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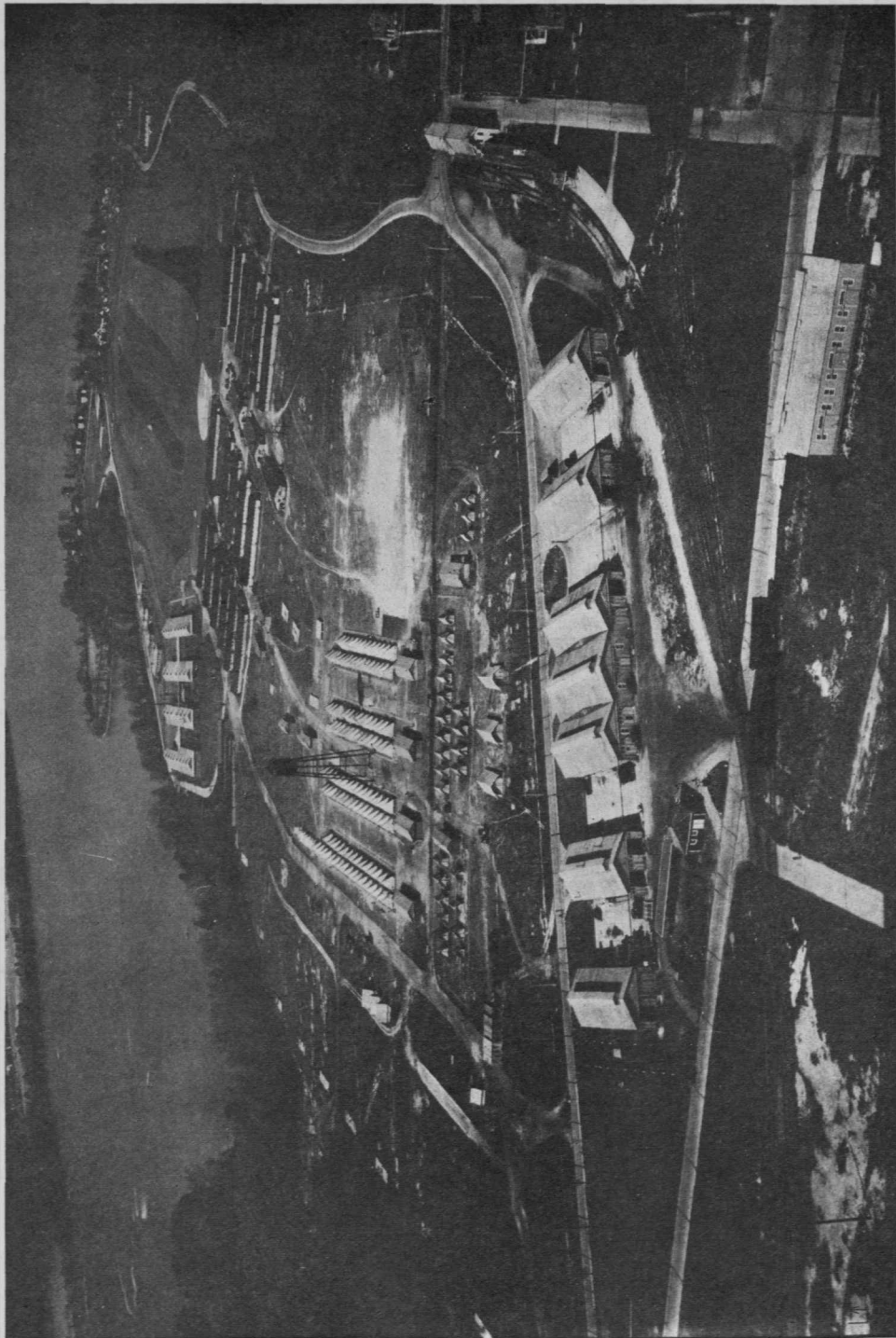
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VIEW OF ABERDEEN PROVING GROUND FROM THE AIR SHOWING CAMP OF THE 62ND C. A. (AA) AND QUARTERS OF THE 69TH C. A. (AA)

Joint Army and Navy Action in Coast Defense

By CAPT. W. D. PULESTON, U. S. N.

IN MODERN military writings there frequently occurs a disparagement of the defensive form of war that is likely to give military students a wrong conception of war, that may easily lead them into grave errors during future wars. To most high-spirited men the offensive makes a larger appeal than the defensive; also, adopting the offensive relieves a loose reasoner, who can always throw in on the side of the offensive certain intangibles, of probing a military problem to its depths. The maxim "Whenever in doubt attack," spares the intellectual processes from much effort; yet it is plain that unless overwhelmingly superior in every particular, if we desire to take the offensive in utmost strength in one theater we should assume the defensive in others. The larger a state and the more widely spread its territories the more certain it is to be thrown upon the defensive in some of its areas.

Nor should officers properly ambitious for military renown forget that the defense offers every opportunity for the display of military ability, for example, it is doubtful if Napoleon's genius ever shone more brilliantly than when he stood at bay around Paris in 1814. The great danger of the defensive form of war is that the defenders will relax into a passive defense, and forget that a sound plan of defense must continually contemplate and prepare for the vigorous resumption of the offense; it is in this true sense of the term that the word defense is used throughout this article, for only by keeping in mind that the defense is a temporary attitude will a clue to proper joint army and navy action in coast defense be found.

Also, in this paper the term coast defense is construed to include the coasts of our outlying possessions as well as the coast of continental United States, and the extent of our responsibilities can be clearly understood by referring to a chart of the world and considering a broken line running from Maine to St. Thomas, V. I., thence to Panama, thence to Honolulu, to Samoa, to Guam, to Luzon and ending at Pt. Barrow, Alaska. This is the perimeter of our coast line.

The subject can be logically approached by commencing with the permanent defense systems that protect our important harbors and cities.

such as New York and San Francisco. They include the heavy guns and mortars, permanently emplaced, the small mobile guns and howitzers, anti-aircraft batteries, minefields, defenses for the minefields, the searchlights and the range-finding apparatus. For brevity hereafter this concentrated mass of guns and accessories will be called a harbor defense. Such a defense system provides a secure base for any or all of the fleet. When it harbors the whole fleet, it provides the necessary security for it; and the fleet so based retains complete freedom of action, and can protect the remainder of the coast line within its radius of action except against a superior fleet. These defenses were primarily erected to prevent hostile fleets and armies from entering port, and to protect certain naval bases. Speaking generally, forts have been universally successful in defying fleets, and even the intrepid Nelson, who at Copenhagen engaged forts and ships simultaneously and, thanks to his personal genius, successfully, warned all naval officers that ships were not built to fight forts.

It is perfectly obvious, however, that the strongest fort in the world, by itself, cannot protect the coast line beyond the range of its guns; nor can it protect itself from land attack unless its fortifications extend around the land side and sufficient soldiers are in garrison to man them; even this is not enough to guarantee its permanent security for it must be regularly supplied and therefore its communication with the remainder of the country must be kept open, else its strength will depart. These disabilities of a fort are not mentioned in order to deprecate the fort, but to establish at once the fact that like all other instruments of war, forts have definite limitations.

Some of the so-called "Blue Water" schools of Navalists have emphasized the limitations of forts and carefully ignoring the limitations of the fleets have advocated doing away with forts and confiding the defense of the coast to the fleet alone. This would be fully as criminal as trusting to forts alone, for fleets have as crippling limitations as forts. On account of fueling, and the necessity for regular overhauls, fleets have a decidedly limited period of action. They must return to port to refuel, must arrange for periodic overhauls to keep the machinery in shape and to make repairs that result from the natural wear and tear of service. The problem of joint army and navy action in coast defense then resolves itself primarily into adjusting the loads on the forts and the fleet, neither of which can undertake the burden alone. But the forts must be protected on the land side and that involves the mobile army so the burden of coast defense is really laid upon three instruments, the fleet, the forts and the mobile army.

Forts repulsed fleets with such monotonous regularity that joint expeditions were organized; in these the fleet would land an army beyond the range of the defenses, to invest the forts on the shore side, then itself blockade them on the sea side and by siege operations, accomplish what neither the fleet nor army could do by direct assault. The prompt and

natural reply to this threat of an overseas expedition was to secure the fort with a mobile army to prevent its investment. So in the many maritime wars that have regularly recurred, on the offensive was usually found a superior fleet, and an expeditionary force against which was pitted the forts, an inferior naval force, and a mobile army, usually, but not always, inferior to the invading army. In modern wars and in civilized states, the mobile army has had a network of roads or railways at its service, which gave it a mobility comparable to that of the attacking force embarked in transports. Also in states with compulsory military service so many trained soldiers have been made available for defense that it has become practically impossible for an expeditionary force to make a successful invasion.

The importance of the problem of coast defense to England has caused that country to give it much study; as usual with all military problems two schools of thought have developed, the "Blue Water" school, who held that invasion was impossible as long as the British navy was in superior strength, and the "Bolt from the Blue" school, who thought the fleet might be evaded or even neutralized and a hostile army landed. The position of the British government oscillated between these two schools and in 1907 a committee under Lord Morley re-examined the problem. The army, while admitting that the navy was the first line of defense, held that the problem involved so many uncertain factors that naval protection alone could not be relied upon. This view obtained and, in 1909, Mr. Asquith announced, in the House of Commons, that it was essential to maintain a home army of such strength that an enemy contemplating hostilities would be compelled to come in such a considerable force as to make it practically impossible for them to evade the fleet.

In 1909, the British government estimated that the strength of possible invading forces would not exceed seventy thousand, and the War Office undertook to have ready at all times a force capable of meeting and defeating this force. Without attempting to pass judgment on the accuracy of the estimated numbers, it seems perfectly clear that the Committee of Imperial Defense proceeded along sound lines to reach this conclusion and properly appreciated the important factors available. However, in using this data in the World War, it was forgotten that the rule was devised to cover the case of England alone vs. a Continental Power with a superior army. As a result, in August, 1914, two divisions of the British Expeditionary Force were temporarily detained in England as a defense against German invasion when every German soldier was sorely needed in Belgium, France or East Prussia, and when the whole British fleet disposed to cover the passage of the British Army to France was in excellent position to intercept a German expeditionary force.

The situation in August, 1914, was a peculiar and critical one. Both sides were straining their military and naval resources, neither the Cen-

tral Powers nor the Allies could maintain the terrific pace, nor could fleets and armies endure without respite the strains set up. Therefore, in considering the availability of the Grand Fleet to assist the British Home Army in coast defense throughout the World War, it should be remembered that the paramount task of the British Fleet was to contain or defeat the German High Seas Fleet. To prevent the German fleet escaping through the northern exits of the North Sea it became necessary for the Grand Fleet to base at Scapa Flow and to make arrangements to continue indefinitely this long-distance blockade. The relative distances from Scapa Flow and Heligoland to the east coast of England are such that granted a reasonable start, by the Germans, and any delay of the British fleet due to low visibility or bad weather, it was quite possible to effect a raid or even a small landing. The Germans were aware of these possibilities and made several raids with their battle cruiser squadron in the hope of inducing the Admiralty to make a regrouping of the fleet that would have increased the security of the coast but would have reduced its ability to contain the German Fleet. The Admiralty wisely adhered to its original dispositions and by keeping the British people informed of the reasons for its procedure avoided any pressure from public opinion.

In 1916, when Verdun was absorbing the German armies and the British army in France was preparing to take the offensive, the British army and navy authorities revised the estimate of invaders upwards and assumed (1) that Germany could dispatch ten divisions, one hundred and sixty thousand men, to the northeast coast of England, (2) that the navy could not guarantee to interrupt this landing within twenty-four hours. On these two assumptions, Lord French, C. in C. of the Home Forces, estimated that he would need nine territorial divisions, seventeen mounted brigades, ten independent brigades, and twenty-three cyclist battalions, a field army of two hundred and thirty thousand men: in addition, garrisons for defended ports, vulnerable points, and anti-aircraft absorbed two hundred and twenty thousand men, a grand total in England of four hundred and fifty thousand men. His demands were never entirely met but the British kept too many men in England to resist an invasion which Germany never seriously considered. Even after our entry into the war had reinforced the British Fleet, the British Admiralty still considered it possible for Germany to land seventy thousand men in England.

In addition to adding to the difficulty of evading a defending fleet the existence of a defending mobile army compels the enemy to come in such strength that the port facilities of a large, well developed harbor are necessary to disembark the invader's impediments; practically all such harbors are protected by harbor defenses that defy a frontal attack, so the combination of forts and mobile armies force an invading army to make the first landing in an open roadstead with all the attendant difficulties. This accomplished, the invaders are still under the immediate necessity of seiz-

ing a harbor that will supply the necessary port facilities. These two factors alone would have made it impossible for Germany to successfully invade England even if she could have spared the troops.

In general the British authorities during the World War held an unnecessarily large number of soldiers in their Home Defense armies, and while many of these were unfit for active duty in the front line in France, they could have performed many of the duties back of the line and released more active soldiers for combat duty. In 1917 and 1918 Lloyd George, according to Field Marshal Robertson, detained an excessive number in England in order to prevent Haig using them on an offensive in France. At other times during the World War it was necessary to hold men in England in readiness for emergency calls from remote parts of the empire. Even making allowance for these factors, there were too many men retained in England. This was not in accord with old English custom, for in the past they usually preferred to defend their frontiers by fighting abroad and long ago embodied this idea in robust proverb, "Better a disastrous campaign in the low countries than a successful one in Kent or Sussex." The British employment of their fleet was sound and gave the army maximum support consistent with its other and more important duties.

The British gradually organized their defenses against air raids and although harassed both by Zeppelins and airplanes, they resisted the temptation to withdraw the air forces from the army in France to defend their coast, and only under extreme provocation and then for a short time only, they borrowed some of Haig's squadrons for defense. These successfully repelled the next German raid and were shortly after returned to France.

The Turkish defense of the Dardanelles region is an excellent example of correct joint army and navy action in the defense of a limited but vital coastal area. The Turks, under German leadership, employed the small Turkish Navy, the Dardanelles Fortress and the 5th Turkish Army to protect the Aegean approaches to Constantinople. The small Turkish Navy operated energetically against allied transport, combat vessels, and the submarines that entered Marmora. The Dardanelles forts, including the minefields, prevented the fleet from entering Marmora via the Dardanelles to operate against the communications of the Turkish Field Army. The Turkish Field Army, originally of six divisions, eventually reinforced to twenty-two, protected the land sides of the Dardanelles forts from investment and by continually interposing itself between the Allied Expeditionary Force and the dominant strategical points on Gallipoli, became the decisive factor in the campaign.

The Turks possessed an unusually strong position that greatly favored the defense, but more valuable still, they were able to set up a situation so that unless the invaders were victorious, all the fruits of a victory went to the defenders. The Turks did not have to resort to a counter-offensive:

by merely closing the Dardanelles, they isolated Russia, and unless the Allies could break through, an almost intolerable handicap was imposed upon Russia.

Wrong methods of employing joint army-navy forces in coast defense sometimes reveal certain factors that are obscured or smothered in victory. For this purpose the disposition of the Russian Fleets in the Russo-Japanese war will be recalled and to obtain the background, remember that just prior to the war England and Japan had formed an alliance as a counterpoise to the Russo-French alliance, and that the foreign policies of Russia and England pivoted around their mutual antagonisms. To meet the potential threat of England in the Baltic and the actual threat of Japan and Korea in Manchuria, Russia depended upon two principal forts, Cronstadt in the Baltic and Port Arthur in Manchuria. She divided her navy into two fleets, the Baltic Fleet and the Far East Fleet, and assigned one to each fort. Mahan referred to these two fleets as "fortress fleets." Their missions in both cases were to assist the garrisons in defending the forts. The results of this vicious arrangement were the loss of one fortress and the two fleets in succession. The tragic part of the sacrifice of the two fleets is that neither one assisted the defense of Port Arthur except by the addition of a few naval guns removed from the ships and mounted ashore. Lest this case be considered exceptional and not likely to recur, it should be remembered that the French Commander at Louisbourg in 1758 made the same use of his fleet, and that even the superb soldier Montcalm for the sake of obtaining a few sailors to assist to man the guns at Quebec, dismantled his small fleet.

Similarly in campaigns ashore the temptation sometimes arises to lock up an army in a fort; if not resisted, this almost inevitably results in the eventual loss of the fort plus the army. During the war of 1870, the French lost two armies in fortresses, McMahan at Sedan, and Bazaine at Metz. In the retreat from Mons, Lord French very properly refused to avail himself of the temporary succor afforded by Mauberge. It can therefore be said quite positively that an army or a fleet should never be tied to a fort.

On the other hand, a relatively inferior fleet, no matter what its absolute strength, may be driven to accept the refuge afforded by a defended harbor. The German Fleet over-matched every other fleet in the world except the British, yet it was driven to seek refuge in its defended ports. While Germany's geographical situation and the neutrality of the Scandinavian states gave its fleet command of the Baltic, and the existence of this fleet forced England to maintain the Grand Fleet and afforded assistance to its Submarine Fleet, it was powerless to effect the naval issue in any other part of the high seas. To the credit of the German High Seas Fleet must be placed its several sorties in the North Sea, one of which led to the battle of Jutland. In spite of certain tactical successes, the results

of Jutland convinced the Germans that the Grand Fleet could not be beaten. Unless the German High Seas Fleet could defeat the Grand Fleet or the German Army win the war on the land or the submarines on the sea, the German Fleet was bound to decay.

After Jutland, except for two minor sweeps and the Oesel Island expedition, the High Seas Fleet relapsed into inactivity, the submarine service drew heavily upon the best personnel of the fleet, whose morale diminished and eventually it abjectly surrendered. Unquestionably the German High Seas Fleet in August, 1914, was in a high state of efficiency, and its fighting edge was keen; it was condemned to inactivity at that time to defend the coast of Germany in order to release a few reserve army divisions for the offensive in Belgium. Considering the problem in the light of after events, it seems certain that the best opportunity for employing the High Seas Fleet was in an attack in force on the Grand Fleet when it was covering the crossing of the channel by the British Expeditionary Force; at no subsequent period was the High Seas Fleet relatively as strong.

The decision of the British Government to undertake the passage of the channel in the presence of the undefeated but inferior German fleet, followed exactly the Japanese procedure in the Manchurian campaign, and should dispose of another hoary naval myth, namely, that an inferior fleet can, by its very existence, deter a determined enemy from moving soldiers overseas.

Modern ship building is about at a parity in first-class nations; the gun and armor are approximately the same; naval gunnery and tactics are diligently practiced by the leading navies; so that the relative efficiency of the fleets of first rate powers are approximately equal; therefore, a numerically inferior fleet is almost beaten before the action. A decisive naval action has such far-reaching consequences that weaker fleets are very apt to deny action, lulling themselves into a fatal inaction with delusive dreams of reducing the enemy's naval superiority by minor attacks. This inaction tends to complete paralysis as witnessed by the supine surrender of the same German Fleet that so gallantly contested the battle of Jutland with the Grand Fleet. Nelson, when pondering over the possibility of fighting a greatly superior French Fleet, said "If we get close alongside, by the time they have beaten us soundly, they will do us no harm this year," and decided to attack if favorable opportunity afforded. But behind Nelson's squadron were several other British squadrons, whereas the German admiral commanded their only fleet.

The commander of a weaker fleet has a difficult choice; if he accepts battle he risks annihilation with little opportunity to inflict serious loss on his enemy; if he accepts the security of a well-defended base, his fleet gradually loses its skill and daring. His one hope is to be eternally alert and vigilant and ready to take immediate advantage of any mistakes of his

enemy, or favors of fortune. And if in spite of his efforts he is "soundly beaten," he may hope by skillful tactics to inflict such damage that the enemy can do "no harm this year."

We are mainly interested in the historical examples cited because they throw some light on the problem of our own coast defense. The principal factors in our problem are, that our Atlantic, Gulf and Pacific coasts and insular possessions are widely separated, and are open to raids, and our commerce in our own coastal and connecting waters is exposed to attack. Some may smile in a superior manner at British apprehensions of invasion during the World War but many of us can remember the alarm along our Atlantic coast during the Spanish War lest the Spanish Fleet raid our coast and the bad effect it had on the disposition of our fleet. In any major war it would be essential to keep the fleet concentrated in one ocean, this would leave to the Army and local naval defense forces the coast defense of our possessions in the other ocean, plus the Panama Canal. Thus, with the fleet in the Pacific, the Army plus local naval forces will have to protect our Atlantic coast, Cuba, Porto Rico, the Virgin Islands and Panama; with the fleet in the Atlantic the Army will have to take over the defense of Alaska, the Pacific Coast, Honolulu, Guam and the Philippines. As long as we hold Panama, the fleet can return to either ocean to assist the Army if the situation demanded it, but for long periods of time the Army must be prepared to undertake the major share of the coast defense on one ocean front.

We hear much about the dependence of the British Empire on the British Navy, but we rarely hear about the British fortified bases and the British Army garrisons that hold them in the absence of the British Fleet. Yet without these bases and their garrisons the British Fleet would be impotent. It was a British First Lord of the Admiralty that reminded Rodney that the British Fleet could not be present everywhere, and that in its absence garrisons must be depended upon. We instinctively associate Nelson with sea fights but his first important service was fighting ashore in Central America, and before losing his life on the deck of the *Victory*, he lost an arm ashore seeking to capture Teneriffe, and an eye at the siege of Calvi in Corsica. Nelson realized the importance of bases to the fleet and continually called the attention of the Admiralty to the value of Malta and was always willing to fight for a base.

To the uninitiated the possession of fortified bases is a harmless, peaceable custom; no band of pacifists are continually urging a limitation of bases; no peace society advocates reducing the number of first-class dockyards securely held; yet the possession of suitably placed and adequately protected bases enables a powerful fleet to protect its own coasts and commerce and to vigorously attack the commerce and exposed coasts of its opponent. The fortified base, at home or abroad, is in itself peaceful and defensive looking, but when it shelters a fleet second to no other it is the

catapult that speeds an irresistible projectile. The combination of a proper fleet basing on a well equipped, properly defended base enables them both to reach their utmost development.

Since the capture of Gibraltar the British Army has always been prepared to hold it in the absence of the fleet, and the British Fleet in its many wars with the French, with the army holding Gibraltar, could throw its fleet into the Atlantic or Mediterranean at will. The Canal Zone offers us similar facility in passing our fleet from one ocean into the other, provided the Army secures it properly.

We do not yet sufficiently realize that frequently the best method of defending a coast is to heavily fortify an outlying island. Thus, with the fleet capable of maintaining its communication with the fortifications of the homeland, Oahu protects our entire west coast; similarly Porto Rico, Haiti and Cuba can be better protected by fortifying the Virgin Islands than by local defenses; in addition the Virgin Islands securely held, would do much to safeguard the approaches to the canal from any European attack.

The Philippines are our most exposed possessions, their extent and configuration make it well-nigh impossible to hold them by local defense except at prohibitive cost, obviously if we could not keep open the communications of the Islands of the United States, by the fleet, the Islands can be taken. The fleet cannot be tied to the Philippines. We should take another lesson from Great Britain in her conduct of the several sieges of Gibraltar and so strengthen the local defenses of the Philippines that the Army plus local naval forces can hold Luzon until the arrival of the fleet. Then our position in the Far East can be assured.

The optimists may say that we are never likely to be threatened in both oceans, and that the presence of the fleet in the theater of operations will insure the coast defense; actually during our War of 1812, we came near to finding ourselves at war with all of England's European Allies, in our Civil War, Lincoln was continuously faced with war with England and France; and after the battle of Manila we came close to war with Germany. In a war with one belligerent with an inferior navy, if we employed our seapower vigorously we would be constantly risking war with neutrals, for Sir Edward Grey is an expert and unimpeachable witness that trade of neutrals cannot be interfered with except at a definite risk of bringing them into the war, so even if we were only involved with a small nation we should at once plan and dispose our Army and Navy on the theory that the war will probably spread.

The two latest weapons, the airplane and submarine, have some interesting characteristics in common: (1) They are difficult to discover and destroy. (2) Under favorable conditions they can be very destructive. (3) They can be advantageously employed in coast defense. (4) Each can be employed to advantage against the other. In fact, the submarine is the

only naval craft that can remain in waters where the enemy's air is in great superiority.

If the improvement in planes is not matched by improvements in defense against air attack, even the splendidly isolated United States will have to extend its fortified frontiers in order to prevent air raids reaching valuable and vulnerable cities. The probable development of planes is an additional reason strengthening our frontiers by fortifying outlying islands, so that our shore based aircraft and fleet may be employed at a distance from our coasts.

The extreme mobility of aircraft, shore and sea, make them particularly valuable in coast defense, directly in attacking the enemy vessels and indirectly by scouting.

In conclusion the Army should remember that in addition to assisting it in coast defense, the Navy has three other tasks: (1) Most important of all, defeat or contain the enemy fleet; (2) To defend the sea-borne trade; and (3) To attack the enemy's sea-borne trade. It is apparent that if the enemy fleet can be defeated or contained our coasts are protected except from minor raids of a hit-and-run nature. Until the enemy fleet is defeated, the major energies of the Navy will be absorbed in the first task, and it will have little force to spare for either the second or third tasks. So the Army will have to undertake a greater burden. During war we will need a few strategic raw materials, so the fleet would probably be under necessity of protecting certain trade routes before it could assume the offensive on a large scale against the enemy sea-borne trade. In their plans for coast defense, the Army should bear in mind these fundamental naval responsibilities.

Finally, in defending our coasts we may become involved in joint overseas expeditions with all their attendant difficulties. This problem with its many aspects is beyond the scope of this paper, but it will have to be reckoned with in forecasting joint Army-Navy action in coast defense. For it is very probable that on the outbreak of war the Navy will be required to escort reinforcements to certain of our outlying possessions, and if the enemy anticipates their arrival, we may be confronted with one of the most difficult tasks in war, namely, to effect a landing in force on a defended shore.

More About Probable Error

By 1ST LIEUT. PHILIP SCHWARTZ, Ord. Dept.

