uses in war—forewarns against the impending attack. Against the increasing speed and range of invading aircraft is set the invention of new guns to protect against an invader. It has been made known publicly that defense guns which are now under test employ a radio principle to keep their muzzles aimed straight at the roar of a plane's motors. In practice, it is revealed, they make the number of hits scored by antiaircraft arms in the World War look like the target record of a nearsighted dowager dragged into a shooting gallery to try her luck for the first time. The advantage still remains with the defense. Just now the increased power of the air seems to guarantee that the great conscript armies of 1917-18 have disappeared from the battlefields of the future. They can no longer be assembled or supplied in such masses. Coördination of movements on such a scale is no longer possible.

Another precept of warfare that continues to be true although aviation gets more headlines, and probably always will, is that wars still are won—finally—by soldiers with their feet on the ground, who take and hold territory. No military invention, however ingenious, can ever take the place of soldiers. When the line does not hold or when an expected advance does not materialize, the failure can be traced to human beings. Modern equipment is necessary to win a moderate engagement, but there must be men of stamina there who know how to use it to fullest advantage.

Turning to peaceful pursuits we find a comparable situation. It is generally in our failure to make best use of scientific and technological advances that the fault ultimately lies if such advances leave us disappointed. Any conceivable forward step in peaceful knowledge and skill is a good thing if we know how to apply it rightly, and if we acquire the knowledge and skills that should come with it to defend ourselves against its doubtful by-products.

Our civilization is not in reverse, nor do we need to turn to a new direction to assure its future progress. What is demanded is more of the well placed self confidence—the concentrated energy, fortitude, flashes of vision—humor, and realistic doubting of dreams, already mentioned. We need a large proportion of readiness to do the

job that is in front of us, the capacity to face unadorned facts; and less talk based on romanticism and abstract theory. If we apply those qualities in full measure, the experience and achievements of all the men who have died before our day and the work of the men who are striving in the present can be put to their fullest use.

A belief of individuals in their own abilities and their own responsibilities, and a critical appraisal of alluring theories, would counteract the trend toward trust in dictators that has left only a few republics on earth. The citizens of the regimented nations should have realized before they submitted to the loss of their freedom that the solution of economic maladjustment cannot come from magic governmental formulas.

In the great republics like ours the characteristics that make for real advances remain unfettered. They still have a free press, scientific research that is free from racial prejudice or political hindrance, and greater freedom in business opportunity than exists in other parts of the world. Our own nation has set an example in developing radio, the most modern means of mass information, as an independent enterprise, thus far unmenaced by government ownership. The greatest hope of future conquests in the region beyond the present frontiers of general knowledge, science, and technology seems to me to exist in the remaining democracies.

To lead the march beyond existing environmental boundaries, the citizens of these countries must hold to the virtues that have formed the background of previous ad-

vances. We cannot disavow the lessons of the past while we look toward the future, a tendency never yet successful. Men have given their lives for the liberty represented in the various republics. Men have lived their lives—and sometimes sacrificed them—in bringing us from the perilous existence of the jungle prowler, looking merely for food and shelter, to our present wider outlook and greater safety and comfort.

Paths ahead will be opened by men unwilling to barter the possibilities of days to come for the false promise of present security held out by totalitarian states, whose restless dream is based upon the denial of all conclusions of their predecessors.

History along environmental frontiers will continue to be made by those with enough sense of reality to reject a ringing catchword, and enough sense of humor to laugh at it, while they hold a threatened strategic line or advance to a new one.

The heroes of the push beyond existing boundaries of environment and thought will not be led into the illusions that come with thinking of themselves as heroes of an impossible, mythical "new dawn." Backing up their occasional flashes of vision of the romance and ultimate purpose of their work will be a willingness and preparedness to meet situations as they rise. They will be men of stamina with their feet on the ground—the type that has met the test in all ages on all battle lines, symbolic as well as physical.

CHARACTERISTICS OF FOREIGN AA AUTOMATIC CANNON

	CALIBER GROUPS							
	13-15-mm.		20-25-mm.			37-40-mm.		
	Vickers	Hotchkiss	Madsen	Bofors	Solothurn	Schneider	Vickers	Bofors
Caliber	12.7	13.2	20.1	25	37	37	40	40 mm.
Initial velocity	910	800	885	900	840	900	750	900 m/s.
Projectile weight	44.7	52	112	250	625	800	900	955 g.
Effective range	1,500	1,500	2,500	2,500	3,200	4,300	4,300	4,700 m.
Maximum rate of fire	400	400	360	180	150	180	200	120 per/min.
Practical rate of fire	200	200	250	160	110	120	120	100 per/min.
Weight in firing position	283	200	480	1,020	1,700	1,200	1,632	2,000 kg.
Weight in travelling position	350	250	700	1,020	2,400	1,675	1,962	2,000 kg.

ARMORED FORCES

By

*Major General Heinz Guderian, German Army**

* Cooperation Between Armored Forces and Other Arms *

INFANTRY

In the matter of cooperation between mechanized forces and other arms there exist two directly opposing views. The advocates of one contend that the infantry is the principal arm, and that all others merely exist to serve it. They believe that the tank must move no faster than the foot soldier. In a sense it should constitute a moving shield for the infantryman who is unable to attack in the face of hostile machine-gun fire without this protection. The inherent speed of the tank is not to be exploited. For the sake of the infantry, the adherents of this conception are willing to accept the considerable tank losses which these tactics make inevitable. They take little account of the strategic potentialities of a speedy armored force. The protagonists of the other school look far in the future. They are not much inclined to cooperation with other arms. They prefer to combine the armored forces in purely mechanized units and use them primarily against the enemy's flanks and rear, or on large-scale raids that reach far into hostile territory. By taking the defense by surprise they would overcome road obstructions, difficulties of the terrain, and fortifications. They expect this method of employing the mechanized arm to decide the war.

In point of fact, various unresolved technical difficulties handicap this adventurous conception to such an extent that, for the time being, it is better to compromise between these two schools of thought. Therefore, we seek a solution that will permit the mechanized force to support the other arms, and at the same time take full advantage of its strategic and tactical potentialities. Above all, we must be careful not to hamper the development of the mechanized arm by adopting a rigid and inflexible organization or by saddling it with obsolete tactical conceptions.

Cooperation is necessary for, like any other arm, the tank is incapable of solving all combat problems by itself. This necessity for cooperation imposes certain obligations both upon the armored forces and the other arms. These obligations are especially binding upon the arms which

are suited for habitual cooperation with tanks. On this point the German training regulations state:

The commander must synchronize tank operations and their support by the other arms. Within the tank zone of attack the action of the other arms depends upon that of the tanks.

The British regulations say, in substance:

The conception that armored cars must always operate in close liaison with cavalry or infantry is obsolete; armored cars are weapons of opportunity. They can exploit their inherent strength best at the time and place and with the combat methods that best suit their characteristics.

The British point out that the direction of an attack is selected with regard to its tactical results, regard-

less of whether or not it runs parallel to that of the infantry. The German regulations say much the same thing in a different way:

The ground is of decisive importance [for the direction of the attack]. Close contact with the infantry will deprive the tanks of their advantage in speed and possibly sacrifice them to the hostile defense.

Of late there has been a return to the conceptions that prevailed during and shortly after the World War. In Great Britain, the maneuvers of 1935 were marked by close teamwork between tanks and infantry. The tank brigade was divided and a tank battalion attached to each infantry division, despite the fact that the British tank is not ideal for joint action with infantry. The British vehicles, on the whole, are too speedy and too large, and their armor is too weak for this purpose. Tank units larger than the battalion were not used. Because of this division of strength, the effect of the tank was negligible. Nor did the motorized infantry brigade play a decisive part in these maneuvers, for it operated in close contact with the foot troops.

The British explain this return to World War tactics by claiming that the introduction of a heavily armored, low-speed accompanying tank would materially reduce the disadvantages cited and permit close cooperation with the infantry. However, in order to be proof against the

▶ *Tanks cannot take over the Infantry's role in combat*

*Translated from the German by Fred W. Merten.

minimum caliber (25-mm.) antitank gun, armor must exceed a thickness of 30 mm. The weight of such armor would require a much bigger power plant, hence a much larger tank. And the cost of producing such tanks in large numbers would be tremendous. Yet only a large number could effectively support infantry.

But even disregarding the cost, there are important strategic and tactical objections to the organization of separate low-speed tank units for the infantry. The tank units that are designed for strategic purposes may also be used tactically, either as entire units or divided. On the other hand, it would be impracticable to combine the division tank battalions for strategic employment. Aside from the fact that their equipment is not suitable for missions of this kind, the combined force would lack the requisite headquarters and could not produce them at will. The greater the speed of an arm on the march and in combat, the more important that it and its commanders be trained in units that are organized in peace the same as they would be in war. In this respect, we have a valuable lesson in the misfortunes suffered by the German cavalry in 1914 as a result of untrained staffs, poor communications, inadequate equipment, and faulty march technique on the part of large units: all of this can be attributed to its pre-war organization. With the exception of the Guard Cavalry Division, the cavalry was parceled out to the infantry divisions by brigades—a peacetime practice that had an unfavorable influence on the early operations of the large cavalry units. This error should not be repeated with our armored forces. Slow infantry tanks, even though their armor be reinforced, will be unable to execute their mission in infantry combat if speedier hostile tanks are encountered. The slow tanks have no chance against a similarly armed opponent of greater speed. In this connection, Major General J. F. C. Fuller says:

. . . infantry cannot under their own fire attack infantry equipped with magazine rifles and machine guns. . . . They can do so only when supported by a dense shell barrage or when led forward by tanks, in which case they are but a drag on the free movement of these machines. To give them special tanks for this purpose is merely to restrict the value of these weapons. . . . (*The Army In My Time*).

In an article published in *The Army, Navy & Air Force Gazette* of September 26, 1935, General Fuller says:

Even if the frontal attack is persisted in, and even if infantry are to continue to assault—seeing that most enemies we shall meet in the next war will possess three to four times the number of machine guns they did in 1918; will have an artillery designed and trained in antitank tactics; and will be equipped with fast-moving tanks (the most effective of anti-tank weapons)—is it sane to suppose that in this war a slow machine will be superior, even as a protective weapon to infantry, to a fast machine? It will have more machine guns to destroy and more antitank projectiles fired at it, and if attacked by fast-moving tanks it will be bunkered.

Although certain British views lean toward independent employment of tank forces, the French continue to demand closest coöperation between infantry and tanks. The latest edition of *Règlement d'Infanterie, Deuxième Partie (Combat)*, 1935, cites tank figures that are based upon

the technical development of the tank as of the final phase of the World War. For instance, light tanks are given a maximum speed of 7 km.p.h.; a combat speed of 2 km.p.h.; and an average speed on tracks of 3.5 km.p.h. In other words, the regulations treating of coöperation between infantry and tanks refer to an old equipment whose speed in combat is no greater than that of the infantry.

The French call for close teamwork between the two arms and make it a rule to subordinate the tank units to the infantry. Infantry and tanks both are assigned the same objectives. The tanks are to withdraw rather than to advance independently beyond the objectives of the infantry. As a rule, the attack of an infantry company is to be supported by a platoon of tanks, that of a battalion by a company of tanks.

The principles governing the employment of the modern French tanks have not yet been released. According to a number of statements published in the French press, the modern French tank is more heavily armored, carries more powerful guns and is a good deal faster than its World War forerunner. Discussions of the new Tank D in current publications indicate that, despite these technical improvements, the French continue to rely mainly on close coöperation between tanks, infantry, and artillery. This conception, however, is not without opponents, even in France. For instance, Colonel de Gaulle in his book *Vers l'Armée de Métier* has this to say:

The tanks, usually divided into three waves, form for attack a favorable distance to the rear. The first wave is made up of light tanks whose mission it is to establish contact with the enemy. The second or combat wave is composed of the mediums and heavies. . . . Finally, comes the reserve wave which is designed to relieve the forward waves or to exploit their gains. . . . Leaving the line of departure at a high rate of speed, the light tanks make the initial attack. Then, organized in large groups, the combat wave enters the battle. . . . The direction of attack will usually be oblique to the hostile front, so that resistance may be taken in flank. The advance must not be unduly delayed by the time-killing task of clearing the zone of attack. . . . In other words, the forward waves must merely clear a passage for themselves and then push on to their objectives as rapidly as possible. As soon as the tank attack shows results, the infantry, too, will gain ground. The infantry may advance either by cross-country vehicles or on foot. Its mission is to occupy the ground that the tanks have seized. In many cases, it may be necessary for the infantry to wipe out the final vestiges of resistance; to do this, it will have to put its accompanying guns into action.

Modern tank forces must not be developed merely with the object of using them in direct support of the slow, laborious attack of the infantry. On the contrary, there must be tests to see whether it is possible to utilize the characteristics of the tank more fully, so that its effect may be more beneficial to operations as a whole. Several countries, for instance, are conducting experiments to discover ways and means of increasing the infantry's battlefield mobility, thus enabling it to keep up with a faster tank attack. There are several methods of accomplishing this. One is to issue the soldier a lighter-weight uniform and to remove his pack. Another is to motorize those rifle units designed for permanent coöperation with

tanks. This method has already materialized in France in the form of the *dragons portées*. The *dragons portées* are largely equipped with Citroën-Kegresse cars—half-track vehicles of considerable cross-country ability. A number of these are now protected by light armor, proof against small arms.

Coöperation between tanks and infantry may be carried out in a number of ways:

(1) The tanks attack in advance of the infantry. The infantry follows, taking advantage of the neutralizing effect of the tank attack upon the hostile infantry and machine guns. The infantry supports the tanks by assaulting positions known or suspected of harboring hostile anti-tank guns. This situation will occur if the attacking force has to cross large, exposed areas in gaining its objective.

(2) The tanks attack simultaneously with the infantry. In this case, the infantry supports the attack in the same manner as above. This method is suitable if the enemy is close and the terrain favorable for the attack.

(3) The infantry attacks in advance of the tanks. In this case, the infantry must be initially supported by other arms, especially by artillery and combat engineers. This method should be used if obstacles, such as rivers or blocked roads, prevent the immediate employment of tanks, and if bridge-heads or passages must first be established.

(4) The tanks, jumping off from a different zone, attack obliquely to the direction of attack of the infantry. This method is contingent upon a suitable terrain.

In crossing the hostile zone of combat, the tanks must clear a path for the infantry by destroying recognized targets—primarily antitank guns, heavy arms and machine guns—and neutralizing suspected localities. Merely to push through the hostile combat zone with the idea of shattering the enemy's morale is not enough; the tanks must break the enemy's strength by the full use of their weapons and open a gap in the hostile defense system.

Rarely, if ever, will the tank attack completely wipe out the resistance of the hostile infantry. Individual machine guns will remain undiscovered or come to life again. Tanks can materially facilitate infantry action and, in many cases, will be indispensable in preparing the infantry attack, but they cannot take over the infantry's rôle in combat. The infantry's job lies in an immediate exploitation of the tank attack by a rapid advance. Nor does the foot soldier pause until the ground seized by the tanks is definitely cleared of the enemy.

While advancing with tanks, the infantry must maintain formations that permit it to move rapidly, and must display signs that will enable the tanks to identify it as friendly infantry, especially in twilight and fog.

ARTILLERY

Armored forces have also created new tasks for the artillery. In the World War, for example, it was practicable and advisable to cover a tank attack by an artillery

barrage, but today the high rate of speed of a tank attack prohibits this method of support.

When tank units attack as part of an army, the division artillery assists mainly by firing a preparation; in this it must put forth its utmost effort. The shorter the artillery preparation, the more effective. If enough artillery is not available in the zone of attack, and if the concentration of adequate artillery and ammunition is so conspicuous and involves so much time as to render a surprise effect doubtful, it is advisable to dispense entirely with the preparation. In event of this the artillery will be charged with guarding the tanks and firing on any targets that might endanger their attack.

As a rule, the artillery must shift its fire out of the zone of attack simultaneously with the opening of the tank assault. It may then box off the flanks of the zone of attack, shell suspected antitank positions, or engage localities unsuitable for tank attack, such as woods and steep slopes. These tasks may be carried out partly with high explosive shell and partly with smoke projectiles. While this requires great attention and expert fire control, it is facilitated by modern means of communication, especially radio.

This type of support does not reach very deep into the hostile zone of action. Furthermore, it is impossible for the artillery observation posts to keep up with the rapid development of the tank attack. And, finally, an aggressive artillery would not be content to see itself limited to such a small battle rôle. Actually it is the aim of the artillery of all armies to participate in the tank attack and, with this end in view, to motorize its components. Motorized artillery may be either motor-drawn or self-propelled. Drawn artillery has been the rule so far. Its advantage lies in the divisibility of gun and tractor; the tractor can be easily exchanged and does not have to be taken into the firing position. The question of weight is of little consequence in motor-drawn artillery.

The self-propelled mount is something new; it possesses the advantage of constant readiness for fire, combined with constant readiness to move. It gives a great radius to the individual gun and to the entire battery. It also has a certain degree of armor protection. Self-propelled artillery seems to be a desirable companion of tank units. Great Britain has employed several types of this artillery for some time, and both the United States and the U.S.S.R. are experimenting with it.

As to the tactics employed by this artillery, Colonel de Gaulle says:

The rapid development of combat will not permit artillery to carry out missions in the manner customarily established for the opening of an attack. It cannot be assigned definite zones of fire as in position warfare; nor can its firing data be prepared with mathematical accuracy. On the contrary, as soon as the hostile position is taken, the artillery fire must keep up with the rapid development of events. In other words, the artillery must tread closely upon the heels of the attacking elements not only with its guns and combat trains but with its observation and communications sections as well. Thus, the artillery itself becomes a *masse mouvante* whose components, on their own initiative, select the most favorable positions in

accordance with the needs of the situation and deliver their fire from all angles on the most fleeting of targets. When it is equipped with antitank weapons and machine guns the artillery can protect itself. It compensates for lack of established position, inability to deliver indirect fire, and the loss of uniform fire control by its mobility, direct observation and inherent independence.

In this description Colonel de Gaulle gives his idea of an ideal artillery. He calls upon it to discard habits acquired in a long war of position, with its reliable firing bases, its careful, studied survey methods and its abundance of time, in order to be capable of speedily following the tank attack.

CHEMICALS

Smoke screens are becoming more and more important as an adjunct to the tank attack. Three main forms of employment can be recognized: (1) smoke projectiles fired by artillery in position during the preparation and at the beginning of the tank attack; (2) smoke projectiles fired by self-propelled artillery accompanying the tank attack; and (3) smoke produced by the tanks themselves.

There is nothing new about the first method. It is used to blind enemy observation. So, too, screens are laid down between the advancing tanks and localities suspected of harboring enemy troops or antitank guns. This enables the tanks to approach the enemy unobserved or outflank and invest him without drawing fire. Smoke may also be used for purposes of deception.

When smoke is fired by self-propelled artillery accompanying the tanks, the fire is executed by platoons or batteries. These guns travel immediately in rear of the forward tank waves and seek to blind any antitank guns that put in their appearance. Smoke projectiles are fired by trench mortars or by guns of 105-mm. caliber or larger. In England, light, medium and "close-support" tanks are combined into companies with the object of assuring teamwork between tanks and accompanying artillery.

Originally great results were expected from the method of tanks concealing themselves by self-produced smoke. It was soon found, however, that owing to the conspicuousness of its source, the smoke tends to reveal the position or course of the tanks. The tanks travel either within the smoke, or—still worse—are clearly outlined by the screen they have just laid. Therefore, it is only under the most favorable weather conditions that this method can be used in the attack. On the other hand, it may serve to facilitate a withdrawal.

Tank crews are relatively immune to gas. This applies particularly to corrosive gases used in the contamination of an area. Protection is furnished either by the gas mask or by the over-pressure maintained in the interior of the tank. Some countries are trying to make tanks that are inherently gas-proof; others are experimenting with filters to purify the incoming air. The U.S.S.R. mentions tanks equipped with a gas-blower apparatus.

ENGINEERS

The tanks have given the combat engineer some knotty problems to solve, especially in getting them over streams,

marshes and soft ground, and in removing obstacles, particularly mines. Minor tasks of this nature may be carried out by the regimental pioneer sections, but major obstacles will usually require entire units of specially trained and specially equipped combat engineers.

Several countries, notably Great Britain and the U.S. S.R., have produced amphibious tanks that have proved highly satisfactory for crossing unfordable streams. It is to be assumed that these will be used for reconnaissance and for the establishment of bridge-heads.

Bridging material must possess a high carrying capacity because of the tremendous weights it is to support. On the other hand, bridges designed only for the accommodation of tanks do not require full decks.

Engineer units must be specially trained to recognize obstacles and schooled in ways and means of removing them. Particular emphasis should be placed on the removal of mine barriers.

Where engineers work in cooperation with tanks their jobs will ordinarily have to be accomplished in great haste and in sight of the enemy. If they are to reach their place of activity and be effective, they must be protected by tanks. Some countries, especially Great Britain, have introduced bridge-carrier tanks and mine-sweeper tanks and placed them at the disposal of engineer units designed for cooperation with tanks.

Combat engineers will find another field of activity in operations against hostile field fortifications. A tank attack on field fortifications can be successful only if the size and strength of the obstacles do not exceed the capacity of the tanks. Whatever the obstacle, both the heavy and medium tanks are capable machines. For instance, the French heavy tank can negotiate a 13-foot trench; a slope of 45°; a vertical wall of 6 feet; a stream 7 feet wide; and trees up to 3 feet in diameter. If the tanks are unable to negotiate the obstacles, the engineers must go into action. Frequently they will be employed in advance as a precautionary measure. During the World War special anchors were constructed for the removal of wire entanglements, and fascines were carried along to be used in crossing trenches. There will be frequent calls for demolitions and excavations for the purpose of overcoming obstacles or enabling stalled vehicles to move on.

All of these tasks require training which in many respects goes far beyond the former sphere of action of the engineer soldier. Therefore, cooperation between tanks and engineers will be most successful if the latter are familiar with the characteristics of the tank and possess the requisite equipment. Irrespective of this requirement, however, the entire corps of engineers must train for cooperation with tanks in offensive as well as in defensive action.

SIGNAL CORPS

The width and depth of tank units and their motorized support weapons on the march and in combat, the dust clouds raised by them, smoke, fog, and rough or covered ground, prohibit the use of visual signals in controlling

units larger than a company. The swift maneuvers over wide areas, which the tanks must execute even in combat, make it impracticable to employ the field telephone except in quiet periods and during approach marches behind the front. Therefore we find that all command tanks carry radio transmitters and even the light tanks carry radio receivers.

Signal troops designated for coöperation with tanks will therefore consist primarily of radio elements. Their task is to maintain communication from the commander of the tank unit down to the regiments and independent detachments, with adjoining troops, with the air service and, in certain cases, with the next higher commander in the rear. Abbreviated codes and special signals must be used in order to assure the speedy delivery of messages and orders. To this end, signal detachments permanently assigned to tank units must receive special equipment and training.

Maneuver being rapid and it being necessary for the commander of a tank unit to be at the head of his command, only armored signal vehicles that possess a high mobility and full cross-country ability can meet his demands.

AIR CORPS

Information is valueless unless it be delivered to the commander in time for him to act on it. This means that reconnaissance elements must be speedier than the troops following them and must possess highly effective means of communication. These two basic requirements throw into sharp relief the difficulties that beset tactical and combat reconnaissance for speedy tank forces.

Aerial reconnaissance promises the best results. As early as the World War, the British High Command permanently assigned aviation to the Royal Tank Corps with good results. Air reconnaissance personally conducted by the commander of the tank forces before going into action may be of material advantage.

The reconnaissance aviator receives his instructions before taking off; supplementary orders or changes may be transmitted by radio or pick-up. He reports either upon arrival at his landing field, or by radio or dropped messages. Of course, it must not be forgotten that the aviator cannot maintain continuous contact with the enemy, and that his ability to observe still depends on weather conditions.

To allow for the high rate of speed of the tank unit, instructions must be issued carefully before the movements begin. The reconnaissance air forces must be acquainted with the plan of attack and, if possible, with the general course to be followed by the tank unit. Above all, they must be able to distinguish between friendly and hostile tanks. Even with this information, the aviator may encounter difficulty in locating the tanks and establishing communication. He communicates by radio, by dropped messages, or by landing in the zone of action. Training should be conducted in all three methods.

Air reconnaissance must be supplemented by a fast, strong, ground reconnaissance force which relays its mes-

sages either by radio or motor vehicle. At present the demand for speed is best met by wheeled vehicles, although their cross-country performance is inferior to that of track-laying types. Of course, wheeled vehicles are more sensitive to obstacles.

Combat aviation can lend considerable support to a tank attack. As early as August 8, 1918, British airplanes effectively supported the advance of tanks by bombing and machine-gunning German batteries, reserves and troop columns. Today, owing to the great improvements in antitank defense and to the mobility of the enemy's motorized and armored reserves, the employment of air forces against ground targets becomes increasingly important. By attacking such targets as mentioned and lines of communication, known locations of troops and headquarters, air forces will render it practicable for the ground attack to speedily penetrate the hostile zone of defense. Particular pains must be taken however, to synchronize the actions of the two arms both in time and space.

The U.S.S.R. is working toward a still closer teamwork between air and ground forces, specifically the landing of infantry contingents by parachute. Landed in proper time, parachute troops may seize vital points in rear of the hostile front and then establish points of support and supply bases to assist the break-through by the tanks. Parachute troops working in coöperation with tanks may seriously damage and interfere with the hostile services of supply

ANTI-AIRCRAFT

Since tanks will quickly attract the attention of hostile aviation, an antiaircraft defense must be provided. Tanks can contribute substantially to this defense by an intelligent use of their own weapons and by skillful camouflage. Though the danger is not to be minimized, only direct or very close hits will destroy the modern tank and this is not an easy thing to do when the tank is in motion. On the other hand, an air attack that catches the tanks at rest with their crews dismounted or—worse yet—while fueling, strikes them where they are most vulnerable.

Since most of the support weapons of tanks are not armor-protected, separate antiaircraft weapons must be furnished them. This applies also to all combat trains.

SUPPLY

The supply problem is the ball-and-chain of the tank commander. The more far-reaching the plan of tank employment, the more vital and the more difficult this problem becomes. Tank units cannot fight indefinitely without drawing ammunition, rations and fuel, nor can they stay in action without medical service, repair shops, and replacements. It is of paramount importance that fuel and ammunition be supplied in proper time.

When operating as part of an army, tanks are supplied by the army; when operating independently, they require a separate service of supply and a mobile base of operations. And in this connection, it should be remembered that tank units will operate independently as soon as the

desired penetration is accomplished, and particularly, during an envelopment or investment of the hostile front.

Since a large part of the supply vehicles are unarmored, they require covering elements as soon as they enter the zone of hostile fire. Furthermore, since supply trains offer a prime target for the enemy's armored attack, the attached covering elements must have a liberal allotment of antitank weapons. On occasion it may even be necessary to withdraw armored cars or tanks from the front and assign them a protective rôle with the trains.

* * *

CONCLUSIONS

Since the mechanized arm, its supplementary weapons, and its various counter-agents are still in a state of development, no final answers can be given to the problem of coöperation between armored forces and other arms. And yet, there are certain conclusions which may be drawn from the evolution of the mechanized arm to date.

First, there are a number of fundamental elements which determine the construction, organization, training and employment of armored forces. These are:

- (1) The matériel on hand and its past performances.
- (2) The domestic facilities for the manufacture of mechanized weapons.
- (3) The maintenance and supply facilities, particularly with regard to fuel.
- (4) The effect of the weapons fired from and against tanks, as determined by experience gathered on proving grounds.
- (5) The organization of the command, as determined by maneuver experience.
- (6) The order of battle.
- (7) The nature of prospective theaters of operations.
- (8) The armament of prospective opponents.

Although the various nations follow different routes in their development of the mechanized arm, they all move in a more or less common direction. This general trend can be summarized somewhat like this:

(1) The importance of aviation is incontrovertibly established, and is admitted even by those who refuse, in general, to accept the doctrines of the Italian General Douhet. The air forces require the support of a partner on the ground who is in a position to supplement and exploit the results gained by aerial reconnaissance and combat. This partner must be speedy, aggressive, and strong.

(2) The older arms lack the penetrative power, mobility and speed to carry the attack so rapidly and deeply into the hostile front that the enemy will not have time to take counter-measures. On the one hand, the defensive power of modern firearms, and on the other, the speed with which motorized reserves may be shifted to critical points, prevent the older arms from decisively exploiting gains. If the defense has motorized reserves at its disposal the attack must also have motorized forces, and vice versa.

(3) The older arms cannot repulse the attack of strong armored forces. Even a large number of antitank guns cannot strengthen the defense enough to frustrate surprise attacks by large bodies of tanks. An attack of this kind must be met by tanks.

(4) On the other hand, the increasing effectiveness of the antitank defense calls for the utmost concentration of force on the part of the mechanized arm if decisive results are to be obtained. In order to be decisive, a tank attack must be launched on a wide front; this is to prevent the enemy from striking the spearhead of the attack in flank. The attacking forces must be organized in considerable depth in order to secure their flanks, effect a deep penetration, and roll up the flanks thus created. To be decisive, an attack must cover much wider zones than can be occupied by a brigade. In 1917, at Cambrai, three brigades, each three battalions strong, fought in a zone 6 miles wide without any organization in depth. In 1918, at Soissons, 16 battalions attacked in two waves—12 battalions in the first, 4 in the second—on a 12-mile front. In 1918, at Amiens, 14 British and French battalions (two battalions and several cavalry corps were combined in the second wave) attacked in a zone about 11 miles wide. The widths of the zones of attack employed in major operations during the last year of the World War must now be regarded as minimum in view of the defensive powers of modern armor-piercing weapons and armored forces. In the future, many times the number of tanks that fought in 1918 will take part in battle.

(5) The tank attack must be carried out with the utmost speed in order to take advantage of the surprise effect. It must drive deep into the hostile front, prevent the reserves from going into action, and convert tactical gains into strategic ones. In other words, speed is the main requirement of armored forces. As the great Frederick said, "The faster the attack, the fewer men it costs. By making your battle short, you will deprive it of the time to rob you of many men. The soldier who is led in this manner will gain confidence in you and expose himself gladly to all dangers." The swift execution of the tank attack being of decisive importance, the auxiliary weapons of tank units must be as fast as the tanks themselves. Auxiliary weapons designed for coöperation with tanks should be combined with them into permanent units comprising all modern arms. This should not be construed as meaning that the whole army must be motorized. Nevertheless, it must be emphasized that armored forces without speedy auxiliary weapons are incomplete and will not be able to realize their maximum potentialities.

(6) Even in earliest times, armies included slow infantry and more mobile units such as chariots, elephants and horsemen. The numerical relationship between the two arms varied according to the ideas of the commander, the ability of the arms, the technique of the weapons and the object of the war. In periods of indecisive position warfare, the armies had to be content with a few mobile units. As a rule, such times indicate a decadence in the art of war. Nobody desires them, but since nobody can

predict them, they cannot be provided for. Great generals have always aimed at decisive warfare which is another way of saying mobile warfare. To that end they have seen to it that the strength of their fast troops compared favorably with that of their slower ones. Alexander, at the outset of the war against Persia, commanded 32,000 foot-soldiers and 10,000 horsemen. Hannibal, at Cannæ, had 40,000 dismounted and 10,000 mounted troops; Frederick the Great, at Rossbach, went into action with 27 infantry battalions and 45 cavalry squadrons. These few figures indicate that the great leaders maintained mobile elements comprising one-fourth to one-sixth of their entire strength. Similarly, modern mobile units can be of decisive value only if their strength is in due proportion to that of the whole army.

As early as his campaign in Spain, Hannibal entrusted his gifted brother Hasdrubal with the training and command of the mass of his cavalry. At Rossbach, Frederick placed 38 of his 45 cavalry squadrons under the brilliant

General von Seydlitz. As a rule, improvisations of mobile units and their commands have proved of little value. Therefore, in the future, mobile forces should have a uniform command even in time of peace and should be formed in large units. The leaders of those forces will do well to recall the trenchant expression of Frederick the Great: "Be active and indefatigable; cast off all indolence of body and mind."

* * *

It was my intention not to stray beyond the limits of the technical possibilities of today. Yet I could not deny myself the right to study new methods of employment for new weapons. There will always be men eager to voice misgivings, but only he who dares to reach into the unknown will be successful. The man who has been active will be more leniently judged by the future.

"Until then, we, whose fate is spun without our being conscious of it, are left to our own determination and courage and are consigned to the voice of our inspiration."



THERE ARE VERY FEW good generals, because most of them see too much: either too much danger or else too much success. Usually they lack a sober recognition of the attainable. It is easy to issue orders for an "annihilation," but the question remains whether or not it is possible. Next to a will for victory, the first and natural quality a good general must possess is a sense for actualities—otherwise he is nothing but a visionary. His other qualities must be courage and an ability to accept responsibility to God and man, high and low, because a general is also responsible to those below him and not only to his War Lord.—LUDENDORFF TO VON WENNINGER.

SCHLIEFFEN

By H. A. DeWeerd

"There is required for the composition of a great commander, not only massive common sense and reasoning power, not only imagination, but also an element of legerdemain, an original and sinister touch which leaves the enemy puzzled as well as beaten."—CHURCHILL.

THE AMERICAN officer who is forced to acquire his military experience through study and maneuvers can find instruction and inspiration in the career of Count Alfred von Schlieffen. Although he rose to prominence at a time when the Prussian army marched from victory to victory, Schlieffen's experience in combat was extremely limited. He never led a company in action, never commanded a brigade or a division in war, never conducted a single campaign. Yet his position among the military great of the twentieth century is secure. Handicapped in his early years by bad eyesight and a shy, hesitant manner, he ultimately came to dominate the thought of the great German general staff. Ludendorff held Schlieffen to be "one of the greatest soldiers who ever lived." In his struggle against adversity and oblivion, *intellect and character* were his sole weapons.

Schlieffen was born in Berlin on February 28, 1833, of a Pommeranian family which had already distinguished itself in the service of Prussia. He was educated at the school for the Moravian Brethren at Niesky, at the Joachimstahl gymnasium, and the University of Berlin. Despite existing legends to the contrary, he showed few military traits in his youth; but an intense patriotism and a keen appreciation of the greatness of Prussia mark the letters of his

boyhood days. In 1844 at the age of eleven, Schlieffen and his comrades at Niesky reenacted the battle of Kulm. Glowing with pride he wrote to his mother: "Not till we Prussians arrived did we deliver the final battle." For the rest, he impressed his teachers as having a keen but lazy mind and marked talents for self-expression. He was painfully depressed by the political squabbles in Prussia from 1848 to 1850, and he abandoned the idea of a career at law for that of the army. This was done with some reluctance, for he feared that his faulty vision would hinder his chances for advancement. Once having committed himself, however, his application to military study was intense. He became a profound student of Hannibal, Frederick the Great, and Napoleon.

A term at the *Kriegsakademie* prepared him for a minor staff appointment. This caused him to be occupied with a map-making project while the Austro-Prussian armies struck down Denmark in 1864. His letters show how eagerly he followed the events of this campaign, and how he chafed at the slow and costly frontal attacks of the German allies.

The idea of deep flank attacks already dominated his mind. He saw action in 1866 at Sadowa as a member of the staff of Prince Albrecht's cavalry corps, but his activity was limited to carrying dispatches and participating in a cavalry skirmish. For a few years prior to 1870, he served as an assistant to Count Waldersee, the military attaché in Paris.

When the long-expected war with France came in 1870, Schlieffen, much to his dismay, was detailed to guard the coast at Hamburg. While



Generalfeldmarshall Graf von Schlieffen

*Common sense, reasoning power,
and a sinister touch.*

the German armies were making history at Spicheren, St. Privat-Gravelotte, and Mars-la-Tour, he fretted on the shore of the North Sea waiting for a French landing force which never came. Released late in 1870, he took part in the Loire winter campaign on the staff of Grand Duke Frederick Francis of Mecklenburg.

Here again bad luck dogged him. He happened to be present when the Grand Duke's chief of staff, General Krenski, made certain stupid decisions. Being new at his post, and naturally tactful and diffident, Schlieffen did not question the decisions of his superior. Greatly angered, Moltke immediately replaced Krenski, and although he left Schlieffen at his post, he repeatedly showed his distrust of the young officer. At the end of the war Moltke reported that Schlieffen would probably make a gallant commander in the field, but that he did not have the character and self-assurance required of a staff officer. It was typical of Moltke's greatness that he later reversed his opinion of Schlieffen. Fifteen years after this unfortunate incident he endorsed him as "fitted to occupy any post in the German army."

Shortly after the close of the war another misfortune befell Schlieffen. The death of his wife, Anna, in 1872, followed close upon his appointment to the staff of the XV Corps. His marriage to his cousin Anna Schlieffen was unquestionably a decisive event in his life. Her great confidence in his abilities had inspired him to surmount many early difficulties. In their courtship days and throughout their brief married life, she insisted that he would some day be chief of the general staff. Having felt, as he thought, the ultimate blow of fortune in her death, his career from that time on was marked by utter fearlessness and unselfish devotion to the welfare of the German army. After her death Schlieffen never wavered over a decision, never softened his words, never curried favor from anyone. His manner grew firm, his voice harsh, his touch cynical and sarcastic. He buried himself in his work, driving himself and his subordinates with a kind of dæmonic fury. For seven years, 1876-1883, he was the much-feared and respected commander of the 1st Guard Uhlan Regiment at Potsdam.

II

In 1883 Schlieffen was transferred to the 3d Section of the general staff concerned with information on France and Belgium. He found this assignment under his old colleague Waldersee highly congenial. After a term in this department, he was appointed head of the 2d Section in charge of *Aufmarsch* or mobilization plans. This gave him an opportunity to become familiar with two of the most important sections of the staff.

On a long staff ride in 1886, the elder von Moltke put Schlieffen through an exhaustive examination on all matters pertaining to the military problems of Germany. At the conclusion he reported that Schlieffen was fitted for the highest office in the army. His application and industry coupled with his wide knowledge of military affairs

made him the logical successor to Waldersee as chief of staff in 1891.

He was now at the summit of his powers. Self-possessed, aristocratic, and soldierly, he appeared to combine the qualities of a guard officer and a philosopher. No one on the staff was left in doubt about the standard of work he required. Woe to the stuffed shirt or dilettante who tried to "get by" Schlieffen with a superficial knowledge of the work at hand! Officers left his room breathless from his reprimands. "Colonel, you made the *same* mistake two years ago," he might say. He would listen to a report with half-closed eyes, playing with a paper knife. At the slightest inaccuracy, he would rasp out a correction and prove the officer wrong on the spot. The range of his precise knowledge was disconcerting. He could speak with authority on the characteristics of French mountain artillery, on the formation of a Russian infantry division, on the training of the Italian Alpine corps, or on the armament of British warships on distant stations. During the Moroccan crisis of 1905 an official from the Foreign Office was speaking before a council of German leaders on certain phases of the crisis. He mentioned the distance between two rather unimportant towns in Morocco as being 150 kilometers. Instantly, but courteously, Schlieffen corrected him. The distance was 130 kilometers. Irritated, the Foreign Office expert called for large scale maps—which only proved Schlieffen right. A matter of twenty kilometers might mean little to a diplomat, but it meant a day's march to Schlieffen with all its problems of transport and supply.

His memory was unfailing; all his lectures and critiques were delivered without a note. In oral as well as written expression he was brilliant and lucid. Those who have read the heavy-footed translation of his *Cannae* may smile at this observation, but many of his passages will stand comparison to the greatest classics in military literature. From his description of the pursuit after Leipzig, one can gain an impression of Schlieffen's powerful and figurative language. He wrote:

Even though Blücher's soldiers grew weary [of the pursuit], the horsemen on the fallow steed did not. Hunger and sickness gathered in a richer harvest than the edge of the sword would have been able to reap. Along the road, in the ditches thousands of human wrecks terminated their agonized existence.

Though many of his works are not military history in the strictest sense, Schlieffen had the makings of a great military historian. But his mind was too closely fastened upon the task of serving the German army to allow him the detachment of view required of a true military historian. All the military aspects of a situation seemed to range themselves in Schlieffen's mind automatically. Should he be listening to a report on a tactical exercise, he might interrupt with an apparently irrelevant observation about the tests of a new mortar. The astonished officer making the report could hardly surmise that the chief had leaped far beyond the immediate implications of his report and had already added a new factor to the problem.

His concentration on military matters was so great that it caused him to be regarded as mildly eccentric. Once, while traveling through East Prussia by train, his attention was called to a particularly beautiful stretch of scenery. He gazed out of the carriage window for a moment and grunted: "The hills are not adaptable for defense, and the river is of slight value as a military obstacle."

Though apparently a harsh taskmaster and a stinging critic, Schlieffen, remembering his own unfortunate experience in 1871, was always careful in condemning an officer. His criticisms were made with a nice accuracy. Now and then he atoned for his harsh words with a touch of humor. "Vexation and ill-humor," he used to say, "can scarcely be avoided in map maneuvers." Again he would assert: "For the purpose of judging others I have evolved a measuring stick from the consciousness of my own imperfections." His most common advice to young officers was: "Be more than you appear to be." He rewarded his favorites in strange ways—giving them special problems on their holidays! "Now you can give your whole attention to the matter without interruption." Kuhl relates that one Christmas Eve the old general presented him with a Christmas present in the form of a difficult strategic problem; the requirement—an operations plan. Thinking to salvage a few hours of the two-day Christmas break to himself, Kuhl worked most of the night and Christmas Day to complete his assignment. Schlieffen, much pleased with his industry, rewarded him with a second problem to solve on the following day!

During the years he was at the head of the General Staff, a corps of able officers: François, Hoffmann, Dellmensingen, Seeckt, Hindenburg, Freytag-Loringhaven, Kuhl, Wetzell, von der Goltz, and Ludendorff came under his stimulating influence.

Germany's military position in 1891 was sufficiently difficult to cause Schlieffen to regard his task as "a very heavy one." France was eager to avenge the defeat of 1870, and German blunders in diplomacy had almost driven Russia into an alliance with Germany's traditional enemy. Until 1873 the elder von Moltke had been able to contemplate an offensive against France and Russia simultaneously. But the rapid recovery of France and the construction of fortified positions in the Belfort, Epinal, Longwy, Toul, and Verdun areas, with secondary positions at Besançon, Langères, Dijon, Rheims, Lyons, and Paris, made this plan impractical. The only gap in the French fortified line was the Trouée de Charmes, a sort of colossal booby trap left intentionally open to trip up an unwary invader.

As a consequence of these developments and on account of the German-Austrian alliance, Moltke in 1879 made plans for an offensive against Russia with a defensive campaign against France. He was willing to abandon Alsace and Lorraine and looked for a decisive battle against the French in the Mainz-Frankfurt area after the enemy had been weakened by the investment of Metz and Strassburg and when their extended communications would invite a flank attack. If the French invaded Germany by way of

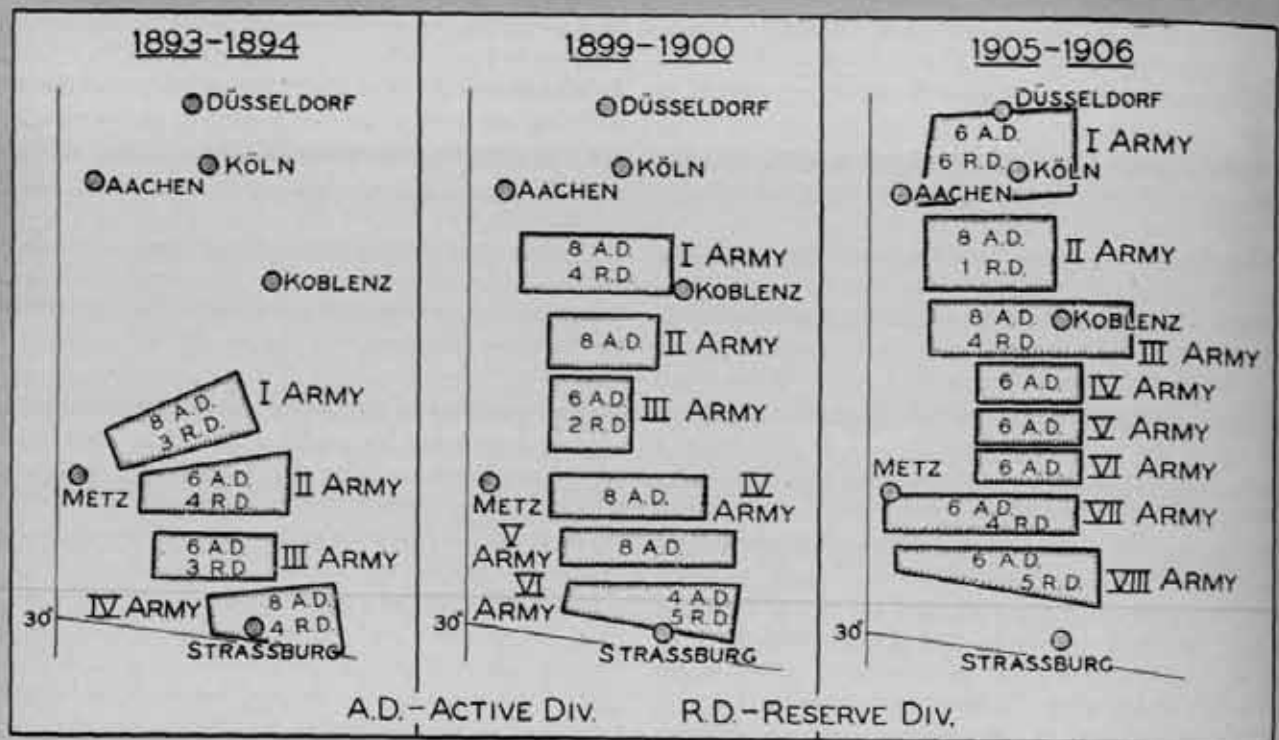
Belgium and Luxemburg, Moltke would strike northward at their flank. Waldersee, who succeeded Moltke, found little to change in these plans; but he would not venture an offensive in Russia during the wet seasons of the year. Such was the state of German military plans when Schlieffen took over the general staff in 1891.