UP TO 1917, light, heavy, and Coast Artillery used the yard as a unit of measure in adjusting fire. Since then in guns up to 6-inch in caliber, the probable error or a multiple of it has been much used in securing adjustment. Within the last few years the probable error has also been adopted as an important yardstick in the scoring of Coast Artillery target practice. Before 1917 hits per gun per minute and penetration in armor were considered to be of interest in measuring the efficiency of a shoot, and probable error or mean error was used comparatively little. Attention has recently been paid to this subject in several numbers of the COAST ARTILLERY JOURNAL as well as in the *Field Artillery Journal* and the *U. S. Naval Institute Proceedings*.

The following quotations from various published articles show a trend of thought toward a critical examination of the vagaries of the probable error.

“The difference between accidental errors, systematic errors and errors caused by some law of retardation must be understood so clearly that an improper adjustment method will never be followed.”

* * * *

“This faulty analysis has resulted in excessive ‘developed armament probable errors’ and it explains also why the probable error developed at one practice was different from the probable error developed at another practice at the same battery. The effect of the unknown wind has been included in the armament error and of course the effect of the unknown wind is different for each practice.”

* * * *

“When based on consideration of the mean squared residual the expression for the probable error of the probable error is $\sqrt{\frac{.477r}{n}}$; when based on consideration of the mean absolute error the expression is $\sqrt{\frac{.510r}{n}}$.”

* * * *

“For the purpose of analysis there is a very simple method whereby the constant and variable errors may be practically eliminated and a fairly accurate value for the accidental error may be obtained. This can be done by taking the differences between the corrected fall of successive shots, and using these differences, instead of the deviations of the individual shots from the center of impact, as the basis for computing the probable error * * *. In recomputing the probable error of a great number of practices held in the past by the method outlined above it has been discovered that almost invariably the probable armament errors as shown in the original analysis have been too large. In most cases the constant or variable errors entering therein become plainly evident. Especially in mortar practices were variable errors encountered in some cases reaching in magnitude fifty yards per minute * * *. As a result of experiments along this line

the conclusion is reached that in all of our armament we have been assigning too large a value for the probable error.”

* * * *

“A careful study of past practices shows the probable errors developed by the same batteries and manned by the same personnel to be extremely varied when fired on different days. * * * A study of the graphs of target practice for 1927 and of those received to date this year shows, in many cases that the general trend of stripped impacts is decidedly toward or away from the line AB. In such cases adjustment is more difficult for the battery commander than it is when the general trend of stripped impacts follow the line AB. This oblique trend is due to unknown causes, probably atmospheric, over which the battery commander has no control.”

* * * *

“Just what is a D. P. A. E. anyhow? How and by what process of reasoning are we justified in plotting shots fired at different elevations, different times, different azimuths as though they were all fired at a single fixed point?”

* * * *

“The Navy uses two units. One is the ‘pattern,’ which is the distance in yards between the shot with the shortest range and the shot with the longest range. New regulations for our branch soon to be published will use this term.”

* * * *

“The probable error and the fork are quantities which can cause the artilleryman considerable worry because of their behavior.”

It appears desirable to reconsider probability theory taking from it only those results which are directly applicable to artillery fire. The mathematical theory can be found in detail by consulting some of the works listed in the bibliography appended to this article, but it is not believed that the proper place for a discussion of these details is in these pages.

Let a number of projectiles n be fired from a gun G , the first one striking at range R_1 , the second projectile striking at range R_2 , etc., and the last at R_n . (See figure 1). Assume that no change in elevation, azimuth, ammunition, gun, gun crew, and atmosphere occurs. If n is large enough and the projectiles do not explode or rebound, they will pile up in such a manner that the curve at the end of the trajectory will envelop a cross section of the pile made by the vertical plane of the line of fall.

The range at which the maximum ordinate of this curve occurs is called the *mode*. More projectiles will pile up at this range than at any other.

If $\frac{n}{2}$ projectiles lie to the left of a particular point on the line GC and

$\frac{n}{2}$ lie to the right of this point, the range of this point is the *median* range.

The *mean* range \bar{R} is the range for which $\bar{R} = \frac{R_1 + R_2 + R_3 + \dots + R_n}{n}$

This is the range which can replace each individual range without changing the sum of the ranges.

If the mode, median, and mean occur at the same point C then the distribution of projectiles is said to be *normal*.

It is possible to have a distribution occur which is not normal. In such a case the mode, median, and mean points, will not coincide in general. (See figure 2.) The enveloping curve is not symmetrical with respect to the mode or point corresponding to the maximum ordinate. This situation may occur, for example, if a projectile has a poorly designed rotating band which causes occasional short ranges. If such a distribution does occur it is an immediate indication that some feature of design of gun, ammunition, or instruments needs improvement.

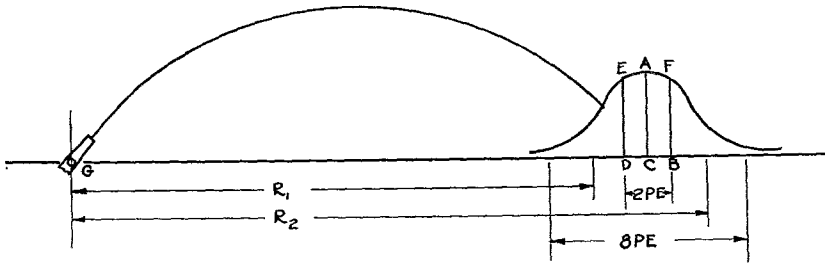


FIG. 1

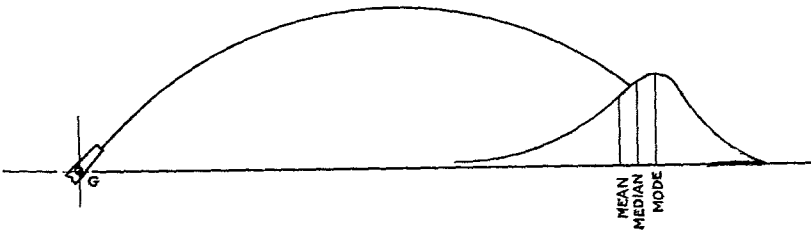


FIG. 2

The actual distribution of projectiles in artillery fire is probably sufficiently close to normal that it is justifiable to assume the normal distribution because of the many applications and uses of results which come from an analysis of such a distribution. Assuming the normal distribution of figure 1, the probable error in range is equal to CD or CB if with C as the mean range, the area DEAFBC contains the equivalent of fifty per cent of the number of projectiles fired, that is $\frac{n}{2}$. The distance DB which is equal to two probable errors is sometimes called the fifty per cent zone in range. With this picture of the probable error as a basis it is possible to develop several formulae which can be used to calculate the probable error of a series of ranges. The following six methods are known for calculating the result from a consideration of this distribution.

- a.* $\sqrt{\frac{.845}{n(n-1)}} [(R_1 - \bar{R}) + (R_2 - \bar{R}) + (R_3 - \bar{R}) + \dots + (R_n - \bar{R})]$
- b.* $\sqrt{\frac{.675}{n-1}} \sqrt{(R_1 - \bar{R})^2 + (R_2 - \bar{R})^2 + (R_3 - \bar{R})^2 + \dots + (R_n - \bar{R})^2}$
- c.* $\frac{.598}{n-1} (R_1 - R_2) + (R_2 - R_3) + (R_3 - R_4) + \dots + (R_{n-1} - R_n)$
- d.* Arrange the errors $(R_1 - \bar{R})$ in order of absolute magnitude. If the number of errors is odd the middle error is the probable error. If the number of errors is even the mean of the two middle errors is the probable error.
- e.* Subtract the greatest R from the least R . Divide the difference by 8. This quotient is the probable error.
- f.* Plot the ranges against the number of rounds or time of firing. Draw a line on the plot which represents the approximate mean range. Outline the area closest to the mean range line which contains fifty per cent of the points. Measure the width of this area parallel to the range axis. This width divided by two is the probable error.

Method *a* is generally used for the calculation of probable errors in artillery fire. The denominator $\sqrt{n(n-1)}$ is usually replaced by n . This is quite accurate if n is large but if n is small an appreciable error may be introduced. If n is equal to 10 an error of approximately five per cent is introduced by the simplification. If n is equal to 5 an error of approximately eleven per cent is introduced. The simplification may result in a smaller value of the probable error than the one computed by the more exact formula of method *b*.

Method *b* is not often used in analysis of artillery fire but is usually preferred for scientific work where the greatest accuracy is required.

Method *c* is not used generally but it may be of considerable value in certain cases. It may happen that during a firing some variable disturbance is at work causing the mean point of impact to alter its position, or effecting a continuous change of the arithmetic mean. Thus the temperature may rise, the bore may become heated or the speed and direction of the wind may change. In such a case the methods of calculating from the arithmetic mean, methods *a* and *b*, would give unsatisfactory results and unless the whole series of observations is to be abandoned, recourse must be had to this method of successive differences. In such cases the accidental errors of the normal distribution have superimposed upon them a more or less uniformly variable error.

Method *d* gives rough values only, and does not have a very high order of accuracy.

Method *e* makes use of the assumption that approximately ninety-nine per cent of the projectiles fall in a zone eight probable errors in length. Unless a very large number of projectiles have been fired very little ac-

curacy is to be expected from this method. Its values are generally lower than those obtained by other methods because the extreme ranges do not often occur in the first ten or twenty rounds. This ninety-nine per cent zone is sometimes called the pattern.

Method *f* is the graphical equivalent of method *d*. These represent another way of expressing the definition of the probable error originally given when considering the pile of projectiles.

It can be shown by mathematical considerations that the order of accuracy of the methods *a* to *d* is as follows: *b*, *c*, *a* and *d*. The probable errors in per cent of the values determined from—

$$\begin{aligned} \text{Method } a &= \frac{51}{\sqrt{n}} \\ \text{Method } b &= \frac{48}{\sqrt{n}} \\ \text{Method } d &= \frac{79}{\sqrt{n}} \end{aligned}$$

when *n* is very large.

An example of the calculation by the various methods follows.

<i>R</i>	<i>Error</i>	<i>Error</i> ²	<i>Successive Difference</i>
10110	— 15	225	
10360	+ 235	55225	+ 250
10310	+ 185	34225	— 50
10060	— 65	4225	— 250
9940	— 185	34225	— 120
10190	+ 65	4225	+ 250
10240	+ 115	13225	+ 50
9990	— 135	18225	— 250
9910	— 215	46225	— 80
10140	+ 15	225	+ 230

Sum 101250 1230 210250 1530

Mean 10125

Method *a.* $\frac{.845}{\sqrt{n(n-1)}} \sum (R_i - \bar{R}) = \frac{.845}{\sqrt{10 \times 9}} 1230 = 110$

b. $\frac{.675}{\sqrt{n-1}} \sqrt{\sum (R_i - \bar{R})^2} = \frac{.675}{\sqrt{9}} \sqrt{210250} = 103$

c. $\frac{.598}{n-1} \sum (R_i - R_{i+1}) = \frac{.598}{9} 1530 = 102$

d. Two middle errors are 115, 135, $\frac{115 + 135}{2} = 125$

$$e. 10360 - 9910 = 450 \quad \frac{450}{8} = 56$$

$$f. \text{ From plot, 50\% zone} = 200, \frac{200}{2} = 100$$

It can be seen that methods *b* and *c* give results which agree the best. Method *d* as is to be expected on account of the small number of ranges considered gives a value which is very small. Method *e* gives a high value and method *f* accidentally gives a value which appears to be good although based on estimated figures. If in method *a*, $\sqrt{n(n-1)}$ were replaced by *n* the value obtained would be 103, which in this case would be an improvement.

Now suppose that we rearrange the ten ranges used in the previous example, so as to give a situation which indicated the existence of a changing unknown variable in the developed ranges. Such an arrangement and the calculation of probable errors by the various methods follows.

	<i>R</i>	<i>Error</i>	<i>Error</i> ²	<i>Successive Difference</i>
	9910	— 215	46225	
	9940	— 185	34225	+ 30
	9990	— 135	18225	+ 50
	10060	— 65	4225	+ 70
	10110	— 15	225	+ 50
	10140	+ 15	225	+ 30
	10190	+ 65	4225	+ 50
	10240	+ 115	13225	+ 50
	10310	+ 185	34225	+ 70
	10360	+ 235	55225	+ 50
Sum	101250	1230	210250	450
Mean	10125			

$$\text{Method } a. \quad \frac{.845}{\sqrt{10 \times 9}} 1230 = 110$$

$$\text{“ } b. \quad \frac{.675}{\sqrt{9}} \sqrt{210250} = 103$$

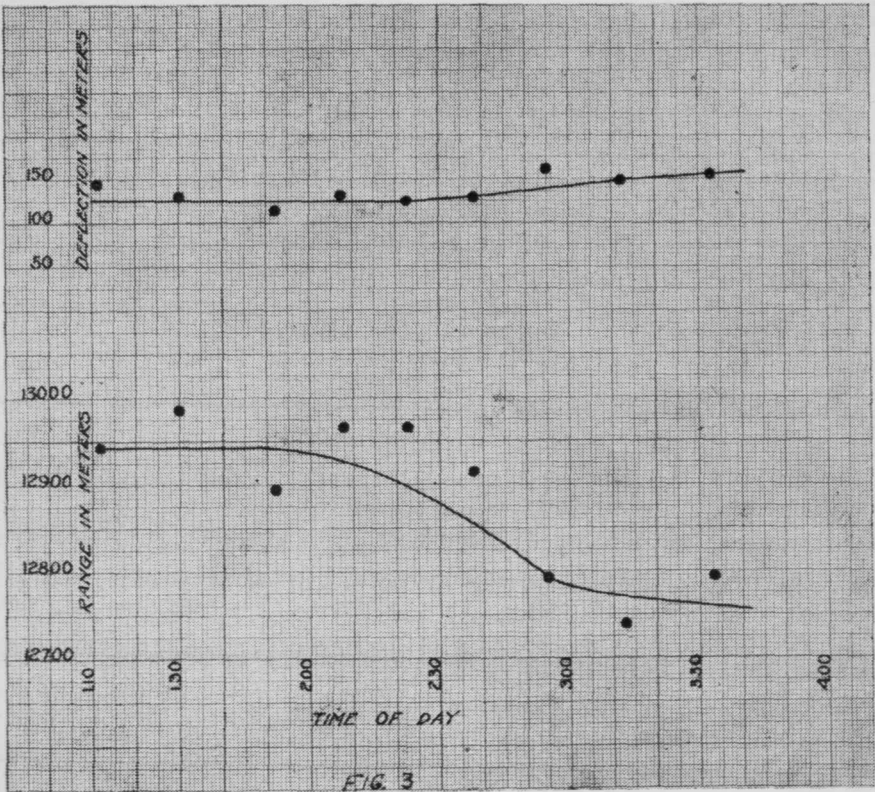
$$\text{“ } c. \quad \frac{.598}{9} 450 = 30$$

$$\text{“ } d. \quad \frac{115 + 135}{2} = 125$$

$$\text{“ } e. \quad \frac{10360 - 9910}{8} = 56$$

$$\text{“ } f. \quad \frac{200}{2} = 100$$

Method *c* now gives a value which is very much smaller than all other methods. Even if it had not been observed that the ranges increased steadily, the resulting small probable error from the method of successive differences would immediately bring this situation to attention. It can safely be said that only method *c* applies to this case and that other methods give values which are far too great. If the cause of the steady increase can be determined and each range corrected for the effect of this cause other methods may be made to apply.



A graph of range and deflection plotted against time of day is shown in figure 3. The firings were made in the 155 m/m gun, and no change in elevation or azimuth of gun was permitted during the firings. This graph gives an example of a steady variation in the position of the points of fall of projectiles. This steady variation was probably caused by a change in the speed or direction of the wind.

In general it can be said that a test for the existence of an unknown variable which affects the range is to calculate the probable error by methods *a* or *b* and *c*. If *a* or *b* agree with *c* then no variation has occurred. If the difference between *a* or *b* and *c* is greater than twenty per cent, it should be assumed that an unknown variable was entering into the situation.

The above considerations concerning methods of calculating the probable error in range apply equally well to the probable error in deflection.

The method of successive differences (method *c*) can be applied to analysis of target practice by making a few simple additions to forms 22 and 23. In addition to obtaining the data on lines 20, 21, 22 and 23 of form 22, calculate also on line 26 the differences corresponding to the successive values on line 19. On line 27 obtain the mean of the figures on line 26 without regard to sign. On line 28 tabulate the product of the mean difference on line 27 by .598. Compare the value given on line 28 with that shown on line 23 and draw conclusions. Make similar changes on form 23. The following is an example of the method.

Line	Round									
	1	2	3	4	5	6	7	8	9	10
19	— 90	— 60	— 10	— 60	— 110	— 140	— 190	— 240	— 310	— 360
20	— 125									
21	215	185	135	65	15	15	65	115	185	235
22	123									
23	104									
26		30	50	70	50	30	50	50	70	50
27		50								
28		30								

Since this is the same problem as the one previously considered the same conclusions regarding the inaccuracy of the values given on line 23 may be reached, and the value shown on line 28 should be accepted.

Consideration of wild or rejected ranges appears to be desirable at this point.

An observation may be rejected when its deviation from the arithmetic mean is greater than *K* times the probable error. The values of *K* have been investigated, and are given by two investigators in the following table. Chauvenet's figures are usually considered the better.

Number of Observations <i>n</i>	Chauvenet <i>K</i>	Vallier <i>K</i>
4	2.27	2.27
5	2.43	2.43
6	2.56	3.25
7	2.66	3.45
8	2.77	3.60
9	2.83	3.69
10	2.92	3.84
12	3.02	4.00
20	3.33	4.49

A large error is as likely to occur early in a series of observations as late. Consequently the limited series of observations taken in practice, frequently contain abnormally large errors. This is not due to a departure from the law of errors but to a lack of sufficient observations to fulfill the theoretical conditions. In such cases there are not enough observations with normal errors to balance those with abnormally large ones. Consequently a closer approximation to the arithmetic mean as well as the mean error that would have been obtained with a more extended series of observation is obtained when the abnormal observations are rejected from the series before taking the mean.

An observation may be rejected because it unduly affects the calculated mean, but it does not follow that it should also be rejected in calculating the probable error. Rejection of abnormal observations will decrease the calculated one hundred per cent zone and consequently the probable error. It is true that the error of the rejected observation affects the mean error unduly but in general it may be said that mean errors are more likely to be too small than too large if the rejection of observations is permitted. Therefore in some work both the total dispersion and the mean or probable errors are listed, great weight being of course given to the mean error since it is based on mathematical consideration of all observations. The calculated one hundred per cent zone is affected only by the largest and smallest observations. The probable error calculated from the mean error has greater accuracy than the probable error calculated by dividing the one hundred per cent zone by eight because the latter is based on only two observations, the largest and the smallest.

It has been pointed out in the above that the method of successive differences may be used to:

- (a) Help determine whether or not an unknown variable such as varying retardation was affecting the firing.
- (b) Calculate more accurate values of the probable error.
- (c) Determine more accurately whether or not the firing was adjusted.
- (d) Calculate more accurate scores.

In conclusion it may be said that some of the present difficulties in handling the probable error may be due to a lack of understanding of all phases of the subject. A better value of the probable error should result from having available the various methods of calculation. Under some conditions one of the methods may give much better results than any of the others. The above study and analysis should also help to explain some of the vagaries of the probable error which have caused discussion.

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Sidelights on Caretaking

By CAPT. HARRY R. PIERCE, C. A. C.

A FEW years ago an up and coming officer or soldier had a tendency to shun the caretaking establishments and, perhaps, rightly. Caretaking was not emphasized then as it is today. For one to be detailed on this kind of a job meant that he would, before long, be a back number. The loss of contact with active firings and drills made him feel that he was slipping, so to speak, and rendered these jobs less attractive accordingly.

Within the last year and with the reorganization of the Coast Artillery Corps the policy which governs our activities has so changed that conditions affecting the caretaking posts have changed also. The object of the work itself, has not altered but the fact that today caretaking is more general and not an incident has given rise to a new feeling with regard to this work. No longer is it a shelf upon which one must sit until he is again picked for foreign service and active duty. No longer is he slipping. For to keep up with our policy regarding National Defense and preparedness the caretaker now has a very important duty and a well marked place in the scheme of things.

Any job is interesting and romantic depending entirely upon the point of view. This new policy in the Coast has put interest into caretaking. If one has the proper frame of mind he will find as much interest, and romance, too, as he will on any other work. This is especially true in Portland, Maine, on account of the National Guard firings each year. They liven things up a bit and permit the caretaking officer once a year to hear the big guns speak once again.

This article is intended to give a few sidelights on the caretaking game, to show a few of the problems which may occur and to present solutions adopted in one particular situation.

In the first place, a Coast Artillery post placed on a caretaking status is not to be considered as being out of commission or on the shelf. If the job is done satisfactorily every element of the command should be ready for almost instant use and the only requisite needed to go into action is manpower.

In Portland the caretaking company consists of two officers and forty-seven men. Within the jurisdiction of the Portland command are also the Harbor Defenses of Portsmouth with a detail of one officer and twelve men. Actually there are only five men at Portsmouth due to quartering conditions, the other seven men being in Portland. Within the geographical limits of the Harbor Defenses is a full regiment of Infantry, the 5th. Stationed in Maine is a full regiment of National Guard Coast Artillery, the 240th. This latter is assigned to the Harbor Defenses of Portland for active duty and becomes, in reality, our first line of defense.

Of the various elements of a Harbor Defense perhaps the most important are the guns themselves. It takes months to make a gun. It takes days to train a soldier. But it is not with the procurement of personnel that the caretaking officer is concerned or even with the procurement of guns. It is his business to see that the guns on hand are ready to use when the personnel to man them arrives.

The Ordnance pamphlets go into sufficient detail regarding the care of guns but they always contemplate a full complement of men. This is a condition never existing at a caretaking post and which under the present circumstances, requires considerable study and ironing out. The ideal condition, therefore, cannot ordinarily be reached due to lack of men. This requires local expedients which must be fully utilized to accomplish the mission, and offers the caretaking officer ample opportunity to plan his line of action and exercise his ingenuity. To begin with the bores of the guns, it may be stated that they require little care. They should be properly cleaned in the beginning and coated with a mixture of three parts preserving compound and one part white lead. This mixture is used extensively here and has been found to answer nearly all of the requirements to which it has been put. It will keep the bore in good condition almost indefinitely with little or no additional labor. The one objection to the mixture is the difficulty with which it is removed. However, this is exactly the reason it is so effective. It will not melt and run off, neither will rain wash it off when used in the open. When used on projectiles even the alkaline droppings from ceilings of magazines have little effect on it. To remove this dope from the bore of a gun takes one man two to three hours. Gasoline is an excellent solvent.

In general, the breech blocks are best cared for by removal from the guns and storage in the magazines. They are disassembled and all parts coated with the white lead mixture. Some objection may be offered to this procedure. The principal objection seems to be the possibility of losing some of the small parts. Of course, if any such parts were lost it would be serious since they are finely machined and made special. This is one of the problems of caretaking, however, and precautions must be taken lest these parts be lost. There is little danger of this with well-trained personnel. Another objection is that the guns are not ready for use. This is true but on the other hand it is customary and required that breech blocks be disassembled and cleaned before firing so this objection should not be given great weight.

The recoil cylinders are kept filled at all times. The biggest enemy here is rust. They cannot be coated inside with the white lead mixture on account of the great amount of work necessary to put them back in shape for firing. If coated with this mixture the guns would be out of commission which is not in accordance with the mission. At this station all cylinders are being completely taken down and cleaned this summer as

well as those at Portsmouth. The entire job will take all available men three months. Although Ordnance regulations require this cleaning to be done each year it becomes an impossibility with the limited caretaking personnel available. Experience has shown, however, and observation of conditions in cylinders that have not been cleaned for a considerable period has verified the fact, that here, at least, a cleaning once a year is not necessary although, perhaps, desirable. In the future, cylinders will not be allowed to go for as long a time as heretofore but those at one fort only will be dismantled each year. This distributes this operation over a period of time, allowing a complete cleaning once each five years. This may be shortened slightly to, say, once each four years, if preferred.

In further contemplation of the cylinders it is noted that, in general, the filling plugs are below the high point of the cylinders. This is an intentional feature of the design of the recoil system and prevents difficulty in tripping and firing. On the other hand, this design leaves an air space above the oil. Such an air space allows rust to form. A possible solution of this is to bore a hole in the high point of each cylinder and fill it with oil at that point. An automatic filler with a small reservoir may be placed over this hole to insure that the cylinder is always full. This will eliminate the air space and prevent rust from forming. The design of each different type of cylinder must be taken into consideration in order that such a hole will, when plugged, in no way interfere with or change the manner of operation of the recoil system. It has been noted that in some D. C. systems such a hole once existed but has since been plugged and the filling hole placed at the other end. This idea merely means reopening this hole. Of course, the gun cannot be fired or even tripped with the cylinder in this condition. It would, however, require only a few minutes to remove the reservoir, plug the hole, open the regular filling hole and allow the excess oil to drain out, when the cylinder would be in the same condition as intended. This is an example of one of the caretaking expedients.

Where breech blocks have been removed a breech cover may be made of burlap, securely sewed onto the breech and thoroughly impregnated and covered with the white lead mixture. All gears, rollers and roller paths are also coated with the mixture. In fact, wherever there is unpainted steel this mixture is used. Guns are inspected frequently, tripped periodically and changed in azimuth often. It is believed that guns so cared for will remain in serviceable condition indefinitely. Practically the only attention needed is a touching-up now and then with the preservative.

Brass parts are coated with vaseline. This is desirable as it allows for ease in removing same and polishing. Where stations are inspected frequently a little brass polish goes a long ways towards presenting a good appearance, especially when easy to apply. Lacquer is not recommended for brass. If applied, it will turn dark within six months and its removal

then becomes a tremendous job. Vaseline will wash off in a heavy rain and must be touched up immediately after a rainstorm and thereafter once a month.

Next to the guns themselves the most important element is the fire control system. Each harbor defense is well supplied with electricians. Their principal duty is to see that the communication system is always in order. In fact, the caretaking of this element is little different from what it would be under active conditions. Maintenance tests are made monthly and trouble showing up is corrected immediately. This insures that the lines are always in good shape. The Signal Corps inspector, each year, actually talks over each line. This insures that once each year, as least, the telephones themselves are workable. In general, it has been found that any defects noted by this inspector can be corrected before he leaves.

War Department policy requires that all telephones be in place. In general, this offers no obstacle. There are locations, however, particularly in batteries, where telephones so installed will go out of order in a short time due to dampness. Such telephones should be removed and placed in dry storage, but authority for the removal of each such telephone must be obtained from higher authority.

One of the best assets of a harbor defense on caretaking status is a cable splicer. While all graduates of the school have had instruction in cable splicing they are not all proficient. Submarine cable is kept in repair, supposedly, by the cable ship. There are, nevertheless, circumstances where such work must be done at once. No doubt less deterioration results if breaks are repaired as soon as possible.

If the National Guard utilizes part of the defenses for their annual encampment such visits should be welcomed. It not only puts the caretakers on their toes to have everything in readiness by a certain time but also furnishes a test as to the efficiency of their work. In Portland the National Guard holds its camp in July. During their stay of two weeks they man two forts and fire five major calibre batteries. Mutual respect and assistance between these two elements of our National Defense has become a matter of course. The Regulars look upon the National Guard as the first increment that would report in case of an emergency and each such annual camp is a test mobilization. Every effort possible is made by all to make this camp a success. On the other hand, not all the work is done by the Regulars. Each year prior to their camp the National Guard sends fifty or more men, generally on a Sunday, to test communications. This is done in their own time and without pay but does help greatly toward insuring that communications are in order for the coming camps.

And now to return to the job. If the guns are in good shape and ready to use, if the communications are in order and if there is sufficient ammunition the defenses are, broadly speaking, ready for war and our mission

is accomplished. But there are a thousand and one other things constantly breaking into the daily routine or whatever program may have been laid out.

Caretaking posts, as well as others, are constantly being inspected. Store rooms are always open for comment. It has been found practicable and advantageous to collect the majority of stores at one post, preferably a centrally located one. Only a small quantity of spare parts and expendable articles are kept on the shelves locally. A three months' supply is generally conceded to be sufficient. Unnecessary supplies and obsolete or unserviceable articles are reduced to a minimum. Extra supplies and spare parts that happen to be on hand and pertain to the particular post but are not immediately needed are packed and boxed, inventoried by an officer and sealed. The inventory is signed and attached to the outside of the box and such boxes stored in one place. It is not necessary to count the articles in the boxes upon annual inventory but to check from the lists on record and from the numbers on the boxes. Generally all of the boxes are of the same size to facilitate storage. Armament chests and spare part boxes pertaining to searchlights and motor-generator sets are collected in one store-room at each fort. Tools that may be needed are carried around from place to place in a tool bag. Thus, tools may be painted and as they are not used they may be kept looking well.

The care of ammunition causes a great deal of work if done properly. Powder cans must be tested and painted. The Ordnance personnel supervise this work assisted by extra artillerymen. Projectiles need scraping and a preserving compound applied. It has been found that the white lead mixture previously mentioned is the best thing to use. Paint has no use except to designate by its color the kind of projectile. The alkaline drops from the ceilings and walls of the magazines quickly eat through paint. The white lead mixture, on the other hand, stands up very well.

A recent test to determine how much of the Harbor Defenses could be placed in a combat condition in one month by the present caretaking detachment was conducted in the Harbor Defenses of Portland. The month of June was selected for the test.

These Harbor Defenses were handicapped in several ways. In the first place it had been on a real caretaking status for several months only and the work had not been reduced to a routine basis. In the second place, the National Guard encampment was due to commence on July 5. In the third place, on account of the Infantry organization having left for the field it was necessary to conduct a mess. Other matters broke in frequently during the test, such as shipments of ammunition, but the foregoing were the principal hardships.

The largest single job was the work on the recoil cylinders. None of them had been properly cleaned for several years and this had to be done

in order to rate one hundred per cent on the test. Upon check up of personnel it was found that there were only six men available for this work. These were assigned to work on the mortars, in fact, had been working on a mortar battery before the test was commenced. In the normal run of events it had been estimated that it would take from one to two years to go over all the guns in the harbor defense. Under the conditions of the test it has required that this work be done in one month. In addition there was other work to do. The first problem to solve, then, was that concerned with manpower.

Practically the only source of personnel resulted from cutting the overhead. The manning table was scanned and certain cuts made. It was scanned again and more cuts made. Of the two night watchmen who were doing guard duty only one was retained, he alternating with the other every week instead of every other night. The animals were all sent to other posts, eliminating stable hands. One man was taken from the boat crews. One radio operator was taken off and replaced by an infantryman. One clerk from the sergeant major's office and one from the artillery engineer's office were taken for gun details. The fatigue detail was cut to a minimum. In place of animals we had obtained a three-quarter ton G. M. C. truck. This truck and driver, a provost sergeant and one other man did all the transportation, police and sanitary work. Prisoners were turned over to Fort Williams.

In this manner thirteen men were obtained who were set to work at once on the recoil cylinders at Fort Williams. At the end of two weeks the cylinders there had all been cleaned except the three-inch. Three men were left there to finish those and the detail, or flying squadron, sent to Fort Levett. By the end of another week all the guns had been finished there and the detail sent on to Fort McKinley. This latter fort was not completed before the end of June. It was estimated that between sixty and seventy per cent of this work had been done. Or, to state it otherwise, the test would have taken a month with twice the strength of the harbor or two months with the present detachment.

All plotting boards were put in place, all telescopes were mounted and oriented and all communications were overhauled.

As a result of the test it was found that several lines or telephones refused to function. It was estimated that three weeks would be required to correct the deficiencies. With the exception of a change in submarine cable, none of the deficiencies were important or difficult to correct. All searchlights were in excellent condition and all controllers but one functioned. All power plants were in operation but one and that one was out of service awaiting a part from the factory.

The following table shows the general assignment of personnel during the test:

Furlough	3	
Sick	2	
Post Headquarters:		
Sergeant Major	1	
A. E. Clerk	1	
Engineer Clerk	1	
Master Gunner	1	
Battery:		
1st Sergeant	1	
Mess and Supply Sergeant	1	} In winter no mess is contemplated and these men would have been available.
Cooks	2	
Dining Room Orderly	1	
Kitchen Police	1	
Latrine Orderly	1	
Post:		
Radio Operator	1	Alternate operator obtained from Infantry.
Switchboard Operators	2	In winter, one is furnished by In- fantry.
Provost Sergeant	1	
Chauffeur	1	
Fatigue Detail	1	
Watchman	1	
Post Exchange Steward	1	
Submarine Mine System:		
Storekeepers	0	Ordinarily two.
Caretakers two L-Boats	4	Ordinarily five—One boat in oper- ation daily.
Artillery Engineer:		
Electricians	7	
Assistants	3	
Detail on mortars	6	
Detail on guns—Major Cal	10	
Detail on guns—Minor Cal	3	
Total	57	

In spite of cutting down it may appear that a large overhead still remains. One of the first questions asked regarding the test was the extent of which it was desired to push this work. In case of actual hostilities it might have been possible to cut out all clerks, the Post Exchange Steward and all police and to work everyone at least twelve hours a day. The harbor defense commander was informed that it was not desired to go to such extremes. Consequently the above list was an attempt at a reasonable compromise.

As a direct result of the test the question may be asked:—How many

men are actually needed at this station for caretaking work? Based on the requirement that conditions in the harbor defense be such that everything can be placed in combat condition in one month, it is imperative that all elements be in commission at all times. To accomplish this mission it is estimated that the Harbor Defenses of Portland would require not forty-seven men but approximately one hundred.

The method of arriving at this figure is as follows: First consider the noncommissioned staff, mostly electricians. They have their duties well cut out for them. The fire control system must be tested and repaired constantly. The post telephone system is in constant use by a full garrison of *Infantry*.

Second: Consider post headquarters, post and company overhead. A mess is necessary in the summer if not in the winter (when it is conducted by the *Infantry*). The post must be fairly well policed at all times and guarded at night. Radio and switchboard operators must be on duty. It has been suggested that the headquarters be eliminated. This cannot be done while the present amount of correspondence and records exist.

Third—Caretakers. A detachment consisting of one man per gun, one man per active storehouse and a minimum of five men for two L-Boats are considered essential.

Fourth—A flying squadron of ten to fifteen men for special jobs. Some of these are found in recoil cylinders, some in cleaning and slushing projectiles, and others in care and testing of powder cans.

If these are totalled the sum will reach approximately one hundred men.

It is estimated that under present caretaking conditions with no training the present detachment of forty-seven men can accomplish, in four months, more than was done previously in a year by more than a hundred men. It is now possible to undertake jobs that could not have been done before due to the fact that training took up all the good summer weather.

From a scrutiny of the manning table it can be seen that there are no men available for assignment as caretakers to guns. This will be true until the special jobs are taken care of. These special jobs will extend through the winter, at least.

In addition to the Coast Artillery men there are also stationed here three ordnance machinists and twelve men of the Ordnance Department. Two Ordnance men are utilized as machinist's helpers, one as chief clerk, one as clerk, four ordnance storekeepers and four as caretakers.

There are six permanent engineer civil service employees who take care of all the painting and repair to fortifications. Extra men are employed as needed.

The foregoing article was prepared in order to present a picture of conditions existing at one of the harbor defenses on caretaking status. It

is realized that other harbor defenses will be confronted with different problems requiring different methods of solution.

Under any conditions it is desirable that caretaking personnel be reduced to the minimum consistent with the maintenance of materiel as required by War Department instructions. "The War Department considers the primary mission of the troops of the Coast Artillery Corps in the continental United States is the maintenance of the armament of the harbor defenses in a condition to permit its effective employment in the early phases of any major emergency. This consideration is based on the supposition that making the maintenance of such armament the primary mission of these troops will not retard the development of the art of serving harbor defense armament." It is obvious that armament in the hands of caretaking detachments will always require the performance of some preliminary operations and labor before it can be definitely designated as ready to be turned over to a National Guard organization for immediate service. Certain caretaking duties become routine, such as: the cleaning of recoil cylinders, doping of bright metal parts, electrical repairs, tests and painting. The number of men required for these duties can be determined by computation or experience. The additional personnel necessary to place the entire armament in condition for actual firing will depend greatly upon the length of time considered available after a state of emergency exists. A detachment of one hundred men should require only half the time allowed one of fifty men. It would seem that caretaking personnel are concerned with two kinds of duties: those of a routine nature which are performed to maintaining the armament in the state of readiness required by the War Department and the additional duties required at the time when an emergency exists or when tests, simulating emergency conditions, are conducted. These considerations affect the strength of the caretaking detachment and, no doubt, will be considered by higher authority in fixing the allotments of personnel.

The officer in charge of a caretaking detachment is offered an exceptional opportunity to exhibit any talent for organization he may possess. It is certain that economy in personnel may be accomplished by study and experiment. Labor saving devices and methods are of particular value to caretakers.

It is hoped that this article may be of value to other officers on this duty or to officers about to be detailed on the duty. It is also hoped that other officers on the same duty may be induced to write of their caretaking problems where conditions are somewhat different. With many harbor defenses and batteries in the hands of caretakers this duty has become one of the highest importance and has acquired some of the characteristics of a specialty. While some will miss the activities of a fully manned post the duty has its compensations and can be very pleasant.

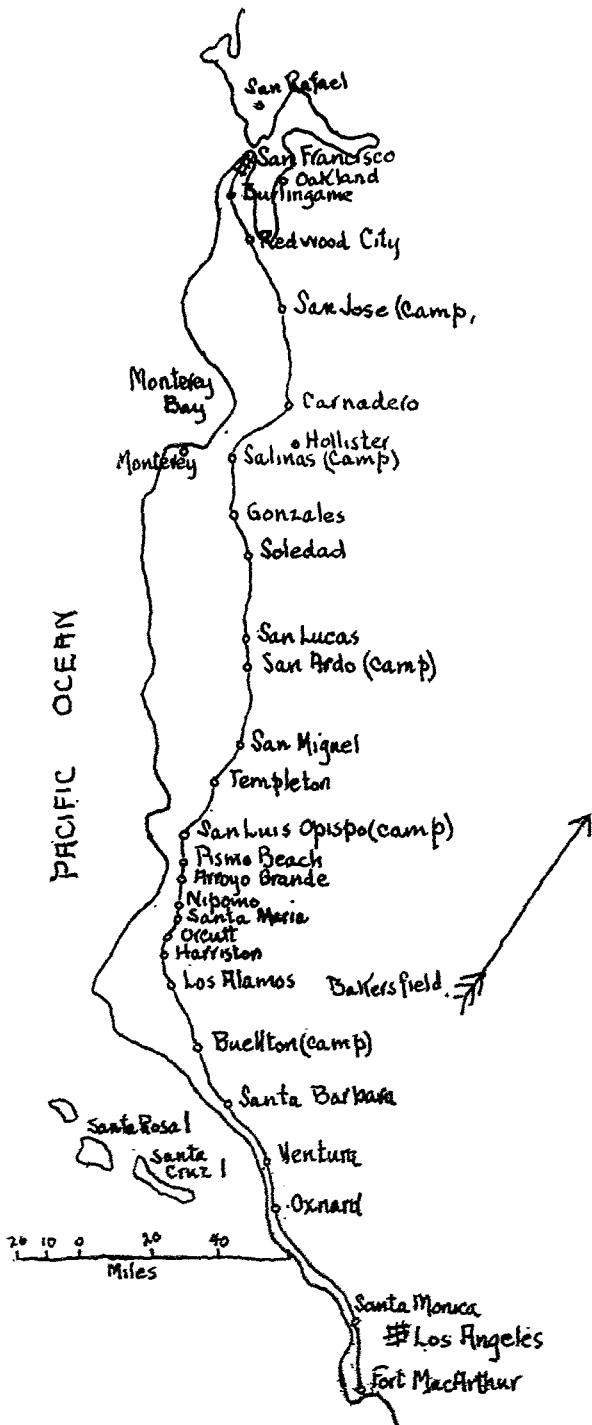
The March of the Sixty-Third

FOR some time prior to the receipt of orders for the move of the 63rd C. A. (AA) from Fort Winfield Scott to Fort MacArthur, the usual rumors had been floating around and the Commanding Officer and P. & T. O. had been considering what should be done if the rumors came true. When the record of the march of the 62nd C. A. appeared in the *Journal* for January, 1930, it was studied carefully for pointers which might be of benefit to us. However, because of differences in organization, road and traffic conditions, available points for purchasing supplies, etc., the only common factor being the antiquated transportation, it became evident that our problem was quite a distinct one and would require its own solution. And as soon as instructions were received we began to get busy.

The two most important preliminary considerations were the time to be allowed for the march and route to be traversed. As to the first, it was finally decided that by taking two weeks for the trip current requirements would be complied with, obviating a subsequent march out from MacArthur. We had the choice of two main highways from San Francisco to Los Angeles—the Valley Route and the Coast Route. The former following the San Joaquin Valley is practically level for the greater part of the way but has one long, crooked and steep grade over the Tehachapi mountains. The latter generally parallels the coast and has three fairly long and steep grades. During the Christmas period, before orders were received, the regimental commander made a trip to Los Angeles over one route and returned over the other. And when the word came to move the decision was given in favor of the Coast Route.

Upon receipt of the letter directing the move, orders were obtained for Maj. F. E. Gross, Reg't. Executive and P. & T. O. to make a road reconnaissance. He was accompanied by the Regimental Supply Officer, Capt. Don R. Norris. Before the reconnaissance started, it was decided to leave Fort Scott on Monday, March 3, march two days, lay over Wednesday and Thursday, march two days and lay over Sunday. The second week was to be the same, Fort MacArthur being reached about noon, Saturday, March 15. This program was based primarily upon the location of towns of sufficient size to afford a reasonable market for supplies. The reconnaissance made by Major Gross was detailed and complete. Notes were made concerning conditions of roads, bridges, grades, railroad crossings, etc. Camp sites were arranged for and tentative arrangements made for the purchase of supplies.

Shortly before the order for the move was received, twenty-three of our F. W. D. trucks were placed on I & I report, having been in the service so long that parts for repair could not be obtained. However, because of the necessity for transportation for the move ten of these trucks were



not condemned, and we were required to place them in condition by utilizing parts from those that were. These trucks gave comparatively little trouble on the march. We were still far below our normal strength in transportation having a total of only twenty-two F. W. D. trucks and to help out we were loaned fourteen Type "B" trucks from the Ninth Corps Area Pool.

As this was to be a permanent change of station there was a considerable amount of equipment and battery property to be shipped by freight and only the field equipment was taken with the column. This, however, made up full loads for all our trucks. Each man was permitted to take a barrack bag with extra blanket, overcoat, shoes, etc., and one locker was carried for each four men. This locker was principally for the purpose of carrying a good uniform and the beneficial effect on the morale was well worthwhile.

In view of the length of time involved and the fact that road and weather conditions would probably make it impracticable to start at the same hour each morning, it was decided to issue a field order at Fort Scott and one at each stop-over point, each covering two days' march; and to cover details of supply and administration in an administrative order which would cover the entire march. This plan worked very satisfactorily.

A march graph was prepared for each two-day march and placed on the bulletin board at the time of issuance of the field order. From this the battery commanders took off sufficient checking points to govern their march. Accompanying the field order was a march table for the two days and a road bulletin which was prepared as a result of the reconnaissance previously made. This bulletin gave complete information as to grades, railroad crossings, turns, etc.

For the march the regiment was formed into five serials; Nos. 1, 2, 3, 4 included all the transportation, respectively, of Hq. Battery and Batteries "A," "B" and "E," except the searchlights of Battery "A" which formed serial No. 5. As this was not a forced march, the rate was fixed well within the vehicle limits, and the column moved with almost railroad precision. At the end of the march each battery commander submitted a log of each day's march, and a study of these shows that seldom was a serial more than ten minutes off schedule.

Experience had convinced us that the old system of marching fifty minutes and resting ten out of each hour was not the best for our men or transportation. During a rest of ten minutes, the driver, if he inspects his truck and puts in water, which is generally necessary, gets very little rest; and frequently adjustments are required which can not be made in this time. So that we generally marched an hour and forty minutes and halted for twenty minutes, although this was varied according to the roads. At

noon a halt of one hour was made. At this halt all serials closed on No. 1 and were gassed and oiled when necessary. Serial No. 5 which had been left behind with a police party for the final clean up of the camp joined here and from here was sent on to the next camp to make necessary preparations. An eight-hour driving day was adhered to as closely as possible; and those who have driven trucks in convoy know that this was enough.

Certain staple ration articles for the entire trip were carried from Fort Winfield Scott. Meat, fresh vegetables, etc., were purchased in local markets. Before leaving camp each morning each battery commander gave to the supply officer an order for such supplies as he wished delivered at the next camp. The supply officer went ahead each day and arranged for deliveries of these supplies, as well as of gasoline and oil. Generally all supplies ordered were on hand upon the arrival of the troops and the evening meal was always served before dark.

The distance marched each day with stopping place is shown below:

Fort Winfield Scott to Edenvale.....	63.6—overnight
Edenvale to Salinas	71.6—two days
Salinas to San Ardo.....	70.1—overnight
San Ardo to San Luis Obispo.....	69.4—one day
San Luis Obispo to Buellton.....	68.5—overnight
Buellton to Ventura	78.5—two days
Ventura to San Monica	62.7—overnight
Santa Monica to Fort MacArthur.....	31.8

At each stopping place a good camp site had been selected; but we were unfortunate in our selection of the weather so that in only three places out of seven were we able to occupy the place selected.

The Regimental Executive says that the C. O. wanted to put on some "dramatics," and the C. O. would perhaps plead guilty; so that instead of breaking out of Fort Scott at daybreak, 8:00 a. m. was selected as marching time. As this was a change of station and many were leaving for good this late hour was selected in order that our friends could turn out to say goodbye. Thorough the courtesy of the Harbor Defense Commander the 6th C. A. Band was there to play us off. But, alas for the dramatics! Just as the first serial moved out it began to rain; and not only did it rain but nature, as if to celebrate our departure, put on a regular thunder storm—a very rare thing in San Francisco. The band had to take cover and all our friends took to their automobiles and watched us from there. The effect was spoiled.

Except for a short interval at noon, the rain continued all day. At Edenvale, our first stop, our camp site was a lake. The trucks were left in column on the hard shoulders of the highway and served for sleeping quarters. The

next day it still rained, stopping only just before we reached Salinas. Again the trucks were parked on the side of the road where they remained for two days. Before we left Salinas it had cleared and the next seven days were all that could be desired. Leaving Ventura the rain began again—a horizontal rain which made driving extremely difficult and dangerous. Thanks to the alertness of the drivers, however, all reached Santa Monica without incident other than one serial narrowly missing a landslide, and everybody getting wet. At Santa Monica a camp was impossible, but the mayor and chief of police were on the job and provided quarters in the American Legion Hall which had formerly been a church and provided enough room. This was the only time we had shelter except of our own providing.

The next day it was again clear, and though the road in many places was covered with water, all went well except that the C. O., the Exec., and the Adjutant all got in deep water and had to be pulled out; and we were just ahead of a small tornado which did considerable damage behind us. The weather man seemed to be celebrating our arrival at MacArthur as he had celebrated our departure from Fort Winfield Scott. Later we were assured that the weather was unusual. On the outskirts of San Pedro we were met by the commanding officer of Fort MacArthur and many officials and distinguished citizens of the city. The column was closed up and under a brilliant clear sky we made our march through the main street of the city to our new home—Fort MacArthur.

Field Orders No. 1 with Annex No. 1 (March Table), Administrative Orders No. 1 and the Road Bulletin for that part of the route between San Luis Obispo and Buellton are included in this article as typical of the instructions governing the conduct of the march and for the benefit of those interested in further details.

63rd Coast Artillery (AA)
FORT WINFIELD SCOTT, CALIF
1 March, 1930, 9:00 a. m.

FIELD ORDERS

No. 1

MAPS: California State Auto Association. San Francisco and Oakland to Salinas, 1" = 14.5 miles approx., and Automobile Club of Southern California Map showing principal routes between Los Angeles and San Francisco, 1" = 15 miles approx.

1. The reorganization of the Coast Artillery requires that this regiment change station from FORT WINFIELD SCOTT, CALIFORNIA, to FORT MACARTHUR, CALIFORNIA.

2. This regiment with detachments of the Ordnance and Medical Departments, will march on SALINAS, CALIFORNIA, at 8:00 a. m., 3 March, 1930.

3. *a.* For details of the movement see Annex No. 1 MARCH TABLE.

x. Halts will be made as follows:

3 March, 1930.

9:40 to 10:00 a. m., Serials Nos. 1, 2, 3, and 4 for inspection and service of vehicles.

Noon halt: Serial No. 1 will halt at 11:30 a. m. Following serials will close on Serial No. 1. Searchlights will join Battery "A" by 12:00 noon. Searchlights will move out at 12:30 p. m. followed immediately by Serial No. 1. Other serials will follow at 10-minute intervals.

2:30 to 2:50 p. m.: Serials Nos. 1, 2, 3, and 4 for inspection and service of vehicles.

4 March, 1930.

9:00 to 9:30 a. m.: Serials Nos. 1, 2, 3, and 4 for inspection and service of vehicles.

10:45 to 11:00 a. m.: Serial No. 5, for inspection and service of vehicles.

Noon halt: Same as for 3 March, 1930.

4. See Administrative Orders No. 1.

5. Command Posts:

Regimental: 3 March: Closes at FORT WINFIELD SCOTT at 9:00 a. m. En route until 3:00 p. m. Thereafter at EDENVALE.

4 March: Closes at EDENVALE at 8:00 a. m. En route until 2:00 p. m. Thereafter at SALINAS.

WALLER,
Commanding.

DISTRIBUTION:

9th CAD	All officers 63rd C. A. (AA)
HDSF	Surgeon
HQ Btry.	File
Btry. "A"	
Btry. "B"	
Btry. "E"	

ANNEX NO. 1 TO FIELD ORDERS NO. 1, 63RD COAST
ARTILLERY (AA), 1 MARCH, 1930
MARCH TABLE

MAPS: California State Auto Association—San Francisco and Oakland to Salinas, 1" = 14.5 miles approx. Automobile Club of Southern California Map showing principal routes between Los Angeles and San Francisco, 1" = 15 miles approx.