III

In 1894 the Franco-Russian alliance made a war on two fronts a certainty for Germany. The rapid development of the military establishments in both these countries plus the limitless manpower of Russia set the problem for Schlieffen. In brief he had to fight a victorious war against superior numbers on two fronts. To be certain of his victory, he had to plan for a quick annihilating battle against one of his adversaries after the model of the classical victories, Cannae, Leuthen, or Austerlitz. After this victory he would be able to concentrate all his power against the second antagonist.

His first step was to increase the general staff from 11 to 16 departments and the personnel from 50 to 162 officers. This gave him an instrument of great flexibility and usefulness. Then he championed the introduction of heavy mobile field artillery in the German army as a counter to the French fortification measures. Although a cavalry officer, Schlieffen showed a keen appreciation of the technical and mechanical aspects of modern war. As could be expected, his heavy howitzer program met with stubborn resistance from many old-line artillery officers. The guns would be too heavy. They would lessen the mobility of units. Schlieffen asked them if they had seen the twelve pounders of Frederick the Great. They were heavier and more awkward than the projected weapons. If "Old Fritz" could move his pieces, they could handle the new guns. Once the heavy howitzer program was adopted, many of the protesting officers became enthusiasts. A vogue for heavy and heavier artillery set in. Lesser officers talked glibly of breaking through the Belfort-Epinal-Toul-Verdun *impasse*. But Schlieffen was not interested in smashing French masonry in the south; his heavy artillery program was conceived for quite a different purpose. With this armament he hoped for a rapid break-through of the less heavily fortified area in the north: Liège-Namur-Mauberge, Antwerp.

Schlieffen's plan for a decisive battle with France was evolutionary in its development. His mind ran to the solution of his problem in something like the following fashion: A campaign in Russia might, as in 1812, drag out endlessly due to the absence of decisive objectives and the immense areas involved. France—the highly prepared and aggressive enemy—must be struck down first. The great development in the size of modern armies, the rise of industrial civilization made it possible to place a great part of a nation's manpower in the field. The network of railways in Germany and France made it feasible to transport these masses to the battle area and supply them. If large masses of troops were simply thrown to the frontier in approximately equal strength by both sides, senseless



GERMAN CONCENTRATION IN THE WEST. Ersatz, Landwehr, and line of communication troops not shown.

slaughter and stalemate were the only predictable results. The sole way to gain a quick ascendancy over mass armies, thought Schlieffen, was to strike deep at their flanks, endangering their vital communications, driving them, through their very size, into confusion and destruction. These ideas were the fruits of his study of Hannibal, Frederick the Great, Napoleon.

No minor victory was sought; Schlieffen desired nothing short of the destruction of the French field armies. To attain these titanic results, immense risks had to be faced. The Russians were to be allowed almost free run in East Prussia. The French were to be deliberately baited into an offensive in Lorraine. The right wing of the German armies opposite the Dutch-Belgian frontier had to be made as strong as possible. Belgium, Holland, and Luxemburg had to be used as a passageway for the armies in the north, neutrality or no neutrality. As General Bliss said, "Schlieffen saw no hope, indeed there was no other hope but to strike the French armies in the flank." Once through Belgium the German armies, pivoting on the line Metz-Thionville, would out-flank and outnumber the French armies in the north. The enemy would be forced to fight under adverse conditions, their front reversed. In confusion they would be driven to destruction in the Juras and against the Swiss frontier. To use Schlieffen's words:

The Germans can feel assured, if they stick to their own operations, that the French will quickly turn about (from their invasion of Lorraine)—in the direction from which the greater danger threatens. It is therefore imperative that the Germans be as strong as possible on the right wing, for there the decisive battle is to be expected. The decision should fall in northern France. The *bataillon carré* on the right flank

should be so strong that the French and their Allies can be driven against the rear of their fortress front and against the frontier of Switzerland. Thus by a huge envelopment of the French and British a colossal Cannae should be prepared. Antwerp and Paris should be invested by Reserve and Ersatz corps, but the decision lies not at these fortresses, but in the surrounding of the field army.

One distinguished American soldier has described this brilliant program as a "masterpiece of divination, absolutely sound from any angle it may be approached."

It is somewhat misleading to speak of "the Schlieffen Plan"; it was in reality a military conception which was modified from time to time. There were two principal programs, that of 1905-06 and that of 1912. They were not plans in the sense that Germany had the necessary resources to carry them out at that time. Never, during Schlieffen's tenure as chief of staff did he have the troops required for the program of 1905, but he hoped they would be available before Armageddon came. One feature of both programs to which Schlieffen attached utmost importance was the despatch of six Ersatz corps in the wake of the I and II German armies. These troops were to be raised on mobilization, and their presence in the battle area would enable the armies of the right wing to devote their whole attention to the encirclement and destruction of the French field armies.

He did not expect to achieve these great results without losses, but victory would be certain if the right wing was strong enough. The accompanying chart shows the gradual increase in the number of troops allotted to the German armies in the north.¹ According to the program

¹Based on Boetticher, *Der Lehrmeister des neuzeitlichen Krieges*.

of 1905-06, the German front on the 31st day of mobilization would be Abbéville, Amiens, St. Quentin, Rethel, Diedenhofen, Saarburg. The encircling program of the northern armies from that time on is shown in Map 1.²

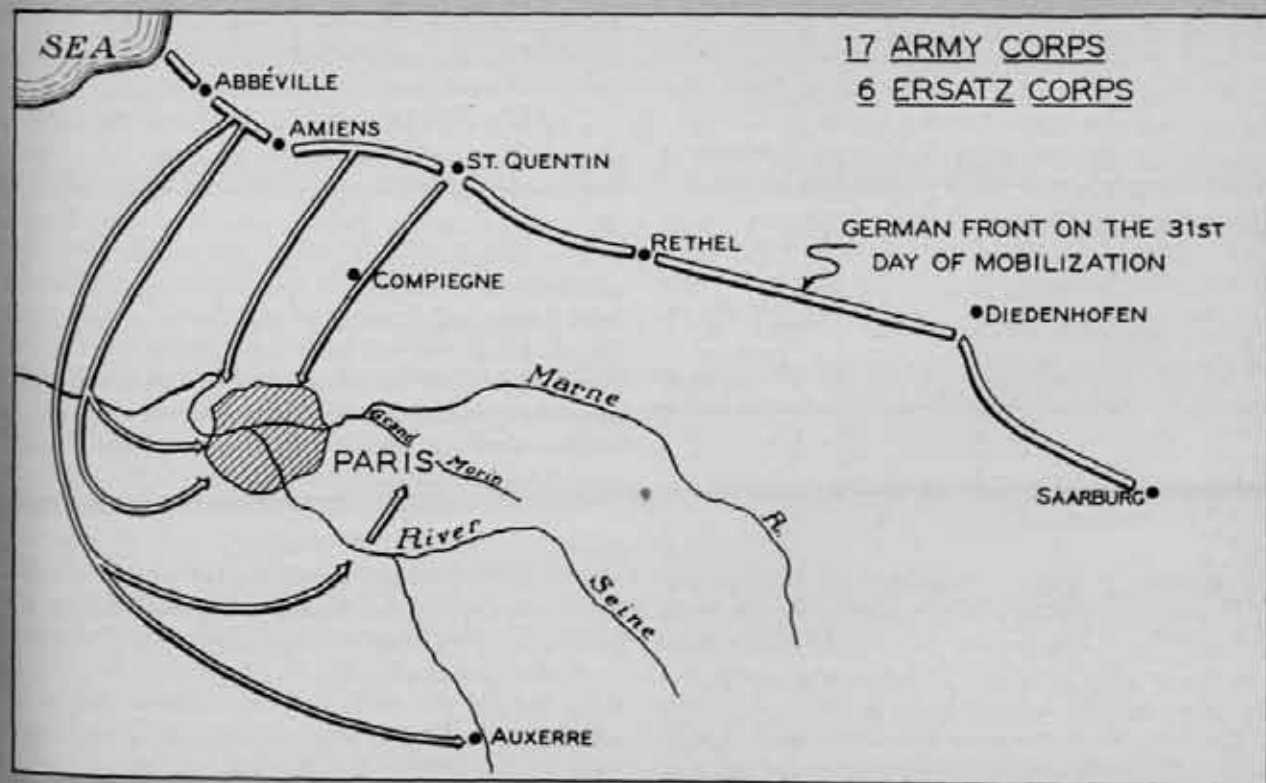
The German Reichstag commission which investigated the causes for the German collapse in 1918 shed some new light on the Schlieffen program of 1905-06. Dr. J. V. Bredt, the chairman of one of the subcommittees, shows in his *Die Belgische Neutralität und der Schlieffensehe Feldzugplan* that Schlieffen fully appreciated the political consequences of the violation of Belgian neutrality. But with a subtle approach, sadly lacking in the direction of German affairs in 1914, Schlieffen planned to mass his armies on the Dutch-Belgian border *without* a declaration of war. To this move the French could respond in only one way. They would be forced to counter by occupying the heights of the Meuse in Belgium as the only area suitable for defense. Thus France, not Germany, would actually be the first to violate Belgian neutrality. Schlieffen believed that Holland could be won over by diplomatic means. This exceedingly subtle opening gambit was never put to the test. It is known, however, that the variants of Plan XVII envisaged the possible operation of French troops in Belgium and Luxemburg, so that one may conclude it had a reasonable chance of success. Had this gigantic *ruse de guerre* been carried off, it would have ranked among the great feats of military legerdemain in history.

In 1905-06 there seemed to be little reason for doubting

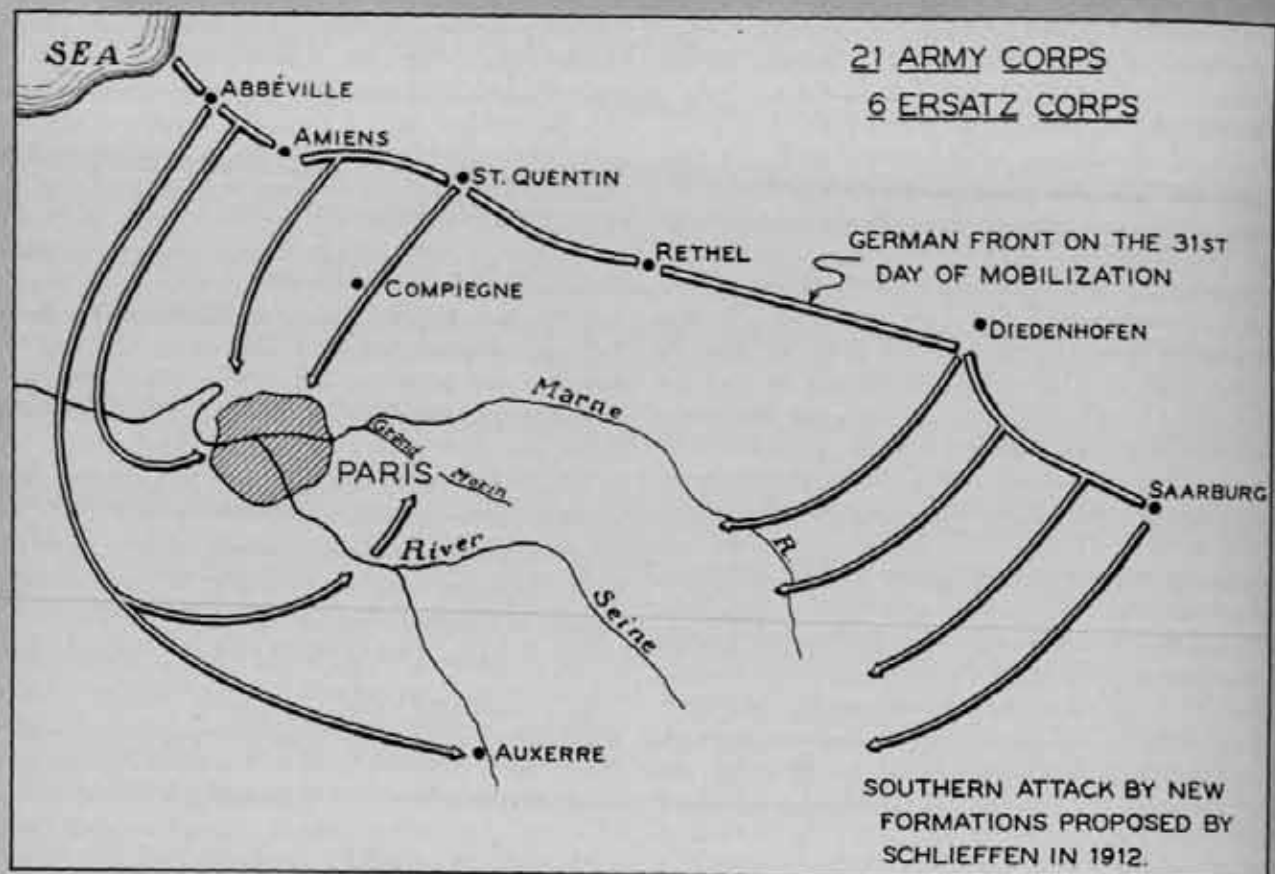
²Based on Foerster, *Graf Schlieffen und der Weltkrieg*.

the success of Schlieffen's program. The Japanese army had just punctured the legend of Russian military prowess in Manchuria. The risks of an invasion of East Prussia were sensibly lessened. The Austro-Hungarian armies could be expected to keep the Russians more or less occupied. Schlieffen respected the French armies, but he did not over-value them. In the matter of heavy artillery and tactics, he knew them to be perfectly prepared in 1905 for the war of 1870. He anticipated the intervention of England but felt that the British expeditionary force would suffer the common fate of the French armies. The British fleet was a different matter. Unlike some "dry land" soldiers, notably Foch and Joffre, who valued the British Fleet as worth "less than one bayonet," Schlieffen regarded British sea power as an extremely important factor. This was particularly true in case the war dragged out. Then German commerce would be driven from the seas, and the shortage of raw materials would slowly lower Germany's fighting efficiency. In time he came to regard Italian aid in Alsace as an illusion.

Not all German soldiers could follow Schlieffen's flight into the military stratosphere. He observed somewhat ruefully that "orthodox soldiers generally prefer an orderly, efficient, frontal attack to all other tactical operations, no matter whether the enemy or position are weak or strong." He complained that the idea of destruction which formed the basic principle of Napoleonic operations and predominated in the battles of Frederick the Great was being forgotten in the Russo-Japanese War. He warned against



MAP 1—PROGRAM OF 1905-1906. "A huge envelopment . . . a colossal Cannae."



MAP 2—THE CONCEPTION OF 1912. *Schlieffen was willing to gamble.*

following what he called the precepts of the new gods in Manchuria.

Schlieffen appears to be one of the first military thinkers to foresee the "total" war in which all the military, economic, and industrial resources of a nation would be involved. This made him all the more eager to insure the success of his great envelopment program by keeping the right wing strong. He wanted the strength ratio of the northern armies to the southern armies to be 7 to 1.

With remarkable accuracy he predicted what would happen in case a quick decision was not reached against France. He said:

Then the war will take a course in which the German forces will move to and fro (from the Western Front to the Eastern Front) pushing the enemy back here and there and again yielding to the adversary. To sum up, the war would drag on with disadvantages and growing disintegration to the German forces and with the possible intervention of other powers.

His desire for a short war was based in part upon his belief that the economic set-up of modern industrial states could not endure a long conflict. The World War demonstrated that in this particular Schlieffen was wrong, but almost every notable military leader in the world except Lord Kitchener made the same mistake in 1914. Schlieffen was willing to gamble with Germany's fate by staking his pile on an overpowering right wing, but he realistically faced the possibility of failure. If success was not

achieved in the first great effort at envelopment, Schlieffen would say to the diplomats: "Make the best peace you can at once."

IV

In 1905 at the age of seventy-two Schlieffen suffered a painful injury while riding. He recovered from this injury slowly and the Emperor began to consider his successor. In the main Schlieffen's relations with the Emperor were friendly but rather distant. He put his views of the requirements of the army before the civil government and defended them with all his power. But once their decision was made, he accepted it without further question. He tried hard in the maneuvers of 1905 to get the Kaiser interested seriously in the military problems of the Empire, but the Supreme War Lord remained incurably superficial when it came to military matters. It hurt Schlieffen to learn that the Kaiser had picked the younger Moltke to succeed him before he resigned.

After his retirement in 1906 Schlieffen tried to refrain from comment on the work of his successor, but when Moltke kept his major conception of an encirclement of the French armies and proceeded to weaken the vital right wing, the old man could no longer hold his peace. In a celebrated anonymous article in the *Deutsche Revue* in 1909 he called attention to the fatal consequences of these steps and outlined what he considered to be a sound military program for Germany. The article was so well writ-

ten and authoritative in character that it was widely believed at the time to have come from the pen of Schlieffen.³ The article produced repercussions in France and Russia as well as in Germany, but it did not change the program of Moltke.

In order to meet the new conditions arising from French military measures and the regeneration of the Russian army, Schlieffen in 1912 made his final revision of the program for destroying the French armies. He was now out of power and his unofficial "plan" is based largely on his conversations with General von Hahnke, his son-in-law. Schlieffen proposed that the encircling stroke be made with a force of no less than 21 army corps between Abbéville and St. Quentin. He also advocated an attack in the south from the area Diedenhofen-Saarburg to complete the disaster of the French. The Cannae then would be complete. To make these attacks possible Schlieffen wanted to amalgamate the regular and reserve divisions and raise the army to the strength of 51 uniform corps. This 1912 program is illustrated by Map 2.⁴

The question has often been raised as to whether or not the French military authorities were aware of the essential features of the Schlieffen program. Maurice Paléologue writing in the *Revue des Deux Mondes* for October 1, 1932, declares that the French Intelligence Service obtained a copy of the Schlieffen plan in 1904 through the treachery of a high-ranking German officer. But since the plan was not completely formulated until 1905, one must conclude that M. Paléologue (known to historians for his lack of accuracy) is merely repeating hearsay. If the French did have early knowledge of the program, they did not alter their military dispositions on that account. In 1909 Schlieffen's *Deutsche Revue* article told them all they needed to know about the program. As evidence that the article was widely read in France, it may be pointed out that there was some talk of a French Schlieffen Plan to meet the German one, but all this was forgotten in the mystic devotion to Plan XVII and to the *offensive à l'outrance*.

Some French writers, particularly General Dupont in his *Le Haut Commandement Allemand en 1914*, attempt to cover up the French miscalculation of the German forces west of the Meuse in 1914. But the report of the German order of battle handed to Joffre by the French Intelligence Service shows that this miscalculation was very real.⁵ One must conclude, therefore, that if the French actually knew about the Schlieffen program, they were so full of the offensive spirit of Colonel Grandmaison that they did not care where the German troops were.

The Russians also studied the *Deutsche Revue* article, for they held maneuvers after 1909 in which they attempted to avoid an encircling battle of the Tannenberg variety. Between 1909 and 1914, however, they must have forgotten the formula. Tannenburg was a typical Schlieffen victory; it would have delighted his soldierly

heart. To a certain extent it was prepared for in his maneuver of 1905 in which a smaller Red Army (IV Corps Hindenburg-François) defeated a larger Blue Army advancing from Leipzig in the direction of the river Saale.

Though Schlieffen had no opportunity to prove his military qualities in battle, "there abided in him an incomparable military fire." His qualities as a commander are most clearly revealed in his critiques and staff maneuvers. He was tireless in his effort to make clear the necessity for and the means of attaining an annihilating victory. As his program of encirclement developed, he stressed the inevitability, indeed, the desirability of a German withdrawal in the center and left flank so that the enemy would be deeply committed and could not escape the net. But he realized that patriotism and local interest would act against even the temporary surrender of any German territory to the enemy. Thus, in his war games of 1905, Schlieffen, who wanted the French to make a deep penetration into German territory between Metz and Strassburg, ordered the German army commander to retreat. After the French forces were irrevocably committed, he theoretically destroyed them by an attack against their flanks and rear. In 1914 Moltke was willing to let the battle develop in the hands of his generals, timidly trying from time to time, to keep them in line with directives. The reader is familiar with what actually took place.⁶

To Schlieffen it was the business of the Chief of the General Staff of the Field Armies to *command* and not to *coördinate*. He knew that a great Cannae could not be brought about by wishful thinking, that willful, self-centered army commanders under the stress of a rapidly changing battle are not likely to be controlled by the possession of a common objective. For example, on the 22d day of mobilization in the maneuvers of 1905 a gap appeared between the I and II German armies. In 1914 (August 27), Moltke was content to make suggestions, but in 1905 Schlieffen ordered the III German army to march against the rear of what appeared to be two hostile armies (in 1914 the V French Army) and saved the situation.

As for drawing any troops away from the vital right wing, he told the German commander in East Prussia not to expect the transfer of a single corps from the west until after the decision had been reached. With rare foresight he warned against premature optimism which was certain to follow the initial successes of the armies in the west. He would have been the first to condemn the "hurrah mood" which characterized German GHQ in August, 1914.

Schlieffen knew that there were few real Cannaes in the history of the world. For such an achievement "a Hannibal was needed on one side and a Terentius Varro on the other." He was particularly eager to have Germany face her great military trial with a leader of unshakable resolu-

³Les Armées françaises dans la Grande Guerre, Tome I, Vol. I, Annex, Doc. 342.

⁶See Tindall, "The Will of the Leader," COAST ARTILLERY JOURNAL, November-December, 1936, *et seq.*

⁵Now included in Schlieffen's works under the title *Der Krieg in der Gegenwart*.

sed on Foerster, *op. cit.*

tion, serenity, and iron will. "A great commander," he used to say, "must be able to endure great blows with steadfastness." "His inner fire should be lighted from the altar of the gods themselves." With a sufficient knowledge of the history and art of war, the great commander "would know how everything happened, how it was bound to happen, and how it would happen again." Sensing the fact that Germany was hazarding her future on the appointment of "a new Benedeck," his last days were rendered unhappy by the fear that the younger Moltke would not measure up to the demands of war.

On January 4, 1913, with Berlin under a blanket of snow the old soldier lay dying. In his delirium he tried to communicate with the members of his family. Once he became lucid for a moment but only delivered himself of a platitude to the effect that great issues depend on little things. Then, as the moment of release approached, he raised himself with great effort and earnestly pleaded with his son-in-law, General von Hahnke: "It must come to a fight. *Make the right wing strong!*" With this effort to foster the military warfare of the German Empire he died.

V

Since the war Schlieffen's reputation has steadily grown. On February 28, 1928, Germany held a national festival—*Schlieffen Tag*—in honor of the great soldier. At that time General von Seeckt held him up as the model and inspiration of the new German army. Today, he is commonly referred to in Germany as "greater than the elder Moltke."

And yet after all is said Schlieffen did not fight his decisive battle with the French. What would have happened in the event remains now and must always remain in the realm of theory. His reputation rests exclusively on his magnificent peacetime achievements. The greatest of these was the plan he bequeathed his country and the Cantae indoctrination that accompanied that plan.

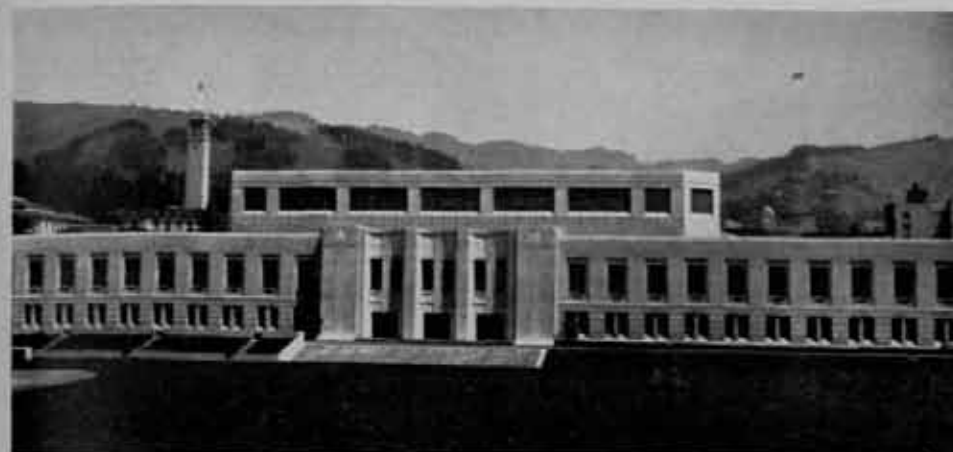
In the hands of Moltke the great plan fell to pieces; not of itself but through a progressive emasculation. Only on the Eastern Front, at Tannenburg and at Lodz, was the Schlieffen concept brought to full flower. Today these two battles are described as "the best conceived operations of the whole war."

Once the trench line closed its paralyzing grip on the battlefields of Europe, the inspired concepts of Schlieffen gave way to the squalor of siege war. In such a war intellect had little place. One writer has referred to it as a colossal intellectual bankruptcy:

One that doomed millions of men for four years thereafter to watch each other from burrows in the earth a few yards apart, striking to kill now and again as the opportunity offered, not in hate, but soberly, impersonally, with the sacred sense of duty which is the distinguishing badge of civilized war.

It was to avoid just such senseless butchery that Schlieffen conceived and elaborated his merciful stroke of annihilation. For by his audacity, imagination, and statesmanlike vision he has earned his place among the military great. Through sheer force of intellect, the soldier who never fought a battle stands with the immortals.





A HALF - MILLION DOLLAR building houses the ROTC unit at the University of California at Berkeley. Modern in design, it easily accommodates the 2,500 students who are enrolled in the ROTC.

ROTC INSTRUCTION AIDS

By MAJOR WILLIAM C. BRALY, C.A.C.

Several factors have served recently to focus more than usual attention on ROTC training in our schools and colleges. One of these is the Thomason Act, which provides a year's active duty for 1,000 ROTC graduates, 50 of whom receive permanent commissions. Another factor is the recent increase in Federal appropriations for the establishment of 50 additional units, and a resumption of agitation by the cranks who imagine our educational system is being ground under the iron heel of the military and would therefore abolish the ROTC.

Methods of instruction and the facilities provided vary greatly at different ROTC institutions and many are the ingenious devices that have been suggested to hold the student's interest and enable him to visualize problems in the absence of modern matériel with which to work. This article will discuss methods of instruction now in use by the ROTC at the University of California, and will describe certain equipment devised locally as aids to instruction in the Coast Artillery Unit.

ROTC units at California are very fortunate in being housed in the big half-million dollar gymnasium for men. Excellent offices, classrooms, and a fine armory are provided for a total strength of approximately 2,500 students. The artillery gun park and the small-bore rifle range are near by, and the adjacent athletic field provides an excellent drill and parade ground.

It is generally conceded that the military department of a University offers greater opportunity for active leadership training than do the academic departments. In connection with "leadership" one usually has in mind some form of group instruction at infantry drill. However, about two years ago the professor of military science and tactics at California, Colonel Elvid Hunt, Infantry, decided to carry leadership training into the classroom and there capitalize on the opportunity afforded the ROTC.

Here is how the California system works. The sophomore sections average about forty students. Each section is subdivided into five groups of about eight

students each; of whom one is designated a group leader. He keeps a roster of his group and a small blank form, à la Leavenworth, on which to report absentees. Thus no time is lost calling rolls. At the opening of the period the instructor lectures for perhaps fifteen or twenty minutes on the lesson for the day. He then assigns a related subject to each group for group discussion for which about ten minutes is allowed. During this time, members of the group go into a huddle over their subject, decide what they want said and select a spokesman to say it. When time is called, all face the front and in turn each group leader rises, announces his subject and introduces his spokesman who moves to the front of the room, faces the class and presents his discussion. He then endeavors to answer any questions bearing thereon by other members of the section.

Group leaders also distribute and collect quiz papers when required. The detail as spokesman is rotated through the group and group leaders are changed monthly. Thus, even in the classroom, large numbers of students are being trained in the proper exercise of authority and discharge of responsibilities. Moreover, they are being taught to think on their feet and to express themselves clearly and forcefully. Believe it or not, the students like it.

The Coast Artillery officers on duty at the University of California are Lieutenant Colonel M. J. O'Brien, C.A.C., Unit Commander, Major William C. Braly, C.A.C., and Captain John F. Cassidy, C.A.C.

♦ ♦ ♦

EDITOR'S NOTE: The Chief of Coast Artillery, during his recent tour of the West Coast fortifications, visited the ROTC unit at the University of California. He especially was impressed by the resourcefulness and executive enterprise displayed by the instructors and felt that the method of instruction had a good psychological appeal. It is his wish that more units employ similar advanced and effective means for training.



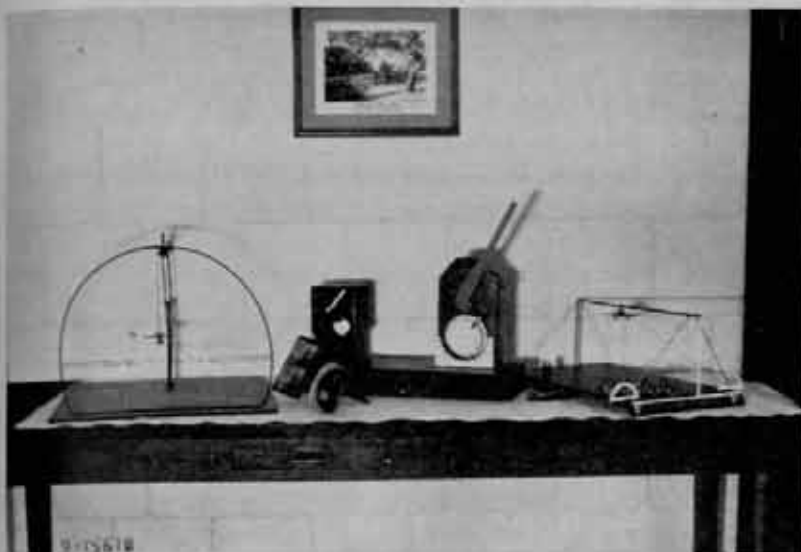
WHEN SHOWING lantern slides, a small portable projector with a 400-watt lamp is used and the room is not darkened. This avoids the drowsiness all too frequent in a darkened room.



IN ORDER to make the artillery instruction more realistic, a miniature gun was constructed. The gun combines the idea of a small boy's bean shooter with an infantry machine-gun tripod. Steel ball bearings (.400) are used for ammunition and the results obtained are surprisingly accurate. Except for the renewal of the strips of rubber tubing that constitute the propellant there is nothing to get out of order.

THE SAND TABLE is "H" shaped and is equipped with several conveniently located power outlets for plugging in the towing device. This device consists of a small sewing-machine motor which operating through speed-reducing gears, rotates a spool, thus winding up the tow-line. A rheostat controls the speed of the motor. The "aerial spotter," with the aid of a magnet, retrieves the ammunition from the sand. This equipment is used regularly by students with the standard position-finding matériel issued.





HERE IS AN ASSORTMENT of gadgets assembled after visits to the five-and-ten, the junk yard, and an attic.

The five diamond-shaped mica figures suspended on fine wires at left represent the symbols engraved on the reticules of the stereoscopic height-finder. By means of a sliding arrangement, a miniature airplane may be moved forward or to the rear to illustrate the method of establishing stereoscopic contact. The ancient stereoscope has been found useful to illustrate the principle of depth perception.

In the center of the table may be seen a representation of Case III pointing of an antiaircraft gun in elevation. This homely invention is used to clear up the mysteries of the "follow the pointer" system. As the small hand wheel on the director is turned, the sight above it changes in elevation, and the inner disc (and pointer) at the gun rotates. As the outer pointer is brought to match the inner, the gun changes in elevation.

On the right is an arrangement to illustrate the altimetric roof and the altimetric triangle that must be solved. To make the idea more real a miniature bomber, antiaircraft battery and searchlight are included. Protractors show the Φ_1 and Φ_2 angles as used on the altimeters.

ALL COAST ARTILLERY officers on ROTC duty are familiar with the difficulty of securing a suitable target for antiaircraft drill. The picture shows how this problem was met at California. The location of a large five-story building, about 100 yards in front of the gun park suggested the solution. The arrangement shown is located on one corner of the roof of this structure. The 3/16-inch cable carrying the small airplane passes around a similar sheave at the other end of the building. Starting the motor starts the airplane on its course. The whole arrangement is on rollers on a track, and a 150-pound weight suspended over a sheave from the large cable at the lower right of the photograph serves to maintain a constant tension on the airplane cable regardless of temperature or weather conditions. The antiaircraft range section and gun sections coordinate their drill on this target.



TELEVISION IN WAR ★ ★ ★



By Major Edwin C. Mead, C.A.C.

IN ADDITION TO becoming a great medium of entertainment and education, television promises to revolutionize military communication methods as we know them today. The extent and variety of television applications are limited only by the fertility of the imagination.

A device that will enable one to see objects or events normally hidden from sight holds something of major importance for the military man. Especially is this true when the promise that fog, smoke, or darkness cannot screen the eyes of television may be realized. The need for controlling wide envelopments and the far-off employment of motorized and mechanized forces lends new weight to the dictum that quickness and certainty in transmitting orders and information are paramount and tantamount to success. It is doubtful whether the communication systems now in use are equal to the task.

Television has reached the stage where it is possible to transmit anything that can be photographed either by a fixed or movie camera. It has some limitations, the greatest being the difficulty of transmission over ordinary wirelines. It is necessary to use coaxial cables and special amplifiers every 5 or 10 miles, depending upon certain technical conditions. Transmission by radio has been relegated to the ultra-high frequencies which are known to be incapable of dependable transmission much beyond the horizon as seen from the transmitting site. In spite of this and a few minor other difficulties, a great many military uses for television are possible. Before discussing these it might be well to take a quick look at television history and describe briefly the operation of a modern system.

As the name implies, the object of television is to effect a means of seeing objects or events at a distance. It also may be used to show nearby objects which cannot be seen with the aid of the telescope or field glass. The discoveries and inventions which make television what it is today were not necessarily evolved with the object of television in mind. Television has borrowed from many sciences and older types of communication systems. It can be justly stated that the following few discoveries established the principles and formed the foundation for all practical developments occurring in the field of television.

In 1817, Berzelius, a Swedish pharmacist, isolated the chemical element selenium. Not until 1873 were the peculiar photo-electrical properties of selenium discovered. At that time a transoceanic telegraph operator by the name of May noticed the variation in the values of some selenium resistors when the sun shone upon them. Only

two years elapsed after this discovery before Carv in 1875 proposed to imitate the human eye by constructing a mosaic consisting of a great number of minute selenium cells upon which a light image could be projected. This light image would create in these cells minute electric currents which in turn would operate individual shutters in front of a bank of lights, thus reproducing the light image.

The method was an elaborate one, but the idea of converting the illumination of each element into electric currents and sending each current through a separate wire was good. However, it used too many wires and was therefore not quite practicable. In order to simplify the problem, Nipkow, a German, proposed in 1884 to send the picture point by point in a definite order and put it together again in the same definite order at the receiving end—with such speed that an observer would get the impression of seeing a composite and continuous picture, exactly as in the movies of today. In other words, Nipkow scanned the picture. As for the apparatus to accomplish the task, this is roughly what he had in mind. A spiral of holes was cut in a disc, and behind the disc a light source was placed. As the disc was whirled the light would peep through each successive hole and scan a strip of the picture. Each strip would be placed directly below the succeeding one due to the spiral arrangement of the holes. In this manner the entire scene was scanned. On the other side of the disc a photo cell picked up the fluctuations of the lights and darks of each strip of the scene as scanned with light by the disc. At the receiving end the process was more or less reversed. A light source was placed behind a similar spiral-holed disc. This light was made to fluctuate in intensity in exact synchronism with the fluctuations of the photo cell at the sending end. The fluctuations when viewed through the holes of the whirling disc recomposed the scene. Of course, the disc had to be whirled in exact synchronism with the sending disc; otherwise the fluctuations of the light which were supposed to be someone's head would wind up where his shoes should be while his shoes poised gracefully at the top of the picture, or some other similar nightmare would result.

Television progress has followed this basic principle ever since Nipkow developed it. In the latest 1937 streamlined model, the same general idea applies.

The progress in television has been along the lines of making the system less awkward, more dependable, much more sensitive, and designing the whole works so that the electrical impulses can be sent by radio instead of depend-

◆ ◆ ◆ ◆ *Eyes that see in the dark* ◆ ◆ ◆ ◆

ing solely on some type of interconnecting wire from sending end to receiving end. From the time of Nipkow's heyday to about 1929, the scanning mechanical methods of television were varied and refined considerably, but seemed to have failed to produce a satisfactory number of picture elements and a sufficiently bright picture. There were also some very limiting transmission difficulties. Around 1929 the inventors began to experiment with what is called the electronic system of television. We find, then, two periods of television apparatus design. The first, the mechanical scanning era, dates from 1880 to around 1929. We are now witnessing the initial serious outcome of the turn to electronic scanning, the second era.

The operating difference between the two methods lies in the fact that in the electronic scanning system, a quite inertia-less beam of electrons (particles of electricity) takes the place of the whirl of motors, discs, drums and belts which are identified with mechanical scanning methods. Because of the comparative ease of control and higher definition possible with the electron scanners, much more satisfactory pictures are obtained. In addition to these developments on "end apparatus" (transmitters and receivers), engineers have recently made great improvements on the "in between" business of television, that is, in ultra high-frequency broadcasting technique and transmission-cable development.

Following the system of electronic scanning, the general formula for a modern television system is as follows: At the sending end to convert a light image into electrical impulses; send these electrical impulses via radio or coaxial cables to the receiving positions; at the receiving positions convert the electrical impulse back into a light image.

Details of the system as a whole apply to the three basic factors mentioned. At the sending end there is a cathode ray tube known as the Iconoscope or eye of the system and its associated scanning circuits and amplifiers. The Iconoscope takes the place of the photographic film used in an everyday movie camera. The lens of the television camera focuses the scene on to a plate in the Iconoscope tube. This plate is covered with thousands of tiny drops of silver coated with cesium, a photo-sensitive material, each drop being electrically insulated from the others. As the light of the scene strikes this plate, each of the tiny drops generates a small charge of electricity. The strength of this charge is proportionate to the strength of the light being focused upon that drop by the camera lens system. It is at this point that the electrical impulse originates because on the Iconoscope plate the scene is built up in terms of electric charges. In the neck of the Iconoscope tube a section called the electron gun directs a stream of electrons toward the plate. This stream of electrons is magnetically drawn back and forth across the plate, scanning the entire area in a series of horizontal stripes in somewhat the same manner that Nipkow's disc scanned the scenes back in 1884. As this stream of electrons passes over the proportional charges built up on the plate by the light image, the charges are neutralized. The process of neutralizing these charges produces a fluctuating current which is am-

plified many times over until it has sufficient magnitude to modulate a radio transmitter. The number of these fluctuations runs into millions per second. It would take a machine gun firing 400 rounds a minute about 10 days to fire as many shells as the number of impulses a television system has to handle in one second.

The fluctuations leave the radio transmitter and are picked up by the receiver in the form of radio waves somewhat similar to the way we use them today in the transmission of sound via radio. The fluctuations are made to regulate the rate of flow of electrons from another electron gun in the Kinescope (name of the receiving cathode tube) of the receiver. This stream of electrons is swept across the end of the Kinescope magnetically in exact step with the stream in the Iconoscope tube in the television camera. The fluorescent material which is coated on the end of the Kinescope tube is caused to glow by the electron beam striking it, and the beam's fluctuations produce light strips varying in brightness along their lengths. These varying shades of brightness in the fluorescent material reproduce the picture originally focused on the Iconoscope plate. A nine-inch tube will give a $4\frac{1}{2}$ " x $6\frac{1}{2}$ " picture.

Interesting facts about a television system in general are that a television camera is portable and can be taken to any place desired, limited by the length of cable attached, and by the portability of its associated radio transmitter. It can operate at a speed equal to that of the motion-picture camera. An interesting property of the Iconoscope is that it has a color response which enables it to be used not only for transmission of pictures in visible light, but also for pictures not visible to the eye, as in cases where illumination is either by ultra violet or infra-red rays, so that it may operate through darkness and smoke.

There are other forms of picture transmission in use at present which can be adapted for military purposes. The general name for the process of transmitting a still photograph is "facsimile process." Facsimile transmission may be termed "delayed distant sight" utilizing either wire lines or radio and suitable "end apparatus" for transmission and reception. The radio photos common at present in the newspapers are examples of this type of picture transmission. The operation usually consists of taking a photograph of the desired scene, transmitting it piecemeal as a series of electrical impulses, and reproducing this photograph at the receiving end. Thus, the operations of television, as we have seen them, differ from those of facsimile in that no preliminary photograph is necessary. Direct scenes are used in television, and at the receiving end instantaneous sight replaces photographic reconstruction.

Now what can be done with all this in a military way? The following suggestions may stimulate other thoughts on the utilization of this medium for military purposes:

TRANSMITTING AIR VIEWS OF THE TERRAIN

With the present-day development of television it is possible to install a transmitting setup in an airplane and send a regular motion picture of the terrain beneath, just as it is now done with the movie camera. When we re-

member that anything that can be photographed can be transmitted, we can count on pictures from altitudes at the limit of visibility. It will now be possible for the commanding general to sit back in his headquarters and watch how his orders are being carried out. Another advantage will be the opportunity to correctly time any secondary attacks in support of a wide envelopment.

On the defensive it should be possible to locate hostile envelopments in time to send out a flank-protecting mobile mechanized and motorized force which will be able to strike the enveloping force at some critical point, and possibly break up the attack. If this cannot be done, the flank-protecting force can operate between the enveloping force and its objective in such a manner as to prevent, or delay deployment for it will have the advantage of knowing where the hostile force is and what it is doing at all times. It seems as though television might bring back to the commander the personal visual supervision which the large modern armies have made impossible.

ARTILLERY FIRE

This offers many possibilities. With a continuous picture being sent from the air, the battery commander can make his own adjustments and observe the effect of his fire. It will be an easy matter to improvise a grid or mil scale, adjusted for the altitude of the plane, so deviations can be read directly. For fire on targets of opportunity it appears to open a new field, since it will be possible to fire on moving targets such as tanks, etc.

Another use is given by a German author in Item 47 of "Periodical Articles," of the Command and General Staff School *Quarterly Review of Military Literature* for December, 1936. The author seems to believe that the photophone (a sort of television apparatus) will in the future automatically replace the human observer. These phones (suitably camouflaged) can be established far in front of our lines, to work automatically. By sensitizing them to infra-red rays they will pierce darkness and fog, and be free from hostile interference. It does not appear that this author is too sanguine. It also seems possible that the use of the infra-red ray, if transmitted parallel to the line of sight, will enable artillery pieces or machine guns to fire accurately on targets through smoke, fog or darkness.

NEUTRALIZING THE EFFECT OF SMOKE AND DARKNESS

If it is possible to see through smoke with the aid of infra-red rays, use of television will surely stop an attacker. With his fire effect reduced, and that of the defender not impaired, the problem is solved. However, if smoke is still an obstacle, transmitters can be placed in front of the hostile smoke to cover avenues of approach at places where rifle and machine-gun fire can be laid down accurately. Fire will be aided because the ranges are determined when the enemy enters the field of view on the transmitters. Television can also be used for the gaining of information for laying down protective artillery fires, and the fire of the infantry weapons. At night infra-red ray outfits can be used to scan the front lines to discover attacks or raiding parties.

TRANSMISSION OF ORDERS

This seems to be a most important use of television. Orders can be sent by radio or wire, using the facsimile process, so that there will be almost no loss of time in distribution to all units. This should solve the problem of control of fast tanks and units on the move. In stabilized positions typewritten orders or operation maps can be sent by wire-photo in secrecy and without detection by the enemy. Moreover, there is a simple system of transmitting weather maps that can be used both by wire and radio. These methods do away with noise. When television is used the order is seen and read, and noise does not interfere.

SEA COAST DEFENSE

The location of transmitters at distant points along the shore or on islands will make possible the study of formations adopted by a hostile fleet. Television can be used in the adjustment of fire on targets beyond the horizon as in land fire. Possibly it may have an under-water use, with infra-red rays, to discover the approach of submerged submarines, or in the firing of contact submarine mines. It is not assuming too much to say that television may be used for the rapid computation of ranges to targets behind smoke screens or crossing a salvo line.

Of course the old radio-controlled torpedo plane idea is obvious. The installation of a transmitter aboard the plane will make possible the attack of vessels, because the plane can now be steered by sight. Because television operates in the dark and through fog it should do away with sub-aqueous sound-ranging systems.

ANTI-AIRCRAFT ARTILLERY

There are a number of possibilities. An excellent idea would be the use of a transmitter in the distant station with the receiver at the guns, adjusting fire as the bursts are seen by the battery commander. Transmitters placed along routes of march may be used to give warning of the approach of enemy planes. For the defense of areas at night, a study should be made of the use of the infra-red ray in conjunction with a receiver. This may be more effective than the use of searchlights. Television can be used to study approaching hostile formations from afar, thus giving the battery more time to get on the target.

This discussion has dealt, in the main, with ideas. However, the future of television lies in the practical work now being done by the engineers and staffs of the radio companies. In the case of radio, the work of the engineers was assisted by the large group of eager amateurs—the "hams"—who tinkered on homemade sets; and were of considerable help in making radio what it is today.

Television will no doubt follow the same trial-and-error process, for a recent announcement says that small parts will shortly be released for sale to the gadgeteers. The progress of television will be as swift as was radio's, as soon as the amateurs get hold of partially built sets and go to spare-time experimentation.

Would it not be well, then, for our Army laboratories to concern themselves with television? A science that offers so much to the tactician should not be neglected.