SERIAL	ORGANIZATION AND	ROUTE	LOCATION BY 5:30 p. m. 3 March	LOCATION 4:00 p. m. 4 March	REMARKS
1.	Head-quarters Battery	FT. WINFIELD SCOTT— BAKERS BEACH road—24th AVE.—GOLDEN GATE PARK— 19th AVE.— JUNIPERO SERRA BLVD.— COLMA—U. S. 101 to Palo Alto—LOS ALTOS— CUPERTINO— SAN JOSE— EDENVALE— GILROY—SAR- GENT—CHIT- TENDEN— WATSONVILLE— SALINAS.	EDENVALE (San Jose Camp Site)	SALINAS (Rodeo Grounds)	March: 3 March, 1930. Head of column will pass upper gate of the BAKERS BEACH Road at 8:00 a. m. and will pass the following points within 5 minutes of the hours stated: (a. m.) 19TH AVE. & SLOAT BLVD... 5.3 Mi. 8:32 CYPRESS LAWN CEMETERY 10.5 " 9:03 SAN BRUNO 15.1 " 9:30 SAN MATEO 21.8 " 10:31 BELMONT 26.0 " 10:56 REDWOOD CITY (5 pts.) 30.5 " 11:23 (p. m.) PALO ALTO 34.7 " 12:47 LOS ALTOS 41.0 " 1:24 CUPERTINO 48.6 " 2:09 LINCOLN AVE. (SAN JOSE). 55.8 " 3:12 March: 4 March, 1930. Column will clear camp site at 7:00 a. m. and will pass the following points within 5 minutes of the hours stated: (a. m.) COYOTE 6.4 Mi. 7:32 MADRONE 12.5 " 8:03 GILROY 24.5 " 9:33 JUNCTION CHITTENDEN PASS Road 34.2 " 10:21 CHITTENDEN 38.5 " 10:43 WATSONVILLE 49.0 " 12:35 (p. m.) CASTROVILLE 61.5 " 1:38
2.	Battery "A" (less Sfts.)	Same as Serial No. 1	Same as Serial No. 1	Same as Serial No. 1	March: 3-4 March, 1930. Follow Serial No. 1 at 10-minute intervals.
3.	Battery "E"	Same as Serial No. 1	Same as Serial No. 1	Same as Serial No. 1	March: 3-4 March, 1930. Follow Serial No. 2 at 10-minute intervals.
4.	Battery "B"	Same as Serial No. 1	Same as Serial No. 1	Same as Serial No. 1	March: 3-4 March, 1930. Follow Serial No. 3 at 10-minute intervals.
5.	Battery "A" (Search-light only)	Same as Serial No. 1	Same as Serial No. 1	Same as Serial No. 1	March: 3 March, 1930. Column will clear upper gate BAKERS BEACH Road at 10:30 a. m. and pass the following points at hours stated: COLMA 9.0 Mi. 10:56 a. m. SAN MATEO 21.8 " 11:33 a. m. CUPERTINO 48.6 " 1:13 p. m. March: 4 March, 1930. Column will clear camp site at 9:45 a. m. and will pass the following points at hours stated: MADRONE 12.5 Mi. 10:16 a. m. JUNCTION CHITTENDEN PASS Road 34.2 " 11:25 a. m. CASTROVILLE 61.5 " 1:04 p. m.

C. W. WALLER,
Commanding.

63RD COAST ARTILLERY (AA)
FORT WINFIELD SCOTT, CALIF.

1 March, 1930, 9:00 a. m.

ADMINISTRATIVE ORDERS

NO. 1

MAPS: California State Auto Association (six road maps of Coast Route), San Francisco and Oakland to Salinas, Salinas to King City, King City to San Luis Obispo, San Luis Obispo to Las Cruces, Las Cruces to Ventura. Ventura to Los Angeles and Long Beach. Scale various. Automobile Club of Southern California map, showing principal routes between Los Angeles and San Francisco, 1" = 15 miles approx.

1. SUPPLY.

- a.* Capt. Don R. Norris, 63rd Coast Artillery (AA), Regimental Supply officer, assisted by the personnel of the Supply Section, Headquarters Battery, will arrange for all supplies, including rations.
- b.* Staff Sgt. Frank Murphy will take orders for rations to be supplied en route, from all organizations.
- c.* Staff Sgt. James R. Lodge, with the mobile ordnance repair shop, tools and a stock of spare parts, will accompany Battery "B."
- d.* Battery Commanders will submit ration returns prior to departure from Fort Winfield Scott, for the period March 1st to 15th inclusive. They will turn over to the Regimental Supply officer sufficient funds with which to make necessary purchases en route.
- e.* Battery Commanders will carry sufficient staple rations for the entire march period upon leaving Fort Winfield Scott, and sufficient meat, vegetables and bread for two (2) days. Before leaving Ventura information will be furnished the Regimental Supply officer of rations desired to be drawn upon arrival at Fort MacArthur.
- f.* Gasoline and Oil: The gasoline tank truck will accompany Battery "B." Opportunity will be taken during the noon halt to fill trucks with gasoline. The gasoline truck will not be used for towing.

At camp sites where camp is made for one night only, gasoline tanks of all motor vehicles will be filled upon arrival in camp. Battery Commanders will issue instructions directing all drivers of motor vehicles to stand by their vehicles upon arrival in camp until vehicles have been filled for the following day's march.

At camp sites where camp is made for more than one night, gasoline tanks of motor vehicles will be filled during the forenoon following arrival in camp.

g. Fuel: Wood for rolling kitchens will be supplied en route at Salinas, San Luis Obispo and Ventura. Upon departure from Fort Winfield Scott and points of supply named above, Battery Commanders will carry sufficient fuel for the rolling kitchens for two days.

2. EVACUATION.

- a.* The Medical officer and enlisted personnel of the Medical Department with the ambulance will follow the last serial of the regiment on the march.
- b.* Evacuation will normally be to the nearest Army Post. Emergency cases will be sent to the nearest hospital.

3. TRAFFIC.

- a.* Convoy regulations as prescribed by this headquarters in Memorandum No. 7, 24 May, 1929, will be observed.
- b.* The repair section, Staff Sgt. James R. Lodge in charge, will effect repairs of all vehicles that cannot be repaired by the batteries. If repair cannot be effected en route, the vehicle will be towed to the end of the march. No vehicle will be left behind.

4. PERSONNEL.

- a.* For equipment to be taken see Memorandum No. 2 this headquarters dated February 24th, 1930.
- b.* Mail will be received and delivered at:
 - (1) Fort Winfield Scott, up to 8:30 a. m., 3 March.
 - (2) Salinas, up to 8:00 p. m., 6 March.
 - (3) San Luis Obispo, up to 8:00 a. m., 10 March.
 - (4) Ventura, up to 8:00 a. m., 14 March.

Staff Sgt. H. M. Kieve is charged with collection and delivery of mail.

- c.* Camp sites occupied en route have been made available through the courtesy and generosity of local governments or of individuals. Battery Commanders will see that property, in and in the vicinity of camp sites, is in no way molested, and that the behavior and dress of the enlisted men is such that no unfavorable comments, concerning this command, will be made.

5. MISCELLANEOUS.

- a.* Maj. Felix E. Gross, 63rd C. A. (AA), is hereby appointed Investigating officer for motor accidents occurring to vehicles of this regiment. He is in addition appointed Investigating officer to investigate any complaints received concerning damages to private or public property and to assess damages against organizations or individuals of this command, before leaving any camp site.

- b. Camp and motor park guards will be established upon arrival at any camp site and will continue until 6:00 a. m. of the morning of departure from that camp site.
- c. On nights when marches are to be made on the day following, taps will be sounded at 10:00 p. m., at which time a check roll call will be taken in each organization, and all enlisted men will be required to be in bed. Report of the roll call will be made by first sergeants to the officer of the day.
- d. For the purpose of securing data of future use, commanders of all units will maintain a log of the march and submit a written report covering adherence to the march table, break down, motor trouble, gasoline and oil consumption and traffic difficulties by noon March 22, 1930. Matters of importance that may occur during any day's march will be reported to the Regimental Executive at the end of that day's march.
- e. Radio communication will be established daily with the Presidio of San Francisco and Fort MacArthur as follows:
 - (a) At 3:00 p. m. on days when the regiment is on the march.
 - (b) At 9:00 a. m. and 1:00 p. m. on days when regiment is in camp—except Sunday. On that day, one schedule at 9:00 a. m.

WALLER,
Commanding.

DISTRIBUTION:

9th CAD	All Officers 63rd C. A. (AA)
HDSF	Surgeon
HQ Btry.	File
Btry. "A"	
Btry. "B"	
Btry. "E"	

ROAD BULLETIN

SAN LUIS OBISPO (Camp Site) to BUELLTON (Camp Site)

Route—U. S. 101.

Distances and Notes.

SAN LUIS OBISPO (Camp Site).....	0.0
Dirt road—turn left into highway at.....	0.5
R. R. crossing	0.9
Bridge—SAN LUIS OBISPO CREEK.....	3.7
R. R. crossing	4.0
Up grade begins at.....	6.7
Bridge—SAN LUIS OBISPO CREEK—10 tons.....	7.3
Up grade begins	7.6
Top of grade	8.1

PISMO BEACH—Hotel Olsen	12.5
Bridge—VILLA CREEK	12.7
Railroad—Passover	13.0
ARROYO GRANDE—White church—sharp turn right.....	16.4
Bridge	16.5
R. R. crossing (narrow gauge).....	17.0
Bridge—LOS BERROS CREEK.....	21.4
NIPOMO—Church	25.3
Long down grade—sharp curves at.....	27.8
sharp curves at.....	28.3
Bridge—SANTA MARIA RIVER.....	29.9
Bridge—SANTA MARIA RIVER—10 tons.....	30.6
SANTA MARIA—Flag pole and sign.....	32.8
R. R. crossing (narrow gauge).....	33.3
R. R. crossing (narrow gauge).....	34.4
Sharp turn right at foot of long hill.....	39.1
ORCUTT—Sharp turn left	39.8
Long grade up to top at.....	42.4
Long grade to R. R. crossing (narrow gauge) and sharp turn left	44.6
HARRISTON—Post Office	47.4
Curves and hills to R. R. crossing (narrow gauge) at.....	48.6
Bridge—LOS ALAMOS CREEK	49.3
LOS ALAMOS	56.4
R. R. crossing	57.0
R. R. crossing	64.0
CAMP SITE (County Auto Camp)	68.5

NOTES: From San Luis Obispo to Pismo Beach there is a short grade up and then down to the ocean. From Pismo Beach to Orcutt while the road is hilly and winding there are no long nor bad grades. From Orcutt to Harriston there is a long easy grade up and down. For about five miles before arriving at camp site the road again becomes hilly and winding. Generally—there are a number of sharp right and left turns on the route that should be looked for.

The Role of Aircraft in Coast Defence

By WING-COMMANDER C. J. MACKAY, M. C., D. F. C., R. A. F.

Motto:

*"The race is not to him that has the longest legs to run;
nor the battle to the people that shoot the biggest gun."*

EDITOR'S NOTE: *The following article won the Gold Medal awarded by the Royal United Service Institution for the year 1929 and appeared in the May number of its journal. It is an excellent article and presents logically the viewpoint of an officer of the British Royal Air Force on a subject with which the Coast Artillery Corps is closely concerned. The author's tranquillity of expression and tolerance of opinion is especially pleasing.*

I. INTRODUCTION

IT IS natural that the first big war of the mechanical age should have raised many problems which its abrupt termination has left unsolved. All wars teach many lessons, but the last enjoys the distinction of having left as many problems to be solved as there are lessons to be learned. It has confirmed the eternity of the principles of war, the dominant rôle of the foot soldier, and of the battleship as the unit of sea power. It has demonstrated the capabilities of the machine gun and the power of artillery scientifically applied; but equally it has left such queries as whether the tank is the answer to the machine gun; whether the aeroplane can subdue the civil will; and so forth.

The great war asks innumerable questions and raises many controversies. Many of these concern aircraft, and it is one of them that it is our task to examine; moreover, it happens to be one on which the last war throws little light. Coast defence is, moreover, a subject which has always provided a wide and fertile field for controversy. In the past its protagonists urged its importance at the expense of the seagoing fleet, and with some success, as the coasts of Britain still bear mute witness.

Today the problem is not to what extent should coast defence works be established, but rather, with what weapon should coast defence be equipped. If, however, the ensuing investigation reveals the aeroplane as an adequate weapon for the defence of certain bases, it does not necessarily follow that it is the proper weapon for the defence of each and every naval base in the British Empire, whatever its geographical position, and whatever the scale of attack to which it may be exposed. It is, therefore, proposed, at any rate in the first instance, to narrow this investigation into an enquiry as to whether the aeroplane is an efficient substitute for the 15-inch gun. But before doing so, it is necessary briefly to consider coast defence in its relation to imperial defence, the importance of bases generally and the methods by which the scale of their defence is assessed. It is not proposed in any part of this paper to study the question of an invasion of our coasts. Invasion, as distinct from raids, pre-supposes a

British defeat at sea. Defeat at sea would be the prelude, not to a discussion on resisting invasion, but to negotiations for the best terms of peace which could be obtained.

II. THE RELATION OF COAST DEFENCE TO IMPERIAL DEFENCE

Unless the coast defences of a maritime country fit into the general scheme of preparation for war, they become a source of weakness by diverting expenditure from essential requirements. However obvious this may appear to be, it is a fact frequently overlooked, and it is one requiring special emphasis at the present time, since there has always been a tendency for coast defence expenditure to vary inversely to naval strength. That the United States spend generously on both proves nothing except their wealth. Coast fortification on a vast scale is a luxury in which that country has always indulged since the French engineer, General Bernard, arrived in America in 1816. Since the days when the American Board on Fortifications proposed to spend twenty-two million dollars on fortifying the relatively unassailable port of San Francisco, American public opinion has always been satisfied with the sight of immense fortifications—technically bad in their day and now worthless—while the American sea-going fleet was often deprived, in consequence, of its essential requirements. But, while American professional opinion continues to be that “coast artillery holds the front line, the seacoast¹,” the correct relation of coast defence expenditure to national defence expenditure in that country is not likely to be appreciated.

It is upon the fleet and not upon coast fortification that the security of the British Empire rests. The importance of coast fortification lies only in providing secure bases for the fleet, from which it can operate with freedom.

III. BASES

The security of bases for the fleet is essential in order that, as President Taft once put it, the Navy shall be “foot-loose.” A fleet is essentially an offensive weapon, one of whose main assets is mobility; if tied to the protection of a base its mobility must be sacrificed. It was the lack of defences at Trincomali that handicapped Sir Edward Hughes’ fleet, and thus eventually led to the capture of the port by Admiral Suffren in 1782.

It is clear, therefore, that those posts or bases which the Admiralty may define as essential to the operations of the fleet must be adequately defended. But hitherto, when the scale of defence has been fixed its provision has been largely a matter for the War Office, and this part of the army’s contribution to sea power has provided some of the finest pages in the history of the British Army.

¹ COAST ARTILLERY JOURNAL, March, 1920; June, 1921.

The probable forms of attack on bases in the future can be summarized as follows:

- (I) A landing in force to capture a base.
- (II) A raid by land forces to destroy its naval facilities.
- (III) Bombardment by a battle-fleet.
- (IV) Bombardment by cruisers or smaller craft.
- (V) Land-based air attack, if within range.
- (VI) Carrier-borne air attack.

The Navy assists directly in meeting the above by the provision of mines, nets and booms. In parentheses it should be noted that in May, 1918, the Italians crossed the boom at Pola by means of a motor boat fitted with tracks. The submarine is not suitable for coast defence purposes: a fact not fully recognized before the war, its limitations detract from its deterrent power in coast defence and, in any event, the submarine is part of the mobile forces of a fleet and so cannot be tied down to the defence of particular places.

Apart, therefore, from infantry, whose presence will always be essential to the protection of a base of first-class importance, there comes next for consideration: the gun.

IV. THE GUN—YESTERDAY

Since Nelson, before Calvi in 1794, wrote to Lord Hood that "the business of laying wood before walls was much altered of late," the coast defence gun has been recognized as superior in fire power to the bombarding ship. There have been two minor exceptions which will be mentioned, but it is unnecessary to go back (beyond 1806) to prove the accuracy of Lord Nelson's foresight.

At Cape Licosa in that year a single gun successfully opposed an eighty-gun British ship and two frigates, which expended most of their ammunition without effect. In 1793 a redoubt in Corsica, mounting two 18-pounders and one 9-pounder, repulsed the three-line-of-battle ships, *Alcide*, *Courageux* and *Ardent*, with loss.

In 1794 a tower in Martello Bay, Corsica, drove off two ships, the *Fortitude* and *Juno*. It was, incidentally, this action which led to the erection of Martello towers all over Great Britain; an excellent example of losing sight of the relation of coast defence to naval strength.

The *Wasp* and *Telegraph* batteries at Sevastapol put six British ships out of action.

In May, 1898, Admiral Sampson's fleet of seventy-two guns, varying from 13-inch down to 4-inch, bombarded San Juan without injury to the forts: At Santiago the American fleet bombarded the shore batteries on ten occasions, killing in all ten Spaniards and demolishing one gun, while two of their ships, *Indiana* and *Texas*, were hit.

In 1894 the Japanese never exposed their ships to the fire of the Chinese shore batteries, but at Wei-hai-wei the Japanese most effectively used the captured coast defences against the Chinese ships which had ventured within range. At Port Arthur in 1904 the Japanese avoided risk to their ships by opening fire between thirteen thousand and fourteen thousand yards, with the result that they achieved nothing.

The two instances in which ships' guns were successful against shore batteries were Alexandria and Sfax. In the former the Egyptians were ignorant of the use of heavy-rifled guns; in the latter the defences were negligible.

This brief review of the history of the coast defence gun brings us to the last war, in which its superiority was confirmed. It is unnecessary to disturb the soil of a separate controversy, the Dardanelles; it will suffice to say that the ships, admittedly handicapped by the presence of mines, were unable to quarrel on equal terms with the forts, and that Admiral Duckworth's views on ships versus the Dardanelles defences, written one hundred and eight years previously, were confirmed.

Experience off the Belgian coast were a further recognition of the inability of sea-going ships to dispute with shore batteries. After the bombardment of the Belgian coast batteries on 7th September, 1915, Admiral Bacon wrote: "The net results of the day were one or more hits on Ostende dockyard, while the Westende batteries were also annoyed. My views as to the uselessness of ships bombarding under modern heavy gunfire, which previously had been theoretical, were confirmed. The German communique, for once, was correct when it stated that our ships were driven off by the shore batteries."

Later still, the fire of the French and Spanish ships against the hastily improvised Riff coast defences at Alhucemas in September, 1925, were wholly unproductive.

Apart from the Dardanelles and the Belgian coast, the great war affords no examples of the predominance of the shore gun over the floating gun, nor, with one isolated exception in the Indian Ocean, is there any example of attack on British coast defences. This, however, is no argument against the gun. On the contrary, it proves our coast defences to have been adequate for their purpose, that is to say, they were a successful deterrent. "The primary object of coast defense artillery," writes General Brind, "is to deter the enemy from bombarding or attacking the vulnerable points it is designed to protect, in fact to make the game not worth the candle, and the existence of the defences is fully justified if the enemy is prevented from even attempting to damage the ports and bases they are there to defend."

The reason for the superiority of the shore gun is not far to seek. It has been admirably summarised by Admiral Mahan when he says that "ships are unequally matched against forts in the particular sphere of the

fort. The quality of one is ponderousness enabling great passive strength; that of the other is mobility." The relative merit of the two has not altered throughout naval history, and there is no reason to suppose that it will in the future. "As the range of the ship's gun has increased, so has that of the shore gun; the relative power of each is unchanged, whether they are 12-pounders, 42-pounders or 15-inch. The shore gun then had the advantage in laying, so it has today. The targets which must be hit are still the gun on shore: a very small object, and the whole ship at sea: a very big one."

The foregoing examination and the opinions of those qualified to judge reveal that the shore gun has proved adequate to the task of resisting bombardment from the sea, and is, therefore, an effective deterrent.

V. THE GUN—TODAY

If, then, history proves the gun to be adequate, why seek a substitute? Briefly, the answer lies, primarily in terms of money and, secondly, in terms of mobility and new forms of attack.

But before examining the limitations of the heavy coast defence gun it is necessary to dispose of the contention, by no means uncommon, that modern coast defence artillery is incapable of hitting the target. Up to 1918 this contention had never arisen, nor could it reasonably have done so in the face of history. Since the war, however, experiments have been carried out which at first sight appear to reflect adversely on the accuracy of the shore gun. These experiments, however, have really proved that with a modernized system of fire control the coast defence gun will be efficient.

But though the 15-inch gun can certainly hit its target, if applied by proper methods, it has certain limitations involving further expense. Prominent among these is the fact that it has outrun local eyesight and, therefore, aircraft observation has become essential to hitting at long ranges.

Again, the entire tendency of modern armaments is towards increased mobility; this is plainly to be seen on land, on sea and in the air. To such tendency the big coast defence gun with its concrete emplacement runs counter, for it is the antithesis of mobility. This fact alone demands serious consideration before large sums of money are invested in weapons which may never be used, or of which, perhaps, it would be more accurate to say, they may never have the opportunity of exercising their deterrent influence.

Another example of the difficulties to which the big gun may lead is afforded by the defences of the Firth of Forth. The guns were installed in the vicinity of the bridge, but as the fleet grew in size it became apparent that there was insufficient room on the inner side of the Firth, i. e., above the bridge. In spite of this, the Government, in 1912, refused on the grounds of expense, to sanction the movement of the guns. This

decision left the fleet unprotected, and the money spent on the gun defences totally wasted.

Thirty years ago the British Empire could have afforded to lock up money on defences which might never deter, and to indulge in similar comparative extravagances. Today, if a mobile alternative can be found, economy demands that it be employed. The money required for modernisation of coast defence would be welcome to the War Office for experiments in mechanization, or to the Admiralty for fleet purposes, if some cheaper form of defence can be found: a form of defence which can be relied upon as a deterrent against attack in time of need, and which can be moved elsewhere for the defence of other bases in the event of war with some other Power in another part of the globe. Whether such an alternative exists or not it is our purpose to enquire.

Meantime, there remains for examination a third limitation to the big gun, namely, that it can be confronted by a form of attack against which it is ineffective, i. e., air attack. If a base is defended by 15-inch guns it is reasonable to suppose that hostile vessels of every class will give it a wide berth, but there is no reason to suppose that an attack or series of attacks will not be launched from aircraft carriers cruising one hundred miles out at sea. The only risk which will deter a hostile fleet from this form of attack is risk to the carriers, and no such risk exists in the circumstances outlined. That there is risk to the attacking aircraft from anti-aircraft fire is unquestionable, but it is more than justified by the possible results of the attack or attacks.

Examination so far, then, leads to the following conclusions. History supports the view that the big coast defence gun is an effective deterrent against most forms of attack. Against air attack, however, it is powerless. It requires air observation to be effective against ships, and, in that it is immobile, it is liable to lock up large sums of money in a distant part of the world which may never be the scene of a war in which the British Empire is involved. Whatever the conditions of the past, the state of our finances today forbids the erection, in numerous parts of the world, of steel and concrete monuments to our determination to deter.

Before passing to the potentialities of the aeroplane in coast defence it is necessary to consider another form of gun defence which must play an important part in the coast defence of the future—the anti-aircraft gun.

VI. THE ANTI-AIRCRAFT GUN

Since the war great strides have been made in the development of aircraft for military purposes, but for obvious reasons less has been heard of the development of the anti-aircraft gun. Statistics concerning anti-aircraft fire based on the experience of the last war are, unless carefully examined, liable to mislead, in that they frequently do not differentiate between bar-

rage fire and aimed fire.² There is little doubt that since the war, and particularly in the last few years, under the influence of new height, speed, and direction-finding instruments, immense strides have been made in the science of anti-aircraft gunnery. On the other hand, it is reasonable to assume that a target capable of three-dimensional movement will always have an advantage over a semi-fixed gun, and that therefore, the anti-aircraft gun alone, although it will undoubtedly account for aircraft, is unlikely ever to prevent air attack. In a word it lacks deterrent power, for it is an axiom of air power that anti-aircraft fire alone will not prevent a determined attack from reaching its objective.

VII. THE AEROPLANE

It has been shown that the scale of attack to which a port is exposed fixes the degree of fortification according to its importance. But if an authority declares the fortification of any port to be insufficient, it is much harder to prove that it is sufficient than that it is insufficient, for, as Admiral Colomb wrote, "there is nothing between a light battery and a first-class fortress." How much harder a task is it to prove that the aeroplane, untried in coast defence under war conditions, is sufficient, when some authorities declare it to be insufficient! Trial under war conditions is the only real proof; without it, at best, a logical argument is all that can be presented. But, on the other hand, it would be not unfair to quote the case of Iraq, where today the country is controlled by a military and air garrison which is less than half that originally thought to be fantastic. This fact, and others which could be quoted, admittedly do not prove the question now at issue, but they are encouraging.

Before examining the part of the aeroplane in coast defence it is necessary to be clear on certain points which affect the argument, namely:

(I) That the rôle of aircraft in coast defence is not necessarily universal; what might apply, for example, to Singapore would not necessarily apply to Malta.

(II) That it is no part of the ensuing argument to prove that the aeroplane is a substitute for the small armament of all bases.

(III) That the ideal deterrent is the big gun *and* the aeroplane, and that but for the urgency of economy it would be unnecessary to suggest the substitution of the one for the other.

² It has been stated that in the German air raids on England in 1917 and 1918 it took eleven thousand seven hundred and twenty-four shells to bring down one aeroplane. But this figure ignored the fact that the fire in question was usually barrage, and not aimed fire. A more accurate picture can be obtained from the following figures based on anti-aircraft fire in France in 1918:

British: One aeroplane brought down per four thousand five hundred and fifty rounds.

French: One aeroplane brought down per seven thousand rounds. (This figure probably includes the barrage fire of the Paris defences.)

American: One aeroplane per six hundred and five rounds. (This figure is that for the best battery in the A. E. F., even so it is somewhat remarkable.)

The big gun in coast defence has a range of about nineteen miles, within which distance, with air observation, it acts as a successful deterrent against bombardment by hostile vessels. The aeroplane in coast defence can be regarded as a gun with a still larger range, capable of delivering a projectile against hostile vessels up to a range of, at present, some two hundred miles. Up to this point there exists no difference of opinion. It is on a question, first, of the accuracy of the aeroplane that difference of opinion has arisen. If the sceptic can be convinced on this point, however, the argument is by no means over, for it is then argued that, even if the aeroplane can drop its projectile with accuracy, it will have little effect on the ship.