DEFENDING OUR HARBORS

By

★ ★ Colonel J. A. Green, C.A.C. ★ ★

EDITOR'S NOTE: *Each year the Chiefs of the various Arms and Services address the students at the Army War College on matters that relate to the particular activities of their respective branches. Due to the absence of the Chief of Coast Artillery, the duty this year devolved upon his Executive, Colonel Green. Colonel Green commented to some extent upon the present state of development of anti-aircraft matériel. He spoke principally, however, upon harbor defenses and gave as his reason that this subject is not taught to any extent at the Command and General Staff School. Knowledge of this subject should be valuable to student officers in their future general staff and command assignments. In order that the student body might have a sound conception of a typical harbor defense, he described the Harbor Defenses of San Francisco and outlined the types and functions of the armament, including the mine and anti-aircraft installations. His remarks dwelt principally upon the importance of harbor defenses in the nation's plans for adequate national defense. Extracts from Colonel Green's address are quoted below.*

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FREQUENTLY UNINFORMED PERSONS express the opinion that the Navy and Air Corps are capable of keeping enemy fleets from our coasts, and as a consequence, that the construction and maintenance of harbor defenses are an unnecessary extravagance on the part of the government. It probably is true that the government could provide a Navy and also an Air Corps of such a size as to constitute a powerful deterrent to an enemy having designs on our harbors, but no informed person could substantiate the claim that this would be an economical or even a safe plan to follow. If such a procedure were adopted, the political pressure for large detachments from the fleet and air forces for the immediate defense of seacoast cities would be too great to be denied, and as a consequence, even if the strategical situation justified it, the full strength of the fleet and the air force would not be available for offensive action. It is always possible too that the Navy might lose control of the sea and be forced to seek anchorage in the harbors, where it would be at a tremendous disadvantage were the enemy fleet to attack it from waters wherein it was free to

maneuver. Even assuming that the Air Corps continued to maintain control of the air at all times, many opportunities probably would be afforded the enemy to penetrate our harbors with destroyers or submarines and to do immeasurable damage. Destroyers and submarines can not do this as long as the harbor entrances are blocked by mines and nets and as long as these installations are adequately defended by gun fire.

If the fleet were to be charged with the defense of its own bases and all other coastal harbors, material additions to it would be necessary. Battleships of the *Maryland* class, laid down in 1921, cost about \$35,000,000, and cruisers of the *Minnesota* class, laid down in 1935, cost \$11,000,000. The *North Carolina*, upon which work has just been started at the New York Navy Yard, will cost \$60,000,000. The most elaborate and powerful type of seacoast battery costs about \$2,000,000, and others essential for a balanced defense cost much less. For instance, a battery of 8-inch guns capable of firing up to 33,000 yards can be built for a little less than \$500,000, and batteries admirably adapted for the defense of mine fields cost only half that amount.

If San Francisco's harbor today were completely undefended by coastal fortifications, it is estimated that a complete and adequate defense, including batteries of various calibers, mine installations, searchlights, anti-aircraft guns, fire-control installations, a communication system, docking facilities, roads, storehouses, barracks, quarters, and everything else required could be constructed for less than \$20,000,000. This figure is based on current prices for material and labor. As a matter of fact, the defensive installations at present installed in San Francisco harbor cost less than that amount. It is generally accepted by military experts that the system of harbor defenses used in the United States is comparatively inexpensive and at the same time a very effective means of preventing an enemy from sailing in and taking possession of our harbors.

In this country it always has been accepted as axiomatic that naval bases where ships can renew their fuel supplies, ammunition, and storage of all sorts, and where they can repair damage, must be self-protected. The need for defended harbors for the fleet was recognized in the first comprehensive report on the subject of seacoast fortifica-

Harbor Defenses Assure Naval Strategic Freedom

tions. The report was submitted to the Congress in 1821 and is known as the Bernard Report. It stated:

If we overlook for a moment the many points of the maritime frontier which the enemy might invade with the most serious consequences to the United States; if we suppose there exists no object on that frontier worth the trouble and expense of a great expenditure, these fortifications will even yet be highly necessary; for we still have one great object to obtain—the security of our Navy.

A more recent confirmation of the Navy's needs for defended bases was made in 1923 by Admiral Frank H. Scofield, a well informed authority on naval strategy, when delivering a lecture entitled "Navy Strategy and Tactics with Special Reference to Seacoast Fortifications." In this lecture Admiral Scofield stated:

Our sea communications extend all over the world and so do those of our possible enemies. It is obvious, therefore, that our Navy can not perform its true function by remaining at home to guard the coast. That function must be left to another arm of the national service. It is here that fortifications first lend their direct support to the Navy by freeing it of local ties, by giving it at least a limited freedom of strategic movement in those great streams of maritime commerce that flow from the Gulf of Mexico, South America, and South Africa to Europe, and from British North America to Europe, that would never be interrupted in war by the American Navy if it were a stay-at-home-coast-defense navy. It must have strategic freedom if it is to accomplish any other result than a strictly local defense. Naval strategic freedom is largely a matter of coastal fortifications at home. The Navy is keenly interested in the efficiency and adequacy of those fortifications. It knows that it can never pursue its proper rôle unless the important coastal cities and naval bases at home are defended against an attack by way of the sea.

The harbor defenses in our foreign possessions have much larger garrisons assigned to them than do those in the United States and so are in a position to put up a strong defense even though reinforcements may not be available immediately. Actually about 9,200 enlisted men of the Coast Artillery are assigned to the harbor and anti-aircraft defense of our foreign garrisons, and only 5,400 to the nineteen harbor defenses in the United States. The bulk of the Coast Artillery troops in the United States are stationed at the Harbor Defenses of Eastern Long Island, Chesapeake Bay, Pensacola, San Francisco, and Puget Sound. These defenses are sufficiently supplied with troops to provide training centers for the civilian components. Skeletonized organizations only are maintained in the other harbor defenses. All Coast Artillery troops whose primary missions are attack on naval targets are required annually to conduct a target practice with anti-aircraft matériel, in addition to the practices they conduct with the seacoast batteries to which regularly assigned. In other words, the system of training in the Coast Artillery Corps is such that practically all troops receive training in firing against aerial targets. Harbor defense troops could, therefore, if the circumstances warranted, be withdrawn from the harbor defenses, assigned to mobile anti-aircraft regiments, and be well qualified to man its armament without the necessity of further training.

The impression has always prevailed that once a battery is emplaced it will remain indefinitely up to date. This impression often has militated against the procurement of adequate appropriations for harbor defenses. Experience has proved that new weapons of warfare and new changes in ordnance have such a far reaching effect upon the adequacy of harbor defense installations that it is unsafe to assume that they will continue up to date even for two or three decades. The rifled gun, with its increased range, striking power, and accuracy of fire, sounded the death knell of the stone and brick forts that for sixty years guarded practically every harbor and navigable river on the Atlantic coast.

The fact that fortifications do not remain permanently up to date is well exemplified by the tragic consequences following the fall of Belgium's eastern fortifications in 1914. At that time the fortifications were only about twenty-five years old. They had been designed by the foremost military engineer of the day, and had been built to withstand the fire of guns larger than any which it was then thought possible to transport with a field army. However, the Germans brought forward guns of such a size that they outranged the Belgian guns and fired projectiles that the fortifications were not intended to withstand. As a result, before many days the Belgian defenses were battered out of existence.

In November, 1914, the Chief of Engineers, taking cognizance of the Belgian situation, submitted to the Chief of Staff a memorandum on the subject of "The Obsolescence of Seacoast Emplacements." He drew attention to the very large number of batteries that had been constructed since 1890, and compared their condition with that of naval vessels. At that time the *Michigan* and *South Carolina*, designed in 1905, were the oldest first line battleships. His conclusion was that we did not have a single "first line" battery on the Atlantic Coast. His report stated that for years the Navy Department had been educating public opinion and Congress to the fact that the life of a battleship is limited, that after a few years it must be relegated to the second line, after a few more years to the reserve for emergency use only, and after twenty or twenty-five years it must be classed as obsolete and fit only to be scrapped. His report then stated:

Unfortunately, the War Department has not seen fit to adopt a similar policy, but has permitted it to be understood that a seacoast battery, once constructed, remains practically indefinitely up to date.

The Chief of Engineers' report dwelt upon the deficiencies in emplacements, the fact that our seacoast guns were outranged by the naval guns, and that our smaller guns needed to be replaced by more powerful ones. He expressed the opinion

that we can not expect our seacoast fortifications shall always remain even fairly up to date unless provisions are made annually for replacing from four to six per cent of our emplacements.

Presumably to emphasize this report the Chief of Engi-

neers, in 1915, in his annual report to the Secretary of War, wrote this statement:

It can not be too emphatically stated that the art of fortification is a progressive one. It must continually grow to keep pace with the new discoveries which give it special advantages or to meet and offset progress in the development of naval vessels and armament against which the forts are expected to contend. However carefully planned and constructed, a battery must always pertain to the date when completed and must be out of date in so far as relates to things which have been discovered or developed since the battery was planned.

Since the above reports were written by the Chief of Engineers, many improvements have been made in our harbor defenses, but the number of batteries recommended by him for replacement each year has not been met. However, the carriages for 12-inch guns have been modified so as to give them an increased elevation, thus extending their ranges from 18,000 to 30,000 yards, 14-inch and 16-inch gun batteries and 16-inch howitzer batteries have been constructed, and a large amount of railway artillery built during the war is now available for augmenting the defenses. Antiaircraft protection has been provided, and the submarine mine system has been vastly improved.

Mention was made of approved plans for the Harbor Defenses of San Francisco. Plans also have been approved for the remaining eighteen harbor defenses in the United States and the harbor defenses and antiaircraft defenses of our foreign garrisons. Determination of the harbors to be defended and the degree of defense to be accorded each rests with the War Plans Division of the General Staff more than with any other army agency. The War Plans Division obtains the viewpoint of the Navy in regard thereto through the Joint Planning Committee. The detailed studies covering the caliber of armament, the locations of the batteries, the mine field and the antiaircraft installations are made by the Harbor Defense Board, a board created about seven years ago and composed of the Chiefs of Arms and Services concerned in the building, maintenance, and operations of the elements of a harbor defense. This board is assisted in its work by local boards appointed by corps area commanders within whose corps areas the harbor defenses lie, each member of the harbor defense board being represented by an officer of his arm or service on duty in the corps area. These local boards complete the details of the projects.

As a result of the extensive studies that eventually resulted in approved projects for harbor defenses, the War Department now is able to calculate accurately the funds required to bring a harbor defense to complete war preparedness. It is able too, based on the international situation, to determine the best priorities for accomplishing needed work. At the present time the unsettled conditions in the Far East make it advisable to spend most of the funds appropriated for harbor defense improvements upon the Pacific Coast, Hawaiian, and Panama defenses. For the current fiscal year \$1,600,000 has been appropriated for augmentation of Pacific Coast Defenses, \$820,000 for the Hawaiian defenses, and \$1,100,000 for the

Panama defenses. More than half of the total amount appropriated is earmarked for antiaircraft equipment and installations.

The development of the airplane has greatly increased the probability of attacks on fortifications. At the time most of our seacoast batteries were installed, the airplane was unheard of or was undeveloped; but today if proper protective measures are not taken, batteries can be neutralized or destroyed by attacks from the air. In the event of a major war in which this country may become engaged, it is most probable that our harbor defenses will be subjected to air attack. This will be almost a certainty if the Navy should lose control of the sea. The main objectives of these air attacks probably will be our long-range batteries, for which these batteries neutralized or destroyed, the enemy can come in near enough to bombard the fleet or merchant shipping that may be at anchor in the harbor and to shell important shore installations. The defensive measures against air attacks rest with such pursuit aviation as may be under the control of the coastal defense commander and with the antiaircraft equipment provided for the protection of the harbor defenses. Although antiaircraft fire has become very accurate, it is recognized that it cannot prevent all of the enemy planes in a large scale attack from reaching their objectives. The Chief of Coast Artillery recognizes this new danger to harbor defenses that results from the development of aircraft, and careful consideration now is being given to providing adequate overhead cover by means of turrets or casemates for the long-range primary batteries.

During our Civil War many attacks were made against fortifications by naval vessels, but since that time the United States has been engaged in no war that involved an attack upon its harbor defenses. As a result, there is sometimes a tendency on the part of uninformed persons to disregard their importance. Apropos of this, Colonel E. E. Winslow, Corps of Engineers, who has written several treatises on fortifications, made this statement in 1919:

If our seacoast fortifications at any harbor have been so well designed and built as to have deterred an enemy from attacking them, to have kept him out of our harbors plentifully supplied with landing and dock facilities, and to have forced him to land elsewhere under difficult conditions and where proper terminal facilities are lacking, they must be considered to have performed most efficiently the main purpose for which they were designed. Nothing more should be expected or desired of them. In fact, the seacoast fortification may be said to have most efficiently performed the function for which it was intended, if it is never called into action at all.

The statement by Colonel Winslow is strikingly applicable to the Heligoland fortifications, as pointed out by Major Bernard Smith in the July-August, 1937, issue of *THE COAST ARTILLER. JOURNAL*. Heligoland was acquired by Germany in 1890. At the time the World War opened it was heavily fortified and jetties constructed so as to form a harbor protected from the seas. German submarines used this harbor as a base during the war, and it

was reported that during a few months' time some \$150,000,000 of allied shipping was destroyed. After the Jutland Battle the German fleet withdrew behind Heligoland where it was safe from pursuit by the British fleet. The capture or destruction of Heligoland by the British forces probably would have shortened the length of the war, but it was so strongly fortified that no serious attack was made against it. Its strategic importance was indicated by the fact that the provisions of the Treaty of Versailles prescribed that it should be destroyed.

An enemy may effect a beach landing, but before a real

invasion can be started, he must have a harbor not only for the landing of heavy equipment, ammunition, and other supplies, but also as an anchorage for his fleets and transports, and a place for dry docks and repair facilities. Before he can hope to effect an invasion, he must gain control of a harbor by one means or another. Were our fleet defeated, our harbor defenses would become powerful elements in our first line of defense, and as a consequence, in time of war must be sufficiently strong and sufficiently well manned to keep the enemy fleet out on the high seas.



Toward an Ideal

By INVICTUS

The fact that the much-maligned efficiency report has remained substantially unchanged for all these years is *prima facie* evidence that no better instrument has been devised. But in spite of this the hue and cry persists; and this certainly argues with equal eloquence that something is wrong. In this brief paper I intend to show what that something is and at the same time suggest a practical, work-a-day corrective.

First, it appears desirable to clear the ground in order that my footing may be apparent to all. To this end I make two admissions. First, I concede that there are now and that there always will be a few officers who allow their prejudices to run away with them. These will submit reports in which they deliberately underrate or overrate their subordinates. Second, I agree that there still remain a few die-hards who refuse to admit that any one short of Bonaparte could meet the War Department definitions of "excellent" and "superior." Fortunately, these two groups are so small that in a broad consideration of the subject they are virtually negligible. It is my considered belief, then, that all other officers conscientiously attempt to make the efficiency report an accurate and impartial appraisal of character.

And there is precisely where the system breaks down. The War Department evidently assumes that by the time an officer is called upon to evaluate his brothers, he will be a qualified judge of character. Just how far from the truth this is, is best evidenced by the riotous and ridiculous inconsistencies that mark nearly every officer's efficiency file. Of course, in theory, every officer is a leader and it is the business of the leader to know men. But we are blind indeed if we accept this pronouncement of a theoretical ideal as an axiomatic truth.

We are members of a practical profession. We do not take kindly to theory nor do we traffic in assumptions that can not be proved out of hand. We place our faith in schools, in training, and in salutary indoctrination. Since these things are true, it is strange indeed that we are willing to rely on a species of intuition in dealing with the most difficult and most important branch of military knowledge—the human psyche.

I am aware that this statement will be contradicted. It will be pointed out that from the first day of our service we begin our study of man; not out of a book but in a laboratory of practical experience. That contention is only a half truth. The laboratory is there but the number of officers who *consciously* apply themselves to a study of the specimens it contains is amazingly few. We observe the men and the junior officers with whom we work in much the same manner that we observe a body of water. We see only the surface and the manifestations of the surface. We have no idea what lies beneath. It is because we base our character appraisals on these surface manifestations that the efficiency graphs do such an erratic dance.

Let me put it another way. How many of us deliberately set out to study the character of those who work under us? Do you, for instance, make it a matter of duty to discover the weak points and the strong points of your subordinates? Do you examine their daily conduct through a psychological microscope to determine their emotional range? Do you study their action and reaction under the stimulant of success and praise, and under the depressant of failure and rebuke? Do you interest yourself in what they read? In what they think? In what they admire? In what they fear? In what they dislike? And in the "why" of all these things? Do you consider the amount of leisure at their disposal and find out how they utilize it? Now be honest with yourself. Do you really do these things? Do you know any one who does? I'll leave the answers to you.

In any event, I think you will agree with me that only through such a searching and continuous study can we arrive at a true evaluation of our subordinates. The question then is this: Can we train those officers who are now growing up in the service and those who have already grown up to probe beneath the superficialities of character and discover the true man? I think so. Here is the method I propose.

First, let us deal with the newly commissioned officer. The responsibility for his training devolves upon the company commander under the direct supervision of the bat-

Can we train officers to probe beneath superficialities of character?

talion commander. The regimental commander is at least morally charged with the duty of seeing that his subalterns are properly trained. Henceforth, a fundamental part of that training should consist of a directed and continuous study of man and his behavior.

This is the way that study should be conducted. The new arrival must first of all be shown that the theory of leadership virtually presupposes an intimate knowledge of human nature. The fundamental necessity of this knowledge must be emphasized. The intelligent company commander will buttress his explanation by citing striking examples culled from his own experience in peace and from the experience of others in war. He must be particularly careful to underscore the point that this knowledge is not intuitive but only comes through conscious and continuous study.

Following this the captain must explain the efficiency report. He must show the young officer that in effect it is a military character sketch of one man by another. He must stress the fact that it is the controlling factor in an officer's career, and that the responsibility devolving upon the reporting officer is a grave one indeed. He must show that in order to discharge this duty equitably a profound knowledge of man is necessary.

After some such orientation as this, the new lieutenant will be told that his training in this difficult subject will start immediately. The noncommissioned officers in his platoon will be the initial subjects for study. At the end of three months he will be required to submit a complete efficiency report on each of these men. He will be warned that the company commander will require him to justify (either orally or in writing) every entry he makes on these reports, and that his own ratings in "judgment" and "intelligence" will be materially influenced by the soundness of his justifications. It must be made unmistakably clear that the mere process of filling out the reports is relatively unimportant, the big thing being the thoroughness and accuracy of his detailed observation during the three-months period as evidenced by the justifications he will be called upon to make in defense of his ratings.

This training procedure should be continuous throughout the ten years an officer is required to serve in the grade of lieutenant. By the end of that period he should be a capable judge of character. His powers of observation should be needle-sharp. The process of studying those under him should be a matter of second nature. In addition to these manifest advantages, he will have made out hundreds of efficiency reports with the knowledge that every entry had to be justified in detail and that no glittering generalities would do. Can any one successfully contend that ten years of such training will not produce a tremendous improvement in an officer's ability to justly evaluate his brothers-in-arms?

But this merely provides for the lieutenants. True enough the system if universally applied will eventually

result in an officers' corps thoroughly indoctrinated with the ideas I have tried to present. This, of course, is the goal to be sought, but in the meantime isn't there something we can do to quicken the judgment of those who already occupy the reporting grades? I believe so. I believe we need merely modify the method I have already outlined and move up a step or two in the chain of command.

This is what I suggest. Let each regimental commander assemble his battalion and company commanders and tell them that he intends to institute a training device designed to encourage a more accurate evaluation of subordinate officers. This device is in no sense to be construed as an infringement of a reporting officer's right to evaluate a subordinate according to his own judgment. It is merely intended to aid him in achieving greater accuracy. To this end battalion commanders will submit jawbone reports on their company commanders to the regimental commander; and company commanders will submit similar reports on their lieutenants to battalion commanders. These reports will be submitted about January 10th and will be held in strict confidence. As soon as they have served their purpose they will be destroyed.

In each instance, the first concurring authority will require the reporting officer to justify every entry he makes on a report. Generalities will not be accepted as satisfactory explanations. When an officer is unable to give a clear cut, logical, and factual explanation of an entry it should be pointed out to him that that entry is unfair whether it be superior or unsatisfactory for it shows a complete lack of detailed study and observation. This should be remedied before the official report is rendered, or the reporting officer will clearly show himself deficient in several items under which he himself must be graded. This is not a threat. It is a statement of fact. The officer who can give no adequate reason for an entry he makes on an efficiency report can scarcely be regarded as a man of sound judgment or satisfactory intelligence.

This device properly used should produce worthwhile results. If, however, the over-zealous convert it into a threat or seek to use it as a means whereby they, rather than the responsible officer, dictate the report, the whole purpose will be defeated. Used as a training medium and as a practical method of forcing reporting officers to study those under them as they should be studied, it will work.

I have discussed this proposition in considerable detail with one regimental commander and one battalion commander. Both have been enthusiastic over its possibilities and both have decided to put it into effect in their commands. Certainly, in justice to the individual and in justice to the service it merits a trial. That trial will undoubtedly disclose collateral benefits that I have not touched on in this paper. Thus, I commit to your hands an idea that has lived long in my mind. I trust that it will not die a-borning.

Bilibids' Guard Battalion



By Lieutenant Colonel R. T. Gibson, C.A.C.

ANY OFFICER aboard an army transport approaching the shores of the Philippine Islands who gets a radio greeting of assignment to the Guard Battalion at Fort Mills, is in for an experience that he will remember to his last pay check.

The 700 Bilibid convict charges of the 3d (Guard) Battalion, 92d Coast Artillery (PS), constitute the largest "regiment" at Fort Mills. The labor value of these civil prisoners has been recognized by all commanders since the introduction of Bilibids to Corregidor back in 1908. Their services are such that the post would find it hard to function without them.

The organization consists of Batteries "E" and "F," of the regiment, but except for a few administrative functions is an entirely separate unit. The personnel consists of 5 officers and 210 enlisted men. The men are all veterans, obtained by transfer from other units of the regiment, and are armed with Winchester repeating shotguns, of the sawed-off or riot type. The sergeants are armed with the pistol. No field equipment is issued except the cartridge belt, canteen and cup. The battalion is quartered in barracks within a hundred yards of the Corregidor Civil Prison Stockade, and has a common mess and recreation room. About 25 per cent of the men are married, and their

families live in the adjacent *Barrio Concepcion*.

The battalion does not perform any military duties that would interfere with its main mission of guarding the civil prisoners. This duty is divided between the main or stockade guard, stationed at the stockade guardhouse, and the road guard which takes the prisoners out to various jobs and stays with them during the day. Six prisoners are assigned to a sentry, with a corporal or sergeant added when gangs of 12, 18, or 24 are sent out together. An American sergeant is on special duty in the stockade as keeper, and he has 8 sergeants and 8 corporals from the Guard Battalion as assistant keepers. One sergeant is detailed as mess sergeant of the prisoners' mess, and 3 American Medical Department men are detailed to the stockade hospital.

Among the officer personnel, a field officer acts as battalion commander and executive of the Corregidor prison stockade. He is also fire marshal of his fire district, and is available for detail on temporary jobs such as boards, courts, inventories and instructor in officers' schools. A line officer acts as adjutant and stockade officer in direct control of the civil prisoners. Two officers are battery commanders, and the remaining officer is in charge of mess, police, athletics, and so on. Each line officer goes on guard every fourth

Where there
are no sitdown
strikes

day. He checks the gangs out to work at 6:25 A.M., and makes a road inspection during the day of prisoners out at work. He checks the prisoners into the stockade at 4:30 P.M., and then counts them for the night. Otherwise, he performs the normal officer-of-the-day duties. A medical officer of the post visits the stockade daily for sick call.

The number of civil convicts or Bilibids is governed by the amount of work or projects on hand. The present number is fixed at 720 and is maintained by replacements from Bilibid Prison in Manila. Representatives are present from practically all Filipino tribes, with as many different dialects. There are about 150 Moros, and some Chinese, Hindus, and other nationalities. There are no whites. The prisoners are divided into first, second and third classes, with distinguishing markings. Only the third-class prisoners wear vertical stripes. Above the classes are the trusties, and the *Bastoneros* or squad leaders. The squad leaders are the police officers while inside the stockade, and maintain discipline with the aid of a short club, usually with entirely too much enthusiasm.

The stockade is an area about a city block in size, surrounded by a double barbed-wire fence. The corners and sides are adorned with sentry towers, and the guardhouse is recessed on one side. The only exit to the stockade is through the sallyport in the guardhouse. Inside the enclosure are the cell houses, kitchen, office, laundry, bath house, supply room and utility shops. The construction, started in 1908, is of wood and galvanized iron. There is little open space other than that of the streets between the buildings and a basket ball court. Other buildings are the hospital, a combined chapel and reading room, and a boiler room. An open-air moving-picture theatre is provided in the open between two cell houses; the patrons squatting on the ground.

The prison mess is run on an allowance of two cents a day from the quartermaster, and five cents a day from Bilibid Prison. The seven-cent allowance may appear low in comparison with the American or Philippine Scout ration allowance, but a great quantity of edibles such as squash, camotes, radishes, gavy, cancong, limes and coconuts are received from the penal farms at low cost. For instance, native salt is five cents a hundred pounds.

The prisoner has only two tin bowls for utensils, and in lieu of eating implements uses his fingers. Rice is the main course, 1,000 pounds being consumed daily. Bread is served only on Sundays. Some 400 pounds of fish, 200 pounds of pork or beef and 500 pounds of vegetables are used daily. The Moros must have special food because they will starve before they will eat pork or beef.

Here is a typical daily menu:

BREAKFAST

Sardine Hash, made of sardines and camotes.

Brown Gravy, ingredients: onions, lard suet, flour, salt and tomatoes.

Coffee, with sugar and evaporated milk.

Steamed Rice.

DINNER

Pork Stew, made of pork, white squash, green papaya, onions, salt, vinegar, garlic.

Baked Fish, (for Moro prisoners).

Steamed Rice.

SUPPER

Yellow Squash Soup, ingredients: yellow squash, onions and salt.

Boiled Fish, made of fish, tomatoes, ginger root and onions.

Steamed Rice.

Iced Tea, with sugar.

The civil prisoners work eight hours in each full work day. At the noon hour they assemble at three eating places—Topside, Middleside and Bottomside—where the meal is brought to them. Each gang, or perhaps several, work under a *capataz*, who is a civilian employee or an enlisted man on special duty. The sentry, as his name implies, only guards the gang. In case of trouble, such as a fight or an attempted escape, the sentry yells "Lie down!" Any prisoner who does not hit the ground is shot, and all know this. Murderers and robbers form the largest group of criminals in the stockade. The Moro prisoners are virtually all murderers, and are the best workers. Only physically fit convicts are accepted.

The working parties are distributed as follows:

Quartermaster (all activities)	276
U. S. Engineer Department	142
Ordnance Department	60
Artillery Engineer	16
Police and Prison Officer	102
Post Library (Trusties)	3
N.C.O. Club (Trusties)	11
Post Hospital (Trusties) (sanitation)	14
Golf Course (Trusties)	17
Stockade Overhead	58
Sick (average)	9
Prisoner Pool	12

Total

720

In addition to guarding the Bilibids, the guard battalion performs military duties in so far as practicable. About twenty-five men, (the new stockade main guard), are available for training each morning; but after 4:30 P.M., when the prisoners are returned to the stockade, the whole battalion is present. This permits the battalion to get in one parade during the month, two infantry drills, a battalion inspection and a troop-leading problem. During the year, the battalion fires a service practice with 6-inch guns, and an AA machine-gun practice as a secondary assignment. Tried out at odd times are the various plans, such as the General Convict Outbreak Plan, the Escape of Civil Prisoners Plan and the Evacuation Plan. The last furnishes a spectacular demonstration in which all the convicts are rushed onto the stockade parade ground, which has first been surrounded by the guard battalion, loaded shotguns at the ready.

The civil prisoner at Corregidor is better off than one at Bilibid in Manila, for he sees more activity, and gets some variety and consideration in his work. The post gets its plumbers, electricians, painters, carpenters, cable splicers, masons, gardeners and ordinary laborers from the prisoners. The amount of construction and repair work to their credit is enormous. The difficulty of visits by relatives is the only disadvantage. The monotony that would craze a white man is the ordinary way of living for a native.

The big occasion of the year is the Christmas vacation. Then the prisoners decorate the stockade with paper lanterns, garlands and other homemade but nonetheless clever adornments. A drama lasting several nights is put on, and vaudeville acts and native dances are staged. The stage is erected just inside the enclosure fence so that the residents of the post, as well as the inmates, can see the show. The prisoner drill battalion, with wooden guns, puts on fancy parades and special drills; and the acrobats, tumblers and clowns furnish entertainment for large audiences. Christmas, Rizal Day and New Year's Day

make practically a continuous celebration with special dinners, cigars and cigarettes as added attractions.

The most unusual feature of the stockade, and one which should appeal to an economical government, is the low cost of operation; for it costs something less than a dollar a month to support one convict. This, of course, does not include the extra guard pay for the enlisted men of the guard battalion. The privates, corporals and sergeants receive three, four and five dollars extra pay per month, respectively. The civil authorities furnish the uniforms, hats and sleeping mats for the convicts. The Quartermaster allows about fifty dollars per month for upkeep of the stockade buildings, and the convicts get the salvaged raincoats, blankets, and mattresses. The living conditions are as sanitary as possible, and the sick list is usually confined to the minor injuries incurred at work. The morale of the convicts is maintained by fair treatment, good food and entertainment.

There is no cheaper labor anywhere; and there are no sit-down strikes.



PROMOTION

By Lieutenant Colonel John S. Wood

FIELD ARTILLERY

The outbreak of a war should find an army with its most capable and experienced leaders in its higher grades, ready and able to meet the tremendous demands that will be made on their mental, moral, and physical strength. A well devised peacetime promotion system must provide this reservoir for the high command and at the same time maintain the morale of the whole corps of officers by protecting the rights of individuals and by giving each one the opportunity for the career to which his merits entitle him. The two requirements are conflicting but not incompatible. The best system of promotion for any particular country and time is the one which secures the best working agreement between them.

War, of course, provides the only positive proof of the qualifications of military leaders. Success in battle, individually deserved or not, will govern here, no matter what the promotion system may be. But the important problem of providing for competent high command at the beginning of any conflict must be settled in time of peace; and it is here that the difficulties arise, for many of the most successful leaders in war have emerged from peacetime obscurity. Nevertheless, careful study of the careers of officers will indicate those who have shown the qualities requisite for high command.

Since all officers do not possess these qualities in the same degree, a system of promotion by simple seniority will not bring the best men to the top. However, seniority must operate to some extent in the interest of the individual rights of officers and their morale. In consequence, the search for a compromise between selection in the general public interest and seniority to protect individuals has always been a problem of armies.

* * *

Whatever may be the advantage or disadvantage of age in the judiciary, it has been determined rather definitely that armies require a degree of physical activity and resistance to fatigue in the higher grades that is rarely present after the age of sixty-five. At the other end of the scale the minimum limit is about twenty-one, since the requisite maturity for managing men in combat is seldom acquired before that age.

Command during an officer's service is exercised in three distinct and important stages or rank—in the company grades, in the field grades, and in the grade of general officer. The critical promotions are those from captain

to major and from colonel to general. The other grades are inserted mainly to recompense length of service by increases of rank and pay.

In the first stage an officer commands small combat units and performs minor staff duties. He is in close contact with the individual fighting man. He should possess the optimism, boldness, physical energy, and dash that go with youth. Therefore, this first period should not be prolonged for more than fifteen years.

During the second stage an officer commands the larger tactical units of a single arm and serves on the higher staffs. Professional experience, calm judgment, firm character, and physical vigor, are the essentials. This period is one of broad development and can extend over the next fifteen or twenty years of service. Beyond that, the physical factor begins to take its toll.

The third stage is for the select. It entails the command of large tactical units of all arms, and the entire army. All the professional, spiritual, physical, and intellectual qualities enumerated for the second stage are required in marked degree.

It is evident that the second stage must contain all who are to be chosen finally for the highest commands. Hence, aptitude for field rank should be carefully ascertained before officers are promoted to it. Also the ages of those promoted should provide that the best fitted may enter the third stage at vigorous maturity.

It may be concluded that only two rigid verifications of aptitude are required in order to bring the best men to the top at a suitable age. The first one should be made when an officer is in the grade of captain and the second when he attains the rank of colonel. Other promotions than those from these grades may be made by seniority alone, presuming, of course, conformity to the required standards of professional, moral, and physical fitness and the elimination of those who fall below them. Retirements in the grade of captain and colonel may be necessary to supplement the natural attrition and avoid congestion in the higher grades. Such retirements should be made after a certain number of years of service in grade rather than by age in grade.

Subject to such examinations, selection and elimination as may be desirable in the public interest, promotion should proceed as tranquilly and evenly as possible with a minimum disturbance of the individual. No group or



Our system is excellent in theory



arm should be favored over another in advancement. This is most important.

* * *

Before proceeding to an examination of promotion in our Army, it may be useful to consider the systems in use today in various armies of the world and in our other armed forces. In general, the countries with the more autocratic forms of government naturally adopt more rigorous rules for the selection and elimination of officers than do the democratic countries. Also they concern themselves less with the interests of individuals.

ENGLAND

Promotion in the British army, like many other English institutions, is characterized by its complexity and seeming lack of system. Naturally, it has aroused much discussion and many differences of opinion among British officers.

It operates by examination and seniority for all arms and services up to the grade of major and by selection above that grade. Promotion in the infantry and cavalry is within the regiment for the lower grades and from the entire arm for lieutenant colonel and above. The other arms and the services are each considered as a regiment for promotion. Officers in excess of the available number of places for employment are put on half-pay status and may be retired after a certain time.

An accelerated list is provided to push forward exceptional officers. These receive a higher brevet rank. They exercise the functions and wear the insignia of the higher grade.

At the present time with fewer voluntary retirements, promotion is retarded considerably. There are also glaring inequalities in the promotion groups of the same grade in the various arms.

FRANCE

The system here is a long standing one of continuous selection above the grade of *sous-lieutenant*, promotion by branch, and compulsory retirement. Selections for the promotion list are made each year by the regional (corps) commanders for the officers under them. The names of those nominated for promotion are forwarded to the directors of the various arms and services where the final lists are prepared. Officers passed over are retired after reaching the age limit for each grade.

Although this system brings outstanding officers to the grade of general in their early fifties, it has not escaped considerable criticism among French officers, because of the lack of any requirement for a minimum age in each grade. Particularly fortunate officers may now reach the higher grades at ages which necessitate the overslaughing and premature retirement of older officers who are equally capable, thus causing needless apprehension and discouragement throughout the army. Some attribute the *crises de commandement* in 1914 to the pre-war latitude in this regard. These cite the case of Pétain who had been passed

over and was on the verge of retirement as a colonel when the war began.

Proposals for improvement of the French system include a minimum-age-in-grade requirement, selection at two stages only (among captains for promotion to major and among colonels for promotion to general) promotion by seniority for other grades, more careful determination of aptitudes, lowering the compulsory retirement age for overslaughed captains (45) and colonels (56), and the creation of a general board to regulate and harmonize promotion among the various arms and services.

GERMANY

The Germans use a system of promotion by seniority and drastic elimination. A measure of selection is introduced by the possibility of ante-dating the commissions of exceptional officers by as much as three years. The German system is based on rigid examination and the automatic retirement of officers who are not physically or professionally fit. The possibility of modifying the promotion list at will by ante-dating certain promotions is open to criticism as being too arbitrary and allowing no recourse to the officers who have been passed over.

The rapid development of the German Army since 1934 has lowered the ages in the various grades, particularly the company officer grades. Under present conditions an officer attains his captaincy in about seven years.

ITALY

The recent Italian promotion laws, in conformity with the spirit of the Fascist regime, made bold changes in the existing system with a view to developing officers destined for high command. As a first step in rejuvenation, forty-seven additional vacancies were created in the grade of general. Two promotion lists were established; a command list of officers who appear qualified for command and destined for the highest grades, and a mobilization list for those in the grades of captain to colonel who must fulfill the many necessary and important positions in the army other than those involving command.

The grades of captain, colonel, and general are considered the three important steps in promotion. A central board is charged with determining the level at which each officer has arrived (*punto di arrivo*).

The disturbing effect of the many eliminations resulting from the new law has been ameliorated in part by liberal provisions for retirement and for reemployment in the preliminary military training of young Fascists.

JAPAN

The Japanese apply a system of rigorous elimination. In August of each year a certain number of officers are retired or discharged, as required by circumstances—a simple and effective arrangement but hardly applicable in all armies.

U.S.S.R.

In principle, promotion up to the grade of colonel is by seniority. The normal time in each lower grade is three or

four years. In the grade of colonel it is eight. In practice, however, the promotion of certain officers may be retarded for lack of the necessary attainments, and the Commissar for Defense may nominate any officer he pleases for any grade. Advancement beyond the grade of colonel is made on the recommendation of the Commissar for Defense.

At present officers of accepted professional and political qualifications are reaching the grade of colonel at 40 years of age. The possibility of favoritism and injustice in such a system is obvious.

U. S. NAVY AND MARINE CORPS

Promotion is by selection above the grade of ensign and second lieutenant, the Marine Corps conforming to the general provisions of the Navy Law. Selections are made by boards convened by the Secretary of the Navy at least once each year. The number of officers recommended for promotion to grades above lieutenant commander is generally ten per cent of the number of officers in the next higher grade. For the grades of lieutenant commander and lieutenant the number recommended equals the number of existing vacancies. Above lieutenant (junior grade) officers recommended must have had at least four years' service in their grade.

The selection is coupled with compulsory retirement. Officers who have been twice passed over by selection boards are retired on completing a certain number of years of service, namely thirty-five for captains, twenty-eight for commanders, twenty-one for lieutenant commanders, twenty-one for lieutenants (senior grade) and fourteen for lieutenants (junior grade).

The decrease in the line officer strength of the Navy, the extension of the compulsory retirement provision to the grade of lieutenant in 1934, the reduced rate of natural attrition at this time, and the difficulties of securing employment in civil life appear to be factors in the present agitation for changes in the Navy promotion law. It may be that changes are needed, but it can not be denied that the Navy system has been generally successful in bringing the best men to the top grades at active maturity—an absolute necessity in a service which should be in perfect fighting trim from the outset of any emergency.

PROMOTION IN OUR ARMY

The passage of the promotion act of 1935 was hailed by our Army with much acclaim, and justly so, for it brought help and hope in a very discouraging situation. Briefly analyzed, it relieved the congestion in the company grades by directing promotion to first lieutenant after three years' service and to captain after ten; and it accelerated promotion in the field grades by prescribing the numbers of colonels, lieutenant colonels, and majors as six, nine, and twenty-five per cent of the total number of promotion list officers. It also operated to prevent undue rapidity of advancement by prohibiting promotion to the grades of major, lieutenant colonel, and colonel prior to the completion of fifteen, twenty, and twenty-six years of service.

As amended by the 1935 act, our present Army pro-

motion system embodies a greater number of sound theoretical principles than any of the others outlined in this study. These operate as follows:

1. Promotion is made from a single list for all arms and branches.
2. Young men are provided in the grade of captain.
3. A large reservoir of field officers is maintained to provide the necessary higher command for a greatly expanded wartime army.
4. Selection by a central board for the grade of general is prescribed.
5. Provision is made for eliminating the unfit.
6. Minimum limits of service are set to prevent undue rapidity of advancement.
7. A large measure of protection of the rights of individuals is provided by adherence to the seniority rule for all grades below that of brigadier general.

It does not embody two important features:

1. Rigorous professional examination and determination of aptitude prior to promotion to the field officer stage and rigorous physical examination for promotion to the grade of general.
2. Compulsory retirement after a certain number of years' service for captains who fail to meet the above-mentioned requirements and for colonels who are not placed on the eligible list for promotion to the grade of general.

The system is working fairly well at present, but if the predictions of a recent War Department study on the dates of probable promotion can be accepted as accurate, there is trouble ahead. An examination of these dates cannot fail to be disturbing. Comparison of the average age on arrival at the grade of colonel during the last hundred years and that to be expected for the next thirty or forty years shows that we are losing ground rather than progressing in the vital problem of providing energetic and able general officers with ten or twelve years of active service before them.

The following table gives the ages of arrival at the various grades for what may be termed an optimum or most favorable career as compared with representative careers in the classes from 1829 to 1916 and the probable careers of the classes from 1921 to 1930. The World War blocks of officers and the classes immediately following are tabulated for field grades only.

AGES OF ARRIVAL AT VARIOUS GRADES

Grade	Optimum	Average 1917	
		Average (3d Quarter) 1829-1916	Average 1921-1930
Second Lieutenant	21-24	21-24	Same as optimum by law
First Lieutenant	24-27	25-29	"
Captain	31-34	29-33	"
Major	36-39	39-43	45-48 43-46
Lt. Colonel	41-44	46-49	55-58 51-54
Colonel	47-50	50-52	59-62 55-58

It will be noted that the present age of arrival at the grade of captain is the same as the optimum. The predicted age of arrival at the grade of major, however, is

seven years greater than the optimum while the predicted age of arrival at the grade of colonel is not only eight years beyond the optimum but five years above the average since 1829. The World War blocks will be nine years above this average. Obviously selection from a group of elderly colonels is not likely to provide young and active general officers. Yet it appears that for the next twenty-five or thirty years we shall have no other choice.

Steps should be taken now to bring the expected ages of the field grades closer to the optimum figure. And in order to provide a remedy the cause of the malady must be determined. In this case the main cause appears to be the same old World War block composed of those who entered the Army as officers in 1917 and 1918. For twenty years they have blocked the path of promotion and they will continue to do so for about twenty years longer. The 1935 act simply shoved the famous hump farther along and made no provision for removing it or for setting it aside.

There should be no question of removal, for these men deserve particularly well of their country and should be given every possible chance of rounding out long and honorable careers in the Service. Their presence, however, should not operate to block promotion and cause superannuation of the field and general officer grades. A solution lies in carrying as extra numbers in the field grades all officers who were not or will not be in the grade of major at the end of eighteen years' service. As extra numbers these officers will continue to advance to the limit of their possibilities without blocking the promotion of those below. For a few years the scheme would necessitate an increase in the appropriations but in due course the field grade numbers would drop back to normal. In addition special provision should be made for the promotion of officers to the field grade after a certain number of years' service. This can be done gradually over a suitable period of years (five, less if possible) until the minimum limits now set by law are reached, i. e., fifteen years for promotion to major, twenty to lieutenant colonel, and twenty-six to colonel. This procedure would promote the majority of World War officers to the grade of colonel at ages that would make possible their appointment and useful employment as general officers.

In addition to setting aside the World War block, there should be some means of augmenting the natural attrition in order to provide a proper flow of promotion without clogging the higher grades. For this, two changes appear advisable: first, a rigid examination prior to promotion to the grade of major and, second, a provision for compulsory retirement of the captains who fail to pass this examination and the colonels not on the eligible list for

general officers who have completed a certain number of years of service, say thirty-five. A safeguarding proviso for re-examination and re-selection should be included in both cases.

Properly safeguarded and applied uniformly, a rigid determination of aptitude should cause no apprehension among the capable and conscientious captains of our Army. The examination should come during the fifteenth year of service and should include a consideration of the officer's entire career by a central board of senior officers, as well as the professional tests of fitness for field grade. In this consideration, service at schools, including Leavenworth, should be given no greater weight than service elsewhere. The main qualification should be *aptitude for command*, and this cannot be evidenced by the possession of an academic degree or diploma. As a matter of fact, the term Command and General Staff School is an unfortunate misnomer and should be changed to General Staff School. It has been said that the present name was imposed by accident. It should be removed by design, since all Leavenworth does and can do is instruct officers in the staff procedure and the tactical conceptions that are in vogue at the moment. It does not and cannot produce commanders, nor can the faculty determine the fitness of an officer for command.

The General Staff Eligibility List should be discontinued, selections for staff positions being made without limitation in this regard. Naturally Staff School graduates will receive first consideration for staff work, but this should not prevent the use of other officers if desired.

Under the conditions which prevail in our Army, attendance at any of our schools, from branch schools to War College, is considerably influenced by chance. The mere fact of graduation from any of them should not have any deciding weight in either promotion or selection. A clear decision to this effect and definite understanding of it throughout the Army will remove all reason for the present apprehension and discouragement regarding promotion that disturbs many of our officers.

The existing system of promotion in the United States Army is fundamentally sound. Owing to special conditions, however, it fails to achieve one of its main purposes, the production of a sizeable pool of *relatively young* officers of wide experience and broad professional attainments ready for high command. This can be remedied by a few legislative changes which will involve only limited additional expense and little disturbance of the present procedure. Our system is excellent in theory. With little change it can be made excellent in practice. It should be made to work—now, not forty years hence.

FOR IT WAS *one man, one brain, that defeated the numbers which were believed to be invincible.*—POLYBIUS.

NEW CLAWS

1904



AS FAR BACK as the fourth century before Christ, the Chinese sage Mencius wrote, "There is no such thing as a righteous war; we can only say that some wars are better than others." And there is an equally ancient proverb which says, "Good iron is not used for nails, nor good men for soldiers." Through all the centuries of her existence, China has hammered home this doctrine that the profession of arms is attainted, that the soldier is an outcast—a paid murderer. For this curious teaching China has suffered more than any other nation in history. Wave after wave of conquest has swept over her; millions of her people have perished by the sword; incalculable wealth has been tortured out of her; poverty, famine, misery, have been her lot. Indeed, that she has endured at all is





due to her amazing fecundity rather than any instinct of national solidarity.

What, then, are we to think of the miracle of 1937? Of the Chinese colossus awakening from its age-old sleep? Of its clumsy flexing of forgotten muscles? Of its growing sense of power and of oneness? What are we to think when we compare the three pictures on this page taken in 1904 by a young American captain named Peyton C. March, with the rest of the pictures in this four-page section taken in 1937?

It may be that China is only stirring in her sleep; it may be that she is only dreaming a dream of her old greatness; or it may be that under the spell of a great leader she is driving forward to a long deferred day of glory. Who knows?

1937









Trainer For Sound Locator Listeners

By Major E. G. Cowen, C.A.C.

THE TRAINER FOR SOUND LOCATOR LISTENERS here described is designed to fill the gap in training existing between the acoustic trainer and the actual tracking of airplanes in flight.

Its construction was begun originally at Fort McClellan, Alabama, in 1933. Technical Sergeant Robert Hutton of Battery "A," 69th Coast Artillery (AA), was chosen to share in the development. Much work had been done upon a field unit when duty with the CCC interfered. The trainer was taken up again in 1936 at Fort Randolph, Canal Zone, where the model shown in the photographs was completed and put into service.

This unit was constructed by the late Sergeant Michael DeVictorinis and the communications detail of Battery "D," 1st Coast Artillery (AA). It was used first by this battery in training for its 1936 target practice.

The essential parts of the trainer are:

- Phonograph records of the sound of airplanes in flight,
- Phonograph turntable,
- Electric pickup with volume control,
- Audio amplifier,
- Magnetic loudspeaker in baffle box,
- Trolley to carry speaker,
- Wire for track, pulleys and cord.

For field training, a unit with the turntable and amplifier designed to operate from a six-volt storage battery will be found most practical, while for use in an armory or close to power mains a 110-volt A.C. outfit will be most economical to construct and operate.

In the latter case, the turntable and magnetic pickup issued with the acoustic trainer may be used. Phonograph records of the sound of various types of airplanes in flight are also furnished with the acoustic trainer.

Since moderate power only is required and tone quality is a minor consideration, the audio amplifier of an auto-

mobile radio or a discarded home radio will be entirely satisfactory.

A magnetic loudspeaker is specified to avoid the complication of having to furnish field current. A motor driven winch for towing the loudspeaker trolley is a desirable but unnecessary refinement.

It is not necessary to give full details of construction, because a man capable of designing and assembling a satisfactory instrument will be found in every training unit.

The photograph above shows the trainer in use. The trolley track is tied to the trunk of a tree at the left about twenty-five feet above the ground. It passes over the sound locators and slopes to the ground where it is anchored about forty yards away.

The loudspeaker may be seen suspended from the trolley in front of the second set of horns. A trailing length of field wire connects it to the turntable and amplifier unit in the right foreground.

The speaker is moved by the man at the left who is pulling a cord which passes over a pulley fastened to the trees at the upper end of the track. The speaker is returned to the lower end of the track by gravity.

Three sound locators are set up at different distances from the trolley wire and the listeners move from one to another frequently to vary the azimuth track. Where only one sound locator is available, it may be moved about, or the lower end of the trolley wire may be shifted to obtain the desired variation in the azimuth track.

In the photograph it may be observed also that the acoustic correctors as well as the horns are being operated exactly as they would be operated in tracking an airplane. Thus, this system affords the coordinated training of complete sound locator crews which is so necessary to assure speed and accuracy in the field.



The unit ready for operation.



The unit packed for traveling.

Since the recordings reproduce the sound of real airplanes, and the volume of sound and the rate of increase of angular elevation of the sound source are under control of the operators, the trainer can be made to imitate all features of the actual flight of an airplane with remarkable fidelity.

The training of listeners can be made progressively difficult, even to the extent of causing them to track through interference from pursuit and attack aircraft.

A method used successfully in training listeners by this system begins with careful selection, by the use of the acoustic trainer, of individuals adapted for the work. Each man chosen is then paired with an experienced listener with whom he works until he understands his duties and has demonstrated sufficient ability to warrant further training. Full crews are then organized, and team training proceeds until they are ready for field training with airplanes.

A valuable feature of the trainer is that it can be used with good results in locations entirely too noisy for tracking airplanes. The volume of sound is stepped up to overcome the local noise level and training proceeds as in quiet locations.

In the construction, there are no critical dimensions to be met and no difficult adjustments to be made. So long as the loudspeaker can start at a low elevation and pass above the horns with a few feet of clearance, the trainer will operate satisfactorily. The rate of increase in angular elevation and the intensity of sound being under complete control, the slope and length of the trolley track are immaterial.

The trainer for sound locator listeners is easily adapted to indoor training in armories and garages as well as out of doors. It will also prove useful in advanced field training to fill in the long period of inactivity between flights of the training airplane.



ZEISS MACHINE-GUN SIGHT

By Major William Sackville, C. A. C.

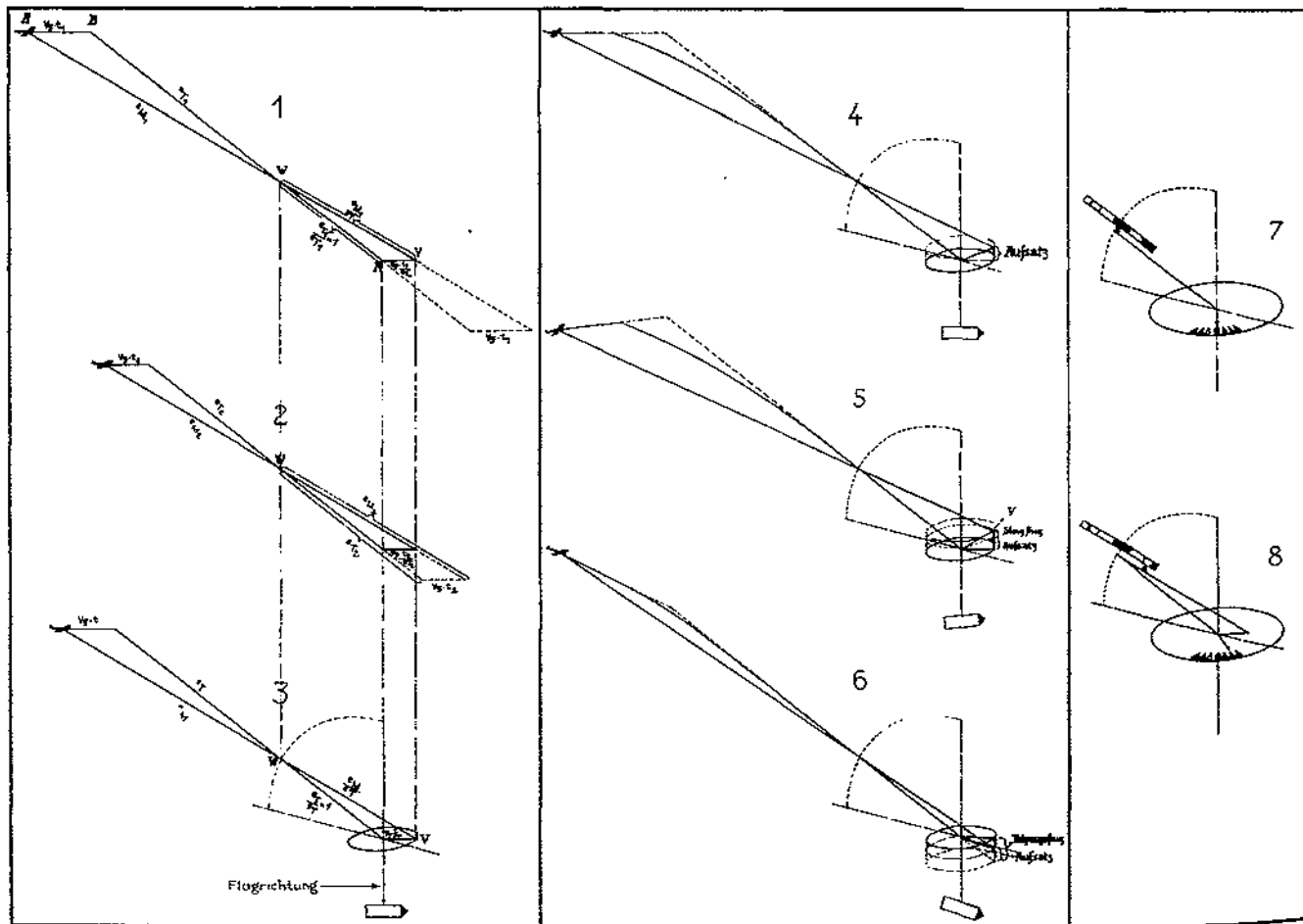
This is a combination machine-gun sight and computer to be used principally in direct pointing at aerial targets. In addition, it is suitable for direct pointing at moving and fixed terrestrial targets.

The sighting device is a reflector sight suited for both day and night firing. The illumination for the sight is produced by a flashlight bulb which is connected to its voltage source by lead, 24 Fig. 9. An illuminated collimator causes a luminous aiming mark to appear in looking through the inclined reflector plate, 7 Fig. 9. In order to better see the aiming mark when working against a bright background, a colored glass 5 is provided, which may be turned into position or out of the way by means of knob 4. A mechanical auxiliary sight, consisting of a notch 6 and a bead 3, is provided as insurance against failure of the illumination of the reflector sight. The reflector sight bears at its lower end a guide plunger 21 positioned parallel to the sighting line of the instrument. One end of the plunger is connected with movable point V of the

computing gear triangle, while the other end is constrained to move along a straight line in guide tube 1. The universal joint center of tube 1 represents point W, Fig. 1, and is raised or lowered in accordance with the quadrant elevation of the gun.

The elements of firing data which are set into the computing gear are speed, flying direction (angle of approach), flying inclination, and target range. All of these elements are susceptible of being measured and set on the spot. The angular height is transmitted to the instrument over a parallel linkage from the gun barrel, and the superelevation is automatically set on the reflector sight corresponding to the various values of angular height and range. The act of setting the firing elements on the computing gear causes the sighting line of the reflector sight to be automatically swung to give the correct deflection and superelevation to the gun barrel.

The antiaircraft computer-sight reproduces the deflection triangle (Fig. 1) marked by the gun location W



Figures 1 to 8

Translation of Terms: Flugrichtung, Flying Direction; Ausatz, Superelevation; Steigflug, Ascending Flight; Neigungsflug, Descending Flight.

and by the observed position A and the future position B of the target. The path A-B is the distance covered by the target at its velocity v_G during the time of flight of the projectile t , and therefore equals $t \times v_G \times e_M$. is the slant range to the observed position, while e_T is the, still unknown, slant range to the future position. The deflection triangle ABW is reproduced on a reduced scale of $\frac{1}{e_T}$, so that

side WM = $\frac{e_T}{e_T} = 1$ and therefore remains constant, while side WV = $\frac{e_M}{e_T}$ and side MV = $\frac{t}{e_T} \times v_G$

Side MV is logarithmically formed from $\frac{t}{e_T}$ and v_G by a computing gear. Every change in range and consequently in $\frac{t}{e_T}$ causes a corresponding change in side MV (compare figures 1 and 2). v_G is set on one of the flying speed scales 28 by knob 27 or 29, Fig. 10.

In order to obtain e_T , the range e_M to the observed position must be divided by $\frac{e_M}{e_T}$, which is automatically found in the reduced-scale deflection triangle. This factor is registered with a good approach to the truth on a series

of colored fields 26. Computation is automatically effected by setting e_M with an index of the same color as that of the particular indicated color field. Thus turn knob 20 to bring one of the colored index marks 19 opposite range scale 18. The mark to be used is indicated on corresponding colored fields 26 by index 25.

The flying direction is set by swinging side MV of the reduced scale deflection triangle, Fig. 3 until it is parallel to the horizontal projection of the flying direction. This is accomplished by turning handle 15, Fig. 9, parallel to the direction of flight.

The flying inclination, caused by climbs and drops, is set by inclining side MV until it is parallel to the vertical projection of the flying direction. This is accomplished by turning one of the two star knobs 13, Fig. 9, until flight inclination arrow 16 is parallel to the inclination of the target course. The angle is registered on scale 17.

The angular height is transmitted from the gun through a parallel linkage to guide plunger 21, Fig. 9, by the direct connection of points W and M, Fig. 1, with the barrel.

The super-elevation is automatically set by the super-elevation cam in the range knob 20. The dependence of the super-elevation upon the angular height is attained with a good degree of approximation by raising point V of the sighting line by an amount corresponding to the super-elevation required in horizontal firing and therefore dependent only upon the range.

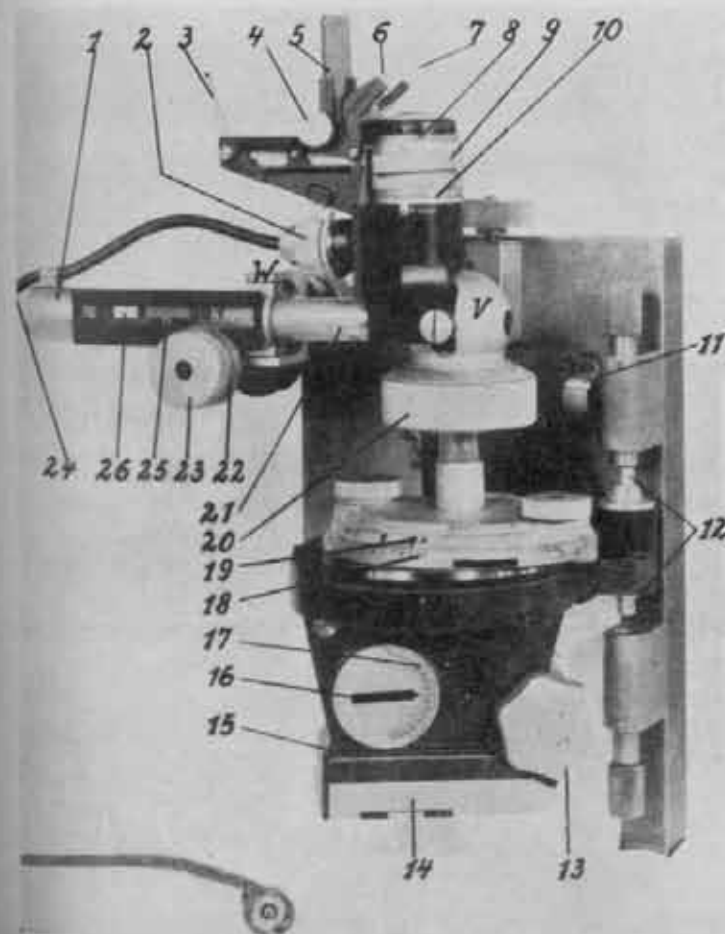


Figure 9

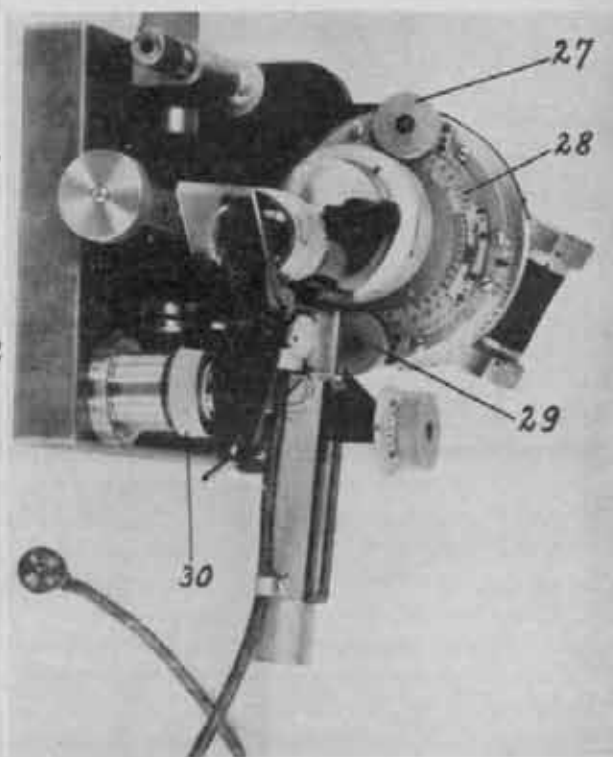


Figure 10

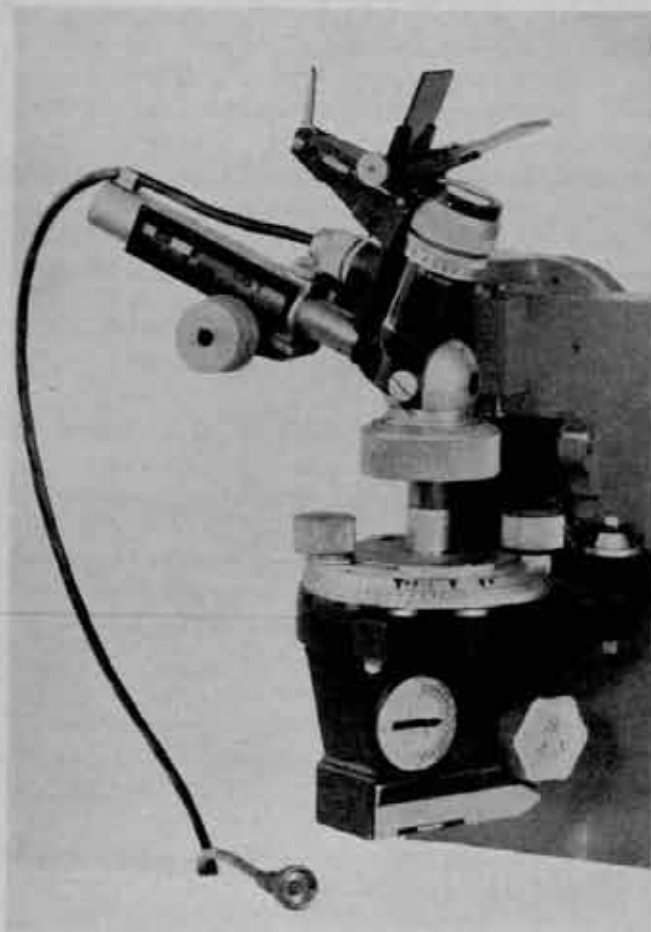


Figure 11

In order to correct firing data by observation of the tracer ammunition, provision is made for correcting the optical and mechanical sighting lines of the reflector sight in azimuth and elevation. The vertical correction is set by knurled ring 9, and is registered on scale 10 in sixteenths of a degree. The lateral correction is applied on knurled head 23 and thereby shifting point W, and is indicated on scale 22.

In firing at moving terrestrial targets, exactly the same procedure is followed as with moving aerial targets. In firing at stationary targets, the computing gear is set at zero for range, flying speed, and flight direction. The superlevation is set with knurled ring 9 on range scale 8 of the reflector sight. The maximum superlevation for land fire is $5^{\circ}45'$.

For attaching the antiaircraft sight to the gun, a carrier plate 34 pivoted around a horizontal axis on the gun is required for carrying the instrument proper, as well as a bearing on the gun barrel for universal joint W. The instrument is hung by its two seating studs into cradles 35 on plate 34 from above, with the ear at its lower end engaging in a matching recess 36, and is held down in the cradles by means of pressure screw 33. Universal joint W of guide tube 1 is connected by nut 30, Fig. 10, with the bearing 32 fast on the gun.

The scope of settings is as follows: Any angle of incli-

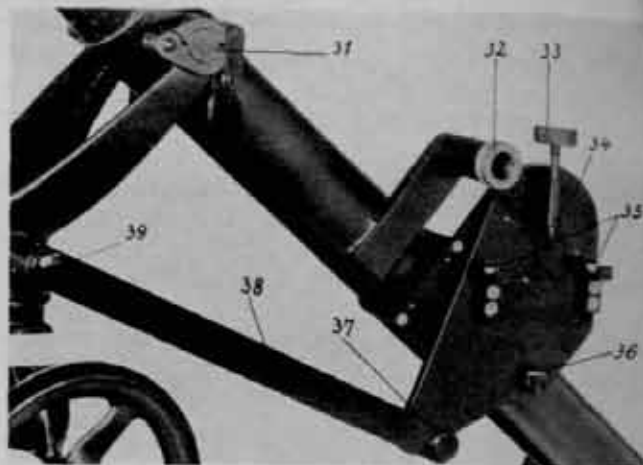


Figure 12

nation between $+20^{\circ}$ and -60° to the horizontal can be set when the largest deflection is used. Angular height limits are -12° and $+90^{\circ}$. Using 20-mm. ammunition, any range between 300 and 2,000 meters can be set. 3,600 meters is the upper limit for the 37-mm. gun.

This instrument can in each case be used only for one given type of projectile because the superlevation cam, the two range scales 18, the colored fields 26 and the range scale 8 for terrestrial targets, are designed for this particular type of ammunition. The use of another type projectile with different ballistic properties, will necessitate the renewal of the parts listed above. New parts corres-



Figure 13

ponding to the new projectile will have to be installed.

The Zeiss Antiaircraft combination sight and computer has certain advantages and also some disadvantages as compared with other types of antiaircraft computers. The sighting device has the advantage of not rigidly confining the eyes of the marksman to a fixed position but rather allowing him a measure of freedom in his attitude and, in addition, permitting him to keep both eyes open during aiming. In this manner, the marksman is enabled to follow the target and the luminous trace of the projectiles with both eyes, and if necessary, to apply corrections in accordance with his impressions. By having the computer attached to the gun, the firing data is mechanically transmitted to the barrel without the necessity of the use of transmission lines, and facility is also had for compactness. However, the attaching of the instrument to the barrel has a tendency to set up vibrations in parts where great

precision is a prerequisite. Approximations are made in the Zeiss for future range and superelevation, whereas, it is possible to be more precise if a different method of solution is pursued in computing these elements. In using the deflection triangle method in solving for data as employed in the Zeiss, several elements of firing data, speed, flying direction, dip and range, must be continuously measured or estimated and set into the computer. It is possible to construct a computer which will give complete firing data, whereby only the altitude of the target need be measured and set into it. The Zeiss instrument is novel in that it does consider instantaneous ascent and descent in its computations, and therefore should be unusually effective against a maneuvering target. The outstanding disadvantage appears to be that the Zeiss must necessarily use special parts for different types of projectiles. A universal instrument would be considered preferable.



Notes on the 155-mm Gun

By Captain C. E. Rothgeb, C.A.C.

THERE are believed to be many officers in the Coast Artillery who are somewhat in doubt concerning certain important characteristics of the 155 mm. gun. This lack of knowledge has caused trouble in the past. With a view of helping some to avoid the mistakes and unnecessary difficulties the following notes are submitted:

(1) It is a waste of time and effort to accurately level a gun of this type when going into position, for it will not stay level after the first shot is fired since the spades do not settle equally. It should be remembered that when the gun is in firing position that it is on a three point support; i.e., two trail spades and the horizontal pivot pin through the axle. No amount of levelling of the wheels will have the desired effect on the level of the gun. Of course, the gun will be canted if it is not level; moreover, the amount of cant will vary with the azimuth; but if the level bubbles, both elevation and cross, are used properly, the quadrant site will correct the errors caused by the cant. Do not on any account fall into the error which has frequently been made, of levelling the cross bubble at one position and then clamping it. The cross level must be set for every shot just as accurately as the elevation bubble and it is even more important because it affects your lateral deviations. Very little difficulty is experienced with the elevation level because everyone realizes that it must be set in order to obtain the proper vertical angle (elevation). However, there are many officers who do not visualize the action of the cross-level. They know, of course, that in order to measure horizontal angles with an azimuth instrument the axis of rotation of the instrument must be vertical; but for some reason they are unable to apply the same reasoning to the panoramic sight. Stated simply,

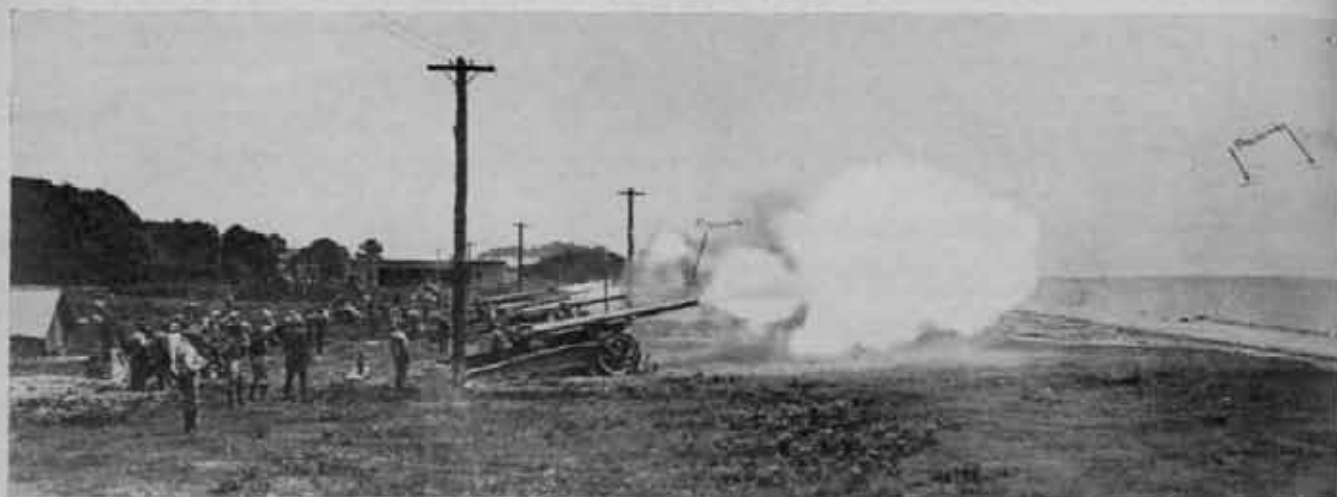
the matters resolves to this: if both the elevation and cross-level bubbles are centered properly the panoramic sight head will pivot about a vertical axis and will measure correctly a horizontal angle. If either bubble is not centered the axis of the sight will be inclined and the sight will measure an angle in an inclined plane perpendicular to its axis. By construction, the axis of the sight is always parallel to a plane through the axis of the bore of the gun. Therefore, if the axis of the sight is vertical it will be parallel to the vertical plane through the axis of the bore and will measure correctly the horizontal angle through which this vertical plane is rotated.

The following test will illustrate the above:

Set up a transit in rear of your gun, which we hope is canted, and sight along the axis of the bore with the gun at zero elevation. Now, without moving the gun, center both levels and place the sight on an aiming point. Note the reading on the sight. Elevate the piece about 400 mils and look through your transit. You will probably note that the gun in elevating has moved laterally so as to form an angle with your line of sight from the transit. Center both bubbles again, and without changing the reading of the sight, bring the sight back onto the aiming point by traversing the gun. Look through transit again. If the axis of the bore is not back on the line of sight from the transit your cross level bubble is in need of adjustment.

(2) Do not try to rotate the mushroom head of a 155 mm. gun. The breech-block of this gun is so constructed that the obturator spindle is locked into position and cannot rotate. The fact that the mushroom head will not rotate is no indication that it is too tight.

(3) When testing for safety be sure that the firing



A battery of 155's in action

mechanism will not screw all the way in until the block is completely closed and locked. This defect is so common that many officers believe that it is normal. It is not. If the breech-block and firing mechanism of a 155 mm. gun are properly adjusted, the firing mechanism cannot be rotated sufficiently to permit firing until the breech-block is closed completely. Nor can the block be opened until the firing mechanism is unscrewed a sufficient amount to remove the firing slot from its alignment with the hammer.

(4) During firing do not permit your gun pointer to grasp the sight when the gun is fired. Gun pointers have no hand hold or rest to support them against the blast,

and they are prone to grasp the sight bracket with the heel of the hand against the horizontal tube just in front of the eyepiece. This places a considerable strain on the small screws which hold the elbow in the optical tube and will frequently distort the metal around them so that they fit into an oval instead of a round hole. This permits play in the elbow and has been known to introduce errors up to 4 mils.

These errors are variable since the horizontal optical tube and eyepiece can be moved laterally as the loosened screws slide from end to end of the distorted holes. The amount of error introduced will depend upon the location of the screws within these "slots."

Ring in Health!

GREETINGS



Protect Your Home from Tuberculosis
with CHRISTMAS SEALS

FORT OBSERVATION PLANES

By Captain Burgo D. Gill, C.A.C.

THE BATTLESHIPS and large cruisers of the U. S. Navy all carry gunnery spotting planes. These planes are an integral part of the ships' equipment, and their crews are members of the ships' complement. Daily work between the range section personnel and air observers are routine affairs and make possible well-trained firing teams, the members of which are familiar with each other's personal characteristics, capabilities and limitations.

In direct contrast to the Navy system, coast artillery forts and garrisons do not have under the direct control of their commanding officers all the essential elements for developing well-trained fighting teams.

In the past, the training of individual batteries using aerial observers has been quite limited. In fact, in some harbor defenses, years have gone by without such a practice.

The benefits to be derived from planes and aerial spotters being assigned directly to Coast Artillery forts should be as great as those derived from the planes assigned to ships.

Why should not the more important harbor defenses, as well as the three Coast Artillery foreign stations, have an annual shoot of the type that could be held if observation planes were available under the direct control of the artillery?

Few Coast Artillerymen would normally object to the assignment of spotting planes to the various harbor defenses. Rather, most of them would welcome such progressive action.

Let us examine some of the objections to planes being assigned to Coast Artillery commands as they are now assigned to ships. The Air Corps would object to the loss of tactical control over their planes and personnel. This is natural—no one wants to scatter his forces. But, if the forts had their own planes, as I believe they should, this objection would be offset by the fact that Air Corps observation squadrons would not have to continually worry about Coast Artillery missions—missions that might interfere with their own training.

It might be contended that the assigning of planes to Coast Artillery stations would be impracticable as there are no means provided for servicing them and keeping them mechanically fit. However, this problem could be easily solved. Near every important harbor defense there is a flying field; for example, Langley Field is within a few miles of Fort Monroe, and Albrook Field is near Fort Amador, and arrangement for service and maintenance could be made readily.

It might also be argued that a very large number of observation planes would be required. Actually the number

needed would be surprisingly small as I shall point out.

There are three Coast Artillery foreign stations—Hawaii, the Philippines, and the Canal Zone. Each should be provided with a flight of three planes each.

The allotment to Panama might be increased to two flights, one for each end of the Canal. Then, we have two major harbor defenses on each coast of the United States which should be provided for. Thirty planes should satisfy the entire coast defense requirement. The total number needed is hardly excessive considering the size of our army and Air Corps.

The planes would not necessarily have to be first line ships. Planes obsolescent in design, but mechanically fit, should be satisfactory. First line planes could be retained by the Air Corps.

Having considered some of the main objections let us now consider some of the advantages that would accrue from the use of fort observation planes. First, all the means for the conduct of much-needed long-range firings with aerial observation would be readily at hand. Peacetime training could be conducted under wartime conditions. Secondly, in the conduct of training there would be a great saving of the time that is usually lost due to the fact that the artillery commander does not normally exercise direct control over the means for developing a complete team. This time is lost as has been touched on above, because commanding officers, pilots, radio operators, and liaison officers must learn each other's personal characteristics, capabilities, and limitations before they can function as a team. Thirdly, it is believed that if the air officers were under the direct control of the officers responsible for the essential artillery training that there would be smoother, better coordinated, and more efficient operation. Fourthly, there would always be available means for extended training in the methods of camouflage and the combating of aerial attacks. Fifthly, the fort observation planes could be given the additional mission of flying for the various antiaircraft regiments, since most of these units are stationed in the vicinity of the major harbor defenses. For example, planes provided for Fort Hancock could be made available at Fort Tilden for the training of the 62d C.A.

In time of peace we must prepare for war. If the Coast Artillery Corps is provided with fort observation planes as outlined above, we shall have gone a long way toward that preparation. Hangars still standing at some Coast Artillery posts give visual evidence of the fact that planes of this type were found essential in the last war. If we needed aerial observation then, we certainly need it now; and we shall need it tomorrow, in order to carry out our mission.

*Coast defenses need
aerial observation*

THE CONVENTION

ALTHOUGH the convention is over, the 300 Coast Artillerymen who attended still speak appreciatively of the useful and pleasant associations they had on the Pacific Coast. To begin with, San Francisco hospitality is traditional and on October 1 and 2 it was not lacking in warmth. For another thing, our Chief was there, renewing old acquaintanceship and meeting the rank and file of western Coast Artillerymen—Regular Army, National Guard, and Organized Reserves. All hands combined to make the gathering one of the liveliest in recent years.

The festivities opened with a reception at the Fort Winfield Scott officers' club, in honor of Major General A. H. Sunderland, Chief of Coast Artillery, who had arrived a few days beforehand from the Canal Zone, on board the *Grant*. His primary purpose was to inspect the personnel and fortifications of the West Coast. About 250 guests attended the reception, among them being Brigadier General J. P. Tracy, commanding the Ninth Coast Artillery District; and Colonel H. T. Burgin, commanding Fort Winfield Scott and the 6th Coast Artillery.

In the forenoon of the next day the 6th Coast Artillery, spic and span for the occasion, passed in review before General Sunderland and the guests of the convention. A brief inspection by the Chief and the regiment was dismissed.

After the review, the Fort Scott officers' club again played host, this time at a luncheon party. After luncheon the party left for a tour of the Presidio and nearby naval and military points of interest, including Forts Baker and Barry. Other activities included golf and the other sports which are available the year 'round in California.

In the evening, the business session got under way in the rooms of the Army and Navy Club at the Fairmont Hotel with over 200 in attendance. Major Farley, president of the San Francisco Chapter welcomed the guests and then turned the meeting over to General Sunderland.

After thanking Major Farley, the General appointed Colonel A. L. Loustalot secretary of the meeting, and the convention proceeded to business.

During the business session, Colonel R. E. Mittelstaedt paid tribute to the *COAST ARTILLERY JOURNAL*, mentioning its contribution to the professional excellence of the Corps. He urged that all non-subscribers be enrolled.

The president of the Los Angeles Chapter, Colonel A. E. Evans spoke to the gathering at this time and expressed his pleasure at being able to attend. The convention thereupon thanked General Tracy and Colonel Burgin for their wholehearted cooperation with the local committee which contributed so much to the success of the affair.

Formal business now being disposed of, the members moved to the cocktail lounge, by way of prelude to the banquet, which took place in the Gold Dining Room of the Hotel Fairmont.

Some 18 officers sat at the distinguished guests' table, including Generals Sunderland, Tracy, Abernathy, and McNeil. Generals Morehead, Davis, and Gilmore, who had attended the other activities, were unable to be present for the dinner.

The committee which in the main was responsible for the success of the meeting was composed of Colonel A. L. Loustalot, CAC; Captain Lester Cole, CA-Res, 57th Coast Artillery; and 1st Lieutenant Irvin J. Robertson, CAC, California National Guard. The committee spoke appreciatively of the effective cooperation and active assistance rendered by Colonel H. T. Burgin, C. O., Fort Winfield Scott and the work and help of Major W. W. Irvine, his adjutant.

The results of the convention go far beyond sociability and recreation. The meeting provided a common ground for the gathering of representatives of all components and developed opportunities for mutual professional advancement among the members of the three components of our

arm. These annual affairs assist in fostering and keeping alive that spirit of cooperation and fellowship which is so essential to any military organization.

The Coast Artillery Association likes its annual meeting. See you at the next one.



A candid camera shot of the crowd, General Sunderland in center.

Coast Artillery Activities

OFFICE OF CHIEF OF COAST ARTILLERY

Chief of Coast Artillery
MAJOR GENERAL A. H. SUNDERLAND

Executive
COLONEL JOSEPH A. GREEN

Personnel Section
MAJOR CLARE H. ARMSTRONG

Matériel and Finance Section
MAJOR C. W. BUNDY
MAJOR H. B. HOLMES, JR.
MAJOR S. L. McCROSKEY

Organization and Training Section
COLONEL HORACE F. SPURGIN
MAJOR AARON BRADSHAW, JR.
MAJOR W. H. WARREN

Plans and Projects Section
LIEUT. COL. JOHN L. HOMER

Notes from the Chief's Office

War Department directives governing the selection of officers to attend the 1938-'39 classes at the Army War College and the Command and General Staff School were reprinted recently in service journals. It is assumed, therefore, that every interested officer is acquainted with the qualification requirements and the restrictions placed upon the Chief of Coast Artillery in making his recommendations of officers to attend the two general service schools. The Chief of Coast Artillery states that he considers the making of these selections one of his gravest responsibilities because of the general belief among officers, that a good record at "Leavenworth" or the War College or both, is a prime necessity for future advancement to high rank and more desirable assignments.

The directives mentioned above require that each Chief of Arm or Service will acquaint his officers with the methods adopted by him in making his selections, and he is making use of this article to carry out such instructions.

The procedure is as follows in selecting officers to attend the Army War College. From the list of all officers in the Coast Artillery Corps, there were eliminated:

- a. Each officer over the maximum age limit.
- b. Each officer who is a graduate of the Army War College.
- c. Each officer not on the General Staff Corps Eligible List.
- d. Each officer with a General Efficiency Rating of less than "Excellent" (and it is regretted that there are some).
- e. Each officer on foreign service whose tour (not including extensions) would not expire in time to allow him to report at the school prior to September 1, 1938.
- f. Each officer whose relief from his present assignment

would disrupt instruction at a service school or R.O.T.C. unit. Officers in this category were considered not available for the 1938-'39 class, but all of them will be given consideration for future classes.

g. All lieutenants.

In order to comply with the instructions in Paragraph 3 b of the directive, which specifies that officers selected will be less than fifty years of age on September 1, 1938, and at least one-half of the quota will consist of officers who will be less than forty-three years of age on that date, the officers remaining on the list for consideration are divided into age groups.

The Coast Artillery quota for the 1938-'39 class is eight; therefore four officers less than fifty and four less than forty-three years of age could be selected. Preference, other things being equal, was given to the older men; that is, the full number authorized for the group was included in the older group.

Summaries of the record of each of the officers not eliminated by the above process were personally scrutinized by the Chief of Coast Artillery, and, assisted by officers on his staff, selections were made to conform as nearly as practicable to the requirement in Paragraph 5 a of the directive; namely, the selection of those officers best qualified for higher training.

Similar procedure is followed in the selection of officers to attend the Command and General Staff School.

The lists are submitted to The Adjutant General of the Army for review before publication, by the War Department General Staff. Cases have arisen in which exception has been taken to individuals recommended by the Chief of Coast Artillery; such cases have been flatteringly few

and in nearly every instance have arisen by the reference to records not available in ordinary routine, to the Chief of Coast Artillery.

* * * * *

The Defense Projects for all Harbor Defenses of the United States have been approved.

* * * * *

Training Memorandum No. 1, Instructions for Coast Artillery Target Practice—1938, has been distributed by the War Department.

a. The eligibility requirements for a battery to conduct an advanced practice have been changed to eliminate any reference to the battery commander's experience and the length of time he has commanded the battery. Two advanced practices are now authorized in regiments having six or more firing batteries.

b. The "D" Component (penalties) has been eliminated from the score for seacoast practices.

c. The "R" Component (speed and range of target) has been changed to incorporate a rate of change of range factor. This will reduce the bonus heretofore obtainable in high-speed practices.

d. The score for submarine mine practices has been changed only slightly. The test phase now includes the operation of the supervisory equipment for a period of ten hours each day for a period of two weeks.

e. The defensive sector for antiaircraft searchlight practices has been made narrower and the exterior limit of the sector boundary has been extended to 12,000 yards.

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A revision of the *Coast Artillery Field Manual*, Volume II, Antiaircraft Artillery, Part One, "Tactics," is about completed and it is hoped it will be in the hands of the troops by next summer.

* * * * *

The Chief of Ordnance has issued a change (Changes No. 5, dated September 27, 1937) to *Ordnance Field Service Bulletin* 3-2, November 5, 1935 which authorizes the use of stacked charges where available in target prac-

tices of certain Model 12", 14" and 16" guns during the calendar year 1938.

* * * * *

A detachment of approximately 8 officers and 180 enlisted men of the 62d Coast Artillery (AA) under command of Lieutenant Colonel J. D. McCain passed through Washington on October 20th en route to Fort Bragg, where 3-inch antiaircraft firings over land will be conducted. As these firings will more nearly approach service conditions it is expected that the data furnished by forward observers will be of great value in solving the problem of fire adjustment.

* * * * *

The U.S.A.M.P. *Ellery W. Niles* will be delivered by the Pusey and Jones Corporation, Wilmington, Delaware, to the army sometime in November. Before departing for her permanent station in the Harbor Defenses of San Francisco the *Niles* will be given a thorough shakedown on the Atlantic Coast. During this shakedown cruise she will perform essential work which will take her to many of the Atlantic coast harbor defenses.

* * * * *

Completion of the new M-4 antiaircraft director which was expected to be delivered to the Coast Artillery Board for test last September has encountered a few "thank you marms" and as a consequence is still in the hands of the manufacturer. The difficulties encountered do not appear to be serious but the tests by the Coast Artillery Board are being delayed.

* * * * *

Three new antiaircraft searchlights incorporating several experimental features have been undergoing mechanical and operational tests during the last two months at Fort Belvoir, under the supervision of the Chief of Engineers. One of the features of these lights is the revolving front door used to move the beam for searching. One of these searchlights is scheduled for delivery to the Panama Canal Department for test in the near future and the other two lights will be sent to Fort Monroe for test by the Coast Artillery Board. A Sperry type sound locator will accompany the lights being sent to Fort Monroe.

Fort Monroe

BRIGADIER GENERAL JOHN W. GULICK, U. S. Army, *Commanding*

COLONEL W. E. SHEDD, JR.
*Commanding, Harbor Defenses of Chesapeake Bay
and 2d Coast Artillery*

COLONEL EUGENE B. WALKER
Commanding 51st Coast Artillery

LIEUTENANT COLONEL FREDERICK A. PRICE
Commanding 52d Coast Artillery

By 2d Lieutenant H. Bennett Whipple

General Gulick loses the last "old guard" member of his staff on November first when Colonel F. Q. C. Gardner leaves to take command of Fort Hancock. Colonel Gardner's departure makes the turnover in staff during the past few months just about complete. Colonel Gard-

ner has been the assistant commandant of the Coast Artillery School for the past 2½ years. He leaves behind an improved school and a host of friends. The new assistant commandant, Lieutenant Colonel Frank S. Clark, is particularly suited for the position. He is a graduate of the

Army and Naval War Colleges and has served as commanding officer of the Submarine Mine Depot and in the War Plans Division of the General Staff. Unfortunately, Colonel Clark will be unable to remain at the School more than eight months, for next July he returns to Washington.

CONSTRUCTION

Fort Monroe is still constructing new buildings. Within the past few weeks a sewage-disposal plant has been completed and a new theatre has been started.

The new sewage disposal plant began as a CWA project and carried on under PWA and WPA. From June 1934 to April 1937 work was suspended. Then the WPA took over the project and completed it early in September of this year.

The new theatre is being constructed by Major Carl H. Jabelonsky, constructing quartermaster, who optimistically states the theatre will be finished by July. The building will face Tidball Road, immediately behind the officers' quarters on the west side of Ingalls Road in the old Sherwood area. Funds are supplied by the WPA and the Army Motion Picture Service. The building will be modern in every respect, will include air-conditioning, and will have a seating capacity of 900.

MURALS AT COAST ARTILLERY BOARD

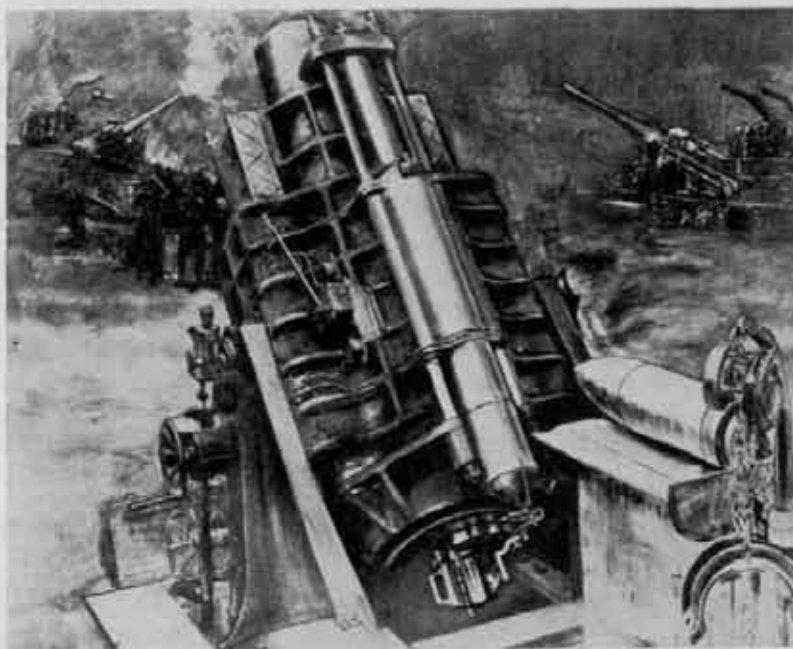
Mr. Einst Halberstadt has recently completed murals for the Coast Artillery Board. The murals, "executed in oil and depicting subjects of a technical nature," are painted on the walls of the main conference room, in natural colors. They realistically portray a railway mortar; a disappearing-carriage gun; a sound locator and operator; a magazine storage room; a plotting crew in gas masks; a submarine mine; antiaircraft guns, lights and equipment; a railway gun; a barbette carriage gun; a base end station, showing observers and instruments; and a few other military objects and scenes.

The work was initiated by Major General A. H. Sunderland and was carried on under the WPA Federal Arts project. The artist, Einst Halberstadt, lives in South Orleans, Massachusetts, and is an officer of the Reserve Corps.