Now, unless it can first be proved that the air projectile can be discharged with reasonable accuracy against the target, there are no grounds for the belief that the presence of aircraft at a naval base will deter an enemy from attack. In the late war, the bomb, the natural weapon of the aeroplane, was not accurate. This must be admitted; but it must equally be admitted that bombing had not been scientifically studied and that there was, therefore, little more reason to expect accuracy in an aircraft bomb in 1916 than there was to expect accuracy in an arquebus in the sixteenth century. As a consequence of this inaccuracy the tendency after the war, in fleet aviation, was to abandon the bomb in favour of the torpedo. That this has been done with considerable success is clear from the results of air torpedo attacks on the fleet carried out since 1921. The percentage of hits obtained compares reasonably even with those secured by the German submarines in their attacks on merchant ships. These exercises, carried out under peace conditions, suggests that the aircraft torpedo can be discharged with considerable accuracy, and that if, as is the accepted figure, six hits will put a battleship out of action, there is every reason to suppose the torpedo-bomber to be a deterrent in coast defence. There is, however, a grave objection to accepting these figures as conclusive, namely, that the ships attacked could only exercise passive defence measures such as turning away. If the ships had been able to use their H. A. armament the figures would doubtless require considerable modification. Against this, on the other hand, it must be remembered that the surprise factor was denied to the aircraft, and that, given surprise, the ships would have but a short time in which to bring the H. A. armament into action. For example, even if the attackers are sighted ten miles away, the ships have but five minutes in which to engage them; moreover, the aircraft will be within range of the H. A. armament for not more than sixty seconds.

The real objection to the torpedo as the weapon of air attack at sea is that, in order to deliver the projectile against the target, the aeroplane is compelled to descend almost to the level of the sea, and in so doing it sacrifices the principal advantage that the aeroplane enjoys: its three dimensional mobility. For a moment in torpedo attack, however short, the

aeroplane becomes a two-dimensional weapon, and is, therefore, reduced to almost equal terms, in space, with its adversary, and this is the period during which the H. A. armament is expected to operate effectively.

The possibilities of torpedo attack on a fleet at sea is a subject for further investigation of which space forbids. The fact that in peacetime the fleet is unable to defend itself will always lead to difference of opinion as to whether or not a reasonable percentage of hits can be obtained under war conditions. The matter is one which can only be decided in war; meantime, individuals will cling to their own conclusions. The writer believes that torpedo aircraft, though they will suffer casualties, have the ability to score such a percentage of hits that any admiral would hesitate to take his ships within their radius of action for the purpose of bombarding a base. Risk in bombarding a base and risk in a fleet action are two totally different things.

But, though it is believed that the torpedo would prove an effective deterrent in coast defence, it is considered that the true weapon of the aeroplane in this rôle, as in others, is the bomb. It is argued that it can be developed into a more effective deterrent, and that it can be employed with less risk to the aeroplane and greater effect against the ship. In using it the aeroplane retains its three-dimensional advantage, and presents a difficult target to the antiaircraft guns of the ships firing from unstable platforms. In destructive power, too, the bomb enjoys distinct advantages over the torpedo. Six of the latter are required to put a battleship out of action; three two thousand-pound A. P. bombs can achieve the same effect. Bombs of this size do not exist at the moment, but their design offers no difficulties; much larger bombs were produced during the war. An aircraft exists capable of carrying twenty two thousand-pound A. P. bombs distance of two hundred miles at a speed of one hundred and five m. p. h.² It would seem, however, that the ability of the big bomb to put a battleship out of action will not be generally accepted until the question has been put to the test on a moving ship. Whether H. M. S. *Centurion* or some other ship can ever be made available for this purpose is a matter on which no opinion is offered, but it will be unfortunate if practical tests cannot be carried out.

There remains the question of accuracy. The war and the years immediately following the war discredited the bomb as a weapon of accuracy; but while the torpedo was being developed the study of bombing was not neglected. The whole subject was re-opened *ab initio* on a scientific basis; new instruments and new bombs were designed and produced, with the result that today the bomb can compete in accuracy with the big gun. That this is so is proved by the recent *Centurion* trials. In these trials the percentage of hits obtained by the two bombing squadrons exceeded that

² The Dornier DO-X.

obtained either by ship or shore guns against the same target. Moreover, it should be remembered that these results have been obtained after only some five years' study of, and practice in, the science of bombing.

Though the data are not extensive, it may be of interest at this point to quote foreign opinion on the possibilities of aircraft in coast defence.

Following experiments carried out in the summer of 1921 by the United States, the Joint Board of the Army and Navy reported:

(a) "That aircraft have marked ability, either in combination or singly, to locate naval vessels operating within their radii of action.

(b) "That it is believed that an effective percentage of hits can be obtained against surface vessels coming within their radii of action.

(c) "That aircraft, carrying high capacity high explosive bombs of sufficient size have adequate offensive power to sink, or seriously damage, any naval vessels at present constructed."

The French admiral, Guepratte, has stated that the coast defences of France could be adequately assured by aircraft, and that it is incorrect to suppose that a coast must be defended by artillery equal in power and range to that of battleships.

Spain, on the other hand, believed in the 15-inch gun, and is now re-arming her shore batteries at Ferrol, Corunna, Cartagena and the Balearic Islands with these guns, of which she has purchased eighteen.

It is sometimes said that, granted the ability of aircraft to deter attack or to punish the attacker, there are certain weather conditions in which they may not be able to operate at all. The only weather which will prevent the operation of land-based aircraft is fog, but fog will also prevent bombardment by hostile ships. In any event, the aeroplane is being examined as a substitute for the big gun, which itself requires air observation; in these circumstances the argument hardly arises. Again it may be asserted that hostile vessels may take advantage of the weather conditions to come close inshore. But in actual fact what admiral would take his ships into an area, probably mined, for the purpose of carrying out a bombardment, when weather conditions forbid accuracy of gunfire?

It is said that surprise attack may catch the air defences of a port unprepared. For example it is asked whether air defences could stop the Mediterranean fleet appearing suddenly off Toulon, firing a thousand rounds, and being away again in fifteen minutes? Air defences could certainly deter an operation of this sort by locating and subsequently attacking the fleet, either before the ships were within range of Toulon or, alternatively, but less desirable, afterwards. Certain it is that guns, except on a prodigious scale, could not stop it.

Could aircraft have prevented the Zeebrugge attack? In the exact conditions of time and space under which that operation took place they could not, but neither could nor did the gun defences stop it. Today an opera-

tion of similar type in the face of efficient air reconnaissance and air defences would be unlikely to succeed.

Against night bombardment of a defended port the big gun is useless, particularly as it is dependent upon air observation. Aircraft, on the other hand, can either attack the enemy before he arrives and before darkness, or alternatively, after he has left and after dawn. The enemy vessels are bound to be within the radius of the defending aircraft in daylight, either before dark or after dawn, sometimes both, according to the part of the world or the period of the year; this will be increasingly so as the radius of action of aircraft increases. In the case of night bombardment, therefore, the aeroplane is a deterrent against attack; the big gun is not.

VIII. DETERRENT POWER

Deterrent power, however, is not confined to the infliction of damage; it also implies instant readiness for action. In the preceding section it has been shown that aircraft have the ability to locate, attack and injure enemy vessels, and so possess one essential of deterrent power. It is for examination whether they have the other requisite—instant readiness for action.

Under modern conditions of international relationship "the bolt from the blue" may reasonably be relegated to the past, and it may be assumed that a sudden and unprovoked attack on a British base in time of peace is a contingency so remote that it need not be provided against. It follows, therefore, that a period of strained relations, during which preparations can be made, will precede any sudden act of war. During that period, however short, aircraft can be placed in a state of instant readiness for action. That this is so is proved by the exigencies of the defence of London. For reasons of time and space, which need not be examined here, it is necessary that the fighting aircraft of the defence should be patrolling at a height of sixteen thousand feet within twenty-five minutes of the alarm being given. This has been done, and is part of the standard training of fighting squadrons. On receipt of the alarm, pilots have proceeded to their aircraft, started and warmed their engines, taken off and been patrolling at sixteen thousand feet, all within twenty-five minutes. This is a state of readiness comparable with that of a fire brigade, and is one which the requirements of coast defence do not necessitate. It will, therefore, be conceded that aircraft possess instant readiness for action.

But arising out of the main controversy as to the rôle of aircraft in coast defence is a lesser controversy which bears on this subject. It has been contended that not only have aircraft the ability to defend a base, but that there is no reason why they need be permanently stationed in its vicinity. At first sight this contention is attractive, because it opens up fresh avenues for economy. But it must be remembered that statesmen have a marked aversion to any obvious movement of forces, even for purely defensive purposes, at a time when relations are strained, and which might

compromise their efforts towards peace. There is, therefore, the danger, if aircraft are not kept permanently at the most vital places, that when required they will not be there in time.

In the case of a first-class naval base where big issues are involved, the principle must, for the present, be accepted that the defending aircraft must be stationed in its vicinity, and only moved temporarily elsewhere after the proposed move has, on each occasion, been examined in relation to the existing international situation. As aircraft improve in performance and range, this conclusion may quite possibly be modified. Meantime, security should not be staked, even in appearance, on too nice a calculation of chances.

IX. RESERVATIONS

Up to this point the endeavour has been to show that aircraft can be regarded as an economical and effective substitute for the big gun as a coast defence weapon. The arguments have been deduced primarily with a first-class naval base, such as Singapore, in mind. It will be recollected, however, that the reservation has previously been made that the aeroplane is not considered as a substitute for smaller coast defence armament, such as 6-inch guns, and that the rôle of the aeroplane in coast defence is not necessarily universal.

(a) *Minor Coast Defence Armament*—Where the Admiralty rate the probable scale of attack on a port so low that it can be met by an armament of 6-inch guns, it would obviously be uneconomical to employ aircraft for its defence. Guns of this calibre are much less expensive to make and to instal; they do not necessarily require air observation; moreover, where the scale of attack is rated so low, there is no reason why, in most instances, the defences should not be manned by a volunteer corps under a small regular cadre. To substitute aircraft in these circumstances would be to send a man on a boy's errand.

(b) *Rôle of Aircraft Not Universal*—Marshal Foch has said that in war there are only particular cases, by which he implied that general principles may be useful, but their application is so varied that each case must be stated in precise and particular terms.

Though aircraft may be a substitute for the big gun in the defence of a case such as Singapore, it by no means follows therefrom that aircraft should be installed for the defence of all bases of immediate naval importance. Each base, on the contrary, must be considered on its merits. In some it will be found that geographical and other conditions either prohibit the aeroplane or render its use economically undesirable. A survey of all bases of importance is outside the scope of this paper; a few examples must suffice:

Gibraltar—Though more exposed to air attack than almost any other British naval base, its surroundings forbid the use of aircraft on an

adequate scale for its defence. Coast guns and antiaircraft guns must always be the primary defence of Gibraltar.

Malta—Like Gibraltar, though on a lesser scale, Malta is exposed to land-based air attack. As adequate gun defences already exist, it would be illogical to suggest that aircraft be substituted for them. They must, however, be supplemented by aircraft to deter air attack, whether land-based or sea-borne, and to spot for the guns.

Aden—As a fleet refuelling base Aden is adequately protected against any probable scale of attack. In any event, a squadron of aircraft is permanently stationed there to ensure the security of the protectorate; the squadron can be used to supplement the gun defences should the necessity arise.

Hong Kong—The seaward defences of this base are governed by Article XIX of the Washington Agreement.

From the foregoing examples it will be seen that the rôle of aircraft in defence of bases is one which must be examined in its relation to each base. For some, it is suggested, aircraft are an adequate defence; for others a combination of guns and aircraft is desirable; for others, again, aircraft may be unsuitable.

X. THE DOMINIONS

The problem of the defence of the coasts of our Dominions is one which requires separate consideration. The answer, whatever it may be, is definitely awaited by at least one Dominion, Australia.

It is not proposed to examine in detail the question of Canadian coast defence, seeing that Canada looks largely for security against external attack to the Monroe Doctrine, "behind which," as Sir Frederick Borden said, "were the guns and warships of the United States and the whole power of eighty million souls."⁴ Nevertheless, Vancouver seems ideally placed for the use of aircraft against sea bombardment. On the eastern coast fog secures immunity to Halifax for nearly half the year.

South Africa is not at present exercised in the matter of coast defence. Nevertheless, Durban is a port whose defence must sooner or later require consideration by the Union Government. It is suited to defence by aircraft; moreover, useful employment in peace can be found within the Union for the aircraft allotted to its defence. It is a base the importance of which is unlikely to demand that its air defences be permanently stationed in its vicinity in time of peace.

The coast defence problems of Australia and New Zealand have much in common. Both have extensive coast lines; the principal cities of both are on the coast; both are nervous about their isolation; both are young countries in which money is sorely needed for economic development, and, therefore, both have but little money to spend on defence generally. Both

⁴ Speech at Ottawa, 23rd February, 1906.

Australia and New Zealand recognize that their best interest lies in contributing to the strength of the Empire's sea power, upon which the security of their coasts ultimately rests. Thus there is little money available for coast defence. At the same time, both countries are acutely aware that there are times, particularly immediately after an outbreak of war, when their coasts might be bombarded by an enterprising enemy.

In addition to her contribution to the Imperial Navy, can Australia, to take three examples only, afford to install big gun defences at Sydney, Melbourne and Fremantle? It is quite evident that she cannot. And if these ports, why not Adelaide, Brisbane and Newcastle? These places will certainly demand that they have an equal right to protection.

It is not suggested that air defence will provide an answer to the security of the entire Australian coast; distances are too great to concentrate air strength in a central position from which it can strike at will. But it is contended that the very vastness of the distances involved demand the maximum mobility, and only aircraft can provide that mobility. Australia has already sanctioned an increase of her sea strength; she is a country which can make use of aircraft in peace for peaceful purposes. It is clear that aircraft are the nearest solution to her coast defence problem. She cannot afford cruisers, aircraft and big guns; she can afford cruisers and aircraft.

The cities of New Zealand, the chief centres of supply and industry in that country, are all located on the coast. There exists in the minds of New Zealanders the possibility of their economic life being dominated by the guns of a hostile fleet. However short the ordeal, and however remote the contingency, New Zealanders do not like it. New Zealand is, as it happens, peculiarly suited to the use of aircraft for coast defence. There is no point of importance, either in the North or South Island, which is distant more than four hours' flight by aircraft based in the vicinity of Wellington. Thus, in view of the small scale of attack probable, two squadrons of bombers at Wellington would meet the coast defence requirements of New Zealand.

The Dominions await the solution of the coast defence question. It is suggested that, in so far as it is possible to generalise, the answer lies in the aeroplane. It is a mobile weapon which is what the Dominions require, and it is economical in relation to its offensive power. Moreover it can be used by them for peaceful purposes when not required for war; to the truth of this statement the Royal Canadian Air Force bears witness. Every penny saved on defensive insurance can help to relieve the burden borne mainly by the United Kingdom in maintaining sea power.

XI. INDISCRIMINATE COAST BOMBARDMENT

It has been asserted by an eminent military thinker⁵ that the ability of a centrally-situated air force to deter an enemy from sea bombardment

⁵ Col. J. F. C. Fuller.

has been disproved by the experience of the war. "The German raids on Hartlepool, Scarborough and Margate," he writes, "succeeded in spite of large forces of aircraft in this country, since time was insufficient for them to concentrate. If this was the case when aircraft were within easy reach, how much more is it likely to be the case when distances run into hundred of miles?"

This argument lacks conviction because the data upon which it is founded are inaccurate. In the first place, there were not large forces of aircraft in England at the time. During the bombardment of Hartlepool and Scarborough (December, 1914), there were not fifty serviceable aircraft in the country, apart from training machines. In the second place, aircraft had not been seriously considered as a means of coast defence. It was never a question of insufficient time to concentrate. No effort was ever made to concentrate aircraft against German ships bombarding our coasts, nor, supposing a concentration affected, could the aircraft have accomplished anything, seeing that the pilots were untrained and the machines unequipped for the purpose. The same applies to the Austrian bombardments of the Italian coast.

This question of the bombardment of open coasts, though illegal, is one which cannot be lightly overlooked. The limits of what is permissible in war are, unfortunately, widening steadily. The fact that certain courses of action are repugnant to British traditions affords no ground for the belief that they will be seen from a similar high plane by other nations. Moreover, the bombardment of open coasts may have a definite military value. The fear of it and the consequent uneasiness of American public opinion handicapped Admiral Sampson's movements in the early part of the Spanish-American War. The German bombardment of our open coast towns in the last war achieved a definite military object. "One other factor," writes Lord Jellicoe, "exercised a cramping effect upon our strategy throughout the war, namely, the bombardment of our undefended towns on the east coast."

This method of reducing the initiative of an enemy fleet is more than likely to be employed again in the future, particularly by a weaker fleet, and, therefore, particularly by any fleet opposed to the British. It is obvious that this form of intimidation cannot be met by gun defences. Whether it is in New Zealand or in the United Kingdom or elsewhere, it is clear that the only answer is the aeroplane, the presence of which will deter the enemy and "make the game not worth the candle."

XII. RAIDS

However powerful its seaward defences, history has shown that the weakest point in a fortified naval base is usually its land side. Provided that it keeps outside the range of the seaward defences, some twelve miles, a raiding force escorted by naval craft can disembark with impunity, and

is then less than a day's march from the fortress whose armament can offer little resistance. To a strong force so landed, a base is as vulnerable "as a hedgehog on its back."⁶ For this reason it is necessary to supplement the fixed defences with a military garrison adequate to the probable scale of attack. In time of peace, these fortresses are usually most unsuitable places for troops, whose training suffers thereby. In time of war, these garrisons eat into our striking force; every soldier employed on garrison duty is a bayonet lost to the main theatre of war. It is realized, however, that the use of aircraft to replace troops can be carried to a point at which the economy becomes false. That point is when reduction commences to re-act on the Cardwell system, on the maintenance of which the strength of the expeditionary force depends. Any action which reduces the strength of the expeditionary force below its present minimum is false economy, for the expeditionary force exists to perform functions which aircraft alone cannot perform. If this fact is always borne in mind, there seems no reason why garrisons should not be reduced in time and army training benefited thereby.

Aircraft can assist the army in the land defence of a fortress, both directly and by raising the distance at which the raiding party must land from the range of the gun, twelve miles, to the radius of the aeroplane, two hundred miles. Two hundred miles from its objective a raiding party is faced with a very different task, upon which it is unnecessary to enlarge. Any attempt to land within the range of aircraft is to invite failure. It is remarkable how easy it is to upset a landing expedition consisting, as it does, of merchant shipping, with soldiers on an unaccustomed element about to land on a strange shore. A few fireships in the roads of Calais caused the terror-stricken *Armada* to cut its cables and risk destruction from English guns and Dutch shoals. A few innocuous shots from a French field battery at Corunna in 1809 caused a panic among the English troopships that might well have proved destructive. That a landing by enemy troops in the face of air opposition would be a delicate operation is indisputable. An attempt to land by night or in a fog in order to avoid aircraft is unlikely to commend itself either to soldiers or sailors as a practical proposition.

On the whole, it can be stated with confidence that troops cannot be put ashore under weather conditions in which aircraft cannot operate. Assuming, therefore, a regular system of air reconnaissance, supplemented by other means of intelligence, it is probable that an attempted landing would be observed, and that it would be interrupted by aircraft before any appreciable number of troops could be disembarked on an open beach. A landing outside the range of aircraft is unlikely to succeed in its object for reasons of time and space.

⁶ COAST ARTILLERY JOURNAL, October, 1928.

Aircraft employed in the defence of a fortress, therefore, have the additional advantage that they strengthen the most vulnerable side of the majority of naval bases.

XIII. SUMMARY

Examination has revealed that the big gun exercises, and will continue to exercise, deterrent power against most forms of attack, provided that it is equipped with observation aircraft; but so also, it is contended, does the aeroplane. The gun is powerless against carrier-borne air attack. No admiral, on the other hand, will lightly lay his carriers within range of shore-based air attack. The gun is immobile; the aeroplane is essentially mobile, and mobility is the keystone of war as it is foreseen today. The gun cannot protect open coast towns; the aeroplane can, within its radius of action, which today is approximately two hundred miles; less than six years hence it will be five hundred miles. The gun can only prevent a landing by an enemy force within twelve miles; the aeroplane extends this distance to five hundred miles. The gun cannot protect the land side of a base; the aeroplane can assist the army to do so. The big gun is a highly expensive form of insurance; the aeroplane, relatively to its destructive power and mobility, is inexpensive. The aeroplane can fulfill a dual rôle, the gun can only fulfill one. If the big gun is installed for the protection of a base in the Mediterranean and war breaks out in the Pacific, the gun is useless, because it is a deterrent where there is nothing to deter; the aeroplane can be moved to the area of hostilities. On the other hand, to substitute aircraft for small fixed armaments would not be economical in most cases; moreover, the substitution of aircraft for big gun defences cannot be laid down as a principle; the defence of each particular base must be examined on its merits. Finally, for the defence of a first-class naval base, the aircraft, in the present stage of their development, should be stationed in the vicinity of the base they are intended to protect.

XIV. CONCLUSION

“Captains of industry,” we are told, “are built on a perception of the advantages of combining related undertakings, coal with iron, both with transport, and so on.” The aim of this paper has been to examine the possibilities of aircraft in coast defence, not as a rôle in itself, but as part of a wider rôle, namely, the assistance which aircraft can give to the navy and army in shouldering the burdens of imperial defence in these days, when money is scarce and universal war-weariness leads the world fondly to imagine that international legislation can make war an anachronism.

The Pact of Paris outlaws war except in self-defence. Such a reservation, however, necessarily implies aggression on someone else's part. The League of Nations, on the other hand, all of whose members signed the Pact of Paris, permits war under Article II of the Protocol. The truth is that neither the Pact of Paris nor the League of Nations can prevent

war, but they do serve the fine purpose of making war more difficult. Unfortunately, they make more difficult also the task of those on whom responsibility for the defence of this Empire rests. This difficulty is apparent in the increasingly vigorous reduction to which defence votes are subjected. In times such as the present, therefore, it is essential that the activities of all three services be correlated to derive the maximum advantage from the limited funds available.

If, as the writer believes, aircraft have the ability to protect a first-class naval base, such as Singapore, and can do it at less expense, then they should be given the task, and the money so saved devoted to other defence purposes. If, on the other hand, their ability to fulfill this rôle is not universally accepted, practical experiments should be continued to decide the question one way or the other.

The navy, the army and the air force are related undertakings; the measure of their success must depend on wholehearted cooperation. The more mobile the combined efforts of the three Services, the greater is their value to the Empire. Mobility gives economy in peace and success in war; the case against immobile defences is clear. It is on a proper appreciation of these factors, now that naval parity has been accepted, that future efficiency depends. The rôle of the aeroplane in coast defence, therefore, is to provide reliable but economical assistance to the Royal Navy and sea power, upon which, in the issue, the future of the Empire rests.

EDITORIAL

The United States Coast Artillery Association

THE formation of a Coast Artillery Association has been the subject of discussion over a considerable number of years. Recently a number of officers were asked to express an opinion as to the advisability of forming an Association. The replies received indicate an almost unanimous sentiment in favor of it.

Therefore, a committee consisting of—

Col. S. C. Vestal, C. A. C.
Lieut. Col. W. H. Wilson, C. A. C. (GS)
Lieut. Col. F. H. Smith, C. A. C.
Maj. C. W. Jenkins, C. A. C.
Maj. S. S. Giffin, C. A. C.
Capt. T. J. Betts, C. A. C.

met and drafted the Constitution which follows, under which The United States Coast Artillery Association is to be organized. The Association will exist and function when this Constitution has been accepted by the designated number of officers. Some officers furnished comments which were an assistance to the Committee in drafting the Constitution.

Although the advantages and uses of an Association are numerous and varied it may be said that it will exist for one purpose alone—to increase the efficiency of the Coast Artillery arm of the Army of the United States. All proper means to accomplish this object will be utilized.

Because the Army of the United States is an army composed of citizen soldiers as well as professional soldiers, the Coast Artillery Association will be composed of members from the three components of that Army—Regulars, National Guard and Organized Reserve. It is expected that an Association formed along these lines will not only secure the interest of the National Guard and the Reserve, but their active participation in the affairs with which it is concerned.

The Association will not exist for the exploitation of its members or for commercial purposes. Nor will it seek to aggrandize the Coast Artillery at the expense of any other arm. While it will strive to secure proper consideration for the missions of the Coast Artillery Corps it will not do so to the exclusion of those of other arms. It will foster the spirit of cooperation not only with other arms of the Military Service, but with our Naval Service as well because this spirit is most conducive to the rapid progress of the Corps. While this spirit has existed heretofore it is believed that it will be more definitely expressed through the medium of an Association devoted to the best interests of the Coast Artillery.

The Constitution drafted by the committee is presented herewith for your consideration and approval. The committee carefully considered its provisions and it is believed that there can be no valid objection to them. Those eligible for membership are asked to approve it and signify their approval by their application for membership.

CONSTITUTION OF THE UNITED STATES COAST ARTILLERY ASSOCIATION

ARTICLE I

The name of the Association shall be the United States Coast Artillery Association.

ARTICLE II

The offices and headquarters of the Association shall be in Washington, D. C.

ARTICLE III

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 improvement of material and methods of training, and by fostering mutual understanding, respect and cooperation among all arms, branches and components of the Regular Army, Organized Reserves, National Guard, and Reserve Officers Training Corps.

ARTICLE IV

SECTION 1. The Association shall consist of Active, Associate, and Honorary members.

SECTION 2. The following shall be eligible for active membership:

- a. Commissioned officers, active or retired, of the Coast Artillery of the Army of the United States.
- b. Commissioned officers, active or retired, of the Staff Corps and Departments of the Army of the United States who at any time have served in the Coast Artillery.
- c. Commissioned officers, active or retired, of the Philippine Scouts who have served in the Coast Artillery.
- d. Former commissioned officers of Coast Artillery of honorable records in the Army of the United States.
- e. General officers, active or retired, of the Army of the United States.

SECTION 3. The following shall be eligible for associate membership:

- a. Commissioned officers and former commissioned officers in good standing of the United States Army, Navy, Marine Corps, Coast Guard, and the Public Health Service.
- b. Warrant officers and noncommissioned officers of the Coast Artillery of the Army of the United States.

c. Members of Coast Artillery units of the Reserve Officers Training Corps and Citizens' Military Training Camps.