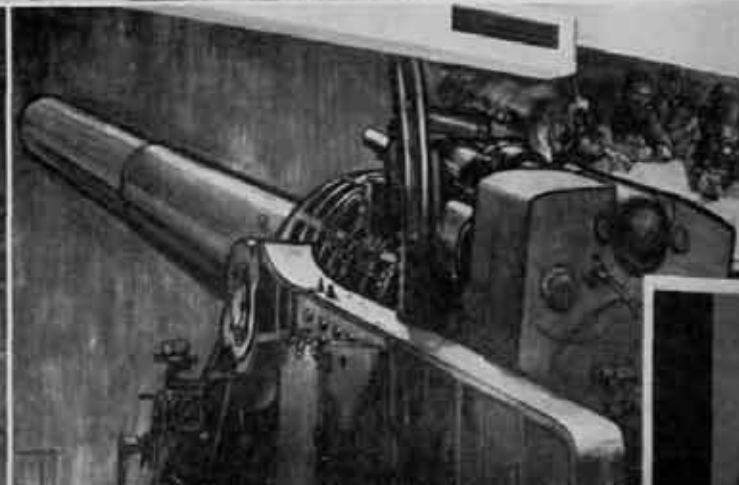
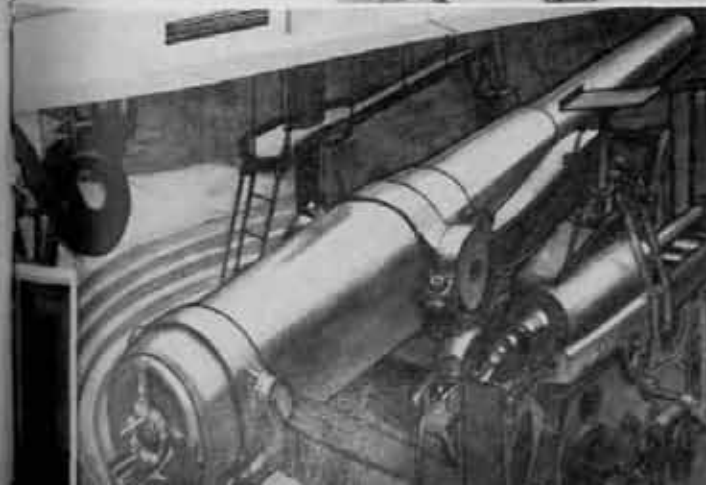
SCHOOLS

During October the National Guard and Officers' Reserve Corps class (Seacoast Section) fired practice problems with French seventy-fives and later fired T.—D. and fixed batteries of Batteries "A," 51st C.A., and "F," 52d C.A., under the direction of Captains N. A. Burnell

MONROE



MURALS



and C. W. Holcomb. The AA section class spent the period at Fort Story where "C," 2nd, commanded by Captain O. H. Kyster, presented antiaircraft to the students under the supervision of Major J. R. Townsend and Captain E. C. Barber. Captain Kyster's battery has been camping at Fort Story since late in August, first running tests for the Board and later instructing the Coast Artillery School students. "C" Battery hopes to return to Monroe early in November at which time it will begin work on another Board test.

Sixteen Reserve officers, on duty under the Thomason Act, started classroom work on October 14. Lieutenant Colonel F. A. Price, 52d C.A. is in charge of instruction, in addition to his hundred and one other duties.

Instruction in the West Point Preparatory School is being carried on by three members of the class of '36: Lieutenants H. J. Katz, E. H. Thompson and R. H. Kessler. They hope to place a large group of men in the Academy this year from the Third Corps Area School.

"SPEEDY" LAWRENCE

Residents and former residents of the post heard with deep regret the announcement of the death of Staff Sergeant George E. Lawrence, 2d Coast Artillery, on September 14, 1937. Staff Sergeant Lawrence was known and beloved by the post commissioned and enlisted personnel and their families for his sterling soldierly qualities, his outstanding athletic prowess, and his participation in every worthy charitable enterprise sponsored by the garrison.

PERSONNEL

Colonel L. B. Magruder, now commanding officer at Fort Hancock, will arrive on November 7, for duty with the Organized Reserves, Third Coast Artillery District.

Lieutenant Colonel L. J. Ahern, I.G.D., visited Fort Monroe from October 19 to 28. Together with Colonel Shedd, he made a thorough inspection of the entire post.

Captain Nicolai Bolonikov, Assistant Naval Attache, U.S.S.R., visited Monroe on October 13 and was escorted

around the post by Lieutenant A. C. Peterson, A.D.C.

On September 7, Captain Joe D. Moss was ordered to Indiantown Gap, Pennsylvania, to participate in the Third Corps Army Maneuvers. There he, a lone Coast Artilleryman, was designated assistant supply officer, in charge of fuel and forage—a job for which his Coast Artillery training rendered him peculiarly suited.

Lieutenant Roger W. Moore, who arrived on the post on September 10, was ordered to Fort Belvoir with a detachment from Battery "A," 2d C.A., to participate in Engineer Board searchlight tests from September 14 until the middle of November. As yet, Lieutenant Moore hasn't unpacked his trunks.

The West Point Class of '37 sent seven members to Fort Monroe this year. They are Lieutenants G. R. Ames, D. B. Nye, T. McG. Metz, R. H. Fitzgerald, J. McG. Gulick, M. S. George and W. J. Worcester.

During the last few weeks there have been several changes in officer personnel. Lieutenant Colonel J. B. Anderson, M.C., has replaced Lieutenant Colonel Sam F. Parker, M.C., at the station hospital. Lieutenant Everett D. Peddicord has been assigned as assistant motor transport officer and commanding officer of Headquarters Battery, 51st Coast Artillery. Captain W. B. Hawthorne arrived from Fort Hancock on September 23. Captain Hawthorne now commands the mine planter *Schofield*. Captain P. McSmith is scheduled to arrive on November 3 and will take over "F" Battery, 52d C.A. Incidentally, this will be "F" Battery's fifth commanding officer during the past year. Captain Smith is not going on CCC duty as announced in the last letter; his orders were changed to bring him to Monroe instead. Major Creighton Kerr returned to Monroe from Hawaii early in October and resumed his duties as artillery engineer. Captain H. C. Reuter arrived on October 16 and is now on duty with the Submarine Mine Depot. Early in October, Lieutenant Clarence Renshaw, Q.M.C., took over the duties of utilities officer, formerly held by Captain R. P. Boykin, now in Hawaii.

Hawaiian Separate Coast Artillery Brigade

BRIGADE COMMANDER, BRIGADIER GENERAL JAMES A. WOODRUFF
CHIEF OF STAFF, COLONEL ROBERT ARTHUR, C.A.C.

S-1, MAJOR M. S. DANIELS, A.G.D.

S-3, LIEUTENANT COLONEL RALPH E. HAINES, C.A.C.

S-2, CAPTAIN WILLIAM H. DUNHAM, C.A.C.

S-4, LIEUTENANT COLONEL ARTHUR E. ROWLAND, C.A.C.

MAJOR LEROY A. WHITTAKER, C.A.C.

Com. and Engineer Officer

COLONEL RALPH M. MITCHELL

Sixty-fourth Coast Artillery (AA)

Harbor Defenses of Pearl Harbor

COLONEL H. C. MERRIAM
15th C.A.

Harbor Defenses of Honolulu

COLONEL G. A. WILDRICK
16th C.A.

By Lieutenant John J. Stark, A.D.C.

CONGRESSIONAL COMMITTEE VISITS

The Congressional Statehood Committee of seven Senators and twelve Representatives, has just left sunny Hawaii

after a three-week stay. Although the primary purpose of their visit was to investigate the statehood situation of the Territory, the Congressmen also inspected the military



HSCAB SEARCHLIGHT REVIEW AT FORT DeRUSSY

Left: Congressional Statehood Committee; Senator King and General Moses in center. Right: The searchlights with troops in the background.

establishment and were given a night searchlight review by the Hawaiian Separate Coast Artillery Brigade and a division review at Schofield.

General Moses, the department commander, first took the Congressmen on a tour of inspection which included Fort Shafter and the armament at Fort Barrette. Also included in the trip were the posts of Fort Kamehameha and Fort DeRussy, where the big guns were given the once-over by the Congressmen. They all seemed much interested in the splendid fortifications, and asked many questions. Drills were conducted on the guns to demonstrate how they operate, and a fine show was the result.

The high spot of the military activities for the Congressmen was the magnificent night searchlight review at Fort DeRussy of the entire Hawaiian Separate Coast Artillery Brigade. Fortunately this took place on a beautiful and star-lit night just made to order for such a review. Under a canopy of some twenty-billion candlepower furnished by the searchlights of the 64th Coast Artillery (AA), all three regiments of the brigade marched by the reviewing party. The troops were commanded by Brigadier General Woodruff, Hawaiian Separate Coast Artillery Brigade, and included a regiment from Fort Kamehameha under the command of Colonel H. C. Merriam, a regiment from Fort Shafter under the command of Colonel R. M. Mitchell, and a regiment from Fort Ruger under the command of Colonel G. A. Wildrick.

The final military demonstration for the Congressional Statehood Committee was a division review held at Schofield Barracks. The 64th Coast Artillery (AA), with their splendid equipment and matériel, took part in this review in company with the division and the ground and air elements of the 18th Wing.

COMMANDING OFFICERS CHANGE AT KAM

A major change of personnel took place in the Harbor Defenses of Pearl Harbor, Headquarters Fort Kamehameha, when Colonel Earl Biscoe sailed for his new station in New York. His successor, at this lively post, is Colonel H. C. Merriam, coming to us from a detail in the I.G.D.

Colonel Biscoe left behind him a splendid command and a host of friends. We wish him our best "Aloha" and success at his new post.

So many other new officers have recently joined the brigade that we are listing them in a tabular form.

Name	Date	Post
Colonel H. C. Merriam	Oct. 7	Kam
Lieut. Col. F. E. Gross	"	Ruger
Capt. G. F. Heaney, Jr.	"	Shafter
Lieut. W. H. Kinard, Jr.	"	Shafter
Lieut. K. I. Curtis	"	Kam
Major S. W. Anderson	Sept. 10	DeRussy
Major R. V. Ladd	"	Kam
Capt. J. H. Featherston	"	Shafter
Capt. D. S. Ellerthorpe	"	Shafter
Capt. H. P. Gard	"	Ruger
Major A. F. Englehart	Sept. 4	Kam
Major H. S. Johnson	"	Ruger
Capt. P. Gregory	"	Kam
Capt. D. B. Herron	"	DeRussy
Capt. M. G. Cary	"	DeRussy
Capt. W. V. Davis	"	Ruger
Lieut. J. T. Darrah	"	DeRussy
Lieut. N. B. Wilson	"	Shafter

TRAINING ACTIVITIES

At brigade headquarters, Fort DeRussy, General Woodruff has been busy with the matériel and transportation inspections of the various harbor defenses and 64th Regiment. These inspections included a detailed survey of all the armament, together with all the units of transportation. It is probable that this brigade is equipped with more different kinds of armament than any similar organization. At this inspection there could be seen everything from a .45-caliber pistol to a 16-inch rifle, and everything from a solo motorcycle to an A.A. prime mover. All the equipment appeared in splendid shape, showing that the officers and men of the brigade take pride in their matériel.

The searchlight practices of the various headquarters

batteries have been taking places at Fort Kamehameha. These are additional assignment target practices and the results are not yet in.

64TH TO SHOOT AGAIN

The 64th Coast Artillery (AA) at Fort Shafter is busy getting ready for their annual gun target practices. The gun batteries, six in all, have just gone into the field at Haliewa. The target practices for these batteries were to have taken place earlier in the year, but were delayed by the non-arrival of new towing equipment for the Martin bombers. A new locale is being tried out this year, up on the north shore of the Island, in hopes that the weather will be an improvement over the cloudy skies of Waimanalo which have greeted these batteries in the past.

Fort Shafter is publishing a new weekly regimental paper for the amusement of the personnel.

At the Harbor Defenses of Honolulu, which includes Forts Ruger and DeRussy, quite a few target practices have been completed recently. During the weeks of Sep-

tember 13th and 20th, the following batteries fired their annual practices with the results listed below:

Organization	Armament	Date	Score	Battery Commander
Hq. 16th	A.A. Searchlight	Aug. 5	97.2	Lt. Elias
D-16th	"	Aug. 6	175.4	Lt. King
Hq. 2nd Bn. 55th	"	Aug. 5	180.1	Capt. Flory
A-41st 3-inch A.A. Gun (add.)		Aug. 11	41.9	Capt. Williard
F-55th	G.P.F.	Sept. 24	137.7	Capt. Davis
E-55th	"	Sept. 23	93.4	Capt. Gard
D-55th	"	Sept. 21	111.4	Capt. Franklin
D16th 6-inch D.C.		Sept. 15	104.1	Capt. Carey

The beach at Fort DeRussy is now sporting a new dance floor and an enlarged pavilion which is rapidly nearing completion. The entire building has been done over and an open-air dance floor extending along the sea-wall over the water has been added. When completed, this will undoubtedly become the favorite dance spot of the department. The construction was under the supervision of Colonel Wildrick and Major Sweet.

Corregidor

BRIGADIER GENERAL P. P. BISHOP, *Commanding*

COLONEL T. A. TERRY, C.A.C., *Executive*

59th Coast Artillery

COLONEL GEORGE RUHLEN

60th Coast Artillery

COLONEL J. H. CUNNINGHAM

91st Coast Artillery (PS)

LIEUTENANT COLONEL R. S. DODSON

92d Coast Artillery (PS)

LIEUTENANT COLONEL ALBERT H. WARREN

By Major R. E. Phillips, C.A.C.

RICHARD STEARNS DODSON
Lieutenant Colonel, Coast Artillery Corps
United States Army
Died October 5, 1937

His eulogy is written in the hearts of each officer and man of the 91st Coast Artillery—the regiment he commanded at the time of his death. Each individual feels a loss that only the passing of a friend can bring—each mourns the absence of a leader.

To those saddened by Colonel Dodson's death may be added the name of every other officer on duty in these harbor defenses and hundreds of others throughout the Coast Artillery Corps and the Army at large. For many years and in many places he has shared our labors and our pleasures with a readiness which commanded our admiration and affection.

As the days go by we hope the sorrowing family will come to derive comfort from the fact that Colonel Dodson's memory remains fresh in the hearts and minds of many soldiers. His absence will only enhance the affection which we shall always hold for him.

August 20, 1937, we were visited by an earthquake. The Heacock Building in Manila, so familiar to shoppers who have resided here in the past, will probably be entirely replaced as a result of damage done, but the local wreckage was limited to a break in the trunk-line sewer near the Middleside officers' line.

The capture of a ten-foot python at Battery Morrison was the occasion of a series of visits to that locality. The big snake's visit is attributed to the proximity of the battery chicken farm.

We are busy with firings of one kind or another. Our schedule calls for machine-gun and light artillery shooting every day but Saturdays and Sundays during the months of August, September, and October.

The Corregidor Club is a valuable asset to the command. It affords facilities for swimming, golf, tennis, badminton, and pool, and is one of the most active of our army clubs. Alterations are under way at the Caddie House which will double the space in the players' dressing room.

The 150th anniversary of the adoption of the Constitution was observed with a thirty-minute assembly which packed the Ciné. Major Robert M. Carswell addressed the gathering in an interesting manner. The chaplains

opened and closed the assembly and there was patriotic music by the band.

FIFTY-NINTH COAST ARTILLERY

By Captain C. H. Crim

The 59th fired a successful season with the antiaircraft machine guns. All batteries used the new Morgan sight and the results were excellent. Last year's scores, which were excellent at that time, were virtually doubled. The sights were built in the post ordnance shops.

Monday, September 13th, was celebrated as Organization Day inasmuch as the 12th of the month fell on Sunday. The morning was spent in athletics and other recreation. At noon special dinners were served by all batteries with plenty of what it takes to make a successful organization-day dinner. The official program started at two o'clock in the Topside Ciné with Colonel Ruhlen, regimental commander, presiding, flanked by athletic trophies for presentation. After the customary music, invocation, and review of the history of the regiment, General Bishop made a short address, told some good stories and presented the athletic trophies. Following the ceremonies there was a showing of a recent movie.

SIXTIETH COAST ARTILLERY

By Lieutenant C. W. Hildebrandt

Gunner's instruction ended in August with 230 men qualifying as experts. Beach defense firing by all batteries followed the indoor period. Batteries "E" and "F" are busy preparing for their machine-gun target practices which will be fired in October.

The officers' ranks remain unchanged since the July transport. Who the October boat will bring we do not know; but when it leaves it will not have any of our present officers on board. Lieutenant Harrison will attend the Cooks and Bakers School at Fort McKinley during October.

NINETY-FIRST COAST ARTILLERY (PS)

By Lieutenant P. H. Wollaston

The 91st CA (PS) has been engaged in beach defense firing and antiaircraft machine-gun firing during the past two months.

The beach defense firing involved day and night firings with 75-mm., 37-mm., and machine guns. The work was conducted with moving targets, and the results were excellent.

The antiaircraft machine-gun fire was conducted with free balloon and towed-sleeve targets. The scores of those batteries using the Morgan machine-gun sight promise to be exceptional, and much higher than those batteries using straight tracer control. Captain Merkle devised a tracer-control sight having possibilities.

NINETY-SECOND COAST ARTILLERY (PS)

By Major H. A. McMorrow

According to the annual training program, the rainy season ended officially on August 7th. Very soon there-

after, J. Pluvius opened up with all guns, and in the ensuing days drenched one and all with many downpours. Now, in the latter part of September, the rain seems to have ceased for a time, and the great outdoors glows with a bit of the good sun.

The Kindley Field area once more reverberates as tractors snort and 155 guns clank for traction tests and position maneuvers. Antiaircraft machine-gun instruction in preparation for November practices has progressed nicely and soon there will be air missions for tracking and preliminary practices. This year, the regiment will use sights in its firing at the towed sleeve; and the training of range sections and gunners has introduced new problems.

During lulls in the August rain, beach defense firings were held at Monkey and Ordnance Points. Machine gunners put on excellent day and night shoots, the latter at moving targets. Both day and night practices of the 37-mm., 75-mm. guns at moving targets, and the judgment and adjustment of the gun commanders proved their training as artillerymen.

On September 1st, a reorganization was effected within the regiment. Heretofore, Battery "D" in addition to its normal gun-battery duties, has had the transportation. Now Headquarters Battery has the transportation and the increased efficiency of the new set-up is apparent to all.

Recent War Department orders direct 1st Lieutenant Daniel M. Wilson, now on detached service with the Philippine Army, to sail on the February transport, for Fort Monroe and the School. No other changes of personnel are expected until the May boat sails.

1 1 1

San Francisco

COLONEL H. T. BURGIN, 6th Coast Artillery,
Commanding

By Major Willard Irvine

- Since the last news letter notable events were the visit of the Chief of Coast Artillery, and the participation of the command in the convention of the United States Coast Artillery Association, which met in San Francisco.

General Sunderland came from Panama on the U.S. A.T. *St. Mihiel* and was met at Fort Mason by the harbor defense commander. At the entrance to Fort Winfield Scott the Chief of Coast Artillery inspected an escort of honor which preceded him to headquarters where he was joined by General Tracy and staff. Following a review of the 6th Coast Artillery, General and Mrs. Sunderland were the luncheon guests of the officers and ladies of district headquarters and the Harbor Defenses of San Francisco.

As part of the program, a reception was held at the officers' club, Fort Winfield Scott, for General and Mrs. Sunderland. Many National Guard, Reserve and retired officers took advantage of this occasion to renew friendships. The following day the program included a regimental review, a motor trip to Forts Baker and Barry, a

visit to the new gun battery and other installations at Fort Funston, and a luncheon at Fort Scott.

The regiment has completed the antiaircraft artillery practices required as an additional assignment. Batteries "A" and "K" fired machine guns, and Battery "E" guns. All firing was at Fort Funston. Battery "E" has moved to Fort Barry for seacoast artillery training and will fire a 12-inch gun battery in November. Battery "A" expects to hold its mine practice in December.

Captain Keeler now commands Battery "A," and 1st Lieutenant Bain, Battery "E." Major Geoffrey O'Connell and family leave for Panama early in November. 1st Lieutenant East has Headquarters Battery and is the post exchange officer at Fort Scott. 1st Lieutenant and Mrs. Carey and 2d Lieutenant and Mrs. Underwood are recent arrivals at Fort Scott. Major W. W. Scott, adjutant, 6th Coast Artillery was promoted to major July 1st. Captain R. R. Hendrix sails for the Philippines in January.

2d Lieutenant Hudson, Air Corps Reserve, on duty at Moffett Field, California, with the 82d Observation squadron, has been attached to the 6th Coast Artillery for a two-week contact course.

While the 30th Infantry band is away from the Presidio, the 6th Coast Artillery Band takes part in the weekly parade of the 30th Infantry.

A regimental competition in close-order platoon drill was won by the 2d Platoon, Headquarters Battery. This platoon is composed of students in the Ninth Corps Area West Point Preparatory School.

Among the October activities of the Fort Winfield Scott noncommissioned staff club were a Hard Times party, a Halloween party, and a picnic at Menlo Park. Master Sergeant Haffards, a patient in Letterman General Hospital is reported greatly improved. Master Sergeant James E. Strong has been appointed a warrant officer. Staff Sergeant A. N. Miller, on duty at Headquarters, Ninth Coast Artillery District, sailed for Panama September 22. Master Sergeant Arthur M. Patton arrived recently from Hawaii.

Battery "K," 6th Coast Artillery, Captain Dean Luce, commanding, will participate in the Armistice Day ceremonies at Mill Valley, and the regiment less Battery "K" will parade on the same day at Oakland. Battery "E," 6th Coast Artillery, 1st Lieutenant James G. Bain, commanding, will act as an escort of honor to the Governor of California on November 21 at exercises on Treasure Island—the location for the Golden Gate International Exposition in 1939.

Mr. Mark S. Curtis, son of Captain E. E. Curtis (MC), U. S. Naval Hospital, Mare Island, California, a Coast Artillery Blue Course graduate of the CMTC held at Fort Winfield Scott in 1937, has been awarded a four-day all expense trip to Washington, as the most outstanding graduate in the Ninth Corps Area. Mr. Curtis will travel by plane to and from Washington and will be presented with the John J. Pershing Medal by the Secretary, of War.

Fort Barrancas

COLONEL B. H. L. WILLIAMS, 13th Coast Artillery
Commanding

By Captain J. E. Harriman

With the departure of the CMTC trainees on August 31, Fort Barrancas closed its summer training activities. Approximately 670 youths were trained by the officers of the 925th Coast Artillery, commanded by Lieutenant Colonel C. S. Vance of Fort Valley, Georgia; the 545th Coast Artillery, commanded by Lieutenant Colonel Robert L. A. Indest of New Orleans; and the 540th Coast Artillery, commanded by Lieutenant Colonel R. W. Coward of Birmingham, Alabama. Regular army officers on duty with the camp included Major Joseph B. Hafer, 13th Coast Artillery, and the following, who were ordered to this station for temporary duty: Major Abram V. Rinearson, Athens, Georgia; Captain George W. Brent, Opelika, Alabama; Captain George R. McElroy, Chattanooga, Tennessee, and Captain Fred B. Waters, Atlanta, Georgia.

Concurrent with the CMTC, the Reserve officers of the following regiments were given unit training: 534th Coast Artillery, commanded by Colonel Henry I. Ellerbe, Bennettsville, South Carolina; 504th Coast Artillery, commanded by Lieutenant Colonel Francis M. Ellerbe, Jonesville, South Carolina; 67th Coast Artillery, commanded by Captain Leon J. Reed, Franklin, North Carolina, and 524th Coast Artillery, commanded by Lieutenant Colonel Charles M. Boyer, Atlanta, Georgia. Lieutenant Colonel Clifford R. Jones, Atlanta, Georgia; Major Vernon W. Hall, Jackson, Mississippi, and Captain Andrew P. Sullivan, Columbia, South Carolina, were at Barrancas on temporary duty in connection with this training.

The 206th Coast Artillery (AA), Arkansas National Guard, commanded by Colonel Eglan C. Robertson of Marianna, Arkansas, preceded the CMTC and conducted its field training here, and the 623d Coast Artillery (HD), a Reserve unit, commanded by Major Harry W. Porter, Jacksonville, Florida, received two-week unit training. A total of 475 Reserve officers have trained at this station during the past year.

The new War Department theatre was officially opened on Sunday, August 22, and fills a need of long standing. The theatre was formally presented to the post by Colonel E. R. Householder, Adjutant General's Department, and was accepted by Lieutenant Colonel G. F. Humbert on behalf of the garrison. Construction of this beautiful little theatre was in charge of Captain E. F. Kollmer (FA), Quartermaster Corps.

Recent visitors to the post included Senator Charles O. Andrews of Florida, Congressman Millard F. Caldwell, and a Congressional committee. Other visitors were Colonel Charles H. Patterson, I.G.D., Colonel Charles B. Elliott, Headquarters 4th Corps Area; Colonel E. R. Householder, A.G.D., Washington; Colonel William

M. Colvin, C.A.C., and Lieutenant Colonel H. F. Nichols, 4th Coast Artillery District, Atlanta.

Repairs to barracks, quarters, roads, and grounds are being continued with WPA funds and the appearance of the post and comfort of the barracks and quarters have been much improved. Porches of several sets of quarters have been renovated to provide sleeping porches.

Colonel Benjamin H. L. Williams and Mrs. Williams arrived at Fort Barrancas on September 14, on which date Colonel Williams assumed command, relieving Lieutenant Colonel George F. Humbert who remains as executive.

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West Point

By 1st Lieutenant L. M. Guyer

Early this fall, upon becoming senior Coast Artillery officer at West Point, Major James L. Hayden scrutinized the austere dust of ancient records to discover that the West Point Chapter of the Coast Artillery Association had been for several years condemned to a "care-taking status." Dust covers shrouded the social plotting board. Hardened cosmoline covered the convivial tea-cups and glasses of old. Open was the breach, and gone were the gun crews. Even the powder magazines were locked and neglected—except for *The COAST ARTILLERY JOURNAL* (nowadays a pretty potent "magazine").

In brief, many a target practice season had come and gone without meetings of the Association—meetings whose need had been apparent since the enlargement of the Corps of Cadets and the number of officers on duty at West Point. Thirty-three officers of the Coast Artillery are now stationed at the Academy. Yet, cadet sports, academic duties, far-flung quarters' areas, and the general social activity of the garrison operated to keep branch acquaintanceship at a minimum. It is no exaggeration to say that officers of a branch may spend four years together at the Point, only to meet again as strangers at some future station. Indeed, rumor has it that not long ago an officer paid his most important *P.P.C.* call, and was warmly greeted with the wish that his tour at the Academy would be a pleasant one!

Howbeit—it was particularly with a view toward furthering the social contact between Coast Artillery officers that Major Hayden appointed Captains A. C. Spalding, Donald McLean, and R. W. Berry; and 1st Lieutenants R. P. Wood and E. E. Farnsworth as a reorganization and nominating committee to polish up the glasses and renew tracking.

The Association met at the Officers' Mess on October 14th, 100 per cent strong except for one member who was unavoidably absent from the post on leave. The tracking was successful, and the dinner—opportunistically timed on the maid's-night-out evening when "rain checks" are an urge and not an argument—was amply bracketed.

Major Hayden reviewed the history of the chapter; Captain Spalding read the report of his Committee with the principal recommendation that the Chapter remain

permanently active; and to this end, the following officers were designated for the year 1937-1938:

President: Major James L. Hayden.

Secretary and Treasurer: 1st Lieutenant E. E. Farnsworth.

Correspondent: 1st Lieutenant L. M. Guyer.

Major Alexander H. Campbell spoke of the desirability of interesting cadets in the Coast Artillery. Proselyting is, of course, thoroughly beyond bounds and good policy; but as Major Campbell pointed out, much can be indirectly accomplished by the renewed meetings of the Chapter, the aliveness and enthusiasm of Coast Artillery officers on duty here, and the indication of that old, if over-used term "esprit de corps" which makes any branch desirable to every cadet.

Warm and serious commendation was voiced, too, for the outstanding worth and interest of *The COAST ARTILLERY JOURNAL*. To the officers here it is the only contact with the activities of our profession. It is—and seriously speaking—a significant compliment to *The JOURNAL* that the Chapter at West Point resolved to limit our own gatherings to those of a social nature, and to depend on *The JOURNAL* to keep us professionally informed. We rather suspect that there is connivance between the editor and such ardent *JOURNAL* supporters as Captain Spalding and Lieutenant Blunda—in making our subscriptions an automatic and eternal thing of renewal—but this, too, we condone. In fact, we submit it to all *JOURNAL* readers, enthusiastically: You're a true 100-percenter at your station when your subscription runs on, automatically from year to year, unless you designate otherwise.

At West Point, we plan 100 per cent on this, and we assure a continuation of the chapter's activity. Although the reorganization meeting was stag, many future meetings will include the Coast Artillery ladies, too. A committee consisting of Major A. H. Campbell, Captain Donald McLean, and 1st Lieutenants E. B. Hempstead and J. C. Steele is at work arranging for the next gathering.

And in case that *JOURNAL* station supplement has been mislaid, and you'd like to—well, contact tickets for next year's Notre Dame game; the following officers are the West Point Chapter of the Coast Artillery Association: Majors J. L. Hayden and A. H. Campbell; Captains I. H. Ritchie, A. C. Spalding, D. McLean, F. A. Mitchell, R. W. Berry, H. P. Tasker, G. Schmidt, A. Hopkins, and A. T. Bowers; and 1st Lieutenants L. M. Guyer, J. Horridge, L. H. Brownlee, E. B. Hempstead, R. J. Wood, H. R. Boyd, M. S. Carter, A. C. Gay, W. F. Ellis, D. B. Webber, P. B. Stiness, G. F. Blunda, L. N. Cron, R. C. Bard, C. B. Duff, C. J. Diestel, R. S. Spangler, J. C. Steele, A. Sommer, E. E. Farnsworth, B. L. Paige, and L. J. Hillberg.

/ / /

Galveston

COLONEL ALLEN KIMBERLY, *Commanding*

Service practice for the 69th was completed August 30 at which time the regiment was temporarily reorganized.

The gun battery and the machine-gun battery were formed into a provisional machine gun battalion with a combat train from Headquarters Battery, under Major Charles Harris, CAC. The battalion was augmented by men from Headquarters Battery and Battery A to make the strength 15 officers and 450 men. It was attached to the test division at Fort Sam Houston but trained the first two weeks of September in vicinity of Galveston.

On September 11th the battalion marched to Camp Bullis where it formally joined the test division under General Parsons. Exercises, problems and maneuvers will occupy the time until November 15th.

Colonel Kimberly accompanied the battalion to Camp Bullis and left for a month's leave in the north and east returning to Fort Crockett October 10th. He was with the battalion in San Antonio from 20 to 25 October.

General Sunderland arrived at San Antonio on October 22 and was met by Colonel Kimberly, Major Harris, and others. He inspected the provisional machine-gun battalion in camp at Camp Bullis on October 23d. Colonel J. K. Crain, Corps Area Ordnance Officer, and many years in the Coast Artillery, entertained for General and Mrs. Sunderland at the Fort Sam Houston Club. Nearly all present and past Coast Artillerymen in that vicinity were present. On October 25th General and Mrs. Sunderland and Colonel and Mrs. Kimberly left San Antonio for Galveston by motor via Austin where the Chief paid his respects to the Governor of Texas. Stop was then made at Texas Agricultural and Mechanical College at College Station where Colonel George F. Moote is PMS&T. Colonel Moore held a reception for General Sunderland and all regular officers on duty there. After lunch the ROTC activities of the college were visited and the party left for Houston and Galveston.

The arrival at Galveston at 9:00 P.M. was marked by a unique escort of honor for General Sunderland. The escort and band were illuminated by red flares, augmented by the searchlights with the illuminated club fountain between and to the rear of the band and troops.

On October 26th the Harbor Defenses of Galveston and the 69th were inspected.

An informal reception for all officers and ladies of the post and many prominent Galvestonians was given in honor of General and Mrs. Sunderland by Colonel and Mrs. Kimberly, followed by a buffet supper at the Beach Club. The 69th band played during the evening.

On October 27th General Sunderland visited the cotton industry activities in and around Galveston and was taken through the new Pan American Oil Refinery at Texas City across the bay.

General and Mrs. Sunderland concluded their visit to Galveston on the evening of the 27th and were motored to Houston by Colonel and Mrs. Kimberly and left after dinner for New Orleans.

The next incident of interest was the return of the machine-gun battalion on November 15th. Colonel Kimberly was present at the exercises in the vicinity of Mineral Wells from 11 to 14 November. Strenuous days are ahead

for the overhauling of all the hard used motor transport.

Rifles, which are strangers to about 90% of the command, will shortly be issued.

Almost the entire period of the division test had fine Texas fall weather which added to the accomplishments and comfort of all concerned. The command at Fort Crockett is still in khaki.

Colonel and Mrs. John B. Maynard, CAC, were recent visitors to Galveston and stopped by at Fort Crockett.

The 3d Wing from Barksdale Field under General Frederick L. Martin with headquarters at the Houston airport conducted extensive exercises and maneuvers in East Texas from October 11 to October 29th. One pursuit group under Colonel Hoyt was quartered at and operated from the Fort Crockett Airdrome. Generals Andrews, Martin, Cheyney, and Emmons, all of the Air Corps, visited the airport during the exercises and were serenaded by the 69th Band.

Colonel and Mrs. Halbert left for the Philippines on November 3d. They were the recipients of many farewell parties.

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Training of 519th C.A.

By Lieutenant Colonel F. J. Baum, CA-Res.

Perhaps the experience of the 519th C.A. during the active duty period this year at Fort MacArthur may suggest some possibilities to regimental commanders who have been puzzling over ways and means of making unit training more valuable.

First off, what do we mean by "unit training"? Most of us in the Reserves have been satisfied with any sort of training, as long as it was done under the direction of the unit commander. Most regiments have a permanent assignment of officers to staff and battery duties; and when the summer camp comes around, those assignments are carried out. This means, of course, that regimental and battalion staffs function in their various duties, that battery commanders handle their various batteries, and the lieutenants stand around and watch proceedings with more or less interest and try to keep out of the way, and avoid sticking their necks out. Staff officers never see a gun—much less have an opportunity to fire one.

Thanks to the advice and help of Colonel R. H. Williams, the executive for Coast Artillery Reserves in Southern California, the unit training of the 519th C.A. this year went a step further. The regiment trained under the command of its commanding officer, and every officer received complete training in every type of activity.

For instance, 150 rounds of 3-inch AA ammunition were available. The ammunition was so distributed that each of the 30 officers present took command of the gun battery, figured his trial-shot data, and fired a minimum of 5 shots, either as a trial-shot problem or a burst problem. This was true of even the newest second lieut. It was encouraging, if a bit astounding, to learn that many of the higher ranking first lieutenants had never before

had the opportunity to do the work and give the orders to fire a battery.

The same method was applied to the machine guns. Every officer, whether assigned to the staff or a battery, actually fired the 1,000-inch range course, and the course at free balloons, as well as daylight firing at towed sleeves.

In locating night positions for the searchlight battery, each officer was present with one of the lights. When the planes came over, each officer had an opportunity to control the light and attempt to get on the target. They also handled the comparator, and for the first time many discovered the difficulty of putting the light in action at the right instant to pick up the target.

In addition to work with searchlights, guns, and machine guns, a 10-ton artillery tractor was made available and, after instruction in its mechanism and uses, each officer was given an opportunity of getting behind the wheel and driving the tractor over rough ground.

Because the regiment is assigned to antiaircraft, many of the officers had not had experience with "concrete" artillery. One full day was given over to manning the plotting room and the disappearing rifles of the harbor defense installations. Every officer progressed through all

the duties, from loading the gun with dummy ammunition, to acting as the battery commander.

Here was "unit training" carried to the utmost—for every officer had a chance to actually handle and use every piece of apparatus.

Great credit for the success of the training period is due Colonel Paul D. Bunker, CAC, the unit instructor, who had arrived from Manila just before the active duty period. Although a stranger, a few days in camp were sufficient for Colonel Bunker to win the whole-hearted cooperation of every officer of the regiment. His genial personality and long experience as a Coast Artilleryman made him an ideal representative of the Regular Army to whom we could appeal in moments of doubt and uncertainty.

The harbor defense commander, Colonel Claude Thiele, and his officers were more than helpful, and went out of their way to make equipment available and see that our training was carried on under the best possible conditions.

All unit commanders should give serious consideration to this type of "unit training" in which every officer actually contacts, handles, and commands each piece of equipment.

Coast Artillery Orders

(Covering the Period September 1 to October 31, 1937)

Colonel F. J. Behr, from San Juan, Puerto Rico, to home and await retirement.

Colonel F. Q. C. Gardner, from assistant commandant, C.A. School, Fort Monroe, to 7th, Fort Hancock.

Colonel J. T. Geary, retired, September 30.

Colonel L. B. Magruder, from 7th, Fort Hancock, to Org. Res., Third Corps Area, Fort Monroe.

Lieutenant Colonel F. S. Clark, from instructor, C.A. School, Fort Monroe, to duty in the Office, Chief of Staff, Washington, D. C.

Lieutenant Colonel F. E. Emery, Jr., from Hawaii, to 2d, Fort Monroe.

Lieutenant Colonel E. O. Halbert, from 9th, Fort Crockett, to the Philippines, sailing San Francisco, January 29.

Lieutenant Colonel R. F. Maddux promoted Colonel October 1.

Major T. R. Bartlett, retired, October 31. Major D. H. Hoge, from 11th, Fort H. G. Wright, to Hawaii, sailing New York, January 6.

Major J. deB. Walbach promoted Lieutenant Colonel, October 1.

Captain R. R. Hendrix, from 6th, Fort Winfield Scott, to the Philippines, sailing San Francisco, January 29.

Captain J. J. Johnson, from 10th, Fort Rodman, to Hawaii, sailing New York, November 27.

Captain P. B. Kelly, from 61st, Fort Sheridan to 12th Brigade, Fort Sheridan.

Captain Otta Marshall, retired, October 31.

Captain V. G. Schmidt, promoted Major, September 1.

Captain C. F. Wilson, from Hawaii, to Fordham University, Fordham.

Captain F. J. Woods, from the Philippines, to 6th, Fort Winfield Scott.

First Lieutenant S. R. Beyma, from Hawaii, to 2d, Fort Monroe.

First Lieutenant W. A. Call, from Aberdeen Proving Ground to Hawaii, sailing New York, December 8.

First Lieutenant D. R. Corum, from Randolph Field, to 63d, Fort MacArthur.

First Lieutenant R. W. Moore, from Judge Advocate General's Dept., and from Georgetown Univ. Law School, Washington, D. C., to 2d, Fort Monroe.

First Lieutenant A. W. Schermacher, from 62d, Fort Totten, to Quartermaster Corps, Fort Robinson.

First Lieutenant D. McC. Wilson, from the Philippines, to 2d, Fort Monroe.

Second Lieutenant Frederick Bell from

student, Air Corps Advanced Flying School, Kelly Field, to Hawaii, sailing San Francisco, November 13.

Second Lieutenant A. S. Buynoski, from 63d, Fort MacArthur, to Panama, sailing San Francisco, January 14.

Second Lieutenant K. I. Curtis, from 63d, Fort MacArthur, to Hawaii, sailing San Francisco, October 1.

Second Lieutenant F. W. Gillespie, from student, Air Corps Advanced Flying School, Kelly Field, to Panama, sailing Charleston, S. C., November 5.

Second Lieutenant R. H. Kessler, from USAMP *General John M. Schofield*, Fort Monroe, to 52d, Fort Monroe.

Second Lieutenant H. D. Lind, from 61st, Fort Sheridan, to Hawaii, sailing New York, December 8.

Second Lieutenant R. H. Mattern, from 62d, Fort Totten, to Hawaii, sailing New York, December 8.

Second Lieutenant C. B. Stewart, from student, Air Corps Advanced Flying School, Kelly Field, to Brooks Field, San Antonio.

Second Lieutenant B. M. Warfield, from 61st, Fort Sheridan, to Hawaii, sailing New York, December 8.

Second Lieutenant J. B. Yost, from 13th, Fort Barrancas, to the Philippines, sailing New York, January 6.

News and Comment

THE UNITED STATES COAST ARTILLERY ASSOCIATION



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

OFFICERS

President

MAJOR GENERAL A. H. SUNDERLAND

Vice-President

COLONEL F. H. LINCOLN

Secretary-Treasurer

MAJOR AARON BRADSHAW, JR.

Additional Members of the Executive Council

BRIG. GEN. WILLIAM OTTMANN	LT. COL R. S. ATWOOD
COLONEL W. S. POLLITZ	LT. COL. C. M. IRWIN
COLONEL CLIFFORD JONES	MAJOR LEROY LUTES
MAJOR JOHN CASWELL	

One Corps—One Magazine

It is gratifying that many of our subscribers send us their suggestions and ideas for improvements. A heavy mail from the field indicates The JOURNAL is being taken from its envelope. Moreover, it is being read. An occasional subscriber takes time out to disagree with us. This constructive criticism adds zest to the game. Once in a while we retaliate by disagreeing with a subscriber but we tell him why and encourage him to continue to send in his ideas. Nevertheless, more often than not, the subscriber is right, and for that reason we like to hear from him. So, if the spirit moves you, let us hear what you'd like to read in The JOURNAL. Tell us what's right—or wrong—with your magazine; we'll meet you more than half way.

All this is by way of a prelude to dealing with a subject

which is the concern of all subscribers. Quite often the suggestion is advanced that The JOURNAL should set aside a certain amount of space to be devoted exclusively to the interests of one of the three components. The idea is that a section headed up "National Guard" should contain items of interest alone to the Guardsman; another, called "The Reserves" should devote itself to the problems of the Officers' Reserve Corps. In like fashion, the Regular Army would receive its own tight little compartment in which to thrash out matters that affect only itself.

The idea may have something in its favor. Yet, as we see it, it has a distinct fundamental unsoundness. Time may prove us wrong in this respect, but perhaps you'd be interested in our reasons for thinking as we do.

The United States Army definitely operates on the one-army plan. We of the Coast Artillery are certain that that plan is a sound one for it has satisfactorily seen us through one war and nineteen years of peace. In such an army, the affairs and problems of any one component should be the mutual concern of all components. Putting each element into a watertight compartment would, it is believed, naturally lead to the conclusion that the three components' interests and objectives are alien to each other. This, of course, is not so, and furnishes our main reason for believing that boxing off Regular, Guardsman, and Reservist is unsound.

With this belief in mind, each item which goes into The JOURNAL is subjected to one test: Will it be of equal interest to all three components? All articles, by their very nature, cannot answer this question in the affirmative, but all *major* articles can—and do. It happens that occasionally an article—say a Regular Army promotion study—inferentially concerns only one component. In a sense this is true, but we hold to the belief that the Guardsman and Reservist don't mind reading about a few of the troubles of their Regular brother-in-arms. And, on the other hand, we feel sure that a study affecting the interests of either of the two civilian components will be sympathetically read by the Regular.

Search as we may, we have been unable to discern any material difference in the characteristics of the members of the three components of the Coast Artillery Corps. Basically, we are all members of the same tribe. With this in mind, The JOURNAL will do its best to be of interest to all.

Election of Officers

Five members of the Executive Council terms of office expire on December 31, 1937. Their successors are to be

ected by ballot from among Coast Artillery officers. The present members whose terms of office expire are:

Colonel F. H. Lincoln, C.A.C.
 Lieut. Col. R. S. Atwood, C.A.C.
 Lieut. Col. C. A. Irwin, CA. Ore. N. G.
 Major LeRoy Lutes, C.A.C.
 Major John Caswell, CA-Res.

To fill the five vacancies the President of the Association appointed a nominating committee to place the names of competent officers in nomination. The committee is somewhat restricted in its selections (even though there are many qualified officers) because of the desire to have as many members of the Executive Council as possible available for meetings in Washington. In order to have a quorum, which is essential for the conduct of business, at least five members of the Executive Council should reside in Washington or be available for meetings there. The nominating committee has submitted the names of the following officers for consideration:

For Vice President—Colonel Avery J. Cooper, C.A.C., Executive Officer, G-4, War Department General Staff, Washington, D. C.

For Additional Members of the Executive Council:

Colonel C. J. Smith, 213th C.A., Pa. N. G., Allentown, Pa.

Colonel E. C. Webster, 243d C.A., R. I. N. G., Providence, R. I.

Colonel E. W. Thomson, CA-Res., Annapolis, Md.

Colonel W. W. Burns, 260th C.A., D. C. N. G., Washington, D. C.

Lt. Col. R. M. Perkins, C.A.C., War Plans Division, War Department General Staff, Washington, D. C.

Lt. Col. J. P. Hogan, C.A.C., National Guard Bureau, Washington, D. C.

Lt. Col. H. L. Spencer, 211th C.A., Mass. N. G., Boston, Mass.

Lt. Col. J. H. Sherman, 251st C.A., Calif. N. G., San Diego, Cal.

Major Milo H. Brinkley, CA-Res., Washington, D. C.

It is especially desired to impress upon all members of the Association that they are not required to accept the selections of the nominating committee and that they are free to make substitutions and to vote for any officer of their choice. If any member does not approve of the committee's recommendation he should enter his personal choice on the ballot in the space provided for that purpose.

Printed ballots will be distributed about December 1, 1937. Normally, they will not be sent to individuals, as this has been found to be impractical, but they will be sent through regimental and post commanders, National Guard instructors, instructors of the Organized Reserves and similar agencies. It is urgently requested that individuals accomplish the ballots and return them to the agency from which they received them, and that these

agencies forward them promptly to the Secretary of the Association. In case a member of the Association should fail to receive a printed ballot it is requested that he record his vote informally. A copy of the printed ballot, which will be mailed out, appears on page 542. Ballots should be mailed in time to reach the Secretary of the Association prior to January 5, 1938. They cannot be counted if received after that date.

In expressing at this time our appreciation to the retiring members of the Executive Council, we are mindful of the sacrifices made by them to further the work of the Association. Their helpful suggestions affecting policies, and their willingness at all times to render every possible assistance, has in measurable degree contributed to whatever success and progress the Association and the JOURNAL have attained.

Training Opportunities

The Chief of Coast Artillery recently made extensive inspections including units engaged in the tests now being held at Fort Bragg. He is especially desirous that the members of the Corps appreciate opportunities to demonstrate the capabilities of our personnel and armament to other branches and to civilians.

When demonstrations are given, those responsible should take every step to insure that the underlying purpose is understood by all present, and that the results and lessons are made apparent to all. Normally demonstrations should not be conducted except under the most favorable conditions. Care should be taken that enlisted men present the best appearance and conduct themselves in an exemplary manner.

Smartness, precision, and excellence in telephone communication should be guiding factors.

New Plans for Award of Trophies

Circular No. 81, War Department, Washington, D. C., 1936, changing the provision of AR 140-5, made it necessary to change the existing plan of award for the U. S. Coast Artillery Association regimental Reserve trophy. The Executive Council was especially desirous that the plan of award be so devised that these awards would be made on an improved and a more equitable basis in the future. The prime objective of the new plan is to reward the regiment whose personnel actually obtains the best record during the year for which the award is made.

The Executive Council desired to make the regimental trophy serve as an incentive to further effort beyond the minimum required for camp attendance. In the award of the individual trophy it was desired to lessen the weight that, in the old system, was placed upon work done in courses not pertaining to the particular grade of the individual or those grades immediately above that grade. It was further thought advisable that the responsibility for the award should rest with a board or committee composed

of field officers of the various regiments and the unit instructors. It was felt that there would be an increase in morale and that a more equitable distribution of individual trophies would result if the unit instructors and regimental field officers participated more actively in making the awards.

The President of the Coast Artillery Association appointed a board consisting of the following named officers: Colonel H. F. Spurgin, C.A.C., Lt. Col. C. M. S. Skene, C.A.C., Lt. Col. R. S. Atwood, C.A.C., Major Milo H. Brinkley, CA-Res., to study and make recommendations for the necessary changes. This board drew up tentative proposals for changes which were submitted to all Coast Artillery Reserve regiments through the various unit instructors. Upon receipt of the comments and recommendations of the various regiments final plans were drawn up and approved by the Executive Council. They appear below and will be in effect for the award for the year 1937-1938.

REGIMENTAL TROPHY

1. The Coast Artillery Association regimental trophy will be awarded annually to the Reserve or Regular regiment, having Reserve officers assigned, that attains the highest figure of merit for the year.

2. The figure of merit will be the sum of the following two components:

a. The total number of credit hours earned during the year by completed extension school subcourses and command and general staff lessons will be divided by the average strength of the regiment.

b. The number of officers who earned 40 or more credit hours during the year by completed extension school sub courses or command and general staff lessons will be divided by the average strength of the regiment. This quotient expressed as a decimal will be multiplied by 100.

3. *a.* The average strength of the regiment is the average of its strength on December 31st and on June 30th.

b. The competition year is from July 1st to June 30th.

c. A regiment must have a strength of 25 or more officers to be eligible for the award.

d. In computing the component in paragraph 2 *a* above no officer will be credited with more than 100 hours.

e. The term "officer" applies to Coast Artillery Reserve officers only, assigned or attached.

f. Only subcourses and command and general staff lessons completed while a member of a regiment will be credited to that regiment.

g. Subcourses must be appropriate to the officer's grade or the next higher grade; that is, for 1st Lieutenants the 30 or 40 Series; except a colonel or an officer holding a certificate of capacity for colonel, may be credited with any courses approved by the corps area for obtaining eligibility for camp attendance.

b. Coast Artillery subcourses and command and general staff lessons only will be credited except as authorized in paragraph 3 *g.* above.

i. The date of issue of a subcourse certificate determines when the hours of credit it represents were earned. The date appearing in the "received from student" column on the lesson assignment card determines when hours of credit were earned for command and general staff lessons.

j. When subcourses are issued in parts (designated by Roman numerals) such parts shall be considered as subcourses.

k. 2d Lieutenants exempted from examinations and tests by Section II, Circular No. 81, War Department, 1936, will not be included in the strength of a regiment nor will correspondence work done by them be credited except as follows: If a 2d lieutenant, so exempted, completes subcourses during the year totaling 20 hours or more he will be included in the strength of the regiment and his work credited to the unit under the same conditions as for other officers.

INDIVIDUAL TROPHIES

An officer's saber will be presented each year to a Regular Army or Reserve regiment in each corps area, under the following conditions:

a. The regiment's average Coast Artillery Reserve officer strength on the last day of December and June must be 30 or above.

b. The number of Coast Artillery Reserve officers in the regiment who have earned 25 hours or more of credit while members of the regiment as evidenced by completed subcourse certificates or satisfactorily completed command and general staff lessons between July 1st and June 30th, will be divided by the regimental strength as determined in paragraph *a* above and the result expressed as a percentage.

c. The regiment with the highest percentage will receive the saber.

d. The saber will be awarded to the Coast Artillery Reserve officer of the regiment in the grade of 2d lieutenant, 1st lieutenant, or captain who has done most to promote the active duty and inactive duty training and the esprit of the regiment, during the year.

e. The officer will be selected by a committee composed of the field officers and the Unit Instructor of the regiment.

* * *

The Cover and the Fan Mail

Having gotten this far in your magazine, you have no doubt noticed that The JOURNAL appears in fancy dress for the first time. Our reason for going into color on the cover is that the holiday season is upon us. We thought that you'd like to be reminded of it.

While at present we can't afford to give you color covers with every issue it may be that some day we'll be able to do it oftener than once a year. Be that as it may, we thank

our subscribers for their support and encouragement during the current year and look forward to it during 1938.

The thought occurs that perhaps you are stuck in picking those last-minute Christmas presents. Why not give *The Journal*? A year of the Coast Artilleryman's own magazine may be just the thing for that brother officer who, for various reasons, may not have heard of it. Rather than tell you ourselves what a good gift it would make, we'll quote from some of the fan mail received since the preceding issue.

That *The Journal's* appeal is not limited to the men of the family appears from the following:

Even the wife reads it—almost from cover to cover.

Captain MILO CARY, C.A.C.

The Journal is also seen (and read) beyond the close confines of the military, as witness the following:

I cannot close without complimenting you on both the appearance of *The Journal* and the interesting reading matter it contains.

ROBERT B. LEA, Vice-president,
Sperry Gyroscope Co., Inc.

The civilian components continue to furnish strong support, not only as contributors but as subscribers:

As a Reserve officer student, *The Journal* has been very helpful to me.

1st Lieutenant WILLIAM BROWN, C.A.—Res.

Another *JOURNAL* booster writes us:

We enjoy *The Journal* immensely.

Sergeant Major W. E. CORLEY.

The strength of the National Guardsmen on our rolls continues to increase, possibly because of the satisfied customers we have had in the past. One of these speaks up:

The Journal enables Coast Artillerymen to keep in touch with the various branches of the Corps which would otherwise remain a mystery.

1st Lieutenant R. J. LOOS,
244th C.A., N.Y.N.G.

And the following letter voices sentiments that could not fail to appeal to any editor:

To show you how eager I am to continue subscribing to *The Journal* I am sending this via Clipper Air Mail so that I will not lose a single copy. As long as *The Journal* continues its high standard I never want my subscription to lapse.

Captain D. J. BAILEY, C.A.C.

That letter winged its way from Manila; we're sorry that we are still forced to depend on the more sedate steamers for delivery service on your magazine.

★ ★ ★

First U. S. Antiaircraft School

The accompanying picture is the first photograph taken of the original faculty and students of the first antiaircraft school in the United States Army. It was taken at Arnouville-les-Gonesse, France, in the early days of October, 1917, shortly after the arrival of the students from the States.



1-2nd Lt. S.C. Deitrick Jr.
2-1st Lt. J.M. Lewis
3-2nd Lt. I. Wynne
4-1st Lt. W.S. Barker
5-2nd Lt. R.O. Edwards
6-2nd Lt. O.J. Miller
7-2nd Lt. J. Jenkins
8-2nd Lt. W. Hesketh
9-1st Lt. J.H. Ewell Jr.
10-2nd Lt. E.R. Holland

Pittsburg,
Pa.
Providence,
R.I.
Harrisburg,
Pa.
Cincinnati,
Ohio
St. Louis,
Mo.
Norfolk,
Va.
Providence,
R.I.
Goliad,
Texas
San Antonio,
-

Va.
Pa.
R.I.
Pa.
Ohio
Mo.
Va.
R.I.
Texas
-

11-2nd Lt. B.F. Harmon
12-2nd Lt. C.W. Lawrence
13-1st Lt. F.W. Mitchell
14-2nd Lt. D.F. Taylor
15-2nd Lt. R.E. Gloagheen
16-2nd Lt. A.G. Dixon
17-1st Lt. H.K. Webb
18-2nd Lt. S. Shillig
19-1st Lt. A.E. Hull
20-1st Lt. W.V. Brenizer

Boston, Mass.
-
Ohiopyle, Pa.
Indianapolis, Ind.
Brockton, Mass.
St. Louis, Mo.
Philadelphia, Pa.
Port Gibson, Miss.
Marshalltown, Ia.
Austin, Texas

21-1st Lt. J.H. Cochran Little Rock, Ark.
22-2nd Lt. W. Tower Mass.
23-1st Lt. D.S. Ward Queens, N.Y.
24-2nd Lt. A.W. Chapman Bay St. Louis, Miss.
25-1st Lt. H.M. Marsh Washington, D.C.
26-Capt. Humbert Annapolis
27-Capt. G.P. Anderson West Point
28-Capt. Gacier Paris
29-Capt. Rollet Paris

oct-1917

The students were all second and first lieutenants, most of them fresh from college, and all of them firm in the belief that lieutenants were non-expendable. The faculty consisted of Captains G. F. Humbert and Glenn P. Anderson, C.A.C., and Captains Rollet and Gassier, French Army.

Paragraph 10, Confidential Order No. 17, W.D., July 14, 1917, believed to be the first U. S. Army order published regarding antiaircraft defense, directed Lieutenant Colonel James A. Shipton, C.A.C., 1st Lieutenant George F. Humbert, C.A.C., and 1st Lieutenant Glenn P. Anderson, C.A.C., to proceed to France, and report to the Commanding General, with view to assignment to the work of organization and training in tactical and technical anti-aviation defense.

The board sailed from New York, July 26, 1917, on the *Philadelphia*, sailing without convoy. The *Philadelphia* was attacked by submarines twice in one morning, off Tory Island at the entrance to the Irish Sea; the first torpedoes missing the stern by inches. There was no damage except perhaps to the nerves of the passengers, who experienced their first war thrill. The board landed at Liverpool August 14, 1917, immediately entraining for Folkestone. From there it sailed in a heavily guarded convoy for Boulogne. The board reported to American GHQ, then located at 23 Rue Constantine, Paris; and fifteen days after leaving New York it was in the front line, wearing steel helmets and gas masks for the first time. Accompanied by Captain Rollet, liaison officer from the French AA school at Arnouville-les-Gonnesse, it made a reconnaissance trip through the French antiaircraft defenses of the Third, Sixth and Tenth French Armies, in the active Chemin des Dames sector. The French had single antiaircraft guns in the front-line trenches. These guns were 75's, carriages modified to permit high-angle fire.

After the trip the group was assigned an office in the American Air Service building on Avenue Montaigne, Paris, and from there commuted to the French AA School at Arnouville. The Regnier-Arnouville instrument (Regnier being the name of the chief designer), known to us as the R.A. corrector, had not yet been generally distributed to the French Army. It was undergoing study and tests at the school. It was the secret and pride of the French antiaircraft service, and was supposed to be far in advance in efficiency to any instrument in either the Allied or German armies. Judging by the results, this was probably true. At that time the latest thing in gun and mount was the 3-inch AA gun M1917. Incidentally, this same type gun, mount, and corrector are now being used by some of our ROTC units.

The natural location for the American School was next to that of the French, where advantage could be taken of their matériel, instructors and textbooks. A beautiful château on the outskirts of Arnouville was requisitioned for classrooms and barracks.

French textbooks and many lengthy treatises had to be translated into English and mimeographed for the use of

the Americans. All the material for the use of the students—bunks, mattresses, and bedding—had to be obtained and set up in the château. This work was done by Captains Humbert and Anderson. General Shipton (who had been promoted to brigadier general), was in England looking over the antiaircraft British methods.

The school was ready for students about the middle of September, 1917. The students arrived at the beginning of October, and instruction began at once. It is believed the the only members of the original board and students still on the active list are Lieutenant Colonel G. F. Humbert, C.A.C., and Major William Hesketh, C.A.C.

Recent Experience of Air Attack

The whole subject of the ability of sea power to withstand the threat of air power is of infinitely more importance than mere controversial interest, particularly for this country, which is so dependent upon the sea. In the inevitable race between the menace and the antidote the latter is undoubtedly steadily gaining ground. In addition to high-angle fire the warship can employ smoke-screening—zig-zagging tactics at high speed do not make the task of attacking aircraft any easier.

There are various rumors of mysterious inventions for defeating aeroplanes—"death rays" and suchlike things. Frankly, we do not set much store by these ideas; we have been hearing of the wonderful things which were to be accomplished by ultra-rays and infra-rays and the rest of the spectrum for as long as we can remember, and are still waiting for anything to be accomplished at all.

But in the methods of straight fighting, progress is continuous. Of course, it is not one-sided by any means, and to say that the defense is getting "on top" of the air menace would be absurdly misleading. Air attack must always remain a very serious danger to warships. But the means of resistance are steadily improving. We no longer hear even the extremists protesting that it is a suicidal waste of money to go on building battleships to be sitting targets for aircraft.

During the past year we have seen plenty of aircraft in action against warships and other ships, and the net results have not been very encouraging to the air-minded enthusiasts. We may hope to have heard the end of those heavily-overworked experiments by the United States Air Force against a motionless and totally-defenseless ex-German battleship because there are now real war experiences to quote. The conclusion to be drawn from these is that air power is not going to drive sea power off the surface of the oceans.—*United Services Review*.

Training Movies

The 603d C.A. (Ry) undertook an unusual and progressive training measure during its active-duty period. Moving pictures were taken of every phase of the training, and are now being used for study and constructive criticism to derive real benefit from the mistakes made. The

methods employed to point out error and the use made of these films is an object lesson in progressive training.

These films add interest to the meetings during the inactive training period and, furthermore, guarantee results for the next year. It is suggested that greater use could be made of the movie camera during training periods and that a great deal of good would result to all organizations, Regular, National Guard, and Reserve.

Moving a Giant Gun

The redwoods grow big in California, and so do trucking operations.

Recently, the heaviest load ever moved on pneumatic tires, a 143-ton, 16-inch coast defense cannon, was hauled by the Converse Trucking Service, 15 miles from the site of the Golden Gate Bridge to a fort on the Pacific Coast.

It took the trucking company exactly seven days from the time it started building cribbing to hold the gun on special equipment, to the date of delivery.

Previously such projects had been handled by hard wooden rollers, or the cannon were delivered direct to the gun emplacement on flat cars.

The efficiency of modern truck transportation as compared with the old methods is illustrated by the fact that it took two hours and 35 minutes to haul the gun at a speed of one and one-half miles per hour over four miles of San Francisco streets and California Highways.

It would have taken approximately two weeks to move the cannon the same distance on the wooden rollers, especially since this section of the movement was up and down a 6 per cent grade.

The trucking service built a special two-axle trailer, which it used in connection with a GMC truck and a Reliance semi-trailer to which it added a third axle.

The total weight of the gun and moving equipment was 160-tons. The gun weighed 143-tons, the special trailer 3-tons, the truck and semi-trailer 11-tons, and 3-tons

of cribbing were used. The two-axle trailer was assembled with 16 wheels bearing 13.5 x 20 tires to take part of the load off the cribbing. There were 12 tires on the three-axle semi-trailer and ten tires on the three-axle truck.

Two days were required to move the gun seven-tenths of a mile, which included two switchbacks and grades up to 10 per cent. The pulls were approximately 25 feet and over each time, with the aid of winches mounted on an auxiliary truck.

Two extra trucks were used to hold the equipment back going down grade by means of a cable attached to the gun itself. The entire load was distributed so that the rear trailer carried 100 tons and the truck and semi-trailer 43 tons.

After Converse Trucking Service had posted a bond of \$350,000 to cover the movement, it had to secure special permission from both the State and City authorities to go ahead with the job.

"It was the most extraordinary operation I have ever known," said Russell Vevans, district director of the Bureau of Motor Carriers.—*Transport Topics, Washington, D. C.*

AA Guns Develop Fast

Those who are inclined to bank too much on aircraft in the next war are doomed to a sad awakening, for the antiaircraft artillery seems to have advanced faster than the planes and continues to do so. The modern range finders, locators, and other fire-control matériel used in connection with the antiaircraft defense do everything but think. There are those who contend that they do that better than some personnel trying to operate them. During the war the "Archies," as the British termed the antiaircrafters, fired on the enemy planes mostly by guess work and with the hope that they would be able to make a hit now and then. They did, but there was a lot of luck in it. Today, with the improved fire-control instruments and firing devices, much of the element of chance is taken out of it.



160 Tons—the heaviest load ever carried by pneumatic tires.

and the "Archies" make frequent hits instead of occasional ones. All of this increased efficiency in antiaircraft fire is evidenced by the performance of the guns in Spain, where plane casualties have been extremely heavy. In the United States Army they have .30- and .50-caliber machine guns and 3" and 105-mm antiaircraft guns. In the Navy they have 5-inch guns with which to oppose the enemy, and when a shell from one of these splatters over a plane something disastrous is likely to happen. It is current news that the countries of Europe are giving increased attention to antiaircraft guns because they have proved to be so effective.—*Army and Navy Register*.



Ground Versus the Air

Results being reported as obtained by air attack in Ethiopia, Spain, and China tend somewhat to lessen the public estimation of the military value of aircraft. The press and the public now seem to discount the extravagant claims sometimes made by over-enthusiastic aviation proponents. It is thought, however, that this apparent change of popular opinion will not react unfavorably upon the air services, or lessen their essential contribution to a well-balanced combat team.

Antiaircraft artillery has suffered in the past from flip-pant belittlement by the uninformed. It is now receiving the serious consideration which is justly its due. The effectiveness of antiaircraft defense is no longer a matter of conjecture. Its adequacy for the job and dependability as a protective medium have been proved under war conditions.

It would seem that our nation could profitably afford an expenditure for antiaircraft defenses equal to the recent 35-million dollars set aside by the British government for such defense. Increased appropriations for up-to-date and efficient antiaircraft matériel should be delayed no longer.



Bilbao Questionnaire

Air force enthusiasts are puzzled and disappointed; they are at a loss to account for the fact that vastly superior air power did not . . . more speedily . . . compel the fall of Bilbao. It does require explanation. The nature of the terrain within the Government lines was such as to preclude the construction of aerodromes and landing grounds. The insurgent forces, on the other hand, not only possessed a plethora of planes, but could operate them from dozens of bases outside the perimeter of the defence.

And yet it took eighty days to bear back the defenders' lines and force submission. Even at that the Basque divisions in large part evaded the encirclement and made good their escape towards Santander, making of Bilbao's fall another city gained rather than a decisive military success. If a large accumulation of air power on one side, with a complete absence of it on the other, cannot accom-

plish a quicker result, then is the use of air force in such circumstances falsely estimated.

The answer is, "Yes, it is!" Although the surrounding villages were often razed by air bombardment, Bilbao itself was largely spared, the attackers' efforts being otherwise mainly devoted to trench-bombing and machine-gunning of exposed personnel. The bomb is not precisely a weapon of precision in the sense of ordnance, and narrow trench systems are extremely difficult targets even at low height. The incendiary bomb has little, if any, effect when thus applied, and gas was not employed. Aircraft can destroy effectually when the objective, be it men or be it material, affords a mass presentment, but otherwise it is usually wasted effort.

In the Great War our R.A.F. communiques used to declare that such and such a weight of bombs and so many rounds of small arm ammunition had been expended on the enemy lines. The wording was for home consumption and, more often than not, might have read as follows: "In the course of operations our bombing and low-flying pilots without exception hoped for the best; in the aggregate their aspirations amounted to a total weight of x foot-pounds."—*United Services Review*.



Legion Defense Program

Following are extracts from the American Legion's new National Defense program as approved by the last annual convention held in New York during the month of October.

ARMY

2. Activation of six skeletonized regiments of our antiaircraft artillery, complete modern equipment for all active regiments of the Regular Army and the National Guard and an adequate reserve of equipment for the additional regiments which will be needed immediately in an emergency.

9. Sufficient appropriations for continued modernization of arms and equipment with special attention to anti-tank and antiaircraft weapons, to the increase and further development of mechanized and motorized equipment, not as a substitute for horse cavalry, but in addition thereto.

15. Necessary improvements in our coast defense to insure protection of our coast and foreign possessions against attack.



Army Increases

It is believed during the special session of Congress, which opened on November 15, there will result augmented provisions for the military establishment. The troubled conditions both in Europe and Asia naturally lead to a conclusion that the subject of adequate National Defense and proper provisions therefor will be matters of first importance with the Congress. It is reasonable to assume that Congress will take protective steps similar

to those of the various foreign governments; this, in spite of the fact that the War Department budget estimates do not provide a larger armament program.

♦ ♦ ♦

Heat Detector for Spotting Planes

Progress in antiaircraft protection is noted from two recent sources.

Experiments have recently taken place at Fort Monmouth, New Jersey, by the military authorities with a new aircraft spotting device. The instrument is a very delicate heat detector which, through the use of infrared rays, can trace the fastest fighting plane flying without lights and engines shut down.

The machines were immediately spotted and illuminated by the ray, which only shows as a faint pencil of light along its course, but brilliantly lights up the object on which it is trained. By automatic triangulation the exact location of the object to be detected is determined within a period of two seconds mechanically within a range believed to be at least 20 miles.

Particulars of the instrument, which is said to be of revolutionary importance, are being kept secret.

A demonstration has been given in Sweden of a new 40-mm. antiaircraft gun, presumably a product of the Bofors factory, although the name of the maker was not made public. No important details were released, beyond a statement that the gun is effective at a range of 3,000 metres and that it fires at the rate of 120 rounds per minute.—*United Services Review*.

♦ ♦ ♦

GHQ Air Force 63d C.A. (AA) Exercise Lessons

The recent exercises held at Muroc, California, emphasized the need for participation of civilians in the organization of the antiaircraft warning service. The exercises showed that the establishment of antiaircraft warning services using private resources, supplemented by Government means, is economical and practicable and that such a service can be made to function effectively.

♦ ♦ ♦

Bark Worse Than Bite

Sir Herbert Russell in an article headed "Japan and Sea Power. Some Reflections on Her Dominant Position" in the September 9, 1937, number of the *United Services Review*, makes a significant survey of the situation in China. He states:

Once again, as so often during the Spanish conflict, we have seen that in the employment of aircraft against warships (and other ships) their bark is much worse than their bite. Chinese airmen may not be particularly good, but from all impartial accounts it seems certain that they are not particularly bad, and the only conclusion to be drawn from the ineffectiveness of their repeated attacks upon anchored ships is that the antiaircraft fire from these rendered anything like accurate bombing impracticable.

Mine Sunk Espana

When the battleship *Espana* was sunk off Bilbao, all available evidence "proved" it had been accomplished by aerial attack. From the manner in which the vessel sank, according to eyewitnesses, it seemed impossible she could have come into contact with a mine.

Two bombing airplanes were seen over her. *The Admiralty stated that they were satisfied the ship had been mined, and there can be no question that they were right.*—*United Services Review*.

♦ ♦ ♦

Spanish Military Lessons

Major General A. C. Temperley, former Deputy Director of Military Operations and Intelligence in the British Army, writing in the current issue of *Foreign Affairs* said "the most modern antiaircraft guns are a greater threat to air power than ground defense has ever been before."

The *New York Sun*, after quoting General Temperley, comments as follows:

It will be observed that these two conclusions indicate that in two categories the defense has tended to catch up with the offense. It is General Temperley's observation that "the war in Spain has confirmed the view that recent developments have tended to strengthen the defense."

Antiaircraft weapons of German make are described as very efficient and the best war material sent to Spain from Germany. The superiority of this matériel and a numerical superiority of airplanes may give General Franco's forces a slight edge in the air over the better equipped and better trained Russian pilots.

♦ ♦ ♦

Guns on Skyscrapers

It is reported that foreign governments are considering the employment of antiaircraft guns emplaced on the top of buildings. It is further understood that our building trades employers' association is giving consideration to the additional structural requirements to make possible the use of guns in a similar manner. This is interesting since the weight of our latest 3-inch antiaircraft gun, when stripped down for use on a pedestal mount, is approximately 10,000 lbs. This gun has a piston-rod pull of between 17,000 and 200,000 lbs.

The future use of antiaircraft guns on roofs of skyscrapers in our large cities, for instance, in New York, reflects confidence on the part of the civilian population in the use of antiaircraft artillery and indicates that the use of this means of protection ultimately will be demanded.

♦ ♦ ♦

Antiaircraft Automatic Cannon

In the July-August number of *The Journal* we called attention to the fact that the Austrian Army had adopted the Swiss Oerlikon 20-mm. (about .80 inch) automatic cannon. In that issue we outlined some of the characteristics of the weapon. Furthermore, we gave a pictorial display of the Bofor automatic cannons, recently purchased by the British Government.

Those who for many years have advocated the adoption of an automatic cannon of greater than .50 caliber as the probable solution of the antiaircraft problem find renewed support for their convictions in these purchases by England and Austria.

It has been reported from responsible sources that the British also have interested themselves in the Oerlikon 20-mm. cannon and have purchased 12,000 of these weapons.

The use of automatic cannon of 20-mm. to 40-mm. appears to be a step in the right direction, and may offer a solution to some pressing antiaircraft problems of our own.

The ultimate results achieved with automatic cannon by the foreign governments will be closely scrutinized, looking to possible adoption by our forces.

* * *

Camera Records

The 249th Coast Artillery (HD), Oregon National Guard, does not have the services of a regular army master gunner during target practice to take charge of the photographic work, the scaling of the negatives, and records of the practice. This work then becomes the duty of the regiment's master gunner, who, as usually is the case in the National Guard, has had little experience in keeping photographic films in numerical order so that there will be no mixup when the films are being scaled. The 249th has its film developing and printing done by civilian personnel, who frequently get the negatives out of sequence, which later causes trouble in identifying the splash.

A simple device designed by Staff Sergeant George Cleary, Headquarters Battery, 249th C.A. has now entirely eliminated the trouble. It is a board 24" x 30" containing the name of the battery firing, the battery and regiment manning the gun or mortar, the date, length of towlines, the shot number, and an arrow pointing in the direction of the battery. The shot numbers are painted on a slip of white oilcloth, rolled on two spools which have small cranks attached. The spools are so arranged that the proper shot number may be placed on the board by turning the spool to the desired number. The other data may be changed at will by submitting the required information (lettered on plates in advance) for that previously posted. The plates are fastened by small bolts.

The board is painted white with black lettering, 3¼" high, is placed approximately 10 feet from the camera in the direction of the target, and is so located that it does not interfere with the line of sight from the camera to the target.



Camera record of a shot.

When the exposure of the splash is made the camera automatically records the information, simplifying the identification of the shot as well as reducing the amount of hand lettering on the negative. The accompanying picture shows the result.

The board proved very satisfactory during the 1937 coast artillery target practice season. It is the result of an idea offered by 1st Lieutenant Charles L. Unruh of Headquarters Battery, 249th C.A. This item is offered in the hope that it may be of value to some other members of the Corps.

* * *

Balloon Barrage

It has been announced the British Government has formed a new organization to control the balloon barrage defense of London. This organization, which will be a part of the fighter command, Royal Air Force, will be known as No. 30 balloon barrage group. The units will be administered on auxiliary air force lines. It is reported that it will be recruited up to strength. The age limit for this service will be higher than that of combat units and opportunity to join will be provided for older ex-service men and others with little or no military experience. The men enlisted will come in the category known in our army as "limited service" men.



Coast Artillery Board Notes

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 Coast Artillery Board, or to present any new problems that properly may be considered by the Board. Communications should be addressed to the President, Coast Artillery Board, Fort Monroe, Virginia.

THE COAST ARTILLERY BOARD

COLONEL WILLIAM S. BOWEN, C.A.C., *President*
MAJOR GORDON B. WELCH, Ordnance Dept.
MAJOR FRANKLIN E. EDGECOMB, C.A.C.
MAJOR HUGH N. HERRICK, C.A.C.

CAPTAIN HOBART HEWETT, C.A.C.
CAPTAIN CORTLAND VAN R. SCHUYLER, C.A.C.
CAPTAIN CHARLES E. SHEPHERD, C.A.C.
CAPTAIN EDWIN W. CHAMBERLAIN, C.A.C.

SECTION I

Projects Completed Since Last Issue of The Journal

PROJECT NO. 1075—CABLE INSTALLATION FOR FIXED ANTI-AIRCRAFT GUNS.—Tests of the buried cable installation for the fixed anti-aircraft guns at Fort Monroe have been completed. Seven hundred and thirty-six (736) rounds were fired by the guns served by this data transmission system during the last summer training period. No troubles connected with the data transmission system were encountered in these firings. A similar installation is to be provided for a battery of fixed anti-aircraft guns at Fort Story, Virginia, in time for the Coast Artillery School firings next spring. The armored cable for this installation has been received.

PROJECT NO. 1076—SWITCHBOARDS BD-71 AND BD-72.—This project involved a test of field switchboards, which are standard at present, with a view to determining what improvements, if any, should be incorporated in future design. The two switchboards are alike in everything except size, weight and the number of switchboard units, the BD-71 being a six-drop board and the BD-72 a twelve-drop board. The most important departures from past design in field switchboards were the inclusion of a ring-talk key in each circuit, thus doing away with the operator's cord; the provision of from two to four (depending upon the type of board) simplex telegraph circuits by the introduction of repeating coils; and certain improvements in the design of the case. Both switchboards are light enough so that they can be carried for a considerable distance by one man. Power for the night alarm, lamp and transmitter circuits is supplied by ordinary flashlight batteries. The Coast Artillery Board found these switchboards to be a considerable improvement over older types and concluded that, with minor changes, this design was satisfactory for future procurement.

PROJECT NO. 1086—POSITION FINDING BY AERIAL OBSERVATION.—The Board tested a method of target location in which the position of the observing airplane at the time observations on the target were made was fixed by means of "dead reckoning." The procedure consisted of tracking the airplane for a short period from a ground station or starting point over which the airplane passed, thus obtaining the true course of the plane and data from which the ground speed could be determined. The pilot maintained a constant air speed and compass heading during the remainder of the run for target location. The position of the plane at the instant the observer in the plane made an observation on the target was obtained by noting the elapsed time from starting point to observation on the target and laying off the travel of the plane along the true course during this interval.

The position of the target with reference to the observing airplane was obtained by reading successive horizontal angles between the target and the longitudinal axis of the plane as the plane proceeded on its course. Two methods for obtaining these horizontal angles were employed. In the first, an angle-measuring instrument mounted in the rear cockpit was used. In the second, the plane itself was pointed at the target and the angle turned from the initial heading of the plane was read on the pilot's "turn indicator."

The "dead reckoning" method is subject to errors due to inability of the pilot to maintain an exactly constant heading and air speed, and also due to changes in wind which may occur after the plane can no longer be tracked from the shore station. However, it was found that the method was capable of producing target locations at ranges of 30,000 to 40,000 yards with an accuracy considered sufficient to enable initial shots to be readily spotted by the air observer.

PROJECT NO. 1108—MOBILE METEOROLOGICAL STATION.—This equipment was assembled by the Signal

Corps for use by all branches of the Army. The component instruments included not only those usually supplied for a Coast Artillery meteorological station but, in addition, sufficient instruments to permit forecasting weather conditions and the preparation of weather maps. Test of this mobile station consisted of the daily preparation of meteorological messages for use in connection with anti-aircraft firings at Fort Story, Virginia. A new position was occupied each day. No difficulties were experienced in the operation of the station. Upon completion of the tests, the Board concluded that a mobile meteorological station was desirable but not essential, that the equipment therein should be limited to that necessary for the preparation of an artillery message, and that, if possible, this equipment should be mounted with one of the regimental radio sets in one vehicle so as to provide a combined radio and meteorological truck for mobile regiments.

SECTION II

Projects Under Consideration

PROJECT NO. 1096—TIME INTERVAL APPARATUS EE-86-T1.—This equipment was described in the September-October issue of the COAST ARTILLERY JOURNAL. The equipment is still under test and it is not expected that the test will be completed before December. No definite conclusions as to the suitability of this apparatus can be arrived at as yet.

PROJECT NO. 1101—REVIEW OF SEACOAST ARTILLERY FIRE CONTROL AND POSITION FINDING SYSTEMS.—Experience with the present fire-control and position-finding systems, obtained largely through target practice, has enabled the Board to accumulate considerable information in reference to the suitability of the methods and apparatus now employed. New methods and devices have been proposed and certain ones are now under study by the Board. The pilot model of one of these devices, the Seacoast Data Computer T-5, is now undergoing test at Fort Monroe.

Problems of fire control and position finding for long-range cannon and the possibilities of airplane observation in connection with target location and fire at extreme ranges are also of current interest.

The purpose of the review contemplated under this project is to consider our seacoast artillery fire-control and position-finding problem as a whole in the light of experience gained through target practices, especially when operating against high-speed targets. The project includes recommending the fire-control methods and apparatus to be employed with each of the various types of seacoast artillery armament, and the preparation of a program for the development of suitable fire-control and position-finding equipment.

PROJECT NO. 1103—EMERGENCY FIRE-CONTROL SYSTEMS FOR ANTI-AIRCRAFT GUNS.—One of the phases of this project was the development and test of a telephone system of data transmission suitable for transmission of

Case III data from the director to the guns, to be employed in the event of failure of any part of the standard electrical data transmission system. The system which was tested included a local battery telephone with hand-set at the director connected to sound-powered receivers mounted in helmets at the guns. Superimposed on each of the lines connecting director and guns was a simple contact which functioned automatically to give a click whenever the firing azimuth (or quadrant elevation) at the director was an even multiple of ten mils. The system operated as follows: readers at the director read the data to be transmitted as rapidly as possible (at one- or two-mil intervals when the data were changing slowly but at twenty-, fifty-, or even one hundred-mil intervals when the data were changing rapidly). The azimuth setter (or elevation setter) at each gun set his mechanical pointer to the values called to him over the telephone using the clicks to get synchronized settings. The frequency of the clicks furnished an easy means for these men to establish the proper rate of turning their handwheels. Tests of this system included drills with normal targets and with high-speed targets. A number of target practices were fired, using the standard data transmission system and the telephones on alternate courses. Although study of the results obtained has not been completed, it appears probable that such a system of data transmission is feasible for emergency use.

PROJECT NO. 1110—ELECTRIC BRAKES FOR MOBILE ANTI-AIRCRAFT GUN MOUNTS.—The rear bogie of 3-inch anti-aircraft gun mount M2A1 No. 49 was received from the Aberdeen Proving Ground where it was equipped with electric brakes made by the Warner Electric Brake Manufacturing Company of Beloit, Wisconsin. These electric brakes consist principally of the brake mechanism proper housed in brake drums, the electric wiring, including couplings and connections to the storage battery of the prime mover, a rheostat by means of which four degrees of maximum braking may be secured, and a controller. The controller is mounted on the steering column of the prime mover where it can be operated conveniently by hand. An effective breakaway feature is included. The Coast Artillery Board has tested these brakes and found them, in so far as a limited amount of road work would indicate, quite satisfactory. The trailer brakes can be applied independently and, if desired, before those of the prime mover. The necessary apparatus is relatively simple. Before reporting on these brakes, the Board is engaged in testing an auxiliary controller for the existing standard air-brake system. This controller is likewise mounted on the steering column of the prime mover and will provide for application of the trailer brakes before those of the prime mover. No breakaway feature is provided.

PROJECT NO. 1111—SIGNAL LAMP EQUIPMENT EE-84-T4.—This equipment is designed to provide a means for visual communication, either by day or by night, between two fixed ground stations. In general, the equipment consists of a lamp, powered by flashlight batteries and equip-

ped with a precise focusing mechanism, a small telescope mounted on the barrel of the lamp for the purpose of accurate laying on the receiving station, a telegraph key for sending signals and a tripod for mounting the transmitter. The equipment is light, compact and sturdy and is designed to be transported and operated by a single signaller. It is not suited either for shore-to-ship or ground-to-air communication. No detailed tests have been made as yet and no conclusions as to the suitability of this equipment for Coast Artillery purposes are possible at this time.

SECTION III

Miscellaneous

MODIFIED FUZE SETTERS M5.—The Coast Artillery Board has received an M5 fuze setter with modifications extending beyond the scope of those reported in the COAST ARTILLERY JOURNAL, May-June, 1937 (page 275). In addition to removal of the devices for locking the round in the fuze setter, the automatic unlocking of the setting handwheel has been abandoned. A hand lever has been provided which the fuze-setter operator strikes with his hand as soon as the round is inserted. This unlocks the setting handwheel and permits the setting operation to proceed as before. The modification allows a redesign of the seat for the nose of the fuze and provides a clear opening through the center of the instrument for chips and other debris. Tests of the modified instrument are being conducted in connection with the School firings.

SLIP-RINGS FOR MOBILE ANTI-AIRCRAFT GUNS.—The junction box recommended in Coast Artillery Board Project No. 1066 (the COAST ARTILLERY JOURNAL, November-December, 1936) for use in connection with the slip-ring installation on mobile anti-aircraft gun mounts has been received. This junction box is provided with a receptacle and "jumpers" for disconnecting the slip-ring circuit so that, in case of failure of the slip-ring circuit, firing can be continued by merely plugging the data cable into the junction box and removing the connecting jumpers. Installation of the new junction box and test of the design as thus modified will be completed at an early date.

ACCURACY TEST OF ANTI-AIRCRAFT HEIGHT AND POSITION FINDERS.—The Board has recently received for study a report of tests conducted by the Ordnance Department, designed to investigate the comparative accuracy of various single-station and multi-station anti-aircraft height and position finders. The report is exhaustive and covers all phases of the tests, which were conducted during a period of about two months in the latter part of 1935.

Briefly, the tests represented the culmination of several years of development in the field of height-finding devices. The accurate determination of altitude is generally considered to be the weakest link in the chain of anti-aircraft fire-control data, hence efforts have been continuously directed toward the development of more suitable

devices for this purpose.

The instruments tested included:

1. The Position Finder T₃, a multi-station instrument which determines altitude, slant range, or horizontal range, by means of measurements in the slant plane containing the base line and target, combined with the angular height of this slant plane.
2. The Height Finder T₁₄, which is based on a new approach to the altimetric roof principle.
3. The M-920 altimeters.
4. The Height Finders T₁₆ and T_{9E1}, both of which are stereoscopic instruments.

The tests included both night and day tracking missions, on rectilinear, maneuvering and diving targets. Errors in altitude were determined by comparing readings of individual instruments with data obtained by mirror or window position finders. Altitudes varied from 1,000 to 5,000 yards. Base-line lengths varied from 375 to 2,000 yards. All instruments were manned by enlisted men of the Coast Artillery Corps.

Of the stereoscopic instruments, the T_{9E1} produced the more accurate and uniform results. Both trained and untrained operators were employed and, as might be expected, altitude errors varied considerably. In general, however, the tests indicated that in the hands of a trained observer the average altitude error of a stereoscopic instrument should not greatly exceed 2 per cent. Since the completion of these tests, the T_{9E1}, with minor modifications, has been standardized as the Height Finder M₁.

Results obtained with the multi-station instruments were not so easy of interpretation. No device tested was entirely satisfactory. Although both the T₃ position finder and the T₁₄ height finder were capable of operation on a much shorter base line than the altimeters, their altitude readings showed little improvement in accuracy over those obtained with the altimeters when the latter were used on a 2,000-yard base line. The greater weight, bulk and complexity of operation, particularly in the case of the T₃, as compared to the altimeters, were serious disadvantages. Percentage errors of all instruments in altitude readings varied greatly, depending on type of course, altitude of target, length of base line and other factors. Under average conditions, an altitude error of about 3 per cent was indicated by the altimeters on the 2,000-yard base line.

In general, the tests indicate that a reasonably satisfactory single-station instrument is now available to anti-aircraft units, but that the need for considerable improvement is evident in the field of multi-station instruments. Present thought throughout the Coast Artillery leans strongly to the view that each 3-inch anti-aircraft gun battery should have available a two-station device to supplement or to replace, in emergency, the stereoscopic height finder. The M1920 altimeters are now used for this purpose, but efforts to develop a more suitable instrument will be continued. The Coast Artillery Board is at present engaged in a further study of the entire problem and will welcome constructive suggestions.

The Contributors

The author of "Guns in Spain" is a Major, Military Intelligence Division, Officers' Reserve Corps. He is a newspaperman and journalist with over thirty-five years experience. The material for his article was developed on the ground in Spain during this year. Readers will agree that he has an eye for what is going on and knows how to tell it after he has seen it.

Major WILLIAM C. BRALY, Coast Artillery Corps, is a member of the hardworking staff of the Coast Artillery Unit at the University of California at Berkeley. He was initially commissioned a captain, Coast Artillery Section, O.R.C., August 15, 1917, and reached the grade of major August 1, 1918. On July 1, 1920 he received appointment as captain, Coast Artillery Corps, Regular Army and was promoted to major on August 1, 1935. Major Braly is a Leavenworth graduate (1934), and a graduate of the Battery Officers' (1925) and the Advanced Course (1930) of the Coast Artillery School.

His graphic summary of how-it-is-done at Berkeley will be of interest to all who like "practice" and not so much "theory."

Major E. G. COWEN, Coast Artillery Corps, is a native of Tennessee. He graduated from Vanderbilt University in 1916 with the degree of A.B. His military career began when he was appointed a second lieutenant of Coast Artillery in October of 1917; and he reached the grade of major earlier this year. Major Cowen is a graduate of the Battery Officers' Course and the Advanced Engineering Course of the Coast Artillery School. He was awarded the degree of B.S., in E.E. by Massachusetts Institute of Technology in 1927.

In this issue we publish the fourth biographical study by Dr. H. A. DEWEERD, who is professor of history at Denison University. His gallery of military portraits now includes Pershing, Kitchener, Lawrence, and Schlieffen.

Lieutenant Colonel R. T. GIBSON, Coast Artillery Corps, is a graduate of the U.S.M.A. '15. All his service has been in the Coast Artillery Corps. At present he is holding forth in the Philippine Islands as a member of the 92d Coast Artillery. Colonel Gibson is a graduate of the Command and General Staff School (1930), and the Coast Artillery School Advanced Course (1928).

Although few of our readers will have an occasion to serve with the Bilibids' Guard Battalion, the majority will enjoy "just reading" Colonel Gibson's essay on penology as conducted by the U. S. Army.

The life story of Captain BURGO GILL was published in the January-February, 1937, number of The JOURNAL which carried his article on uniforms. At present he is on duty with the 59th Coast Artillery, Fort Mills, P. I.

Colonel J. A. GREEN, C.A.C., is the Executive Officer in the Office Chief of Coast Artillery. His 35 years of service have been spent in the Artillery Corps and Coast Artillery Corps. His many important assignments include four years as Editor of The COAST ARTILLERY JOURNAL and several details on the General Staff Corps. Prior to coming to Washington he served a tour as Deputy Chief of Staff, 8th Corps Area.

Major General HEINZ GUDERIAN, German Army, was born at Kulm, Germany, in 1888. He was initially commissioned in the Infantry in 1907, and assigned to the 10th Jaeger Battalion. From 1912 to 1913 his service was with the 3d Signal Battalion at Coblenz. During the period 1913-1914 he attended the *Kriegsakademie* at Berlin.

In the early part of the World War he commanded a radio section of the 5th Cavalry Division, later being transferred to Headquarters Fourth Army, and then to the Communication Section.

O. H. L. From April 1, 1917, to the end of the war, he served in various sections of the General Staff and commanded a battalion.

After the war he participated in the frontier service and in the operations in the Baltic States. When the new Reichswehr was formed he became a company commander, being stationed at Goslar. In 1922 he was assigned to the Office of the Inspector of Communications Troops in the Reichswehr Ministry. In 1924, he became a member of the General Staff. He commanded the 3d Motorized Trains during the period 1930-1931. In the fall of 1931 he was appointed Chief of Staff, Office of the Inspector of Motorized Units. Four years later he became the commanding officer of the 2d Tank Division, an assignment which he still holds. General Guderian was appointed *Generalmajor* (equivalent to brigadier general, U. S. Army) in August, 1936.



INVICTUS broke into print exactly a year ago with "The Legion of the Lost." Maybe you read it. At any rate here he is again.

The long career in the public service of the Honorable LOUIS JOHNSON, The Assistant Secretary of War, is known to all. Of interest to our readers is the fact that in 1917 he resigned his office as a member of the West Virginia legislature to enter the Second Officers' Training Camp, from which he was commissioned a captain of Infantry. He was in active combat service in the Meuse-Argonne offensive with the 80th, 4th, 5th, and 90th Divisions, marching into Germany with the last-named outfit. The war over, he continued his interest in military affairs by affiliating with the Officers' Reserve Corps, rising to the rank of lieutenant colonel, Infantry Reserve. His valuable services to the American Legion culminated in his election as National Commander in 1932. At the time of his appointment as The Assistant Secretary of War his Reserve assignment was as executive of the 397th Infantry, 100th Division.

Readers will agree that Colonel Johnson has far-reaching knowledge of the duties of his present post, which covers industrial procurement for war.

The services to the nation of Major General JAMES G. HARBORD are best told by written history rather than in the thumbnail sketches of this column. Between the dates of his enlistment as a private of the 4th Infantry in 1889 and his retirement in 1922 as major general and Deputy Chief of Staff he encompassed a career that is truly an inspiration to the American soldier.



The record of his service during the World War speaks volumes. In a brief two years he served as chief of staff AEF; commanded the Marine Brigade in the Bois de

Belleau and at Chateau Thierry; commanded the 2d Division in the Soissons drive; and directed the far-flung activities of General Headquarters, Service of Supply.

Since retirement from the service General Harbord has served as president and chairman of the board of the Radio Corporation of America. In all his life, public and private, he has well earned the commendation that he has contributed much to the betterment of the United States "as a soldier, industrialist, humanitarian and public spirited citizen."

Major EDWIN C. MEAD, Coast Artillery Corps, is a native New Yorker. His military career began in 1908 as a private of the Coast Artillery Corps. He won his commission in 1916 and reached his present grade in 1927. Major Mead is a graduate of the Command and General Staff School (1932), the Coast Artillery School

Battery Officers' Course (1921), and the Chemical Warfare School Field Officers' Course (1935).

A good portion of his time has been occupied in work with radio, communications, and submarine mines. At present he is on duty as instructor of the 330th Coast Artillery (OR), at Topeka, Kansas.