SECTION 4. The following shall be eligible for honorary membership:

- a. Civilians who have demonstrated their interest in national military preparedness.
- b. Persons who have rendered distinguished services to the Association or to the United States.

SECTION 5. Any member may withdraw from the Association by tendering his resignation in writing.

SECTION 6. Any member may be expelled from the Association for cause by the unanimous vote of the Council; provided, that before any member is expelled, he shall have been given an opportunity to be heard in his own defense.

SECTION 7. For the purpose of this constitution the Army of the United States shall be considered to be composed of the Regular Army, Organized Reserves, and the National Guard.

ARTICLE V

SECTION 1. Meetings, both annual and special, shall be held as provided by the by-laws.

SECTION 2. All members of the Association shall have the privilege of the floor at any meeting of the Association, and each active member shall be entitled to one vote on all questions, subject to the provisions of Articles VI and XVI.

ARTICLE VI

SECTION 1. The elective officers of the Association shall be a President, a Vice President, and seven members of the Executive Council. They shall hold office for two years or until their successors have been appointed.

SECTION 2. The officers of the Association shall be chosen from the active members.

SECTION 3. The Executive Council shall appoint a Secretary-Treasurer to hold office at the pleasure of the Council. The Secretary-Treasurer shall be an officer of the Regular Army on duty at Washington. If he is not a member of the Council he shall have no vote in its deliberations.

SECTION 4. At least five of the elective officers shall be Coast Artillery Officers on active duty.

SECTION 5. At the regular election of officers of the Association next succeeding the adoption of this constitution, the President and four members of the Council shall be elected for a term of two years and the Vice President and three members of the Council shall be elected for one year; and, thereafter, at each successive annual meeting, successors shall be elected for the full term of two years.

SECTION 6. A vacancy occurring among elective officers may be filled by the Executive Council for the unexpired portion of the term.

ARTICLE VII

The duties of the officers of the Association shall be such as are incident to their respective offices and such as the by-laws prescribe or the Association directs.

ARTICLE VIII

The Executive Council shall have the power to make, alter, or amend the by-laws.

ARTICLE IX

The COAST ARTILLERY JOURNAL shall be the official publication of this Association.

Subscriptions to the Journal shall not be considered as essential to membership or as dues for membership.

ARTICLE X

SECTION 1. The Executive Council shall consist of the President, the Vice President, and the seven elected members.

SECTION 2. Five members shall constitute a quorum for business.

SECTION 3. The Executive Council shall have charge of the general administration of the affairs of the Association under the Articles set forth in this Constitution. It shall authorize the expenditure of the funds, audit the accounts of the Secretary-Treasurer, control the records and property, define the policy and supervise the contents of its publications; in general it shall take such measures, within the limits of this Constitution, as it may deem most expedient to further the objects of the Association.

ARTICLE XI

The Secretary-Treasurer

He shall perform such duties as are usually specified for such officers. He shall keep a journal of the proceedings of the Executive Council and of the regular and special meetings of the Association. He shall have charge of the finances and correspondence of the Association, under the Executive Council, and be at all times subject to its orders. He shall keep accurate account of the finances of the Association, and at each annual meeting of the Association, or on demand of the Executive Council, he shall make a complete report of the financial state of the Association and such other matters as may be called for by the Council.

ARTICLE XII

The Association shall publish an annual report and shall furnish this report and bulletins of timely professional interest to all members.

ARTICLE XIII

There shall be neither assessments nor annual dues.

ARTICLE XIV

The organization of the Coast Artillery Association may include Branch Associations.

ARTICLE XV

Adoption

SECTION 1. This Constitution shall be considered as adopted and shall be in effect when it shall have been accepted and subscribed to by not fewer than one hundred persons having the qualifications prescribed for active members, who shall then and thereafter be known as Charter Members of the Association.

SECTION 2. Immediately upon the adoption of this Constitution the Charter Members shall proceed to the election of the officers according to Section 5, Article VI, of this Constitution. For this election all persons eligible for active membership shall be considered eligible for election as officers of the Association. Officers so elected shall qualify as members of the Association before assuming office.

ARTICLE XVI

Amendment

SECTION 1. This Constitution may be amended or altered by the affirmative vote of two-thirds of the ballots cast by active members. Votes may be cast in person or by properly authenticated proxies. To obtain consideration of any proposed change, a written application requesting such consideration and setting forth, in detail, the nature of such change and the reasons therefor, shall be signed by not fewer than twenty-five members and submitted to the Secretary. This application must be submitted at least one hundred and twenty days prior to the time of meeting. The Executive Council will direct the Secretary to give notice of the proposed amendment to all members entitled to vote so that it may be received at least sixty days prior to the meeting at which it is to be considered. This notice will contain the proposed amendment and the names of the proposers.

SECTION 2. The mailing of proposed amendments to the last known address of any active member not less than ninety days before the date of the meeting shall constitute due notice.

COAST ARTILLERY ACTIVITIES

Office of Chief of Coast Artillery

Chief of Coast Artillery
MAJ. GEN. JOHN W. GULICK

Executive
COL. H. L. STEELE

Plans, Organization and Training Section

MAJ. J. B. CRAWFORD
MAJ. R. V. CRAMER
MAJ. S. S. GIFFIN
CAPT. J. H. WILSON
CAPT. H. N. HERRICK

Materiel and Finance Section

MAJ. J. H. COCHRAN
MAJ. C. H. TENNEY
CAPT. F. J. MCSHERRY
Personnel Section
LT. COL. H. T. BURGIN

Chief of Coast Artillery Inspects

During July the Chief of Coast Artillery, Maj. Gen. John W. Gulick, accompanied by Maj. C. H. Tenney, of his office, continued his visits of inspection along the Atlantic Coast. On July 1 he visited the Harbor Defenses of Portland and inspected the results of the tests conducted there during the month of June. He also visited the 240th C. A. (Me. N. G.) during its training at Fort Williams. On July 11 Fort H. G. Wright was inspected and offered an opportunity to inspect the 245th C. A. (N. Y. N. G.) and five reserve regiments which were in training during his visit. A few days later he visited the Harbor Defenses of Sandy Hook and the C. M. T. Camps then in progress. The end of this trip included an inspection of the Harbor Defenses of the Delaware. At this harbor defense particular mention was made of the good work of Capt. William R. Maris who has been on caretaking duty at Fort Dupont for the past five (?) years. The excellent condition of these harbor defenses is a tribute to Captain Maris' work. The Chief's satisfaction has been expressed to Captain Maris and the JOURNAL also takes pleasure in bringing good work to wider attention.

General Gulick left Washington again on July 20 and visited harbor defenses, also the South Atlantic and Gulf Coasts ending at Pensacola. He will visit Camp Knox later where the 61st is on duty at the reserve camp. On this same trip, possibly, he will go to Chicago and visit the 61st, newly settled at Fort Sheridan, and the Organized Reserve office of Colonel Barnes who as a member of the Corps Area Staff is in charge of all Coast Artillery Reserve activities in the Sixth Corps Area. Backed by General Parker's interest the Coast Artillery Reserve in the Sixth Corps Area is now on the

up and up. The Antiaircraft Group has been organized with a separate office and Colonel Barnes in charge.

General Gulick will visit *all* Coast Artillery stations in the near future, including those beyond the continental limits of the United States. Among the foreign service stations Panama will probably come first on the list.

General Gulick stated that he found all stations in a very satisfactory condition. Although he has observed all activities he has concerned himself particularly with artillery material and has been especially interested in observing its condition at posts where it is in the hands of caretaking detachments. He remarked particularly on the excellent condition of the materiel at these stations and highly commended the personnel on this duty. His observations have led him to emphasize a few matters in which improvement can be made. He found that greater effort can be profitably expended on the cleaning of recoil cylinders. The prevention of deterioration of recoil cylinders is a rather difficult problem when guns are not fired for years. The interior of the cylinders easily rust, and if neglected, will put the bore of the cylinder to such an extent as to weaken the walls or to cause failure to function properly. In some few cases conditions were very bad. It is believed that all recoil cylinders should in time be completely dismantled and rust removed by scraping.

In the inspection of emplacement books it was noted in a few cases that entries had not been made or were incomplete. This was more common in connection with entries of work done on the guns. Battery commanders should realize that the emplacement book is a record for the guidance of their successor as well as their own and that matters within their own knowledge, where pertinent, should be set down so that those who come later may be informed of them. This is particularly important in connection with certain operations which, under the regulations, should be performed at regular intervals of time.

While these few matters were noted unfavorably the general impression gained was one of satisfaction and confidence in the personnel in charge.

Sergeant L. F. Johnson was specially mentioned because of the excellent condition of the mine casemate and storehouse at Fort Williams, Maine. Staff Sgt. John J. Maykovich was specially complimented upon the general condition of the armament at Fort Andrews. Sgt. Walter Levisky is in charge of a well-kept battery (Battery Long) at Fort Duvall. These men are to be congratulated on the kind of service which brings praise from the Chief of Coast Artillery and contributes to the generally favorable opinion held by all who have ever come in contact with Coast Artillery enlisted personnel.

As a result of General Gulick's recent inspections a study will be made of the courses at the Coast Artillery School with a view to the introduction of additional instruction on materiel with particular reference to its functioning and care. There is a belief held by a number of senior officers that knowledge of the materiel is somewhat deficient among the younger officers.

In former times the newly commissioned officer was given an intensive basic course at his first station covering materiel, its care and operation. His instruction was of the practical type, and generally was conducted at the materiel being studied. One of the typical questions was: How many oil holes has a particular piece? Name, locate, and state the moving parts lubricated. Since the war, with the introduction of many new types of armament, this form of instruction is not so common. It is probable that action may be taken soon to increase the time devoted to this kind of instruction.

Railway Gun Moved to Fort MacArthur

On June 28, the last stage of the movement of the 14-inch railway gun to Fort MacArthur was completed. This gun arrived at Benicia Arsenal on July 16, 1929, after an interesting transcontinental trip from Aberdeen Proving Ground. Capt. A. L. Parmelee was in charge of the transcontinental trip and was also in charge of the movement from Benicia Arsenal to Fort MacArthur. This part of the journey was uneventful and was accomplished at the comparatively low average speed of eight miles per hour.

This gun is a sister gun of the one already at MacArthur. It remained at Benicia Arsenal for a period of about one year awaiting decision as to its final destination. Conditions at Fort MacArthur, due to the proximity of civilian residences, are not favorable for the firing of target practices. Firing positions are still under investigation, but at present there is a probability that they may be secured at Fort MacArthur or in the vicinity.

Reserve Instructors to Attend Aberdeen Exercises

During the period August 15-November 1 instructors on duty with the Organized Reserve will again be given an opportunity to be present as observers at the Aberdeen exercises. These exercises, more technical than tactical, are for the purpose of conducting tests and firings in connection with the development of antiaircraft materiel. Ordnance and Engineer materiel will be tested—the greater part being Ordnance. A list of this materiel appears on page 73 of the July COAST ARTILLERY JOURNAL.

Two Reserve instructors will be selected from each Corps Area and will be ordered to Aberdeen Proving Ground on temporary duty for a period of two weeks. The date of the period has not been set. Presumably it will be during a time when the visiting officers can see most.

The antiaircraft exercises offer an exceptional opportunity to Reserve instructors to inform themselves of the latest in antiaircraft materiel and methods. Furthermore they are able to return to their permanent stations and disseminate the knowledge gained to the Reserve officers under their instruction.

Officers on detached service sometimes feel more or less out of it, especially those on duty at points inconvenient to any Coast Artillery station. The in-

structors on duty with the Reserves, in particular, are apt to get a little rusty on the subject of artillery since no artillery equipment is issued to Reserves as is the case with the National Guard and R. O. T. C. units. In the past several years the Chief of Coast Artillery has made an effort to bring these officers in close touch with the newest developments, especially in anti-aircraft materiel, and many officers have visited Aberdeen for short periods during the period of the tests. The favorable remarks made on this policy are an indication of its value to these officers.

Coast Artillery Liaison Officer at Aberdeen

Major O. L. Spiller recently detailed liaison officer for the Coast Artillery with the Ordnance Proving Ground at Aberdeen has taken up his duties at that post. Major Spiller is the first Coast Artillery officer to be assigned to this class of duty although other arms of the service have had officers stationed at Aberdeen.

For some time the Chief of Coast Artillery has realized the need for an officer on duty at Aberdeen who would keep his office informed of the progress made on Coast Artillery projects being developed by the Ordnance Department. Reports can be made informally and directly but not confidentially since the commanding officer at Aberdeen will be informed of their contents. The essential purpose of detailing an officer at Aberdeen is to bring the Chief's office into closer relations with the Ordnance Department developments and to induce a better understanding of the problems of each.

Major Spiller will also keep in touch with Chemical Warfare activities at Edgewood Arsenal.

The Coast Artillery School

At the present time (July 10) the graduation exercises of the School are a memory and the School activities are reduced to the minimum customary during the summer inactive period—inactive so far as students are concerned, but there is sufficient work for the instructors. The new School program has been prepared and appears in this number of the Journal. Schedules are to be prepared in accordance therewith, subjects assigned to new instructors, and all preparations made so that the new students may be received with lesson assignments and lose no time in getting started in the various courses.

Towards the end of the School considerable firing was conducted with a four-gun battery of 75-mm. field guns, model 1916, American. Both Case II and Case III methods were used and all methods of trial fire and fire for effect were employed. Each officer in the class conducted at least one problem in which fire was adjusted. Students performed the various duties in the base end stations, B. C. station, plotting room and gun section. The Coast Artillery School claims to have introduced the use of the 75-mm. field gun for adjustment problems. It has many advantages over the sub-

The Coast

1930

Commandant: Brig. Gen. Stanley D. Embick
Secretary: Maj. R. M. Perkins

Department of Tactics

Lt. Col. M. A. Cross, Director
Maj. T. C. Cook
Maj. H. W. Stark
Maj. D. D. Hinman
Maj. C. M. S. Skene
Maj. W. C. Foote

Maj. H. M. Estes, Cav.
Maj. L. R. Boyd, Inf.
Maj. R. H. VanVolkenburgh
Maj. H. F. Loomis
Capt. C. W. Walton, C. W. S.
1st Lieut. J. P. Hodges, A. C.

Department of Artillery

Maj. W. K. Richards, Director
Capt. F. E. Edgcomb
Capt. J. T. Lewis

Capt. G. W. Ricker
Capt. H. F. E. Bultman
Capt. Homer Case

OFFICERS DIVISION

DATES (Incl. Owing Lv. Sept 6)	SCHOOL HOURS PER WEEK	WEEK #	ADVANCED COURSE		BATTERY OFFICERS COURSE		COURSES FOR NATIONAL GUARD & RESERVE OFFICERS			ADVANCED ENGINEERING COURSE	ADVANCED MOTOR TRANSPORT COURSE	ADVANCED GUNNERY COURSE	REFRESHER COURSE FOR GENERAL AND SENIOR FIELD OFFICERS
			AVC	BOC	1ST SECTION	2D SECTION	FIELD OFFICERS	BATTERY OFFICERS					
			8:00-12:00 and 1:00-4:00	8:00-12:00 and 1:00-4:00	1:00-4:00	8:00-12:00 and 1:00-4:00	ANTIAIRCRAFT	SEACOAST DEFENSE					
Sept 8-12	32.5	32.5	1	SEACOAST MATERIEL & GUNNERY (A 93)	MILITARY FIELD ENGINEERING (E-14)	MIL FIELD ENGRG (E-14)	BASIC GUNNERY (A 64)	ELECTRICITY (113)	MACHINE SHOP PRACTICE (63)	SEACOAST MATERIEL & GUNNERY (A 93)	AS Required		
15-19	35.5	35.5	2	GEN CONF (45)	MILITARY TOPOGRAPHY (E-14)	MIL TOPOGRAPHY (E-14)	GENERAL CONFERENCE (3)		STORAGE BATTERIES (30)	AA MATERIEL & GUNNERY (A 94)			
22-26	35.5	35.5	3	EQUATION (60)	COMBAT ORDERS (E-14)	COMBAT ORDERS (E-14)	(WITH BO CLASS) OR		ELECTRO PLATING (63)	OT & T			
29-Oct 3	35.5	35.5	4		SEACOAST ARTILLERY (F-40)	SEACOAST ARTILLERY (F-40)	ANTIAIRCRAFT MATERIEL & GUNNERY (A 192)	FORTIFICATION POWER PLANTS (67)	WELDING (63)	COMBINED ARMS IN COAST DEFENSE (F-50)			
Oct 6-10	35.5	35.5	5		ANT-AIRCRAFT MATERIEL & GUNNERY (A 192)	ANT-AIRCRAFT MATERIEL & GUNNERY (A 192)	SC MAT & GUN & AA MATERIEL & GUNNERY (WITH ADV CLASS)	RADIO (204.5)	PAINTING (63)	SEACOAST ARTILLERY (F-50)			
13-17	35.5	35.5	6		GENERAL CONFERENCE (75)	GENERAL CONFERENCE (75)			UPHOLSTERING (63)	AA ARTILLERY (F-40)			
20-24	35.5	35.5	7		EQUATION (150)	EQUATION (150)	GEN CONF (9)	GEN CONF (9)	MAGNETO REPAIR (63)	RY ARTILLERY (F-40)			
27-31	35.5	35.5	8				GEN CONF (9)	GEN CONF (9)	TIRE REPAIR (63)	LAND WARFARE (F-5)			
Nov 3-7	33	35.5	9		ORIENTATION (E-105)	ORIENTATION (E-105)			BATTERY MAINTENANCE & STARTING SYSTEMS (63)	OTHER ARMS (F-35)			
10-14	33	35.5	10		GENERAL CONFERENCE (60)	GENERAL CONFERENCE (60)				LOGISTICS (F-15)			
17-21	33	35.5	11		EQUATION (105)	EQUATION (105)				METH OF TRAINING (F-10)			
24-28	19	20.5	12										
Dec 1-5	34	35.5	13		SEACOAST ARTILLERY (F-115)	MATERIEL (E-174)	BASIC GUNNERY (A-105)						
8-12	34	35.5	14		ANTIAIRCRAFT ARTILLERY (F-115)	ANTIAIRCRAFT ARTILLERY (F-115)	GEN CONF (45)						
15-19	34	35.5	15		MOTOR TRANSPORT (E-72)	MOTOR TRANSPORT (E-72)	EQUATION (105)						
22-24	20	20.5	16		RY ARTY IN LAND	RY ARTY IN LAND							
Jan 5-9	34	35.5	17		WARFARE (F-10)	WARFARE (F-10)	SC MAT & GUN (A-74)						
12-16	34	35.5	18		INF & COMBINED ARMS (F-10)	INF & COMBINED ARMS (F-10)	GEN CONF (45)						
19-23	34	35.5	19		CANNALRY (F-47)	CANNALRY (F-47)	EQUATION (75)						
26-30	34	35.5	20		FIELD ARTY (F-90)	FIELD ARTY (F-90)							
Feb 2-6	34	35.5	21		AIR CORPS (F-75)	AIR CORPS (F-75)	ELECTRICAL MATERIEL (E-174)						
9-13	34	35.5	22		SIGNAL CORPS (F-45)	SIGNAL CORPS (F-45)	BASIC GUNNERY (A-105)						
16-20	34	35.5	23		MED CORPS (F-45)	MED CORPS (F-45)	GEN CONF (60)						
24-27	26.5	28.5	24		CWS (F-14)	CWS (F-14)	MOTOR TRANSPORT (E-72)						
Mar 2-6	34	35.5	25		EQUATION (105)	EQUATION (105)	GEN CONF (60)						
9-13	34	35.5	26		SC MAT & GUN (A-74)	SC MAT & GUN (A-74)	GEN CONF (45)						
16-20	34	35.5	27		COMBAT INTELLIGENCE (F-70)	COMBAT INTELLIGENCE (F-70)	EQUATION (240)						
23-27	34	35.5	28		EQUATION (75)	EQUATION (75)							
30-Apr 1	20	20.5	29		STATISTICS (F-50)	STATISTICS (F-50)	ANTIAIRCRAFT MATERIEL & GUNNERY (A-192)						
Apr 6-10	34	35.5	30										
13-17	34	35.5	31		MILITARY HISTORY (F-10)	MILITARY HISTORY (F-10)	GENERAL CONFERENCE (75)						
20-24	32.5	34	32										
27-May 1	32.5	34	33				EQUATION (60)						
May 4-8	32.5	34	34		GENERAL CONFERENCE (34)	GENERAL CONFERENCE (34)							
11-15	32.5	35	35				SUBMARINE MINING (E-4)						
18-22	32.5	32	36										
25-29	32.5	32	37										
June 1-5	29.5	32	38										
8-12	24	25	39										

E PLANATORY NOTES
(F 15) Department of Tactics 15hrs
(A 93) Dept of Artillery 23hours
(E 16) Dept of Engineering 16hrs

During the period Apr-May the Advanced class will observe Selected Termes Seacoast Defense and Antiaircraft scheduled for the Battery Officers Class

GENERAL CONFERENCES (46.5 HOURS) WEDNESDAY PM
SEPT 10TH TO APR 15TH (INCL.)
EQUATION: ADVANCED CL. MONDAYS-THURSDAYS (102 HOURS)
SEPT 15TH TO MAY 28TH (INCL.)
BTRY OFF CL. TUESDAYS-FRIDAYS (91.5 HOURS)
SEPT 16TH TO MAY 8TH (INCL.)

HOLIDAYS. BOTH DATES INCLUSIVE
THANKSGIVING NOV. 27-30.
CHRISTMAS DEC. 25-JAN 4.
WASHINGTON'S BIRTHDAY FEB. 23.
EASTER APRIL 23.
MEMORIAL DAY FALLS ON SATURDAY.

CLOSING PERIOD

Artillery School

1931

Assistant Commandant: Col. P. P. Bishop
 Librarian: Maj. C. E. Hocker

Department of Engineering

Maj. S. S. Winslow, Director
 Capt. S. R. Mickelson
 1st Lieut. W. R. Ellis

Capt. R. C. Snidow
 1st. Lieut. L. D. Flory

Department of Enlisted Specialists

Maj. C. W. Bundy, Director
 Capt. G. M. O'Connell

Capt. C. W. Higgins

Department of Extension Courses

Maj. R. L. Tilton, Director
 Capt. W. H. Warren

Maj. R. E. Phillips

DEPARTMENT OF ENLISTED SPECIALISTS

WEEK NO.	REGULAR COURSES												SPECIAL COURSES												WEEK NO.	DATES (INCL.)
	MASTER GUNNERS				ELECTRICAL				RADIO				CLERICAL				RADIO-NATIONAL GUARD									
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4						
1	ANALYTIC GEOMETRY 41				MECHANICAL DRAWING 24				MECHANICAL DRAWING 24												1	Sept 8-12				
2					ALGEBRA 45				ALGEBRA 45												2	15-19				
3	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												3	22-26				
4	GEOMETRY 41				ALGEBRA 45				ALGEBRA 45												4	29-Oct 3				
5	ALGEBRA 45				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												5	Oct 6-10				
6	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												6	13-17				
7	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												7	20-24				
8	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												8	27-31				
9	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												9	Nov 3-7				
10	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												10	10-14				
11	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												11	17-21				
12	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												12	24-26				
13	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												13	Dec 1-5				
14	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												14	8-12				
15	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												15	15-19				
16	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												16	22-24				
17	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												17	Jan 5-9				
18	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												18	12-16				
19	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												19	19-23				
20	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												20	26-30				
21	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												21	Feb 2-6				
22	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												22	9-13				
23	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												23	16-20				
24	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												24	24-27				
25	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												25	Mar 2-6				
26	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												26	9-13				
27	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												27	16-20				
28	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												28	23-27				
29	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												29	30-Apr 1				
30	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												30	Apr 6-10				
31	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												31	13-17				
32	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												32	20-24				
33	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												33	27-May 1				
34	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												34	May 4-8				
35	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												35	11-15				
36	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												36	18-22				
37	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												37	25-29				
38	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												38	June 1-5				
39	DRAWING 30 1/2				MACHINE SHOP PRACTICE 9 1/2				MACHINE SHOP PRACTICE 9 1/2												39	8-12				

caliber system. Splashes are easily visible and the range can be made greater. All range finding operation can be made similar to those employed with the major caliber guns.

Seacoast target practices at towed targets were held under the new target practice regulations with the four-gun 155-mm. G.P.F. battery firing at fifteen seconds interval. The 8-inch railway (two gun) battery, with a thirty seconds interval, and the 12-inch railway mortar (two gun) battery with one minute interval were also fired by the students. They performed all battery duties except those of the breech and ammunition details. The practices were conducted very smoothly and were carefully analyzed. Ending the Artillery Course, a critique of all practices was held in which various phases of the firings were discussed by students and instructors.

The class completing the courses in June was one of the largest to be graduated from the School. Seventy-five officers and fifty-eight enlisted men received their diplomas in the main assembly room of the Coast Artillery School. Gen. Charles P. Summerall, Chief of Staff, United States Army, and Maj. Gen. John W. Gulick, Chief of Coast Artillery, were distinguished guests at the exercises. Maj. Gen. Henry D. Todd, Jr., the Commandant, introduced General Gulick who addressed the graduates and others assembled. Not a few of the fair sex were also present to grace the occasion. General Gulick introduced General Summerall who spoke on the importance of the Coast Artillery School in the Army system of military education and the part of the Coast Artillery in National Defense. The full text of these speeches have appeared in a previous number of the COAST ARTILLERY JOURNAL.

A few days after graduation the entire School and post were shocked and saddened by the untimely death of Capt. Clyde LeG. Walker who had entered the post hospital for a comparatively simple operation. By his death the Army and the Coast Artillery lost an officer of unusual ability and value to the service. It is by those of the same grade that an officer is really known. By them as well as by his superiors, Captain Walker was known as one of intense loyalty to the service. Never satisfied with "well enough" his well-known initiative continually urged him on in his search for improvement and perfection in service methods. His logical and progressive mind supported his initiative. His industry was an inspiration to the students whom he instructed. No student worked harder than Captain Walker. His high character, his devotion to duty, his superior professional knowledge leaves a void in the staff of the School difficult to fill but which will serve as a model to all who knew him.

The following student officers will attend the various courses for the School year 1930-31 :

Advanced Course

Maj. C. S. Doney	Capt. V. P. Foster
Maj. M. J. O'Brien	Capt. R. T. George
Maj. E. H. Underwood	Capt. B. T. Ipock
Capt. C. R. Adams	Capt. Frederick Lofquist
Capt. M. G. Armstrong	Capt. W. R. Maris
Capt. E. R. Barrows	Capt. B. L. Milburn
Capt. T. R. Bartlett	Capt. J. C. Stephens
Capt. H. H. Blackwell	Capt. E. H. Stillman
Capt. George Blaney	Capt. F. L. Topping
Capt. L. J. Bowler	Capt. J. R. Townsend
Capt. A. C. Chesledon	Capt. A. V. Winton

Battery Officers' Course

Capt. H. G. Archibald	1st Lieut. J. F. Howell, Jr.
Capt. J. T. deCamp	1st Lieut. F. R. Keeler
Capt. J. W. Vann	1st Lieut. G. J. Kelley
1st Lieut. W. I. Brady	1st Lieut. L. L. Lemnitzer
1st Lieut. L. R. Bullene	1st Lieut. J. E. McGraw
1st Lieut. J. B. Carroll	1st Lieut. E. A. Merkle
1st Lieut. J. F. Cassidy	1st Lieut. O. A. Nelson
1st Lieut. R. W. Crichlow, Jr.	1st Lieut. A. B. Nicholson
1st Lieut. F. B. Dodge, Jr.	1st Lieut. D. G. Pamplin
1st Lieut. J. L. Harbrough	1st Lieut. J. B. Renno
1st Lieut. M. A. Hatch	1st Lieut. W. L. Richardson
1st Lieut. J. I. Hincke	1st Lieut. L. O. Shutt
1st Lieut. J. L. Hogan	1st Lieut. H. P. Tasker
1st Lieut. W. G. Holder	1st Lieut. W. H. Webb
1st Lieut. David Hottenstein	1st Lieut. C. M. Wolff

Advanced Gunnery Course

Capt. E. T. Conway	Capt. L. L. Davis
1st Lieut. R. B. Pape	

Advanced Engineering Course

Capt. F. A. Hollingshead	1st Lieut. D. B. Latimer
1st Lieut. Edward Barber	1st Lieut. E. C. Wallace

Advanced Motor Transportation Course

Capt. N. E. Hartman	Capt. H. E. Pendleton
Capt. P. W. Lewis	1st Lieut. J. D. Moss

The Harbor Defenses of Honolulu

The month of June was an eventful one for the Harbor Defenses of Honolulu, inasmuch as the annual joint Army and Navy maneuvers were in full swing during the month. On June 23 the 2nd Battalion, 55th Coast Artillery, departed for Fort Kamehameha, where they resumed their participation in the maneuvers and tactical exercises which have been underway since May 2. Under the command of Maj. Monte J. Hickok, the three batteries and Hq. Det. and Combat Train comprising this battalion, have been busily engaged in preparation for the annual battle practice which was fired on July 2. At Fort Ruger, Battery "C," 16th Coast Artillery, was engaged in a similar task and the post assumed an aspect of real war conditions. Air forces of both the Army and Navy participated in the attack and defense as well as the Coast Artillery and Naval forces.

NATIONAL SERVICE SWIMMING PENTATHLON

For the second time in two consecutive years the Honolulu Army-Navy Y. M. C. A. won the National Service Swimming Pentathlon. This is an annual event competed for by all the Y. M. C. A. units, working with the Service men at foreign stations as well as the continental United States. The contest consists of five swimming events, the time of which are transposed into points. The standing of the first five associations was as follows:

1. Honolulu	13,540 points
2. Cristobal	10,589 points
3. Norfolk	9,858 points
4. San Diego	7,201 points
5. Fort Monroe	5,728 points

Out of the nineteen men comprising the Honolulu team, the Harbor Defenses of Honolulu furnished fifteen. It was a wonderful showing that these men made and we are all proud of them for helping to keep these Defenses on the map.

Coast Artillery Reserve, Southern California

751 South Figueroa St., Los Angeles, Calif.

Lieut. Col. Willis G. Peace, C. A. C. (DOL).

Maj. Edward P. Noyes, C. A. C. (DOL)

Staff Sgt. John Ivieh (DEML)

At the time the new allocation of Coast Artillery Reserve units for Southern California was received, during the summer of 1929, the following units existed and all had some officers assigned to them.

<i>Organization</i>	<i>Authorized commissioned strength</i>
519th Coast Artillery (AA)	63
552nd Coast Artillery Bn. (AA)	15
605th Coast Artillery Bn. (Ry)	19
608th Coast Artillery 3rd Bn. (TD)	21
610th Coast Artillery Btry. A (Hvy. Mob.)	6
625th Coast Artillery Btry. A (HD)	5
626th Coast Artillery (HD)	25
627th Coast Artillery 3rd Bn. (HD)	23
Total	177

Approximately one hundred reserve officers were assigned to the above units and, in addition, a few were assigned to regular army units in the Ninth Coast Artillery District. The new procurement objective, referred to above, withdrew or transferred the 552nd Battalion, Battery A, of the 610th Coast Artillery and the third battalion of the 627th Coast Artillery. It allotted to Southern California the entire 608th Coast Artillery and in addition, four new antiaircraft regiments: the 975th, 976th, 977th and

981st. The last was designated a fourth-phase unit and no officers were assigned to it. Other units indicated in original allocation remained unchanged.

These changes increased the procurement objective from 177 to 382 officers. With only about 100 officers available there remained approximately 282 vacancies in the various grades. The only apparent sources of supply from which these vacancies might be filled were: the two R. O. T. C. units at the Universities of Washington and California, respectively, turning out about fifteen Coast Artillery graduates each, per year; the few C. M. T. C. Blue graduates who succeeded in completing the basic extension course; and a few civilians who enlisted in the reserve corps and qualified themselves to pass the examination for original appointment. Obviously, if the new units were ever to be more than a paper assignment, some means had to be found to fill the vacancies. Accordingly, Col. F. S. Long, C. A. C., then the executive, held a conference with two of the most active of our reserve officers, Majors E. A. Evans and F. H. Holden (both now Lieutenant Colonels), gave each the command of one of the new antiaircraft regiments, and put it up to them to recruit their own officers from suitable candidates. This office then established a candidates' school, meeting one evening each week, in which an intensive course in the subjects required by AR 140-27 was given.

The results proved more successful than we most hopefully expected. The first class started within a few weeks, with over sixty candidates. Later some of these brought in others, and other regimental commanders began to send candidates to build up their own regiments. The course was then made continuous, one subject being covered before another was taken up and when all subjects required had been covered, the process was repeated. This system permitted a candidate to start at any time and to repeat as many subjects as he found necessary. Before any candidate was ordered before the examining board he was given a written examination, covering all subjects. If he failed in any subjects he was advised to repeat those subjects, either in class or by home study. Upon enrollment, a set of mimeographed data and such texts as were available, were issued to the candidate.

Since this school was started, 184 reserve officers have been commissioned in the Coast Artillery Reserve by its means. A few of these were obtained by transfer from other arms, especially those (such as the Engineer Reserve) where promotion was blocked due to lack of vacancies, but most of them were civilians, a considerable proportion of the latter being world war veterans. A large part of these candidates were practicing engineers, whose familiarity with instruments and figures enabled them to master fire control, position finding and gunnery very quickly. Naturally a few were passed by the board who lost interest after receiving their commissions, but most of them have been extremely active since. In

fact, the bulk of the work in troop school and extension school courses, as indicated below, was accomplished by them. Their military education really started only after they were commissioned.

At present there is an excess of second lieutenants and a dearth of officers in the higher grades, especially first lieutenants and captains, but this situation will be automatically adjusted as these new officers complete their time in grade.

Accomplishments During School Year Ending June 30, 1930

Extension Courses:

Subcourses completed	451
Hours of instruction	9233

Troop Schools:

Conferences held	69
Attendance, officers	3143
Hours of instruction	7145

Active Duty Training: (July-August, 1930)

<i>Organization</i>	<i>Authorized strength</i>	<i>Actual strength</i>	<i>Expected to attend camp</i>
605th C. A. (Ry)	19	22	11
608th C. A. (TD)	81	30	16
626th C. A. (HD)	25	24	11
975th C. A. (AA)	63	65	41
977th C. A. (AA)	63	60	57

The first three units listed above conduct the C. M. T. C. training at Fort MacArthur.

The 519th C. A. (AA), the 976th C. A. (AA), and Btry. A, 625th C. A. (HD), are the only units from this area that were not ordered to active duty this summer.

Except as indicated above, the work of this office does not differ from that of any other reserve office. Due to the activity of the officers, the necessity of going out and making contacts is reduced to a minimum, and the correction of papers and other routine work is at a maximum. All units furnish their own instructors for troop schools. Some are organized into battalion and battery classes, and one, the 977th C. A., has an enlisted men's class. Without this assistance and the splendid cooperation of the reserve officers themselves, especially the regimental commanders, the two regular army instructors on duty here could not possibly have made the success of the troop school that the reserve officers themselves have made of them.

In conclusion it can be said that there is no single element in the training of reserve officers as important as the selection of the regimental commander. Experience proves that where this officer is interested in his military work, is proud of his organization, and turns out at all meetings, he induces an esprit de corps and enthusiasm in his regiment that the Regular Army unit instructor cannot possibly obtain. —E. P. N.

The 61st Coast Artillery (AA), Fort Sheridan, Ill.

The 61st arrived at Fort Sheridan exactly at noon on June 13, where the regiment was received by the Post Commander, General Conrad, and cordially welcomed as a member of the garrison. A few days before its arrival the regiment was inspected en route by a member of the Sixth Corps Area Staff, which resulted in the following letter:

Headquarters Sixth Corps Area
Office of the Commanding General
Chicago, Illinois

1819 W. Pershing Road,
June 16, 1930.

Subject: Commendation.

To: The Commanding Officer, 61st Coast Artillery (AA).

1. As a result of his observation on June 11, 1930, and June 13, 1930, of the 61st Coast Artillery (AA), then en route by marching from Fort Monroe, Virginia, to Fort Sheridan, Illinois, the Corps Area Inspector has reported that in respect to the following he found evidence of marked efficiency:

- a. Appearance and discipline of personnel.
- b. Appearance and condition of vehicles.
- c. Road discipline.
- d. Orderly establishment and breaking of camp.
- e. Routine of command supervision.
- f. Courtesy in contact with civilians.

2. These commendable conditions reflect much credit upon the Regimental Commander, Maj. James H. Cunningham, 61st Coast Artillery (AA), and upon the officers and enlisted men of his command.

FRANK PARKER,
Major General, U. S. Army,
Commanding.

A few days after arrival nearly the entire garrison departed for Chicago where the Military Tournament and Exposition was held, leaving the 61st in charge of the post—the principal duties being the guarding of prisoners and furnishing transportation. The transportation duties were easy for the anti-aircraft regiment but some consternation was caused when it was learned that the one hundred and sixty prisoners at Sheridan were guarded with shot guns. Shot guns were new to the 61st but after some intensive instruction they were issued and no casualties resulted.

The 61st also participated in the exposition by furnishing a detachment under the command of Captain Marquat who had with him Lieutenants Howe and McLean and about forty enlisted men. Their equipment consisted of one gun and prime mover, one machine gun, four searchlights and a

truck load of submarine mine equipment and other Coast Artillery materiel transported by truck from Fort Monore to Chicago for this purpose.

The exposition was very successful and much appreciated by the people of Chicago. It was held at the fine municipal stadium (Soldiers' Field) and participated in by troops of all arms. A battalion from the Great Lakes Naval Training Station gave two fine exhibitions. Opportunity to see some high class horsemanship was furnished by the jumping of the Army Olympic team. The *piece de resistance* of the show was the "Attack on Chateau Thierry" which, if not altogether tactically perfect, was spectacular enough to please the spectators. During the entire exposition the 61st had a prominent part. The searchlights, particularly, were in action from beginning to end with colored beams adding to the beauty of the spectacle. A part of the anti-aircraft exhibition included the emplacing of an anti-aircraft gun which was accomplished on one occasion in four and one-half minutes. Captain Marquat's detachment attracted much attention and was highly praised for the appearance of the personnel and materiel by all connected with the carnival.

Returning to Fort Sheridan on June 30, Captain Marquat and a detachment of sixteen men, with one gun, searchlight, and a few other vehicles left on July 1 for Camp Knox, Kentucky, where they joined Major Hinman and his detachment of eighty-five men which had left the regiment at the Jeffersonville Q. M. Depot nearly a month before (June 5).

Beginning on June 16 the R. O. T. C. from the Fifth, Sixth and Seventh Corps Areas were in camp at Knox for a period of six weeks. The students were organized in two batteries of about seventy-five men each. Maj. Willis Shippam, from the University of Minnesota, was senior instructor in charge. Capt. Kenyon P. Flagg (Mich. State College Agri. and Applied Science) commanded one battery while Capt. Ellsworth Young (Kansas State Agricultural College) commanded the other. Other R. O. T. C. instructors present were:

Capt. Porter P. Lowry—University of Cincinnati
 Capt. Rodney C. Jones—Washington University.
 1st Lieut. Richard A. Ericson—University of Minnesota
 1st Lieut. Harry F. Meyers—University of Kansas

Gun drill, searchlight drill, and instruction on the use of the instruments and materiel occupied the first week. Due to the absence of the director (in Chicago) machine gun and small arms firing was conducted during the following week. When Captain Marquat and his detachment arrived (July 4) active anti-aircraft training was again resumed. Firings were held both during day and night—with guns and machine guns—with very satisfactory results. Students performed all duties including ranging officer and battery commander.

The training of Reserve units began on July 13 and was completed on August 9. No details of this training mission are available at this writing.

The following officers are now assigned to the regiment at Chicago:

Maj. J. H. Cunningham, commanding
 Maj. B. S. DuBois (leaving August 15
 for temporary duty at Aberdeen
 Proving Ground)
 Capt. R. B. Bottom
 Capt. Frank Richards
 Capt. R. T. Chaplin
 1st Lieut. P. C. Howe
 1st Lieut. F. J. Woods
 1st Lieut. Donald McLean

Five officers were present at Knox for the R. O. T. C. and Reserve training. They were:

Maj. D. D. Hinman
 Capt. W. F. Marquat
 1st Lieut. W. B. Merritt
 1st Lieut. G. W. Trichel
 1st Lieut. I. H. Ritchie

Major Hinman, Lieutenants Trichel and Ritchie were on temporary duty only and will return to their permanent stations upon departure from Camp Knox. Lieutenant Merritt will leave the regiment for new station upon the return to Fort Sheridan.

The 69th Coast Artillery (AA)

Aberdeen Proving Ground, Md.

About the time this number of the JOURNAL appears the 69th Coast Artillery will begin its long drill on the firing tests which continue up to November 1. Following the tests the preparation of the records and the report will require a further period of one month, at least. Then the regiment will be ready to move to its new station—Fort Hancock. In this connection the question of a temporary station for this regiment is now under consideration with some indication that perhaps it will not go to Hancock but may be sent to some other station or, perhaps, even remain at Aberdeen Proving Ground. Nothing definite can be stated at this time since no decision has been reached.

The 62nd has now returned to Fort Totten and the 69th has been conducting its regular machine gun and gun practices. All gun materiel has not been received but it is expected that it will arrive some time this month (August) and that the gun practices can be fired before the tests begin. Searchlight practices conducted by Captain Sackville are mentioned as having been particularly good. The searchlights used were three of the new type and two of the old. Two sound locators of the first vintage are available. On eight runs Captain Sackville's battery made "possibles" six times and lacked only a few points on the other two. Altitudes—nine thousand

and seven thousand five hundred (feet). The scores were all the more creditable due to the brilliant moonlight, the moon being located in the defended sector (or so our correspondent says, concerning the moon's location—which might draw some fire from the facetious). From this statement it is inferred that the searchlight sharks do not appreciate the moon's assistance and prefer to do their own illuminating.

In the next number of the JOURNAL it is expected that there will be much news of the tests which will be appreciated by those not concerned with them.

The 245th Coast Artillery (HD), N. Y. N. G.

The old 13th New York is well and favorably known throughout the Coast Artillery. Perhaps some may fail to recognize it by its newer numerical designation but as the 13th New York its annual visits to harbor defenses in the vicinity of New York were awaited with pleasure by the Regular Army personnel on duty. Maj. O. C. Warner is now the Regular Army instructor on duty with this regiment. He writes that the 245th conducted field training at Fort H. G. Wright during the period June 22-July 16. Fort Wright in many respects is an excellent location for National Guard training. However, one of the bugaboos of the Guardsmen has been the fogs which drift in towards the race from the general direction of Block Island. The regiment is, indeed, fortunate when the conditions permit all batteries to fire. On at least one annual period, due to atmospheric conditions, the entire two weeks passed with no firing conducted. This condition is discouraging because the firing is the most important feature of a National Guard encampment.

This year the regiment was very fortunate because all twelve firing batteries succeeded in completing their practice—the first time in several years. Battery "C," 1st Lieut. H. R. Johnson commanding, succeeded in winning high honors as represented by the score. Capt. E. J. Richards' "F" Battery obtained the best K factor while Battery "L" piloted by Capt. William Pabst, proved itself best at the infantry competition. During the firing aerial observation was furnished by the 27th Division Air Squadron. Captain Brewer and Lieutenant Mulligan were the pilots who spotted for the artillerymen during eight of the twelve practices.

The Regimental Commander is Col. Bryer Pendry while Lieut. Col. R. P. Orr is the executive officer. Many noted visitors came to Fisher's Island during the camp period to inspect the work of the regiment. Among those honored by reviews were Maj. Gen. John W. Gulick, the Chief of Coast Artillery, Maj. Gen. Wm. N. Haskell, commanding the National Guard of New York, and Brig. Gen. Henry J. Hatch, commanding the Second Coast Artillery District. The regiment also rendered honors to Brigadier General Byrne, commanding the Coast Artillery Brigade, and Brig. Gen. Sidney Grant, now retired, who for many years commanded the 245th. General Grant has never lost interest in the Coast Artillery nor in the old 13th.

The New England Bankers' Association held its convention at Fisher's Island during the camp. As a mark of courtesy the bankers, too, were asked to review the regiment.

Newly revised T. R. 435-55 were used in analyzing the practice and computing the score. The National Guardsmen approve of the revision and say that the new graphical analysis simplified the preparation of the record. They state that the scoring system is very fair and that the score actually indicates the worth of the practice. This is what the score should do but under the old scoring system this was not always the case.

The following officers commanded the batteries indicated during the encampment:

Capt. W. P. Alexander, Battery H
Capt. H. H. Busener, Battery D
Capt. T. E. Donelan, Battery A
Capt. E. J. Richards, Battery F
Capt. William Pabst, Battery L
Capt. J. W. Kersey, Battery M
Capt. E. S. Barron, Battery E
Capt. G. F. Orthey, Battery K
Capt. C. A. Lollo, Battery I
Capt. C. R. Munske, Battery G
Capt. H. A. Jones, Battery B
1st Lieut. H. R. Johnson, Battery C

PROFESSIONAL NOTES

Excessive Pressures Developed in Seacoast Firing

In a number of target practices fired in the past year and a half excessive pressures have been developed, in some cases, bordering on the dangerous. Investigations have been made to determine the causes of these high pressures and various officers have expressed their opinions, including officers of the Ordnance Department.

One Ordnance officer calls attention to the fact that the high pressures usually develop in the larger calibers and during the firing of record shots—not during trial fire. The inference he draws is that trial shots are fired with greater care, i. e., the gun crew functions unhurriedly permitting more careful ramming of projectile and charge. High pressures are more apt to develop from blended charges or, more exactly, charges which have been made up by the battery personnel.

During record firing, when speed is important to secure a good score, the ramming is more apt to be haphazard. Excessive pressures are believed to result from deformation of the charge. A charge lacking rigidity, when rammed hard, will undergo a shortening of its longitudinal dimension and an increase in its diameter.

Careful ramming will assist in eliminating high pressures. More important, however, is the proper forming of the charge so that the dimensions may still conform to those designated by the Ordnance Department after ramming and at the time the gun is fired.

The Coast Artillery Board has recently tested a diameter gage, consisting of a bronze hoop with handle, which should fit exactly, the charge when ready to serve. The Board recommends the adoption of the gage but no date can be set on which it will be furnished. The Panama Coast Artillery District favors the use of a device designed in that district which, it is claimed, will assist materially in making up charges. A full description of this device has been requested and will be published when received.

Percussion Primers Favored

If one were to examine the records of Coast Artillery target practices over a period of several years a surprising number of misfires would be disclosed. Misfires may be due to a number of causes but it is safe to say that primer failures are more numerous than any other materiel defect.

It is exasperating to the battery commander when a primer misfires. He may feel somewhat worried and nervous as to what higher commanders may say concerning the "failure of the battery commander to thoroughly inspect the primers used prior to firing." It is true that the battery commander may have certain electrical tests made for continuity of circuit. In the tropics he may (and probably does) store the primers in a dry closet for

a considerable period before the practice. He probably tests out a few in each gun. Even if all reasonable precautions are taken the primer case may rupture upon firing due to worn primer seat or the firing circuit may be broken during firing due to the shock of discharge or the hurried action of the gun crew.

The many cases of primer failure have been studied by the Coast Artillery Board. As a result it has recommended that the electric primer be abandoned and the percussion primer be adopted as standard equipment. The certain functioning of the percussion primer as used on small arms is common knowledge. No difficulty has been experienced with it in other types of fixed ammunition used by the Field Artillery. For this reason many officers have mentioned the possibility of the use of the percussion primer in guns of the largest caliber. The recommendation of the Coast Artillery Board has been referred to the Ordnance Department for remark and action may be expected shortly. No information is available as to the cost of such alterations as may be necessary if the percussion mechanism is approved. Availability of funds may influence any action contemplating a change in the system.

Extracts from War Department Training Directive, 1930-31

Regular Army self-training should occupy at least ten months of the year. Although Regular Army Units will only be available for actual, command and tactical training of Organized Reserve Units in association with them for the two months per year not set aside for self-training, Reserve units and individual officers will be given every possible assistance consistent with non-interference with the current training of Regular units.

The period of field training should be devoted as much as possible to the tactical training of the unit. All instruction which leads up to this should be accomplished in garrison and armory.

Provision should be made for the command and tactical training of headquarters of battalions and higher units of all components without the use of troops other than communication and intelligence personnel. Upon the conclusion of the basic training of all troops similar exercises should be conducted with all troops participating.

Ground units of all components must be trained to combat low flying aircraft. Active and aggressive measures, not passive defense, will be the primary consideration.

All military personnel must be accustomed to the use of the gas mask and to gas discipline.

All mobile organizations of the Regular Army will make, during each calendar year, the practice marches prescribed by War Department letter, December 10, 1929.

Mobile Regular Army units will hold field exercises annually.

Field training for Coast Artillery troops of active harbor defenses

will include manning installations to which assigned for a continuous "war period" of a minimum of one week.

During field training as many Reserve officers and units will be attached to Regular Army units as funds and circumstances will permit.

The initiative of junior officers must be fostered and developed by every means possible. To this end they should be afforded frequent opportunities to exercise, for extended periods, command of units appropriate to the next higher grade.

DISCREPANCIES NOTED

Efficient training in the battalion and below is sometimes hampered by higher headquarters prescribing too much in detail the hourly employment of lower units.

Some battalion and higher commanders failed to supervise properly the training of lower units during the company or battery periods, apparently being under the misconception that during this period company commanders should be left entirely to their own devices.

There is some tendency to conduct, over a period of time, the training of subordinate units of a major unit, individually, rather than concurrently with the progressive training of the major unit.

There is a tendency on the part of some units to neglect the proper use of cover during field exercises or to ignore the necessity for cover when operating in the presence of an assumed enemy.

It was noted in the tactical inspections of some units that the unit commanders had drawn the problems to be solved and that all echelons were thoroughly familiar with this problem prior to the inspection.

Frequently a greater number of Reserve officers and Reserve units were superimposed upon Regular Army units for training than could be effectively trained. The number of Reserve units superimposed at any one time should be strictly limited to that which can be thoroughly trained with the personnel and equipment available in the Regular Army unit concerned.

Spotting and Adjustment Board T1

The Chief of Ordnance has shipped to the Harbor Defenses of Balboa, Pearl Harbor, Manila and Subie Bay a Spotting and Adjustment Board T1, designed by the Coast Artillery Board and combining so far as possible the best features of various types of spotting boards submitted for test. In these harbor defenses the new spotting board will be given exhaustive and grueling tests to determine its suitability.

The main characteristics of the board are as follows:

a. It is designed for spotting upon the target (not the set forward point).