Captain C. C. ROTHGEB, C.A.C., was born October 16, 1898, on a farm in Kansas and is proud of the fact. Graduated from high school in 1917 and enlisted in 1st Inf. Kansas N.G. Served in France and came back a veteran at the age of 20. Enlisted in Regular Army and served as squadron clerk, 5th Air Park, Kelly Field, Texas. Appointed to U.S.M.A. from Kansas in 1920. Neglected to tell us he graduated. Served 2 years with 51st C.A. (Tr.D.), 2 years with 41st C.A. (Ry) and 1½ years as B.C. Battery B, 13th C.A. (155-mm. guns). Spent 2 years as executive assistant to C.O. Charleston Ordnance Depot during which time he claims to have learned to know most of our ammunition by sight.

Generally considered a *practical* man. Claims that long technically-termed discussions bore him. He is always suspicious of the man who goes into a verbose technical discussion because he believes it serves to cover a lack of thorough knowledge of essential facts and is more often the result of memory than of sound reasoning. Generally considers any discussion of artillery which is beyond the comprehension of an intelligent corporal to be a waste of effort.

Major WILLIAM SACKVILLE, C.A.C., is an authority on antiaircraft fire control; and was a pioneer in the development of infra-red ray radiation detectors for the tracking of airplanes. He has been in the Coast Artillery Corps since 1917. Some of his important assignments have included details at Frankford Arsenal, Aberdeen Proving Ground, and as military attaché to Brazil. At present he is on duty as the Coast Artillery representative with the Engineer Board, Fort Belvoir, Virginia.

Lieutenant Colonel JOHN S. WOOD, Field Artillery, makes his initial bow to The JOURNAL audience with a penetrating study of the promotion problem.

Colonel Wood hails from Arkansas, from which state he entered the Military Academy in 1908. Upon graduation in 1912 he was appointed second lieutenant, Coast Artillery Corps. In September, 1916 he began an Ordnance Department detail which terminated in May, 1920. During the World War he reached the temporary grade of major, serving overseas with the 3d and 90th Divisions. Colonel Wood was transferred to the Field Artillery in July of 1920.

Colonel Wood is a distinguished graduate of the Command and General Staff School (1924). In 1931 he graduated from the Ecole Supérieure de Guerre. He holds the degree of B.S. in Chemistry from the University of Arkansas (1907).

Book Reviews

IF WAR COMES. By Major R. Ernest Dupuy and Major George Fielding Eliot. New York: Macmillan Co., 1937. 368 pages; 11 maps; \$3.00.

Military provincialism is the most deadly intellectual indictment that can be levelled against the Twentieth Century man of war. There is no place in a modern army, navy or air fleet for the leader whose concept of war is circumscribed by the capabilities and limitations of his particular service. In a world grown strangely small, it is imperative that military thought be all-embracing; that thought must include not only the fighting services, not only the national defense, but the great interlocking strategic problems that confront a confused and frightened world. To think less broadly is to move in the dark.

Those who have groped toward an understanding of the national and international military picture will best understand the difficulties of evaluation and interpretation. The barriers of language alone have often been sufficient to defeat the most conscientious efforts. Today, two men have levelled those barriers. In a single volume of razor-edged analysis they have set forth a world-estimate of the situation. It is unthinkable that this monumental study shall not find a prominent place in the library of every thinking soldier, sailor, airman and civilian. Not since the classics of the great Admiral Mahan has there been such a vital addition to the field of military literature.

The book is divided into two parts—*The Game* and *The Moves*. Part I covers war by air, by land, and by sea with all the major collateral issues that those three subjects give rise to. Part II is introduced by a chapter called "Paths of Conquest"; it then swings into a detailed consideration of the complicated strategic problems that face the major nations of the world.

In dealing with *The Game*, the authors make no excursions into the future. They say:

We are not crystal gazers; to the enthusiasts for this or that weapon, this or that new arm, we leave the field of prophecy free; weapons and combat of today we will discuss simply in the light of present knowledge.

To this pledge, made early in the book, Majors Dupuy and Eliot consistently adhere. They do take time out to quote such juicy pronouncements as this from the Right Honorable Winston Spencer Churchill, C.H., M.P.:

Might not a bomb, no bigger than an orange, be found to possess a secret power to destroy a whole block of buildings—nay to concentrate the force of a thousand tons of cordite and blast a township at a stroke?

But they do it only in order to point out that "viewed in

the cold impartial light of proven fact" it is "sheer nonsense."

The chapter "What About the Air?" is at once the clearest and closest reasoned paper on the strategic and tactical capabilities and limitations of air power that this reviewer has ever read. The great Douhet Doctrine is not merely thrown for a loss, it is chucked out of the military picture. They set up the very heart of the Doctrine—

Defend on the surface, that you may mass all possible strength for attack in the air. The air force *only* can attack under the conditions of modern war; and only by attack can victory be won.

Then they destroy that basic premise with needle-pointed logic and the whole house that Douhet built comes tumbling down.

Though they crumple the Douhet Doctrine, these authors are not right wingers, nor are they centrists; if anything they strike midway between the extreme left and the center. They point out that

Just as we find air enthusiasts telling us that air power has made infantry and battleships obsolete, so do we find both amateur and professional strategists of the *ancien régime* assuring us patronizingly that "planes are very useful auxiliaries," nice to have around for special jobs, but not of course to be taken seriously as a weapon. Heaven help the hapless nation in the minds of whose leaders this point of view prevails, or even lurks beneath the surface, when the next war comes upon them with lightning swiftness.

The very next paragraph is equally worthy of quotation:

The other edge of the sword is the danger that the military and civil authorities of a nation may not appreciate to the full the offensive qualities of their own air force, and the results which ought to be obtained from the proper use of these qualities. In air warfare initial errors may have disastrous results out of all proportion to the results of initial errors in land warfare. . . .

The chapter "What Will War On Land Be Like?" is no less vital than the one dealing with the war in the air. At the very beginning they point out one of our commonest errors. They say:

A commonplace amongst military men when the lessons of the last war are trotted out for airing is to say: "Very well, very well; but we've got to get out of the trenches. The next war will be a war of movement." Possibly—nay probably—yet not certainly so. . . . Let it be remembered that in the last war the Western Front stalemate was unforeseen and unsought.

In considering war on the land the authors attack that twin nightmare—motorization and mechanization—with a line of reasoning that will undoubtedly cheer the heart of many a downcast horse cavalryman. Here again their

logic proceeds step by certain step from an unshakable foundation. If you happen to be one of those optimistic souls who expect the tank, the combat car, and the truck to do everything short of standing up on their hind wheels and declaiming Hamlet's soliloquy, it is suggested that this chapter is the best possible antidote for that state of exaltation that comes from too many gasoline cocktails.

"What Will War at Sea Be Like?" should prove an eye-opener to those of us whose knowledge of the Navy has been largely confined to their performance on the gridiron.

Other chapters under *The Game* are: "The Basic Rules"; "The Soul of the Warrior"; "Of New and Fear-some Weapons"; "What's All This About Gas?"; "War of Words—Lies and Spies"; "What Will War Mean To The Civilian?"

Part II—*The Moves*—includes the following sub-heads: "Paths of Conquest"; "Germany"; "Italy"; "U.S. S.R."; "Japan"; "France and Britain"; "The High Cost of Being in the Way"; and "America—On The Sidelines?"

Finally there are six appendices—"Armies of the World Today"; "Air Forces of the World Today"; "Navies of the World Today"; "Organization and Armament Reference Data"; "Fleet Organization"; and "Strategic Raw Materials."

It is apparent that a review can not hope to cover even a single chapter of such a tremendous study as this. The best it can do is merely suggest the scope of the book.

To set down the findings arrived at in any chapter without setting down the logical processes by which those findings were reached, would be a grave injustice to Majors Dupuy and Eliot.

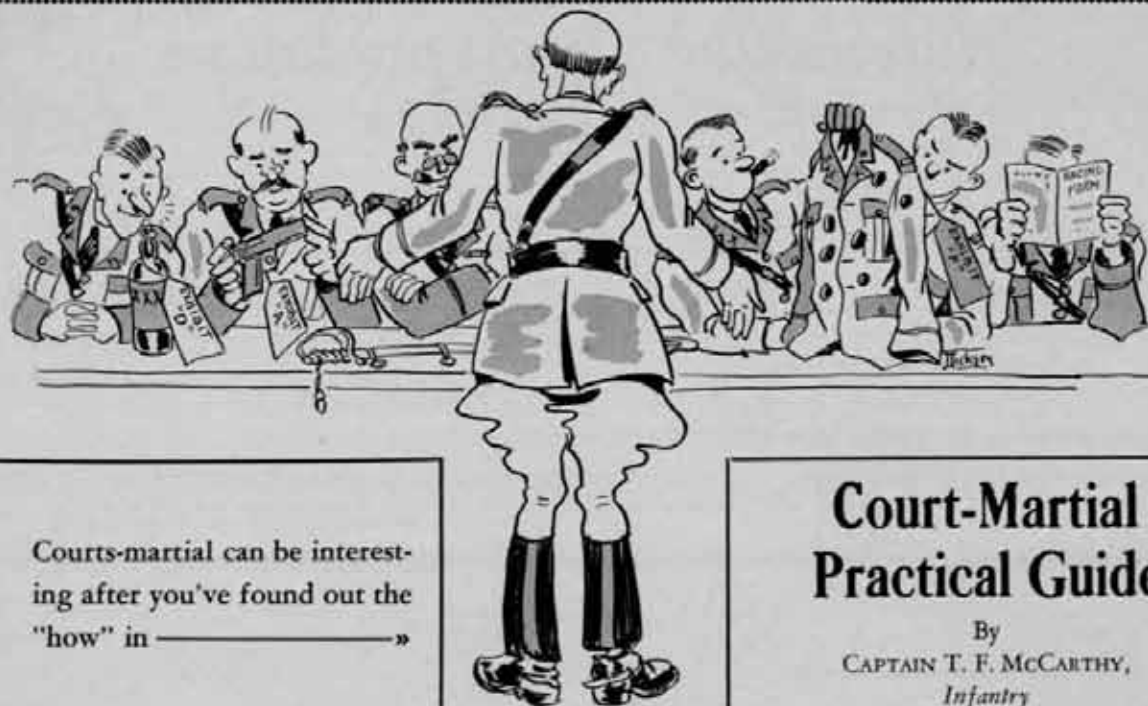
These two gentlemen have produced a book as vital as *Field Service Regulations*, as dramatic as an S. S. Van Dine mystery, and as closely reasoned as an Einstein equation. If you fail to add it to your library you are missing the outstanding military item on the market today—indeed from the comments in the national press you are missing what bids fair to be a military *Gone With The Wind*.
C. T. L.

✓ ✓ ✓

THE SIEGE OF ALCAZAR. By Major Geoffrey McNeill-Moss. New York: Alfred A. Knopf, 1937. 313 pages; II appendices; 39 illustrations. \$3.50.

This is the story of a knock-down and drag-out, with no holds barred. It is the beginning of the civil war in Spain, and any one who thinks those fellows are fighting according to rule had better read up on some old Spanish customs.

Colonel Moscardó, commandant of Toledo's Alcazar and military governor of a province, has twenty-four hours in which to make up his mind as to which side of the revolution he will do his fighting on. A tough question, the answer to which is not found in any military textbook: yet it is a problem that has disturbed the sleep of many a European general.



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The second situation confronting Colonel Moscardó calls for a decision with even more mental anguish than the first. His son falls into the hands of the enemy and they, not unlike some of our own public enemies, inform the Colonel that he will surrender the Alcazar within twenty-four hours—or else. The telephone conversation between father and son is an epic and one not yet equaled by American parents under similar circumstances.

The story of the siege unfolds in a day by day account of the fighting. One by one the heavy walls of the Alcazar melt away under intense bombardment. Airplanes rain bombs from the sky, tanks batter against the outer works, and machine guns drench the area with bullets. Every attempt to take the position by assault is repulsed with heavy losses, so the enemy resorts to tunneling underground. Tons of dynamite are exploded beneath the Alcazar and whole buildings go rocketing into space. Yet the defenders—men, women, and children—existing on horse meat and parched wheat, cling tenaciously to the shattered ruins.

The siege of the Alcazar emphasizes a certain Spanish characteristic. Napoleon first discovered it to his sorrow at Salamanca. It is this: Once a Spaniard makes up his mind to hold a town or building, there is only one way he will ever leave, and that is feet first. Such is the spirit of the Alcazar.

If the reader finds himself getting impatient waiting for the arrival of the relieving force, he should remember the defenders. They had to stick it out for seventy days.

Is the account of the Alcazar worth reading? Well, if you admire a fierce loyalty to ideals and the physical courage to back them up, the book is more than worth while. On the other hand, if you are by way of being a pacifist with a weak stomach, you had better skip it.

E. D. C.

GENERAL VON STEUBEN. By John McAuley Palmer, Brig. Gen. U.S.A. Ret. New Haven: Yale University Press. 423 Pages; Index; 3 Maps; \$4.00.

Out of the welter of legend, inaccurate observation, slipshod research and the obscurity cast by time's passage a beam of light brings into bold relief the chronicle of a man who did much to aid American Independence. To General Palmer is due great credit for his clear, authentic portrait of General von Steuben. This biography of Washington's inspector-general is the first to present facts heretofore unknown, at least to this reviewer.

In the hands of one lacking restraint and a sense of values the facts uncovered by Palmer's painstaking research could very well have resulted in a sensational "debunking" biography. Palmer discovers Steuben's genealogy to be fraudulent; his rank of lieutenant general in the Army of Frederick the Great turns out to be a figment of imagination, perhaps of Benjamin Franklin who was instrumental in obtaining von Steuben's services for the Continental Army. However, the pseudo lieutenant general's career as a major general in the American forces was

Automotive Transportation for the Military Service

By MAJOR JOHN T. DE CAMP, C.A.C. and CAPTAIN LEW M. MORTON, C.A.C.
Instructors in Motor Transportation, Coast Artillery School

HERE is a concise, technical discussion made available to the service at a time when such a book is in considerable demand. This one volume covers all necessary information concerning the design, operation and maintenance of automotive transportation issued to the military service. The text has been reviewed and approved by Professor Erwin H. Hamilton, B.S., M.E., of New York University, acknowledged authority on automotive engineering.

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Crankcase Lubrication.	Front Axles and Steering.
Engine Cooling Systems.	Tires, Rims and Wheels.
Fuel and Fuel-Feed Systems.	Engine Overhaul.
Elements of Carburetion.	Automotive Vehicle Troubles.
Carburetors.	Painting.
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Starting Motors, Generators, and Lighting Systems.	Automotive Maintenance.
Theory of Internal Combustion Engines.	

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PRICE: Durable Paper Binding, \$2.50; Leatherette Binding, \$3.00.

highly creditable and his services were such that Washington was unstinting in his praise.

Von Steuben's excellence as a soldier cannot be doubted. Within a few weeks after joining Washington at Valley Forge the Continental Army ceased to be a rabble. A French officer seeing the Continentals a few months after von Steuben became inspector general asserted that the troops "drilled like Prussians"—a great compliment in that day.

It seems unbelievable that a great soldier, imbued with the precise discipline imposed by Frederick the Great should have been so lax in his personal financial affairs. His aide and adopted son, Major North, constantly referred to von Steuben's habit of "eating the calf in the cow's belly."

This biography of a Prussian captain who became an American major general is distinctly an addition to our store of knowledge of Revolutionary figures. The book is the seventh work published by the Yale University Press on the Calvin Chapin Memorial Publication Fund and such an imprimatur is richly deserved. A. M.

♦ ♦ ♦

PEN AND SWORD IN GREECE AND ROME. By Colonel Oliver Lyman Spaulding. Princeton: Princeton University Press, 1937. 151 pages. \$2.00.

Colonel Spaulding believes that "Experience is our most expensive material," and that all human experience in war

is precious; because "The greater the mass of laboratory results assembled, the greater the probability of reaching a safe conclusion." And so he has summed up very delightfully, the military literature of the Ancients.

These Ancients were far more "modern" than our grandfathers. In fact, it is only since the Spanish-American War that the United States Army has caught up with them. They were very shrewd fellows indeed, these Ancients, and Colonel Spaulding proves it to the King's taste.

Xenophon, whose bones were laid to rest some thirteen centuries ago, was a soldier who conducted one of the most brilliant retreats the world has ever seen. His essay *Horsemanship* "is a sound, practical treatise on hippology, one which our cavalry schools ought properly to place in the hands of every student." On marches, the service of security and information, and field service in general, "his book reads like any modern manual."

Xenophon directly influenced modern military thought and practice through Wolfe and Foch (which the author notes) and General Colin; and God only knows through how many others. The indirect influence can be traced through Scipio Africanus, Arrian, Procopius, and a host of others. When Vegetius says that "Victory is gained, not by weight of numbers and untrained courage, but by skill and discipline," he repeats the philosophy of Socrates as recorded not only by Xenophon but by Plato; and in almost the same words this thought echoes through the military manuals of Maurice and Leo in Byzantine military literature.

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Vegetius, whose works were the Bible of Renaissance soldiers, reiterates Xenophon's insistence on the necessity for personal reconnaissance by commanders. His practical advice of keeping soldiers contented by occupying them with physical training, drills, and maneuvers, is a condensation of Xenophon without the reasons.

This same Roman author who colored our modern military thought had a form of an estimate of the situation which was copied and elaborated in Byzantine military manuals.

The author compares the military code of Rufus with the U. S. Articles of War (1920) by placing the text of each in parallel columns. The similarity is due less to coincidence than to direct lineal descent.

Perhaps the best evidence of modernity is to compare the study of panics which appeared in a recent issue of *THE INFANTRY JOURNAL* with the chapter on the same subject found in the writings of Seneas Tacticus. Seneas had a simple device for use in this emergency: the soldiers were to be trained beforehand that when a panic began, each should stand fast and shout "Panic!" In those places from whence there came no answering cry, the panic would be known to have sway. Where real danger existed, "call to arms" would be sounded. Seneas also cites the device of Euphrates, who prescribed that if panic came at night, each soldier was to sit up, but not stand up; all who stood up would be treated as enemies.

Anyone reading Colonel Spaulding's book is bound to

recall that adage which speaks of teaching one's grandmother to suck eggs.

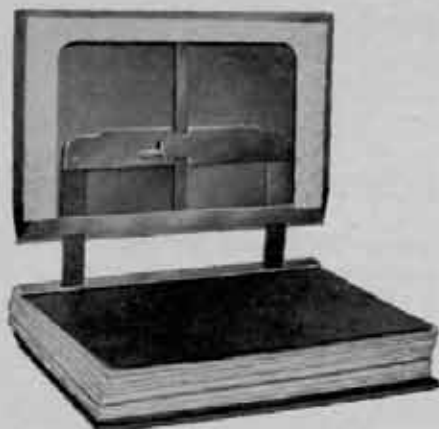
Considering the nature and purpose of this book, an index would have served a useful purpose. J. M. S.

THE ENEMY WITHIN. By Captain Henry Landau. New York: G. P. Putnam's Sons, 1937. 303 pages; 35 illustrations; chronology; index. \$3.00.

Captain Landau, formerly of the British intelligence service, gives a compressed transcript of the chain of evidence uncovered on wartime activities of the German secret service, spies, and *saboteurs*. He has written a tale of intrigue, conspiracy, adventure, and clever code breaking, in many parts as fascinating as a dozen detective stories rolled into one.

That other parts are tedious and fail to hold one's interest must be ascribed to the author's zeal in presenting so voluminously the case against Germany. Which is not to be wondered at, for he assisted the American claimants in their investigations and had full access to their records. He knew intimately many of the principal characters involved and obtained their personal stories.

As a result, we see the melodrama replayed by the original cast, from the patriotically motivated Imperial ambassador and other diplomats down to mercenary incendiaries. The successive plots develop sensationally: Railway demolitions, fires in munitions plants and on ships, inoculation of animals with glanders and anthrax, attempts to foment



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strikes in American labor and rebellions in the West Indies, Mexico, Ireland, and India. The property damage in the United States alone amounted to \$150,000,000.

Clues connecting Section III B of the Imperial German General Staff with these activities were found in diaries, check stubs, incendiary "pencils," a stolen brief case, documents removed from a foreign consulate by drilling through the wall of a neighboring office, overheard conversations, bomb factories on interned ships, stolen German code books, intercepted cables and radiograms decoded by the well camouflaged "40 O.B." of the British Naval Intelligence, and so on.

The munition factory fire at Kingsland, and the explosion on Black Tom Island, are the cases on which the author concentrates, as these were the major disasters. An attempt is now being made to prove German complicity and to collect damages through a Mixed Claims Commission.

The moral is saved for the closing pages, in which our lack of a counter-espionage service is decried. Captain Landau claims that, "For an annual expenditure of less than one per cent of what we lost from German sabotage during the neutrality period we could maintain a secret service and counter-espionage organization the peer of any in the world. . . ."

W. G. J.

By H. A. Jones. New York: Oxford University Press, 1937. 558 pages; 23 maps; index; 1 volume appendix. \$10.00.

These are the concluding volumes of the official history of the Royal Air Force. The narrative deals with the organization of the Royal Air Force and of the Independent Bombing Force and their operations in 1917-1918. Mr. Jones maintains the high standard common to the series familiarly known as the British official history of the war. His conclusions are based upon the study of German and French official documents as well as those of the British.

Officers acquainted with the difficulties of the United States in the production of aviation equipment during the war will be interested to know that the British met with the same disappointments. The production of aviation engines always fell far below even the most conservative estimates.

Much space is devoted to British bombing attacks on German territory. General Trenchard's view that the moral effects of these attacks would be much greater than the material damage is shown to be vindicated. The British only scored two big successes in bombing military targets during this period. One was the destruction of a small-arms plant at Kaiserslautern and the other the blowing up of a powder magazine at Metz. The Germans scored three major successes in the same period: the destruction of ordnance depots at Blarges and Saigneville,

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and the bombing of the No. 2 Base Mechanical Depot at Calais which held all the spare parts for the mechanical transport in France. This was a tremendous loss to the British.

The chapters on operations in Palestine, Mesopotamia, and Macedonia show what a decisive part can be played by aircraft when the enemy is demoralized and can be strafed in flight. Similarly in the great German defeat of August 8, 1918, the Royal Air Force made a sustained effort to trap the retreating German armies by bombing the Somme bridges. The attempt failed, but the attack forced the German air force to stand and fight. The heavy losses sustained by the Germans in this change of policy did much to break the backbone of the German air forces. In the opinion of the author, the reputation of several German airmen, notably Richtshofen, would have been quite different had the Germans followed the British policy of fighting at all times. When they were forced to fight continuously to save the Somme bridges, Richtshofen's old circus, then under Hauptmann Göring, was virtually destroyed. Adverse weather conditions prevented the Royal Air Force from taking its full toll of the retreating German armies in the early days of November, 1918.

British air casualties were generally higher than those of the enemy. This can be attributed in part to the offensive policy of the British, to the hasty training of re-

placements necessary to carry out this program, and to the superiority in technical equipment often enjoyed by the enemy.

The volume of appendices contains a large number of important documents, reports, and a mass of statistical data which can be studied with profit by all those who are interested in the proper rôle of aircraft in war.

H. A. D.

✦ ✦ ✦

GONE TO TEXAS. By Major John W. Thomason, Jr., U.S.M.C. New York: Charles Scribner's Sons. \$2.75.

A highly entertaining tale of a shavetail's adventures in Texas shortly after the War Between the States when that region seethed with intrigue and was fraught with sudden death. Major Thomason's background is alive and the story he tells could have happened.

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FLOOD LIGHT ON EUROPE—A Guide to the Next War. By Felix Wittmer. New York: Charles Scribner's Sons. 541 pages; 53 illustrations; Index. \$3.75.

Mr. Wittmer, lecturer at New Jersey Teachers College, wrote his guide to the next war for the purpose of giving the public a general outline of European public affairs and their background. He has carried out his self-appointed mandate with unquestioned success. His book is packed with an amazing amount of up-to-the-minute, concise information. This information, in spite of its encyclopedic scope, is presented in a breezy journalistic manner occasionally the effort to be entertaining seems somewhat forced; this is particularly true when the topic of the moment is too tragic to be treated with levity. On the whole, however, this book summarizes the European stage, its actors, and the development of the current setting and drama, more comprehensively and more readably than any recent study I have seen.

The narrative opens on The War to End War, points out its failure and the failure of the treaties which followed it, and finally the failure of the League. The helplessness of the "pawns on the Baltic" composing "the northeastern crazy quilt" is described. Then the see-saw of nationalities is introduced with an anecdotal description of affairs among the "midgets on stilts"—the small fry of southeast Europe. "The Heart of Europe" is the caption of Part Six which deals mainly with Hitler and his "poker deuces wild." The Scandinavian and Low countries are treated under the title of "Showers and Sunshine." Next, of course, comes France, described as the land of clarity and order, where diplomacy is centered on security. Surprisingly, France is now less adequately protected, the author holds, than in 1914.

Spain is a nation of individuals, of people who are unruly lovers of freedom. Mr. Wittmer remarks, "If the fate of a country depended solely on the heroism and self-sacrifice of its inhabitants, and not also on collective wisdom, Spain might duly come first; but in the face of an inborn inclination towards anarchy, self-destruction, and death, the party slogans of Communists evaporate like frivolous soap bubbles."

The author arraigns Alfonso XIII and makes him appear as bad as his dissolute Bourbon forbears who ruled France. In part there may be a foundation for this denunciation, but I am convinced that Alfonso unhappily was cursed by the system and conditions into which he was born king. Perhaps a strong monarch might have done something drastic. But it has been a long time since a king stepped out and did things.

The author claims that England, and not Mussolini or Hitler, would eventually dominate Spain if Franco should win the Civil War. The Spaniards would throw out the Teutons and Romans as they once evicted the Napoleonic horde. Then John Bull would slide in as the industrial adviser and money lender.

Here is an interesting statement on the foreign "volunteers" aiding Franco: "In Italy and Germany, at least

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1. The list shown on page 521 is the slate prepared by a nominating committee to replace those members whose term of office expires on December 31, 1937.

2. Record your vote by making an "X" in the appropriate square or indicate your choice by writing in the name of your candidate. Ballots received with signature, but no individual votes recorded will be considered proxies.

3. No member is to be deprived of a voice in the nomination and selection of the new members of the Council. If you do not approve of the Committee's choice, enter your personal choice in the space provided.

4. Ballots received after January 5, 1938, will not be counted.

5. If residing on a military post, please hand your ballot to the Adjutant to be forwarded together with all other ballots collected on the post. Members of National Guard and Organized Reserve Regiments should turn in their ballots to their regimental headquarters to be forwarded at one time. Those members for whom the foregoing instructions are not applicable should mail their ballots to The Secretary, U. S. Coast Artillery Association, 1115 17th St., N.W., Washington, D. C.

THE U. S. COAST ARTILLERY ASSOCIATION BALLOT

FOR VICE PRESIDENT (1938-1939)

Colonel Avery J. Cooper, C.A.C.

FOR ADDITIONAL MEMBERS OF THE EXECUTIVE COUNCIL (1938-1939)

*Vote for four only

- Colonel C. J. Smith, 213th C.A., Pa. N.G.
 Colonel E. C. Webster, 243d C.A., R.I. N.G.
 Colonel E. W. Thomson, C.A.-Res.
 Colonel W. W. Burns, 260th C.A., D.C. N.G.
 Lt. Col. R. M. Perkins, C.A.C.
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 Lt. Col. H. L. Spencer, 211th C.A., Mass. N.G.
 Lt. Col. J. H. Sherman, 251st C.A., Calif. N.G.
 Major Milo H. Brinkley, C.A.-Res.

Fill in names of other candidates you desire to vote for in lieu of those above

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Rank and Organization

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semiofficially, volunteer tourists were encouraged to spend a paid vacation in sunlit Spain. Italians who enlisted were guaranteed a premium of 2,000 lire, a 50,000-lire insurance policy, and wages of 40 lire a day. Nazis were promised a salary of 200 marks a month."

And this: "Aviators of all nations tried out their planes. The previously confident Germans learned that their machines ought to attain higher speed if they wished to survive the coming struggle. They made another experience by realizing that their light tanks could easily be pierced and destroyed. It was also found out that liquid gases, which burn the victims, for the time being are of greater avail than any of the poison gases which were—at some occasions—used. It became evident that terrorization of the civilian population by air raids, and by permanent use of the radio, may be more effective than the most deadly air attack on fortresses."

Italy and Great Britain with its empire also come in for extensive treatment by Mr. Wittmer. He shows why Mussolini is compelled to seek land elsewhere—principally to get the raw materials which Italy lacks. *Mare Nostrum* begins to look like a proud threat. Meanwhile Britain is sitting on an anthill and suffering one nightmare after another.

Before turning off his floodlight, Mr. Wittmer switches it momentarily to the Far East to illuminate the "dynamite" involving China and Japan. He says that at the outbreak of the coming war in Europe, Japan, China, and Russia will clash in the East. At that time it is not improbable that China and Russia will be allies.

One cannot help but wonder whether the mass of factual data assembled in this book is entirely accurate, and whether the twists put on the author's "unbiased" declarations of government policies give correct interpretations. It seems unlikely. But it would be humanly impossible to hit the truth on every matter covered. Nevertheless, *Floodlight on Europe* is an outstanding book and wins this reviewer's unqualified recommendation.

W. G. J.

New Books

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JANUARY-FEBRUARY, 1937

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Bundy, C. W.
Holmes, H. B., Jr.
Bradshaw, Aaron, Jr.
Armstrong, C. H.
McCroskey, S. L.
Warren, W. H.

THE COAST ARTILLERY BOARD Fort Monroe, Va.

COLONEL
Shedd, W. E., Jr.

MAJORS
Cotter, C. E.
Engelhart, A. F.
Mickelsen, S. H.
Conway, E. T.

CAPTAINS
Hewitt, Hobart
Wolfe, W. J.

SUBMARINE MINE DEPOT Fort Monroe, Va.

LIEUTENANT COLONEL
Cottrell, J. F.

CAPTAIN
Engelhart, E. C.

DISTRICTS AND BRIGADES

1st C. A. DISTRICT Boston, Mass.

BRIGADIER GENERAL
Cheney, S. A.
LIEUTENANT COLONEL
Guthrie, R. E.
MAJOR
Topping, F. L.
1ST LIEUTENANT
Frederick, H. T., Aide

2d C. A. DISTRICT New York, N. Y.

COLONELS
Fergusson, F. K.
Bowen, W. S.
LIEUTENANT COLONELS
Mountford, F. A.
Chase, T. M.
Green, F. M.

3d C. A. DISTRICT Fort Monroe, Va.

BRIGADIER GENERAL
Gulick, J. W.
LIEUTENANT COLONEL
Moore, G. F.
1ST LIEUTENANT
Fuller, A. L., Jr., Aide

4th C. A. DISTRICT Fort McPherson, Ga.

COLONEL
Colvin, W. M.
LIEUTENANT COLONEL
Nichols, R. F.

9th C. A. DISTRICT Presidio San Francisco, Calif.

BRIGADIER GENERAL
Tracy, J. P.
LIEUTENANT COLONELS
Wing, C. K.
Campbell, A. G.
CAPTAIN
Carter, C. C., Aide

HAWAIIAN SEPARATE COAST ARTILLERY BRIGADE Fort DeRussy, T. H.

BRIGADIER GENERAL
Woodruff, J. A.
COLONEL
Williams, B. H. L.
LIEUTENANT COLONELS
Smith, J. P.
Haines, R. E.
Davis, H. C., Jr.
MAJOR
Lewis, J. T.
CAPTAIN
Bransham, C. M.

COAST ARTILLERY REGIMENTS

1st COAST ARTILLERY Fort Sherman, C. Z.

COLONEL
Carpenter, W. T.
LIEUTENANT COLONEL
Wilson, R. W.
MAJORS
Grimm, H. F., Jr.
Whybark, G. W.
Dunn, G. W., Jr.

CAPTAINS
McGeehan, C. W.
Shunk, P. W.
Strickland, H. E.
Raitor, W. C.

1ST LIEUTENANTS
Thompson, M. R.
Parr, W. H.
Briggs, K. M.
Francis, W. H.
Seward, J. H.
Sutherland, A. J.
Cory, I. W.
Powell, C. W.

2d LIEUTENANTS
van Ormer, H. P.
Greenlee, H. B., Jr.
Foster, S. W.
Alfery, John
Wolfe, Y. H.

Fort Randolph, C. Z.

COLONEL
Meyer, C. R.
MAJOR
Detwiler, H. P.
CAPTAINS
Myrah, H. H.
Anderson, G. B.
Ward, E. B. C.
Mortimer, J. E.
Haakensen, N. T.

1ST LIEUTENANTS
Bain, J. G.
Lapping, A. J.
Gilbert, O. H.

2d COAST ARTILLERY Fort Monroe, Va.

COLONEL
Spurgin, H. G.
LIEUTENANT COLONEL
Clark, F. S.

MAJORS
French, P. H.
Campbell, J. T.
Rutledge, P. W.

CAPTAINS
Brusher, H. A.
McGarragh, R. E.
Moss, J. D.
Roussau, J. H., Jr.
Miller, A. D.
Tracy, M. W.
Wright, W. L.

1ST LIEUTENANTS
Kimm, V. M.
Linn, J. J.
2d LIEUTENANTS
Hildebrandt, C. W.
Whipple, H. B.

3d COAST ARTILLERY Fort MacArthur, Calif.

MAJOR
Thompson, L. H.

CAPTAINS
Mendenhall, C. M., Jr.
Nepoul, I.

1ST LIEUTENANT
Paires, G. F.

Fort Rosecrans, Calif.
LIEUTENANT COLONEL
Kolly, E. L.

CAPTAIN
Young, N. D.

1ST LIEUTENANTS
Moore, R. F.
Scheneck, H. W.

Fort Stevens, Ore.

MAJORS
Stewart, W. B.
Jones, A. W.

CAPTAINS
Chambers, A. K.
Renter, H. C.

1ST LIEUTENANT
Adams, G. N.

4th COAST ARTILLERY Fort Amador, C. Z.

COLONEL
Pearce, E. D'A.
Williford, F. E.

LIEUTENANT COLONEL
Spiller, O. L.

MAJORS
Freedland, E. H.
Pierce, H. R.
Jackson, A. M.
Greenwood, T. B.
Dennis, L. C.
Craig, J. L.

CAPTAINS
Chaplin, R. T.
Moore, J. M.
Ericson, E. A.

Rejerson, J. E.
Smith, P. McC.
Shumate, J. P.
Nielhauser, W. P.
Toftoy, H. S.
Miller, R. L.
Grinder, R. H.

1ST LIEUTENANTS
Dunham, C. E.
Holst, J. J.
Samuels, Andrew, Jr.
Gungdon, N. A.
Parks, H. C.
Lodward, W. J.
Flynn, T. deN.
Gallagher, R. E.

2d LIEUTENANTS
Jablonsky, H. J.
Stuart, A. J., Jr.
Boudley, C. J., Jr.
Perkins, N. T.

5th COAST ARTILLERY Fort Hamilton, N. Y.

MAJORS
Gilbert, W. J.
Riggs, C. G.

6th COAST ARTILLERY Fort Winfield Scott, Calif.

COLONEL
Choke, H. E.

LIEUTENANT COLONEL
Stuart, L. L.

MAJORS
Irvine, W. W.
McCarthy, E. B.

CAPTAINS
Jones, R. C.
O'Connell, G. M.
Scott, W. W.
Hartman, S. E.
Shelton, C. Q.
Luce, Dean
Cassidy, J. F.
Lawton, W. S.
Hendey, G. F., Jr.
Vanderhalis, H. J.
Pape, R. B.
Vichulek, L. D.
Hendrix, R. B.

1st LIEUTENANTS
Snyder, C. M.
Cott, W. S.
Hall, W. H.
Taylor, E. O.
Chapman, E. A.

2d LIEUTENANTS
Ingram, L. L.
Hale, H. R.
Miner, R. M.
Ashman, A.
Persons, H. P.
Swain, Owen
Kinard, W. H., Jr.
Kallman, M. M.

7th COAST ARTILLERY Fort Hancock, N. J.

COLONEL
Magruder, L. B.

LIEUTENANT COLONEL
Dennis, E. B.

MAJOR
Stephens, J. C.

CAPTAINS
Cowan, E. G.
McFadden, W. C.

1st LIEUTENANT
MacNair, T. K.

2d LIEUTENANT
Murrin, W. R.

Fort DuPont, Del.

CAPTAINS
Nichols, G. F.
Newman, Glenn

8th COAST ARTILLERY Fort Preble, Maine

LIEUTENANT COLONEL
French, C. A.

MAJOR
Waldron, A. W.

CAPTAINS
Lins, H. W.
Kirkpatrick, L. S.

1st LIEUTENANT
Somerville, E. C.

9th Coast ARTILLERY Fort Banks, Mass.

LIEUTENANT COLONEL
Tilton, R. L.

MAJOR
Gibbreth, J. H.

CAPTAINS
Denny, C. S.
McComsey, J. A.
Franklin, A. G., Jr.

1st LIEUTENANT
Leahy, P. A.

10th COAST ARTIL- LERY Fort Adams, B. I.	14th COAST ARTIL- LERY Fort Worden, Wash.	51st COAST ARTIL- LERY Fort Monroe, Va.	1st LIEUTENANT Glass, T. A.	62d COAST ARTIL- LERY Fort Totten, N. Y.	1st LIEUTENANTS McLamb, N. A. Ross, L. G. Sawyer, J. A. Peddicores, E. D. Carey, G. R. Logan, W. B. Lippcomb, Lafar, Jr.
LIEUTENANT COLONEL Herman, P. H.	COLONEL Pease, W. G.	LIEUTENANT COLONEL Walker, E. B.	2d LIEUTENANTS Voehl, W. E. H. Hoffman, T. F. Stevens, J. DuV. Pillivan, R. A. Schweidel, K. R.	COLONEL Ferguson, F. K.	2d LIEUTENANTS Stark, J. J. Piram, J. S. Ebel, H. W. Pinkenaur, R. G. Kosorick, K. R. McGoldrick, F. M.
CAPTAIN Supple, E. L.	LIEUTENANT COLONEL Ficker, W. D.	MAJOR Bucher, O. B.		LIEUTENANT COLONEL Bourne, E. E. Brown, R. D. McClain, J. D.	
1st LIEUTENANT Gerhardt, H. A.	MAJORS Owens, G. R. Bary, E. L.	CAPTAINS Dingeman, R. E. Wilson, A. M., Jr. Shepard, Lloyd	59th COAST ARTIL- LERY Fort Mills, P. I.	MAJORS Taliaferro, E. H., Jr. Farnsworth, I. D.	
Fort Rodman, Mass.		2d LIEUTENANTS Harrison, H. J. Katz, H. J. Moore, J. C. Thompson, E. H., Jr. Blair, W. S.	COLONEL Bunker, P. D.		
CAPTAIN Johnson, J. J.	CAPTAINS Harrison, L. V. Snell, V. C. McCormick, W. L. Barker, W. L. Bell, C. O. Lamson, D. D. Gibbs, G. G. Garley, F. K.		LIEUTENANT COLONEL Turner, E. W.		
11th COAST ARTIL- LERY Fort H. G. Wright, N. Y.		52d COAST ARTIL- LERY Fort Hancock, N. J.	MAJORS Morgan, Maurice Bartow, E. R.		
COLONEL Collins, R. W.	1st LIEUTENANTS Kochetky, J. H. Vickers, L. T. Edison, D. D. Lawlor, R. J. Shepardson, F. H.	LIEUTENANT COLONEL Hawkins, S. P.	CAPTAINS Myers, C. M. Griffin, W. E. Woods, F. J. Kleinman, E. A. Bailey, D. J.		
LIEUTENANT COLONEL Foote, W. C.		MAJORS Foster, V. P. Young, Ellsworth	1st LIEUTENANTS Deichelmann, M. K. Woodbury, K. S. Williams, R. L., Jr. Patterson, C. G. Cooper, A. J., Jr.		
MAJOR Hope, D. H.	18th COAST ARTIL- LERY Fort Kamehameha, T. H.	LIEUTENANT COLONEL Maynard, John B.		1st LIEUTENANTS Raymond, M. B. Schrarnacher, A. W. Liwiski, P. A. McMortow, F. J. Fritz, W. G. Hain, R. W.	
CAPTAINS Schmidt, V. C. Willard, S. E. Walton, T. L. Goodall, J. R. McCarthy, W. J. Stabbe, G. H. England, J. M. Simmons, N. H.	COLONEL Bischof, Earl	MAJORS Cravens, W. M. Smith, C. J. Kerr, Creighton Crowell, E. B. Heilbron, Milton		2d LIEUTENANTS Robbins, A. D. Wehl, S. I. Mattern, R. H.	
1st LIEUTENANTS Folk, F. T. Stuyton, T. V. Cooper, H. B. Chase, E. N. McNik, S. M. Ebez, F. W. Ostenberg, F. T.	LIEUTENANT COLONEL Maynard, John B.	CAPTAINS Road, M. M. Harris, P. A. Bent, H. T. Holcomb, C. W. Jacard, P. A.	2d LIEUTENANTS Peca, P. S. Beasley, L. K. Kushner, G. L. Reifold, F. B.		
2d LIEUTENANTS Donohue, J. M. Boys, R. C.	MAJORS Cravens, W. M. Smith, C. J. Kerr, Creighton Crowell, E. B. Heilbron, Milton	CAPTAINS Bead, M. M. Harris, P. A. Bent, H. T. Holcomb, C. W. Jacard, P. A.		63d COAST ARTIL- LERY Fort MacArthur, Calif.	2d LIEUTENANTS Frith, R. E. Lockhart, K. E.
13th COAST ARTIL- LERY Fort Barranca, Fla.	1st LIEUTENANTS Edwards, P. W. Shaw, L. E. Orden, M. L. Totten, Robert	CAPTAINS Cravens, W. M. Smith, C. J. Kerr, Creighton Crowell, E. B. Heilbron, Milton		LIEUTENANT COLONEL Thiele, C. M.	
COLONEL Arthur, Robert	MAJORS Loquist, Frederick Sweet, W. H. Atkinson, C. E.	CAPTAINS Harrington, J. H. Swift, P. S.	60th COAST ARTIL- LERY Fort Tilden, N. Y.	MAJORS Griggs, D. M. Lawrence, A. M.	
LIEUTENANT COLONEL Humbert, G. F. Jones, C. R.		MAJORS Harrington, J. H. Swift, P. S.	COLONEL Kimberty, Allen		
MAJORS Harrington, J. H. Swift, P. S.	16th COAST ARTIL- LERY Fort Ruger, T. H.	1st LIEUTENANT Kyrier, O. H., Jr.	LIEUTENANT COLONEL Kemble, Franklin	CAPTAINS Amoroso, A. D. Young, C. P. Duvall, H. H. Aldrich, H. S. Davis, J. W. Hawthorne, W. B.	
CAPTAINS King, E. W. Bafer, J. B. Bunney, K. C. Hatch, M. A. Harriman, J. E. Anderson, Grandor Barrett, J. R. Kobbege, G. E. Gendelman, C. M.	COLONEL Wilbrick, G. A.	2d LIEUTENANTS Morgan, J. B. Walker, E. H. Spang, C. E., Jr. Kessler, R. H. Cordes, C. F., Jr.	MAJOR Parsons, M. H.		
1st LIEUTENANTS Hunter, H. W. Glassburn, B. D. Kruscher, W. H. Julian, Harry Crawford, G. H.	LIEUTENANT COLONEL Cook, T. C. Rowland, A. E.	1st LIEUTENANT Kyrier, O. H., Jr.		1st LIEUTENANTS Alexander, D. S. Hampton, W. A. Massola, W., Jr. McPeely, H. G.	
2d LIEUTENANTS Winking, G. R. Yast, J. R.	MAJORS Loquist, Frederick Sweet, W. H. Atkinson, C. E.	2d LIEUTENANTS Dunn, C. G. McCarty, A. A. Tanner, R. A.		2d LIEUTENANTS Curtis, K. I. Howell, J. N. Wollaston, P. H. Farphy, F. L. Ruyoski, A. S.	
Key West, Fla.	1st LIEUTENANT Moorman, Richard	1st LIEUTENANT Kyrier, O. H., Jr.	2d LIEUTENANTS Andrews, C. L. Gilman, S. I. Hill, C. W.		
MAJOR MacMullen, J. D.	18th COAST ARTIL- LERY Fort Rugar, T. H.	1st LIEUTENANT Kyrer, O. H., Jr.		64th COAST ARTIL- LERY Fort Shafter, T. H.	2d LIEUTENANTS Kemble, Franklin, Jr. Routh, D. B.
CAPTAIN Johnson, W. L.	COLONEL Wilbrick, G. A.	2d LIEUTENANTS Morgan, J. B. Walker, E. H. Spang, C. E., Jr. Kessler, R. H. Cordes, C. F., Jr.		COLONEL Mitchell, R. M.	
Fort Meade, S. C.	LIEUTENANT COLONEL Dunn, W. K.	55th COAST ARTIL- LERY Fort Kamehameha, T. H.	31st COAST ARTIL- LERY Fort Sheridan, Ill.	LIEUTENANT COLONEL Hardaway, F. P. Emery, E. E., Jr.	92d COAST ARTIL- LERY Fort Mills, P. I.
LIEUTENANT COLONEL Dunn, W. K.	MAJORS Hanson, F. A. Powers, J. D. Mabbott, H. C. Harris, C. S. Jeffords, T. E. Roberts, C. B. Donaldson, W. H., Jr.	MAJOR Phillips, W. S.	COLONEL Gilmer, A.		LIEUTENANT COLONEL Dalso, E. B. (P.S.) Meberg, Reinold
CAPTAIN Clim, H. W.		CAPTAINS Gunn, C. G. Schellier, F. F.	MAJORS Hinton, J. C. Armstrong, M. G.		MAJOR Gibson, R. T.
Fort Crockett, Texas	CAPTAIN Hobson, G. B.	1st LIEUTENANTS Barber, J. T. Heidland, E. F. Nelson, R. M. Rude, W. A. Ashworth, E. T.	CAPTAINS Wilson, A. E. Elli, H. P. Turnbull, H. T. Wahle, C. B. Field, G. L. Walbridge, Vero Harwell, M. H.		CAPTAINS Caluya, P. Q. (P.S.) Pamplin, D. G. Bates, R. E. French, F. J. McKinney, M. J.
CAPTAIN Kendall, W. H.	MAJORS Dunham, W. H. J. Weddell, W. A.	2d LIEUTENANT Reynolds, S. R.		1st LIEUTENANTS Wrean, J. T. Reynolds, J. G. Moore, R. W.	1st LIEUTENANTS Wilson, D. M. Thomas, A. H. McKee, W. S. Russell, S. O. McReynolds, S. M., Jr.
1st LIEUTENANT Leslie, R. C.	CAPTAINS Dunham, W. H. J. Weddell, W. A.		2d LIEUTENANTS Root, W. G. Remick, J. W. Winfield, B. M. Lind, H. D.		2d LIEUTENANTS Moore, E. W. Weitzel, G. J. Hardy, R. M.
	1st LIEUTENANTS Dayhardt, T. J. Fairchild, F. H.	CAPTAINS Dodgo, P. B., Jr. Pitzer, J. H. Kessler, F. R. Tischbets, C. F.			

DEPARTMENT HEADQUARTERS AND UNASSIGNED

PANAMA CANAL DEPARTMENT STAFF	PANAMA DEPARTMENT UNASSIGNED	HAWAIIAN DEPARTMENT UNASSIGNED	PHILIPPINE DEPARTMENT STAFF	PHILIPPINE DEPARTMENT UNASSIGNED
COLONEL Turtle, Lewis	LIEUTENANT COLONEL Stockton, E. A., Jr.	LIEUTENANT COLONEL Arbush, H. H.	BRIGADIER GENERAL Bishop, P. P.	LIEUTENANT COLONELS Dodson, R. S. Warren, A. H.
LIEUTENANT COLONEL Smith, E. K.		CAPTAINS Hodger, G. M. Flory, L. D. Simmons, J. F.	COLONEL Terry, T. A.	CAPTAINS Crim, C. H. Tucker, G. A. Tuedennick, D. C. Smith, J. W. (P.S.)
MAJORS Hudgins, L. A. Nelson, P. B.		1ST LIEUTENANTS Paris, C. L. Tumlin, R. S.	LIEUTENANT COLONELS Wardner, G. C. Hood, J. H. Pitt, O. G.	1ST LIEUTENANTS Anderson, R. L. Tarrant, L. K.
		2D LIEUTENANTS Morris, Robert Hutterman, G. H. Kramer, Arthur	MAJORS Hester, G. J. Feltz, G. G. Nicht, P. F. Gibson, M. B. Heckath, William Steward, W. H.	2D LIEUTENANTS Skinner, N. A. Raynes, W. H. Waterman, R. S. Coutts, C. A.
			CAPTAINS Gillotte, C. A. Wilson, P. M. (PS) Martellino, Pastor (PS)	
			1ST LIEUTENANTS Zeller, F. J. Donnelly, H. C. Gills, S. F.	

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COMMANDANT	INSTRUCTORS	MAJORS	Students	Advanced Technical Course
BRIGADIER GENERAL Gulick, J. W.	Tactics	Townsend, J. H. Cochran, H. McC.		Students
STAFF	LIEUTENANT COLONEL Orr, R. F.	CAPTAINS Bishop, K. A. Harber, Edward	CAPTAINS Eberthorpe, D. S. Shori, W. B. deGravillines, K. L. F. Gambor, J. F.	CAPTAINS Shepherd, C. E. Chester, G. A. Davis, W. V. Gard, H. P. Hopkins, Armand
COLONEL Gardner, F. Q. C.	MAJORS Jackson, H. R. Mackin, K. N. Edgcomb, P. E.	Engineering	1ST LIEUTENANTS Lovell, J. R. Griffith, K. G. Fornstrom, C. H. Twyman, J. H., Jr. Daffah, J. T. Perry, W. A. Taber, A. P. Odenweller, C. J., Jr. Peterson, A. C. Roy, P. A. Harris, W. H. Koscielniak, A. A.	1ST LIEUTENANT Chamberlain, E. W.
LIEUTENANT COLONEL Kable, J. P.	CAPTAINS Lennitzer, L. L.	MAJOR Hickey, D. W., Jr.		
MAJOR Lowry, Porter	EXTENSION COURSES	CAPTAIN Bartlett, L. W.		
	MAJOR Carrington, G. de L.	Enlisted Specialists		
	CAPTAIN Starr, R. E.	LIEUTENANT COLONEL Pendleton, R. T.		
	Artillery	CAPTAINS Kane, F. B. McPherson, W. L. Stevens, V. C.		
	LIEUTENANT COLONEL Cramer, R. V.			

OTHER SCHOOLS

COMMAND AND GENERAL STAFF SCHOOL	ARMY WAR COLLEGE	NAVAL WAR COLLEGE	ARMY INDUSTRIAL COLLEGE	AIR CORPS TACTICAL SCHOOL	INFANTRY SCHOOL
Fort Leavenworth, Kansas	Washington, D. C.	Newport, R. I.	Washington, D. C.	Maxwell Field, Ala.	Fort Benning, Ga.
Instructors	Instructor	Student	Students	Instructor	Instructor
LIEUTENANT COLONELS Crawford, J. D. Meyer, G. R. Finley, C. R.	COLONEL Pohl, J. S.	MAJOR Goodman, W. M.	LIEUTENANT COLONELS Gage, P. S. Babeock, F.	MAJOR Epling, F. G.	MAJOR K. E. Turley
MAJORS Phillips, T. B. Wilson, J. H. Bullman, H. F. E.	Students		MAJOR Hastings, F. H.	Student	
CAPTAIN Webble, W. L.	LIEUTENANT COLONELS Hickok, M. J. Koenig, W. C. Hines, Charles			MAJOR Herrick, H. N.	
Students	MAJORS Ricker, G. W. Case, Homer McSherry, F. J. Milburn, B. L.				
MAJORS McCaig, Kenneth Anderson, S. W. Handwerk, M. C. Christian, F. L. Johnson, H. S. Coburn, H. W. Winton, A. V. deCamp, J. T. Lewis, P. W.					
CAPTAINS Davis, L. L. Meyers, H. F. Kady, P. R. Madison, J. H. Crislow, R. W., Jr. Cole, P. W. Denson, L. A., Jr. Kreuter, R. H. Smith, L. S. Featherston, J. H. Schuyler, O. V. R. McConnell, F. O. Mitchell, P. A. Sevilla, P. C. (P.S.) Santon, M. M. (P.S.)					

MINE PLANTERS AND CABLE SHIPS

General Abner Baird
Lt. H. G. Wright, N. Y.
Captain P. S. Lowe

Captain Joseph Henry
Fort Hancock, N. J.
Captain Burgo Gill

General Edward O. C.
Fort Hancock, N. J.
Captain Charles M. Wolff

General John M. Schofield
Fort Monroe, Va.
1st Lt. A. R. Harman

General J. Franklin Ball
Ft. Warden, Wash.
1st Lt. H. F. Townsend

General William M. Graham
Ft. Sherman, C. Z.
Captain G. A. Ford

Colonel George F. E.
Harrison
Fort Mills, P. I.
Captain Samuel Rubin

NATIONAL GUARD

OFFICE CHIEF OF NATIONAL GUARD BUREAU

Washington, D. C.

Lt. Col. L. B. Weeks
Major LeRoy Lutes

COAST ARTILLERY NATIONAL GUARD REGIMENTS

Instructors

Lt. Col. W. M. Chapin,
240th (HD), Port-
land, Maine
Major George Blaney,
240th (HD), Rock-
land, Maine

Capt. Samuel McCul-
lough, 197th (AA),
Concord, N. H.

Lt. Col. R. F. Maddux,
211th (AA), Boston,
Mass.

Major B. Vogel, 241st
(HD), Fall River,
Mass.

Capt. A. L. Lavery,
241st (HD), Boston,
Mass.

Lt. Col. H. E. Small,
242d (HD), Bridge-
port, Conn.

Lt. Col. E. H. Metzger,
243d (HD), Provi-
dence, R. I.

Major R. T. George,
243d (HD), Provi-
dence, R. I.

Major Benjamin Bower-
ing, 244th (TD),
New York, N. Y.

Lt. Col. J. F. Hogan,
212th (AA), New
York, N. Y.

Col. L. L. Pendleton,
245th (HD), Brook-
lyn, N. Y.

Capt. A. L. Parmelee,
245th (HD), Brook-
lyn, N. Y.

Capt. Sylvan Bertner,
198th (AA), Wilming-
ton, Del.

Lt. Col. H. W. Stark,
261st (HD), Laurel,
Del.

Major H. H. Blackwell,
240th (HD), Roan-
oke, Va.

Lt. Col. J. L. Sinclair,
246th (HD), Lynch-
burg, Va.

Major E. C. Seaman,
213th (AA), Allen-
town, Pa.

Major O. D. McNelly,
213th (AA), Allen-
town, Pa.

Lt. Col. D. S. Lenzner,
260th (AA), Wash-
ington, D. C.

Major J. deB. Wallack,
252d (TD), WB-
mington, N. C.

Major T. R. Hartlett,
263d (HD), Colum-
bia, S. C.

Lt. Col. E. P. Noyes,
264th (HD), States-
boro, Ga.

Lt. Col. F. L. Hoskins,
265th (HD), Jack-
sonville, Fla.

Major N. L. Adams,
202d (AA), Chicago,
Ill.

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(AA), Carthage, Mo.

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206th (AA), Fayette-
ville, Ark.

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tree, 249th (HD),
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2d Lt. John K. Arnold, Jr., Randolph Field, Texas.
2d Lt. Frank W. Gillespie, Randolph Field, Texas.
2d Lt. Frederick Bell, Randolph Field, Texas.
2d Lt. Leland R. Drake, Randolph Field, Texas.

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1st Lt. Robert F. Haggerty, Watertown Arsenal, Mass.
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1st Lt. Frederick R. Young, Aberdeen Proving Ground, Md.
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1st Lt. Edward J. Rodden, Springfield Armory, Springfield, Mass.
1st Lt. Ferdinand M. Humphries, Aberdeen Proving Ground, Md.
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The Coast Artillery Corps

OFFICERS' STATION LIST

September 21, 1937



SUPPLEMENT TO
THE COAST ARTILLERY JOURNAL
SEPTEMBER-OCTOBER, 1937

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Homer, J. L.

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Nichols, H. F.

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Fort Monroe

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Perkins, N. T.

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LERY
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LERY
Fort Winfield Scott,
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Seier, T. D.

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LERY
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Newman, Glenn

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Molnick, S. M.
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LERY**
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Crawford, G. H.
Glassburn, R. D.

2D LIEUTENANTS
Yost, J. D.
Cresker, G. W.
Bask, J. W.
McLain, E. W.

Key West, Fla.

MAJOR
MacMullen, J. D.

CAPTAIN
Johnson, W. I.

Fort Moultrie, S. C.

LIEUTENANT COLONEL
Gagn, P. S.

CAPTAIN
Ulmo, H. W.

Fort Crockett, Texas

LIEUTENANT COLONEL
Dawson, C. A. W.

CAPTAIN
Dodge, F. B.

**14th COAST ARTIL-
LERY**
Fort Worden, Wash.

COLONEL
Peace, W. G.

LIEUTENANT COLONEL
Frazier, W. D.

MAJORS
Owens, G. R.
Cook, F. W.
Clayton, L. L.

CAPTAINS
Bastinar, L. Y.
McCormick, W. L.
Bell, C. O.
Lamson, D. D.
Gibbs, G. G.
Gurley, F. K.
Meyers, C. M.

1ST LIEUTENANTS
Vickers, L. T.
Edison, D. D.
Lawler, R. J.
Aldworth, E. T.
Flem, T. DeN.

**15th COAST ARTIL-
LERY**
Fort Kamehameha, T. H.

COLONEL
Riscoe, Eagl

LIEUTENANT COLONEL
Asheson, H. H.

MAJORS
Smith, C. J.
Crowell, E. R.
DeMerritt, R. E.

CAPTAINS
Snell, V. C.
Harris, P. A.
Ellis, H. P.
Simmons, J. P.
Jaccard, P. A.
Shaw, L. E.

1ST LIEUTENANTS
Ogden, M. L.
Twitten, Robert
Mourman, R. R.

2D LIEUTENANTS
Weld, S. L., Jr.
Morris, Robert

**16th COAST ARTIL-
LERY**
Fort Ruger, T. H.

COLONEL
Wildrick, G. A.

LIEUTENANT COLONEL
Smith, J. P.

MAJORS
Lofquist, Frederick
Sweet, W. H.

CAPTAINS
Holder, W. G.
Cordell, B. E.

1ST LIEUTENANTS
Elias, Paul
Clark, Erskine
Tubbs, H. S.
King, V. H.
Turner, H. F.

**41st COAST ARTIL-
LERY**
Fort Kamehameha, T. H.

MAJOR
Crawers, W. M.

CAPTAIN
Willard, S. E.

1ST LIEUTENANTS
Daybarsh, T. J.
Tomlin, R. F.

2D LIEUTENANTS
Root, W. G.
Howell, J. S.
Kramer, Arthur

**51st COAST ARTIL-
LERY**
Fort Monroe, Va.

COLONEL
Walker, E. R.

MAJOR
Kerr, C.

CAPTAINS
Dingeman, R. E.
Shepard, Lloyd
Ward, E. R. C.

1ST LIEUTENANT
Hiddleton, E. W.

2D LIEUTENANTS
Katz, H. J.
Thompson, E. H., Jr.
Blair, W. S.
Fitzgerald, R. H.
George, M. H.

**52d COAST ARTIL-
LERY**
Fort Hancock, N. J.

LIEUTENANT COLONEL
Hawkins, S. F.

MAJORS
Poster, V. P.
Young, Ellsworth
Putnam, W. F.

CAPTAINS
Lawry, R. C.
Carlisle, W. H.
Goff, J. L.
Merritt, W. B.
Hendessay, H. P.

1ST LIEUTENANTS
Harkman, E. E.
Gilbert, O. H.

2D LIEUTENANTS
Cherubin, S. J.
Young, C. G.

Fort Monroe

LIEUTENANT COLONEL
Price, F. A.

MAJOR
Atkinson, C. H.

CAPTAINS
Chamberlain, F. R.
Baren, A. S.
Kyster, O. H., Jr.
Smith, P. McC.

1ST LIEUTENANTS
Schmick, P.
Corbin, F. P., Jr.
Williams, R. L.

2D LIEUTENANTS
Kessler, R. H.
Gulick, J. M.
Ames, G. R.
Worcester, W. J.

**55th COAST ARTIL-
LERY**
Fort Kamehameha, T. H.

CAPTAINS
Badger, G. M.
Gunn, C. O.
Henn, J. S.

1ST LIEUTENANTS
Barber, J. T.
Partin, C. L.
Hedland, E. F.
Nelson, R. M.
Reyna, S. R.

Fort Ruger, T. H.

MAJOR
Dahler, B. C.

CAPTAINS
Flory, L. D.
Keeler, F. R.
Tischbein, C. F.
Franklin, A. G., Jr.

1ST LIEUTENANTS
Voehl, W. E. H.
Hoffman, T. F.
Stevens, J. DeV.

2D LIEUTENANT
Pillivant, R. A.

**59th COAST ARTIL-
LERY**
Fort Mills, P. I.

COLONEL
Rahlen, George

LIEUTENANT COLONEL
Turner, E. W.

MAJORS
Morgan, Maurice
Barnes, E. H.
Campbell, J. T.

CAPTAINS
Criss, C. H.
Woods, F. J.
Kleinman, E. A.
Trosienick, D. G.
Tucker, G. A.
Gill, B. D.
Brusher, H. A.

1ST LIEUTENANTS
Kushner, G. L.
Ingram, L. L.

2D LIEUTENANTS
Baynes, W. H.
Reybold, F. B.
Firth, R. E., Jr.
Cuzzar, C. A.
Drake, L. R.

**60th COAST ARTIL-
LERY**
Fort Mills, P. I.

COLONEL
Cunningham, J. H.

LIEUTENANT COLONEL
Gibson, R. T.

CAPTAINS
Richardson, W. L.
French, F. J.
Martin, E. G.
Bender, A. H.
Wynn, J. T.

1ST LIEUTENANTS
Tarrant, I. K.
Anderson, R. L.
Hill, C. W.

2D LIEUTENANTS
Waterman, H. S.
Wilkins, G. H.
Harrison, H. J.
Hildebrandt, C. W.
Hale, H. R.
Ashman, Alfred
Romlein, J. W.

**61st COAST ARTIL-
LERY**
Fort Sheridan, Ill.

LIEUTENANT COLONEL
Campbell, A. G.

MAJOR
Armstrong, M. G.

CAPTAINS
Wilson, A. E.
Tarnbull, H. T.
Field, G. L.
Walbridge, Vern
Harwell, M. H.
Griffin, W. E.
Kelly, P. B.
Nelson, P. B.
Roth, A.

1ST LIEUTENANTS
Briggs, K. M.
Cloud, C. C., Jr.
Thompson, M. R.

2D LIEUTENANTS
Wardfield, R. M.
Lind, H. D.
Eustank, P. H.
Steady, O. B.

**62d COAST ARTIL-
LERY**
Fort Totten, N. Y.

COLONEL
Eglin, H. W. T.

LIEUTENANT COLONEL
Bennett, E. E.
McCain, J. D.

MAJORS
Taliaferro, E. H., Jr.
Farnsworth, L. D.
Read, M. M.

CAPTAINS
White, L. A.
Hogren, J. L.
Bullens, J. R.
Dwyer, J. W.
Gettys, C. W.
Madison, J. H.
Gregory, E. M.
Howell, J. F., Jr.
Miter, F. F.
Lepping, A. J.

1ST LIEUTENANTS
Raymond, M. H.
Fritz, W. G.
Hain, R. W.
Cassavady, A. F.

2D LIEUTENANTS
Mattern, R. H.
Shiva, D. W.
Rumph, R. W.
Clark, M. H.
Hickok, M. J., Jr.

**63d COAST ARTIL-
LERY**
Fort MacArthur, Calif.

LIEUTENANT COLONEL
Thiele, C. M.

MAJORS
Lawrence, A. M.
Detwiler, H. P.

CAPTAINS
Amoroso, A. D.
Duval, H. H.
Davis, J. W.
Cole, D. W.
Gamber, J. F.
Edwards, P. W.

1ST LIEUTENANTS
Hampton, W. A.
Mansell, W., Jr.
Kaufman, R. K.
Corum, D. R.

2D LIEUTENANTS
Furbey, F. L.
Buznoski, A. S.
Spangler, H. M.
Scott, J. A., Jr.

**64th COAST ARTIL-
LERY**
Fort Shafter, T. H.

COLONEL
Mitchell, R. M.

LIEUTENANT COLONEL
Hartway, F. P.

MAJORS
Gallagher, F. F.
Roberts, G. R.
Jeffords, W. Q., Jr.
Lowder, J. R.
Cassard, H. D.

CAPTAINS
Wilson, C. F.
Hayden, F. L.
Rocheb, C. E.
Hinckle, J. T.
Palmer, G. W.
Donson, P. B.
Skinner, M. L.
McLamb, N. A.

1ST LIEUTENANTS
Reas, L. G.
Capey, G. R.
Shepherdson, F. H.
Piran, J. S.
Ehrl, H. W.
Finkouard, E. G.
Kenerick, K. R.

2D LIEUTENANTS
Walter, E. H.
McGoldrick, F. M.
Murrin, W. R.
Boys, R. C.
Holtzman, G. H.
Swain, Owen
Kallman, M. M.

**69th COAST ARTIL-
LERY**
Fort Crockett, Texas

COLONEL
Kimberly, Allen

LIEUTENANT COLONEL
Halbert, E. O.

MAJOR
Harris, C. S.

CAPTAINS
Ballard, A. L.
Smith, H. W.
Papenoth, W. H.
Fonvielle, J. H.
Meyers, H. F.
Short, W. B.
Benn, H. T.

1ST LIEUTENANTS
Gross, C. E.
Ratchiffe, L. C.
Thorlin, J. F.
Longacker, C. R.
Koscielniak, A. A.

2D LIEUTENANT
Lockhart, E. E.

**91st COAST ARTIL-
LERY**
Fort Mills, P. I.

LIEUTENANT COLONEL
Dodson, R. S.

MAJOR
Bowering, Benjamin

CAPTAINS
Lavery, A. L.
Kruenger, R. H.
Olivares, J. E.
Nicholson, A. H.
England, J. M.
Merkle, E. A.
Morrow, S. H.
Alba, B. M.

1ST LIEUTENANTS
Pohl, M. G.
Hartman, A. R.
Matteson, R. L.
Routh, D. B.

2D LIEUTENANTS
Moore, J. C.
Miner, R. M.
Wollaston, P. H.
Morgan, J. B.
Skeinford, X. A.

**92d COAST ARTIL-
LERY**
Fort Mills, P. I.

LIEUTENANT COLONEL
Warren, A. H.
Dalso, E. B. (P. S.)

MAJORS
Casswell, R. M.
McMorrow, H. A.

CAPTAINS
Caluya, P. Q. (P. S.)
Pamphle, D. G.
Young, G. E.
McKinney, M. J.

1ST LIEUTENANTS
Wilson, D. M.
Thomas, A. R.
Keeler, G. E., Jr.
McKee, W. F.
McReynolds, S. McF., Jr.
Moore, E. W.
Weitzel, G. J.

2D LIEUTENANTS
Hardy, R. M.
Spahn, C. E., Jr.
Cordes, C. F., Jr.

DEPARTMENT HEADQUARTERS AND UNASSIGNED

PANAMA CANAL DEPARTMENT STAFF

COLONEL
Stockton, E. A.

Pacific Sector

LIEUTENANT COLONEL
Smith, E. K.

PANAMA DEPARTMENT UNASSIGNED

LIEUTENANT COLONEL
Washington, W. C.

MAJOR
Imperatori, R. J.

CAPTAINS
deGravelines, K. L. F.
McConnell, F. C.
Wahle, C. B.
Nelson, O. A.
Hatch, M. A.

1ST LIEUTENANTS
Twyman, J. H., Jr.
Odenweller, C. J., Jr.
Fensterom, C. H.
Taber, A. P.
MacLachlan, C. I.
Berg, F. T.
Passarella, P. F.

2D LIEUTENANTS
Ripley, L. H.
Robbins, A. D.
Moomaw, O. A.

HAWAIIAN DEPARTMENT UNASSIGNED

COLONEL
Merriam, H. C.

LIEUTENANT COLONEL
Gross, P. E.
Skene, C. M. S.

MAJORS
Kuglehart, A. F.
Johnson, H. S.
Davis, L. L.
Anderson, S. W.
Ladd, R. V.

CAPTAINS
Davis, W. V.
Cary, M. G.
Herron, D. B.
Gregory, P. T.
Featherston, J. H.
Ellerthorpe, D. S.
Gard, H. P.
Goodrich, W. B.
Heaney, G. F., Jr.

1ST LIEUTENANTS
Darrah, J. T.
Wilson, N. B.

2D LIEUTENANTS
Kinards, W. H., Jr.
Register, C. L.
Easton, W. G.
Hall, L. A.
Curtis, K. I.

HQ. H.D. OF MANILA AND SUBIC BAYS

BRIGADIER GENERAL
Bishop, P. F.

COLONEL
Terry, T. A.

LIEUTENANT COLONELS
Hood, J. H.
Pisa, O. G.

MAJORS
Phillips, R. E.
Stewart, W. R.
Folta, C. G.
Harrington, J. H.
Swett, F. S.
Conable, M. E.
Parsons, M. H.

CAPTAINS
Babey, D. J.
Smith, J. W. (PS)
Martellino, P. (PS)

1ST LIEUTENANTS
Woodbury, K. J.
Gibb, S. F.
Cooper, A. J., Jr.
Donnelly, H. D. (Aide)

PHILIPPINE DEPARTMENT UNASSIGNED

LIEUTENANT COLONEL
Crawford, J. B.
Koenig, W. C.

MAJORS
Lohmann, L. H.
Marquat, W. F.
McBride, R. W.

CAPTAINS
Sevilla, Pacifico (P.S.)
Santos, M. M. (P.S.)
Denson, L. A., Jr.
Harry, John
McNamee, W. L.

1ST LIEUTENANTS
Boz, P. A.
Dice, J. B. P.
Lazar, A. M.

2D LIEUTENANT
Leist, G. F.

THE COAST ARTILLERY SCHOOL

COMMANDANT

Gulick, J. W.

STAFF

COLONEL
Gardner, F. Q. C.

LIEUTENANT COLONEL
Pendleton, R. T.
Clark, F. S.

MAJOR
Lowry, P. P.

INSTRUCTORS

Tactics

LIEUTENANT COLONEL
Cox, R. P.

MAJORS
Poland, E. L. (Inf.)
Trigg, O. B. (Cav.)
Jackson, H. R.
Mackin, R. N.
Paul, F. M. (A.C.)
Robinson, G. B.
Handwerk, M. C.

CAPTAIN
Lemnitz, L. L.

Artillery

LIEUTENANT COLONEL
Cramer, B. V.

MAJORS
Townsend, J. R.

CAPTAINS
Burnell, N. A.
Barber, Edward
Holcomb, C. W.

Engineering

LIEUTENANT COLONEL
Cramer, R. V.

MAJORS
Cochran, H. McC.
Lewis, P. W.

CAPTAINS
Bartlett, L. W.

Enlisted Specialists

LIEUTENANT COLONEL
Pendleton, R. T.

CAPTAINS
Kane, F. B.
Stevens, V. C.
Hartman, N. E.

Extension Courses

LIEUTENANT COLONEL
Clark, F. S.

CAPTAINS
Starr, R. E.
Thompson, E. B.
Chester, G. A.

STUDENTS

Regular Course

CAPTAINS
Guid, E. R.
Wright, W. L.
Day, F. E.
Kinn, V. M.

1ST LIEUTENANTS
Hennig, W. H.
Frederick, R. T.
Congdon, N. A.

Fuller, A. L., Jr.
Alexander, D. S.
Folk, F. T.
Hunter, H. W.
Stayton, T. V.
Skidmore, W. M.
Cooper, H. B., Jr.

Russell, S. C.
Metzler, J. E.
Roth, I. D.

Doyle, P. V.
Johnson, D. B.
Steele, Preston

Rude, W. A.
Adams, G. S.
Cott, W. S.

Liwski, F. A.
Moore, R. F.
McFreely, H. G.

Harvey, T. H.
Turner, B. A.
Leslie, R. C.

Dunn, C. G.

Glass, T. A.
Julian, Harry

Lane, J. J.
Cory, I. W.

MacNair, T. K.
Zeller, F. J.

Logan, W. H.
Lipscomb, Lalar, Jr.

Fairchild, P. H.
Gainey, P. W., Jr.

Patterson, C. G.
Chapman, E. A.

Andrews, C. L.
Gilmann, S. I.

Rozley, L. K.
Kensle, Franklin, Jr.

Fargus, Rafael
(Phil. Army)

Taxis, Samuel G.
(U.S.M.C.)

2D LIEUTENANT
McCormick, Wm. S.
(U.S.M.C.)

Advanced Technical
Course

CAPTAINS
Barker, W. L.
Shank, P. W.

Lovell, J. B.
Deichelmann, M. R.

1ST LIEUTENANTS
Bogart, F. A.
Weber, M. G.

OTHER SCHOOLS

THE COMMAND AND GENERAL STAFF SCHOOL

Staff

MAJOR
Boultax, E. M.

Instructors

LIEUTENANT COLONELS
Meyer, G. R.
Hocker, C. E.
Finley, C. R.

MAJORS
Phillips, T. R.
Wilson, J. H.
Bulman, H. F. E.
Milburn, B. I.

Students

MAJORS
Dutton, D. L.
Dennis, L. C.
Griggs, D. M.

Bucher, O. B.
McNeely, O. D.
Betta, T. J.
Hickey, D. W., Jr.
Morrison, D. E.
Conway, E. T.
Jefferson, L. W.

CAPTAINS
Shelton, C. Q.
Wilson, A. M., Jr.
Allen, W. I.
Shuff, L. O.
Vanderstijn, H. J.
McPherson, W. L.
Pape, R. B.
Glasgow, R. I.
Goodman, S. J.
Martin, D. D.
White, T. H.

ARMY WAR COLLEGE

Instructor

MAJOR
Carrington, G. DeL.

Students

LIEUTENANT COLONELS
Tison, R. L.
Dunn, W. K.
Brown, R. D.
Stuart, L. L.

MAJORS
Cotter, C. E.
Lewis, J. T.
Mickelson, S. R.

CAPTAIN
Weibis, W. L.

THE NAVAL WAR COLLEGE

Student

LIEUTENANT COLONEL
Van Volkenburgh, R. N.

THE ARMY INDUSTRIAL COLLEGE

Staff

CAPTAIN
G. R. Burgess

Students

LIEUTENANT COLONELS
Hines, C.
Kable, J. F.

MAJOR
Cochran, H. W.

THE AIR CORPS TACTICAL SCHOOL

Instructor

MAJOR
Epling, F. G.

Student

CAPTAIN
Kreuter, R. H.

THE INFANTRY SCHOOL

Instructor

MAJOR
Tarley, R. E., Jr.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Student

1ST LIEUTENANT
Irvine, M. M.

MINE PLANTERS AND CABLE SHIPS

General Abner Baird
Fort H. G. Wright, N. Y.
Captain P. S. Lowe

Cablesnip Joseph Henry
Fort Hancock, N. J.
Captain J. B. Carroll

General Edward O. O'Ord
Fort Hancock, N. J.
Captain Chas. M. Wolff

General John M. Schofield
Fort Monroe, Va.
Capt. W. R. Hawthorne

General J. Franklin Bell
Fort Worden, Wash.
1st Lt. J. A. Sawyer

General William M. Graham
Fort Sherman, C. Z.
Captain G. A. Ford

Lt. Col. Elbery W. Niles
Fort Winfield Scott, Calif.
Captain Samuel Robin

Col. George F. E. Harris
Fort Mills, P. I.
1st Lt. P. S. Pees

NATIONAL GUARD

OFFICE, CHIEF OF NATIONAL GUARD BUREAU

Washington, D. C.

Lt. Col. J. P. Hogan
Major LeRoy Lutes

COAST ARTILLERY NATIONAL GUARD REGIMENTS

Instructors

Lt. Col. W. M. Chapin,
240th (HD), Portland, Minn.
Major George Blaney,
240th (AA), Rockland, Maine

Capt. Sam'l McCullough,
197th (AA), Concord, N. H.
Lt. Col. R. F. Maddux,
211th (AA), Boston, Mass.

Major H. Vogel,
241st (HD), Boston, Mass.

Major A. V. Winston,
241st (HD), Fall River, Mass.

Major William Hesketh,
242d (HD), Bridgeport, Conn.

Lt. Col. E. H. Metzger,
243d (HD), Providence, R. I.

Major R. T. George,
243d (HD), Providence, R. I.

Major J. L. Craig,
244th (TD), New York, N. Y.

Major F. A. Hulse,
212th (AA), New York, N. Y.

Col. L. L. Pendleton,
245th (HD), Brooklyn, N. Y.

Major A. L. Parmelee,
245th (HD), Brooklyn, N. Y.

Captain Sylvan Berlinier,
198th (AA), Wilmington, Del.

Lt. Col. H. W. Stark,
261st (HD), Wilmington, Del.

Major H. H. Blackwell,
246th (HD), Roanoke, Va.

Lt. Col. J. L. Sinclair,
246th (HD), Lynchburg, Va.

Major C. J. Heraer,
211th (AA), Allentown, Pa.

Major E. C. Seaman,
213th (AA), Allentown, Pa.

Lt. Col. R. Melberg,
213th (AA), Allentown, Pa.

Lt. Col. D. S. Lenzner,
260th (AA), Washington, D. C.

Major J. deB. Walbach,
252d (TD), Wilmington, N. C.

Major P. W. Rutledge,
263d (HD), Columbia, S. C.

Lt. Col. E. P. Noyes,
264th (HD), Statesboro, Ga.

Lt. Col. E. L. Hoskins,
265th (HD), Jacksonville, Fla.

Major N. L. Adams,
202d (AA), Chicago, Illinois.

Major A. A. Allen,
203d (AA), Carthage, Mo.

Major Kenneth McCarty,
203d (AA), Springfield, Mo.

Lt. Col. C. S. Doney,
204th (AA), Little Rock, Ark.

Major J. D. Powers,
204th (AA), Hot Springs, Ark.

Major P. S. Biehl,
250th (HD), San Francisco, Calif.

Major Kenneth Rowntree,
249th (HD), Salem, Ore.

Capt. R. W. Crichtow,
245th (HD), Camp Murray, Wash.

Lt. Col. W. E. Duvall,
251st (AA), San Diego, Calif.

ORGANIZED RESERVES

1st C. A. DISTRICT Hq. Boston, Mass.

Colonel L. P. Horsfall
Major F. C. Scofield
Major L. E. Schoonmaker
Major E. J. VanBuskirk

2d C. A. DISTRICT Hq. New York, N. Y.

Colonel A. Gilmer
Colonel C. W. Baird
Lt. Col. H. LeR. Muller
Lt. Col. S. S. Giffin
Lt. Col. F. M. Green
Lt. Col. H. F. Loomis
Major Delbert Ausmus

3d C. A. DISTRICT Hq. Fort Monroe, Va.

Colonel I. C. Brinton, Jr.
Lt. Col. A. G. Frick
Lt. Col. R. S. Atwood
Lt. Col. T. M. Chase
Lt. Col. R. B. Cochrift
Lt. Col. P. E. Emory, Jr.
Major C. D. Hindle

4th C. A. DISTRICT Hq. Fort McPherson, Ga.

Lt. Col. C. R. Jones
Major V. W. Hall
Capt. A. P. Sullivan

5th CORPS AREA Hq. Columbus, Ohio

Colonel M. A. Cross
Lt. Col. M. M. Kimmel
Major N. Boudreau
Major W. R. Maris

6th CORPS AREA Hq. Chicago, Illinois

Colonel J. S. Dusenbury
Lt. Col. C. D. Peirce
Lt. Col. G. W. Easterday
Major T. R. Parker

7th CORPS AREA Hq. Sioux City, Iowa

Colonel R. P. Ghasburn
Major B. L. Flanigan
Major E. C. Mead
Major S. E. Wolfe
Major L. B. Hill

8th CORPS AREA Hq. San Antonio, Texas

Lt. Col. O. C. Warner
Major E. B. McCarthy

9th C. A. DISTRICT Hq. Presidio, San Francisco, Calif.

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Colonel R. H. Williams
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Colonel A. L. Loustalot
Lt. Col. Willis Shippant
Lt. Col. A. J. French
Major H. R. Behrens
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Capt. D. J. Rutherford

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Capt. G. J. Loupre

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Cambridge, Massachusetts
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Major A. D. Fleken
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University of New Hampshire, Durham, N. H.
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Capt. W. G. Devans

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Capt. F. J. Cunningham
Capt. T. L. Waters

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Major J. G. Murphy

University of Pittsburgh, Pittsburgh, Pa.
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Lt. Col. R. W. Wilson
Major K. P. Flagg
Capt. J. D. Mitchell

Virginia Polytechnic Institute, Blacksburg, Va.
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Major W. S. Phillips
Capt. W. J. Wolfe
Capt. T. W. Munford

Clift High School, Opelika, Ala.
Major G. W. Brent

University of Alabama, University, Ala.
Major E. H. Underwood
Major W. W. Wertz
Capt. W. B. Carlson
Capt. W. A. Waddell
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Georgia School of Technology, Atlanta, Ga.
Lt. Col. T. H. Jones
Major W. D. Evans
Capt. H. H. Newman, Jr.
Capt. F. B. Waters

Athens High School, Athens, Ga.
Major A. V. Richardson

Mississippi State College, State College, Miss.
Major M. Hedfren
Capt. C. P. Young
Capt. W. K. Stennis

Pearl River College, Poplarville, Miss.
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The Citadel, Charleston, S. C.
Lt. Col. Gooding Packard
Major G. A. Patrick
Capt. J. S. Robinson

University of Cincinnati, Cincinnati, Ohio
Major C. W. Higgins
Major W. H. Steward
Capt. H. E. Strickland

Joliet Township High School, Joliet, Illinois
Major T. E. Jeffords

Rockford High School, Rockford, Illinois
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University of Illinois, Urbana, Illinois
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Kansas State College of Agricultural and Applied Science, Manhattan, Kansas
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Major H. E. Pendleton

Denver High School, Denver, Colorado
Major J. G. Decline

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Major R. E. Hill
Capt. F. A. Hollingshead

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Major Maitland Bottoms

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Sacramento High School, Sacramento, Calif.
Major J. C. Bates

St. Ignatius High School, San Francisco, Calif.
Major H. G. Archibald

San Francisco High Schools, San Francisco, California
Capt. O. T. Forman

University of California, Berkeley, Calif.
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University of California, Los Angeles, Calif.
Major D. R. Norris
Capt. E. C. Wallace

University of San Francisco, San Francisco, California
Lt. Col. Frank Drake
Major W. G. Brey
Major W. F. Lafranz

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Capt. J. H. Pitzer

Reno High School, Reno, Nevada
Capt. J. H. Smith

Logan Senior High School, Logan, Utah
Major E. H. Stillman

Utah State Agricultural College, Logan, Utah
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Col. Sanderford Jarman	" " "
Lt. Col. Harvey C. Allen	" " "
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Lt. Col. John H. Lindt	" " "
Lt. Col. E. B. Colladay	" " "
Major William Goodman	" " "
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Major Homer Cass	" " "
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Col. Olin H. Longino, Hq. Panama Canal Dept., Quarry Heights, C. Z.
Col. T. C. Cook, 2d Corps Area, Governors Island, N. Y.
Lt. Col. Robert C. Garrett, Federal Bldg., 15th and Dodge Sts., Omaha, Neb.
Lt. Col. Homer G. Oldfield, Presidio of San Francisco, Calif.
Lt. Col. Kenneth T. Blood, Schofield Barracks, T. H.
Lt. Col. J. B. Maynard, Hq. 8th Corps Area, Fort Sam Houston, Texas.
Major Dale D. Hinman, Hq. 8th Corps Area, Fort Sam Houston, Texas.
Major C. Y. D. Ostrom, Hq. 8th Corps Area, Presidio of San Francisco, Calif.
Major H. C. Mabbott, Hq. Hawaiian Dept., Fort Shafter, T. H.
Major W. H. Donaldson, Hq. 7th Corps Area, Omaha, Nebraska.
Major H. C. Barnes, Hq. Panama Canal Dept., Quarry Heights, C. Z.

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1st Lt. Joseph Horridge
1st Lt. L. H. Brownlee
1st Lt. E. G. Griffith, c/o Mil. Attaché, Mexico City
1st Lt. E. B. Hempstead
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1st Lt. C. R. Duff
1st Lt. R. S. Spangler
1st Lt. C. J. Diastel
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1st Lt. Arnold Sommer
1st Lt. B. L. Paige
1st Lt. L. J. Hillberg
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U. S. Army Recruiting Office, San Francisco, Calif.
Colonel Lewis Tertle,
U. S. Army Recruiting Office, Seattle, Wash.

Lt. Col. K. B. Lemmon,
U. S. Army Recruiting Office, Omaha, Nebraska.
Lt. Col. Octave DeCarre,
U. S. Army Recruiting Office, Des Moines, Iowa.
Lt. Col. F. Kemble,
U. S. Army Recruiting Office, Harrisburg, Pa.
Major J. B. Martin,
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Major A. W. Gower,
U. S. Army Recruiting Office, New York, N. Y.
Major E. L. Barr,
Fort Slocum, N. Y.
Major A. W. Waldron,
Fort Slocum, N. Y.
Major H. H. Slicer,
Fort Slocum, N. Y.

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Civ. Component Affairs, Fort Hayes, Columbus, Ohio.
Colonel J. S. Pratt,
Civ. Component Affairs, Fort Shafter, Hawaii.
Colonel F. J. Bohr,
San Juan, Puerto Rico.
Col. R. H. Smith,
c/o Military Attaché, Brazil.
Lt. Col. J. T. H. O'Rear,
S. F. Port of Embarkation, Fort Mason, Calif.
Lt. Col. A. G. Strong,
1st Army Staff, Boston, Mass.
Major W. D. Hohenthal,
c/o Military Attaché, Brazil.
Captain J. P. Starman,
Able, 5th Corps Area, Fort Hayes, Ohio.
1st Lt. W. H. Brucker,
West Point Prep. Sch., Fort McPherson, Ga.
Major Gen. T. Q. Ashburn,
Chief, I. & C. W. Service, Washington, D. C.
Captain O. D. Bowman,
Disciplinary Barracks, Governors Island, N. Y.
Captain B. F. Fellers,
Military Advisor, Phil. Gov., Manila, P. I.
1st Lt. W. M. Vestal,
Able, S. F. Port of Embarkation, Fort Mason, Calif.

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Capt. George R. Burgess.

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Lt. Col. J. H. Cochran, Ordnance Board, Aberdeen Proving Ground, Md.
Major William Schkville, Engineer Board, Fort Belvoir, Va.

STUDENTS, JAPANESE LANGUAGE

Capt. E. E. Count, Jr., c/o American Embassy, Tokyo, Japan.
1st Lt. K. E. Rasmussen, c/o American Embassy, Tokyo, Japan.

MILITARY ATTACHES

Lt. Col. Eugene Villaret, American Embassy, Belgrade, Yugoslavia.
Major L. C. Mitchell, American Embassy, Rio de Janeiro, Brazil.
Major E. W. Timberlake, American Embassy, Havana, Cuba.

DETAILED IN OTHER BRANCHES DETAILED I. O. D.

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Col. Franz Lecoq, Hq. 3d Corps Area, Baltimore, Md.
Col. C. H. Patterson, 4th Corps Area, Atlanta, Ga.
Lt. Col. J. S. Smylie, Panama Canal Department.
Lt. Col. Franklin Babcock, Washington, D. C.

DETAILED SIGNAL CORPS

Capt. J. E. McGraw, Philippine Department.

DETAILED AIR CORPS

- 1st Lt. C. J. Boudley, Jr., Randolph Field, Texas.
- 2d Lt. C. B. Stewart, Randolph Field, Texas.
- 2d Lt. J. K. Arnold, Jr., Randolph Field, Texas.
- 2d Lt. F. W. Gillespie, Randolph Field, Texas.
- 2d Lt. Fredrick Bell, Randolph Field, Texas.
- 2d Lt. A. D. Clark, Randolph Field, Texas.
- 2d Lt. W. C. DeBill, Randolph Field, Texas.
- 2d Lt. H. H. Hackford, Randolph Field, Texas.
- 2d Lt. E. H. Herman, Randolph Field, Texas.
- 2d Lt. E. M. Lee, Randolph Field, Texas.
- 2d Lt. C. E. Lew, Randolph Field, Texas.
- 2d Lt. C. L. Robbins, Randolph Field, Texas.
- 2d Lt. A. Rutherford, Randolph Field, Texas.
- 2d Lt. B. Taylor, III, Randolph Field, Texas.
- 2d Lt. K. R. Schwedel, Randolph Field, Texas.
- 2d Lt. W. C. Conway, Randolph Field, Texas.

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- 1st Lt. W. L. McCulla, Aberdeen Proving Ground, Md.
- 1st Lt. L. A. Bosworth, Watervliet Arsenal, N. Y.
- 1st Lt. H. duB. Lewis, Aberdeen Proving Ground, Md.
- 1st Lt. R. F. Haggerty, Aberdeen Proving Ground, Md.
- 1st Lt. G. F. Powell, Watertown Arsenal, Mass.
- 1st Lt. F. E. Young, Aberdeen Proving Ground, Md.
- 1st Lt. C. K. Allen, Watertown Arsenal, Mass.
- 1st Lt. E. C. Mitchell, Aberdeen Proving Ground, Md.
- 1st Lt. H. W. Mansfield, Watertown Arsenal, Mass.
- 1st Lt. J. F. Rodenhauer, Aberdeen Proving Ground, Md.
- 1st Lt. W. A. Call, Aberdeen Proving Ground, Md.
- 1st Lt. Edward Bodeau, Watertown Arsenal, Mass.
- 1st Lt. F. M. Humphries, Watertown Arsenal, Mass.
- 1st Lt. E. H. Kibler, Picatinny Arsenal, Dover, N. J.

- 1st Lt. P. N. Gillis, Watertown Arsenal, Mass.
- 1st Lt. F. S. McMucrow, Watertown Arsenal, Mass.
- 1st Lt. J. O. Baker, Aberdeen Proving Ground, Md.

DETAILED FINANCE DEPARTMENT

- Capt. Frank Richards, Fort McPherson, Ga.
- Capt. D. B. Latimer, Hq. 6th Corps Area, Chicago, Illinois.
- 1st Lt. J. G. Reynolds, Finance School, Washington, D. C.

DETAILED J. A. G. D.

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- Capt. David Hottenstein, Department of Justice, Washington, D. C.
- Capt. J. W. Huyssoon, Georgetown University Law School, Washington, D. C.
- 1st Lt. C. G. Hauck, Jr., Georgetown University Law School, Washington, D. C.

DETAILED A. G. D.

- Major E. F. Olsen, Hq. 2d Corps Area, Governors Island, N. Y.
- Major F. H. Hastings, Washington, D. C.
- Capt. Raymond Stone, Jr., First Cavalry Division, Fort Bliss, Texas.
- Capt. L. S. Smith, Hq. 6th Corps Area, Chicago, Ill.

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- 1st Lt. A. W. Schermacher, Fort Robinson, Nebr.

HISTORICAL SECTION, ARMY WAR COLLEGE

- Col. W. W. Hicks, Washington, D. C.