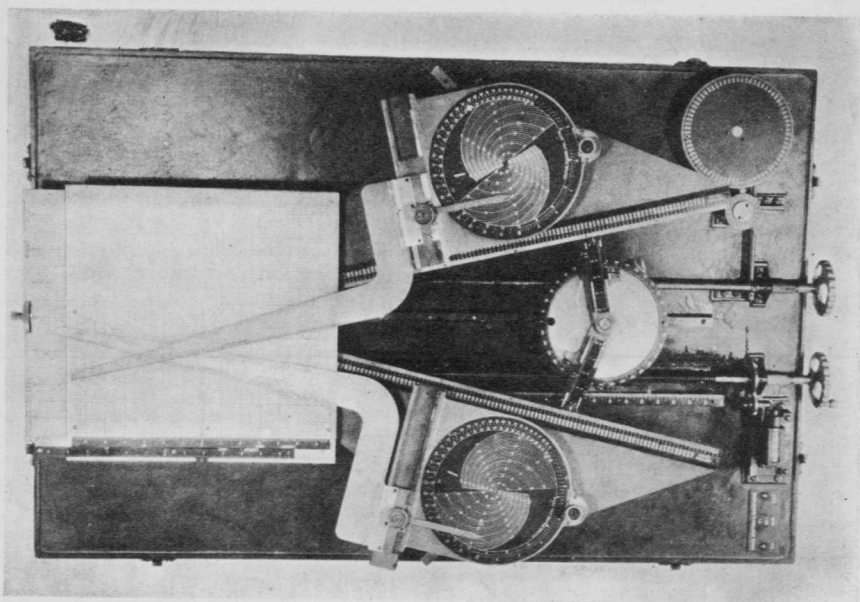
b. It is flexible with regard to the location of spotting stations which may be changed quickly.

c. All orientation data necessary are available through the normal plotting room operations.

d. One observer reader only is required at any one spotting station.

e. To begin operation the spotter requires no data except the assignment of target and notification of the instant of fire (or splash).

f. Maximum speed of operation of the board may be obtained by use of two operators (or three if used as an adjustment board).



g. The board is small in size and can be built at a reasonable cost.

h. It is capable of use in any system of observation now employed.

i. Range deviations may be read either in terms of percentage or yards.

j. Both range and deflection corrections may be made simultaneously.

A fourth board is in the hands of the Coast Artillery Board and will be used for service tests by organizations at Fort Monroe. While there is every indication that it will be adopted as standard its final approval depends upon the result of the service tests. If finally approved funds are available for the manufacture of (approximately) ten additional boards.

The photograph shows the general appearance of the board and indicates, somewhat, the manner of its use.

COAST ARTILLERY BOARD NOTES

Communications relating to the development or improvement in methods or materiel for the Coast Artillery will be welcome from any member of the Corps or of the Service at Large. These communications, with models or drawings of devices proposed, may be sent direct to the Coast Artillery Board, Fort Monroe, Virginia, and will receive careful consideration. J. C. Ohnstad, Lieutenant Colonel, C. A. C., President.

Projects Completed During June

<i>No.</i>	<i>Title</i>	<i>Action Taken</i>
609	Comparative Test of Self-contained Range Finders.	Completed June 9. Recommend that stereoscopic range finder be adopted for 155-mm. and all other rapid fire batteries of Coast Artillery; that 6-meter Zeiss stereoscopic range finder be built for test.
629	A Test of Gunner's Quadrant.	Completed June 12. Recommend Gunner's Quadrant M-1919 be adopted as standard for C. A.
698	Test of Sight Mount TO-5 for 155-mm. Guns.	Completed June 6. Recommend for adoption as standard, with certain modifications.
707	Test of Artillery Lantern M-1 and Lantern Mask T-1.	Completed June 17. Recommend be not adopted; that standard vehicle tail light be adopted for night aiming point light.
723	Study of the Causes of Misfires.	Completed June 10. Recommend modification of firing mechanism to use percussion primer.
753	Test of 8-inch Howitzer Firing Platforms for use as Semi-Permanent Firing Position for 155-mm. Guns.	Completed June 17. Recommend be not used; recommend certain sizes of timbers be issued.
781	Tables of Organization for AA Regiment.	Completed June 14. Tables, in general, are satisfactory.
782	"Brown" Antiaircraft Spotting and Graphical System.	Completed June 14. System should not be used.
788	Modification of Traversing Mechanism for Case III Fire (12-inch D. C.).	Completed June 7. Recommend modification be made.
792	Specifications for Finder, Height, T-12, 6 meter Base.	Completed June 10. Specifications believed satisfactory.
794	Modification of M-1917 AA Gun Carriages to give M-1917-M-1 Operating Characteristics.	Completed June 28. Recommend work be started at once on pilot mount.

Projects Under Consideration

<i>No.</i>	<i>Title</i>	<i>Action Taken</i>
661	Illumination of Mortar Pits and Gun Emplacements for Night Firing.	Under study.
665	Source of Power Supply for EE-5 Telephones.	Expect to complete during July.
681	Test of Fast Towing Target (Navy Design).	Awaiting result of study by Navy Department.

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| 689 Special Seacoast Target Practice for Training of Aerial Observers. | Awaiting reports of practices. |
| 694 Test of Erosion Charts. | Awaiting return of Jekaduma Chronograph from Panama. |
| 701 Comments on Target Practice Reports. | Comments submitted as reports are received. |
| 702 Test of Headset, Type HS-17. | Awaiting reports of tests at Pearl Harbor & M. & S. B. |
| 712 Conduct and Adjustment of AA Fire. | To be incorporated in C. A. F. M.; report in preparation. |
| 722 Tow Chains for Tractor Artillery. | Report in preparation. |
| 727 Standard Single Conductor Mine System. | A continuing project. |
| 731 Lighting Devices for Panoramic Sights, Scales, and Aiming Rules, Ry. Arty. | Awaiting reply from HD of Balboa. |
| 750 Faster Loading for Coast Artillery. | Report in preparation. |
| 761 Test of Experimental Reel Cart, Type RL-23. | Under test by 51st C. A. |
| 764 Reminder List for AA Target Practice. | Under study. |
| 789 Comments on Manual for Commanders of Large Units. | Under study. |
| 790 Fire Control Power Panel (Modified BD-17). | Under study. |
| 791 Development of Motor Vehicles. | Report in preparation. |
| 793 Proposed TR for Data Transmission System M-2. | Under study. |

*It is astonishing that the English endured for so long the pressure of our submarine headquarters in Flanders, and did not attack them till 1918, when they tried to close the small entrances of Zeebrugge and Ostend. So long as the coast defence was maintained this could only be achieved by surprise. * * * From an article, "Surprise in Naval Warfare," by Capt. Oswald Paul, late Imperial German Navy, appearing in Journal, R. U. S. I.*

YOU TELL EM

The Listening Posts Are Manned

The Editor, the COAST ARTILLERY JOURNAL

Dear Sir:

While I am one of those who believes that there are now too many service journals and that the interests of all would be better served if we had one good service journal covering the activities of the various arms, I would like to hand you a little boost. I have been a subscriber and a reader of the COAST ARTILLERY JOURNAL more or less continuously for the past nineteen years. In my opinion the magazine you are now editing is vibrant and interesting.

I enjoyed the article by "Onagarchus" and the replies it brought forth. It indicates that the COAST ARTILLERY JOURNAL today is a medium for controversy over questions of interest to our arm. An honest discussion in which both sides of any subject are fully presented is always to be desired. The article, "Let's Get Acquainted," tickled me. Too bad the author did not write a similar one relative to the different arms of the service understanding and getting along with one another. The articles on the new target practice regulations prepared by the Coast Artillery Board were indicative of your desire to keep the Coast Artillery, as a whole, informed in advance of changes which will affect everyone. I like your section, "Coast Artillery Activities," and your interest in the civilian components is to be commended.

In an article of some months back I noted that the question of whether the Knox Trophy should properly be awarded to a machine gun battery was raised. While it is my understanding that this trophy today is awarded by the Massachusetts Society of the Sons of the American Revolution for the best Coast Artillery battery, the possibility of making a really effective comparison between a good antiaircraft machine gun practice and a 14-inch seacoast practice seems doubtful.

Why can't the JOURNAL, with its progressive spirit, denote, or secure donations of, a couple of trophies, one to be awarded to the battery firing the best machine gun practice during the fiscal year, and the other to that battery making the best searchlight score. This would leave the Knox Trophy to be competed for only by organizations firing cannon, that is, seacoast batteries manning guns or mortars, and antiaircraft gun batteries. My suggestion would be that the trophies be in the form of cups and that they be passed on from year to year. A suitable pennant might be awarded at the same time with the cup, this pennant to remain in the possession of the battery winning it.

J. BALBOA.

P. S. Please don't ask me to donate one of the cups. I am a bachelor, and they are always poor. I also like your "You Tell Em" column. That is why I am trying to break into it.

J. B.

The Call of the Wild

EDITOR'S NOTE: *The purpose in publishing the following letter is to furnish proof that the pages of the JOURNAL are open for the expression of opinion by all readers. The title of the article was furnished by the author. It is believed that the conditions presented are not serious or, at least, not general. On the other hand it is not difficult to imagine that the state of mind indicated might result in the case of a very junior officer suddenly placed in command of a battery performing dual missions and who is lacking in tactical, technical, and administrative knowledge of the Coast Artillery. This condition may deserve some consideration from senior officers.*

For the benefit of the writer it may be said that the Coast Artillery Corps has never flunked any job assigned it. Its record in France with tractor, railway, trench mortar, and antiaircraft artillery is one in which to take pride. It has served as infantry on the Mexican border and performed other extra duty with entire satisfaction.

Recently it has been assigned a dual seacoast-antiaircraft mission. It is believed that it is capable of handling both in an efficient manner. If a few officers feel oppressed by a variety of duties this feeling will gradually disappear as their knowledge increases. It is natural that this oppression should be felt by the very junior officers. It can hardly be expected that the technical knowledge necessary can be acquired in a short period but study and experience will eventually correct this deficiency.

What is it going to be for our beloved branch, antiaircraft or seacoast?

Pardon the stupid question, gentle readers. You may be serving your country at the present time in various capacities but your reaction to the above question would be the same in all cases. Surely, you will say, we must have *both*; we must always man both types of armament.

Let us pause for a moment and look around us. While this article is written by a junior (exceedingly so) officer, it applies to all officers actively engaged in troop duty, and to the new officers just graduating from the Academy it applies particularly.

At the present time, if we study the conditions at varied Coast Artillery posts we cannot help but be impressed with the intense activity manifested. The Coast is an interesting branch—we all admit that; the Coast is a busy branch, we all see that. Our antiaircraft outfits are kept occupied all year long, with practices, drills, marches, schools, experiments conducive to a more efficient air defense, etc. Our seacoast defenses are even busier, attempting to do the same as far as their armament is concerned, and, *in addition*, conducting antiaircraft practices, drills and schools. Notice the addition. Perhaps, and it is only perhaps, an old Coast Artilleryman, versed in all phases of seacoast defense, can accomplish both missions efficiently. If so, he is doing his branch, the Army, and the people of the United States a great service. Parenthetically, he is certainly earning the salary voted him by the Congress of 1922. However, if we consider a junior officer, new to the Coast, full of ambition to learn the game, how long, under the handicap of the many boards, soirres, etc., that occupy his time, will it take him to reach the stage where he will serve his country efficiently? He knows practically nothing about the guns of his regiment, the instruments in his plotting room; his leadership qualities are still latent, his knowledge of battery administration is often embarrassing. And yet, with the small number of officers in the Coast he may (as actually happened to the author of this article) be

placed in command of a battery, entailing responsibilities such as property, for instance, with which he is entirely unfamiliar and which will demand practically all of his time to cope with successfully. Now, when he is trying to do his bit for the service, by means of long hours and conscientious application, he is required to detour frequently from his course to learn the gadgets and fire control of armament peculiar to antiaircraft only. He is told that, after all, antiaircraft is the main mission of all Coast Artillery batteries,* and that he should study nights in order to assimilate all the characteristics of this all important armament. Upon reflection, the truth is evident and painful. Antiaircraft is the coming thing; it is all important; we should know everything about this comparatively new branch. "How," thinks he, "can I learn the stuff when I'm only getting on to the ropes in seacoast? Am I wasting my time on something that is about to die a natural death?"

The junior officer—no exaggeration—is bound to be in a maze. If he is conscientious, the burden thrust upon him is liable to break him. He'll either ruin his health or give up the fight. In any case, he will be unable to perform his work as efficiently as he would like to, and gradually his ambition to become an efficient officer will suffer. He would have to be an exceptional officer if he didn't think, "What's the use. If I get my work done, fine; if not, the devil take it." This condition, if allowed to set in, would introduce a spirit into the Coast heretofore unknown. A conscientious, hard-working arm of the service, under the present system, would soon retrogress into a branch of much lower morale and efficiency.

Therefore the question, "What is it to be—antiaircraft or seacoast?" In many instances, this question is the desperate cry of Coast Artillery personnel. The need for antiaircraft training is obvious to all, but, with seacoast duties imposed, efficiency in both is out of the question. A solution must be arrived at—and the solution must be reached at an early date!

A plausible answer to the problem would be the following: Since both types of armament must be kept up, and since antiaircraft training is of greater importance, why not put all seacoast forts on a caretaking status? Let us turn to antiaircraft wholeheartedly and give it the attention it deserves. The experiments conducted at the Aberdeen Proving Grounds would be sufficient to determine the adequacy of our seacoast armament. The one hundred and fifty-five batteries should remain active, for the principles involved in their firing would apply as well to fixed and railway armament if the need arose. Our schools could keep our cold storage guns alive while we mass our forces where they are urgently needed.

A radical suggestion—the above—but why not? The day is only twenty-four hours long; an officer must keep fit. Certainly all the above is food for thought.

Sincerely,

JACK UVALTRADES.

* Note: This statement is incorrect.

COAST ARTILLERY ORDERS

Brig. Gen. William E. Cole, from command 1st C. A. Dist., to Hawaiian Div., sailing New York, September 27.

Col. Lawrence C. Brown, 9th C. A. District, Presidio of San Francisco, to Panama, sailing San Francisco, August 30.

Col. William A. Covington, to recruiting, San Francisco, instead of to 6th, Fort Winfield Scott.

Col. Homer B. Grant, Hq. 1st C. A. District, Boston, to Honolulu, sailing New York City, October 10.

Col. Edward Kimmel, Ass't Comd't, Coast Artillery School, to 62nd, Fort Totten, July 12.

Col. Frederick W. Phisterer, from Hawaii, to 14th, Fort Worden.

Col. Joseph P. Tracy, Gen. Staff Corps, to 2nd C. A. District, Fort Totten, instead of as previously ordered.

Lieut. Col. R. W. Collins, promoted colonel, May 21.

Lieut. Col. William A. Covington, promoted to colonel, May 27.

Lieut. Col. Frank Geere, to sail from San Francisco for Hawaii, November 20 instead of September 8.

Lieut. Col. Jacob A. Mack, upon his application, retired from active service, October 31.

Lieut. Col. Henry C. Merriam, promoted colonel, May 21.

Lieut. Col. Walter W. Merrill, from Hawaii, to Org. Res., Cincinnati.

Lieut. Col. Earl W. Thomson, CA-Res., to active duty, Sept. 2, on office of Chief of Coast Artillery.

Lieut. Col. James F. Walker, Org. Res., New York, to Army Retiring Board for examination.

Maj. Roger B. Colton, Fort Totten, transferred to S. C. and to Panama, sailing New York, August 21.

Maj. Edward B. Dennis, from Panama, to Org. Res., Columbus, Ohio.

Maj. Bird S. DuBois, previous orders relieving him from assignment, C. A. School, November 1, revoked. To be relieved August 15 and proceed to 61st, Fort Sheridan.

Maj. James P. Hogan, from Hawaii, to 62nd, C. A., Fort Totten.

Maj. Reinold Melberg, to sail New York, October 10, instead of August 12.

Maj. Reuben N. Perley, from Org. Res., New Orleans, to student, Q. M. Subsistence School, Chicago, August 22.

Maj. Charles Schaefer, Jr., CA-Res., orders to active duty revoked.

Maj. Francis J. Toohey, to sail New York, August 21, instead of July 18.

Maj. Edward W. Turner, from R. O. T. C., Utah State Agricultural College, Logan, to 6th, Fort Winfield Scott.

Capt. Percy Adams, from Panama, to 62nd, Fort Totten.

Capt. Albert A. Allen, 62nd, Fort Totten, to Quartermaster Corps School, Philadelphia, as student, August 22.

Capt. Sam W. Anderson, from Hawaii, to 12th, Fort Monroe.

Capt. Herbert H. Blackwell, from instructor, Coast Artillery School, Fort Monroe, to Advanced Course, Coast Artillery School, as student.

Capt. Ben B. Blair, 12th Fort Monroe, to Honolulu, sailing New York, October 10.

Capt. John B. Day, from Walter Reed General Hospital, to Fort Eustis, thence home and await retirement, June 3.

Capt. Harold P. Detwiler, 51st, Fort Monroe, to Quartermaster Corps School, Philadelphia, as student, August 22.

Capt. Alva F. Englehart, promoted major, June 16.

Capt. Henry F. Grimm, from Philippines, to Fort Leavenworth on transport, sailing San Francisco, July 30.

Capt. H. R. Jackson, from Hawaii, to 14th, Fort Worden.

Capt. Paul S. Roper, from Hawaii, to 6th, C. A., Fort Winfield Scott.

Capt. James A. Ryan, 14th, Fort Worden, to Honolulu, sailing San Francisco, November 20.

Capt. John L. Scott, promoted major, May 21.

Capt. Evan C. Seaman, promoted major, June 16.

Capt. Adrin B. Smith, 6th, Fort Winfield Scott, to Panama, sailing San Francisco, September 12.

Capt. Charles H. Stewart, from R. O. T. C., Kansas State Agricultural College, Manhattan, to Org. Res., Lawrence, Kansas.

Capt. LeRoy A. Whittaker, from Hawaii, to 62nd, Fort Totten.

1st Lieut. William I. Allen, from Coast Artillery School, Fort Monroe, to student, Mass. Institute of Technology, June 10.

1st Lieut. Raymond M. Arthur, from Hawaii, to 14th, Fort Worden.

1st Lieut. Orley D. Bowman, 10th, Fort Adams, previous orders to 69th, Aberdeen Proving Ground, revoked.

1st Lieut. Geoffrey C. Bunting, promoted captain, May 1.

1st Lieut. Frederick R. Chamberlain, Jr., 51st, Fort Monroe, to Honolulu, sailing New York, October 10.

1st Lieut. William G. Devens, 52nd, Fort Hancock, detailed in Ord. Dept. and to Watertown Arsenal, Ordnance School, as student, July 5.

1st Lieut. Edward A. Dolph, 62nd, Fort Totten, to Panama, sailing New York, September 11.

1st Lieut. Dean S. Ellerthorpe, from Panama, to 14th, Fort Worden.

1st Lieut. Charles W. Gettys, 12th, Fort Monroe, to Panama, sailing New York, September 11.

1st Lieut. Franklin K. Gurley, from Hawaii, to 52nd C. A., Fort Monroe.

1st Lieut. Herbert B. Kraft, from R. O. T. C., Utah State Agricultural College, Logan, to 6th, Fort Winfield Scott.

1st Lieut. George W. MacMillan, 11th, Fort H. G. Wright, to Panama, sailing New York, August 7.

1st Lieut. Harry F. Meyers, from R. O. T. C., University of Kansas, Lawrence, to Philippines, sailing San Francisco, November 19.

1st Lieut. Charles E. Neagle, from Panama, to 62nd, Fort Totten.

1st Lieut. Felix N. Parsons, 13th, Fort Barrancas, to Panama, sailing New York, September 11.

1st Lieut. John H. Pitzer, from student, Coast Artillery School, to R. O. T. C., Utah State Agricultural College, Logan, sailing New York, August 21. Previous orders revoked.

1st Lieut. John D. Robertson, from Hawaii, to 14th, Fort Worden.

1st Lieut. Rupert E. Starr, from Hawaii, to 14th, Fort Worden.

1st Lieut. Raymond Stone, Jr., 12th, to report July 5 for duty at West Point instead of August 25.

1st Lieut. Harold P. Tasker, 12th, Fort Monroe, to Honolulu, sailing New York, October 10.

1st Lieut. Henry W. Ulmo, 63rd, Fort MacArthur, to Panama, sailing San Francisco, September 12.

1st Lieut. George E. Young, 11th, Fort H. G. Wright, to Europe with pilgrimage of mothers.

2nd Lieut. John J. Holst, from Panama, to 61st, Fort Sheridan.

2nd Lieut. George E. Keeler, Jr., 62nd, Fort Totten, to Panama, sailing New York, October 23.

2nd Lieut. John H. Kochevar, from Panama, to 13th, Fort Barrancas.

2nd Lieut. John R. Lovell, from Hawaii, to 14th, Fort Worden.

2nd Lieut. Charles W. McGeehan, from Hawaii, to 62nd, Fort Totten, instead of to 14th, Fort Worden.

2nd Lieut. James W. Mosteller, Jr., from Panama, to 12th, Fort Monroe.

2nd Lieut. Robert J. Moulton, from Panama, to 13th, Fort Barrancas.

2nd Lieut. Harlan C. Parks, from detail in A. C. and from March Field, to Hawaii, sailing San Francisco, July 9.

2nd Lieut. George F. Peirce, from Hawaii, to 10th, Fort Adams.

2nd Lieut. John F. Powell, from Hawaii, to Hq., 9th Corps Area, Presidio of San Francisco.

2nd Lieut. Will K. Stennis, promoted first lieutenant, May 29.

2nd Lieut. William A. Weddell, 51st, Fort Monroe, to 69th, Aberdeen Proving Ground, July 1.

Dana Stuart Alexander, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Neal E. Ausman, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

David Hodge Baker, graduated U. S. Military Academy, appointed second lieutenant, C. A. C.

Oscar B. Beasley, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Lawrence A. Bosworth, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Harry R. Boyd, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Charles C. Cloud, Jr., graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Robert Edwin Cron, Jr., graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

James T. Darrah, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

John B. Fillmore Dice, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Carl H. Fernstrom, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Arthur Leonard Fuller, Jr., graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Hubert du Bois Lewis, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Robert Foster Haggerty, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Marvin Lewis Harding, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

William H. Harris, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Grant E. Hill, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Adam A. Koscielniak, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

James S. Lunn, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Charles J. Odenweller, Jr., graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Edwin S. Ferrin, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Willis A. Perry, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Arthur C. Peterson, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Clark Neil Piper, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

James S. Sutton, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Alden P. Taber, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Paul A. Roy, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Joseph Henry Twyman, Jr., graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Robert Jefferson Wood, graduate U. S. Military Academy, appointed second lieutenant, C. A. C.

Master Sgt. Benjamin Eisenberg, Battery E, 3rd, Fort Stevens, retired.

Master Sgt. Wilson H. Nutt, Hq. Btry., 7th, Fort Hancock, retired.

Master Sgt. William R. Sprague, retired July 31, and to home (Washington, D. C.)

Master Sgt. William H. Stevens, C. A. S. detachment, Fort Monroe, retired.

1st Sgt. Michael J. Healy, Bat. C, 12th, Fort Monroe, retired.

1st Sgt. James P. Langain, Bat. D, 16th, Fort DeRussy, retired.

1st Sgt. Edward A. Lawford, Hq. Bat., 60th, Fort Mills, retired.

1st Sgt. Michael Varley, 12th, Fort Monroe, retired.

Staff Sgt. Thomas Downey, 63rd, Fort MacArthur, retired.

Staff Sgt. Ransom P. Wodd, Bat. D, Fort Rosecrans, 3rd, retired.

Private Henry W. Sacknus, Bat. G., Fort H. G. Wright, 11th, retired.

BOOK REVIEWS

Siberian Garrison. By Rodion Markovits. Translated by George Halasz. New York: Horace Liveright. 5¼" x 7½". 407 pp. \$2.50.

First published in Transylvania in the Hungarian language, "Siberian Garrison," by sheer force of merit, has become the literary sensation of Europe, and is now being printed in nine languages, with the second printing already out for the United States.

The book is so unusual in every respect that it is difficult to classify. Although written in narrative style, it is not a novel—it deals with fact, not fiction; written in the third person, it cannot be called a diary, yet it is the author's own Odyssey; nor is it a war book, in the accepted meaning of that term, although it pictures a practically unknown phase of the World War; it is not a history in the strict sense, although it is based upon material that has now become historical. "Siberian Garrison" is an unforgettable book that stands in a class of its own.

The author, Rodion Markovits, a young Hungarian officer in the Austrian army, was captured by the Russians in 1915, and with a group of officer-prisoners, was sent first to Makariev on the Volga and then across Siberia into Manchuria to a military prison camp on the Ussuri, a tributary of the Amur. When the Czarist government fell and chaos descended upon Siberia, several hundred of the prisoners of war seized a train and started toward the European frontier, only to be turned back into Asia again by the fierce fighting beyond Ufa.

After coming and going aimlessly for weeks, the prisoners, hungry, tattered, bewildered, were taken off the train and interned once more in a prison camp on the Yenesei River. Here they saw the Czech legionaries of the Russian army under General Gajda and Admiral Koltchak seize the Trans-Siberian railway and murder the Red Guard; saw the mutiny and punishment of the Thirtieth Siberian Regiment—one of the most tragic episodes of history; saw the last desperate stand of Koltchak's White Army, and saw Siberia under the despotic heel of the victorious Red Army.

Finally, after seven years of untold misery and danger—cut off entirely from the rest of the world and constantly facing privation, epidemic and sudden death—Rodion Markovits was returned to his home—three years after the Armistice!

"Siberian Garrison" is the story of these seven years, and in the stark realism of the telling there is very little, if anything, left to the imagination. The primitive and uncompromising struggle for existence, the sex problems within prison walls, the hunger, the filth, the cold, the cruelties, the killings that come with revolutions and counter revolutions, are drawn in word pictures that are as powerful as they are vivid.

The literary style of Markovits, although undoubtedly modified or altered by translation, is still distinctly Slavic; introspective, analytical, sometimes morbid, with a fatalistic acceptance of the inevitable, it is a style that suits the amazing story he is giving to the world.—E. L. B.

The War of Independence: American Phase. By Claude H. Van Tyne. Boston: Houghton Mifflin Company. 1929. 5¾" x 8¾". 518 pp. \$5.00.

When Professor Van Tyne first undertook his work on the *Founding of the American Republic*, he planned to present his account in two volumes, of which



INTERIOR VIEW OF A CONSTANT TEMPERATURE MAGAZINE

The Life of Smokeless Powders

THE life of a smokeless powder is determined not only by the stabilizing agents that are incorporated in its manufacture but also by the purity of the materials of which it is made. And while strict chemical control is exercised at the powder plant, it is also highly desirable to have some means of checking the life of a powder after it has been loaded and has reached the hands of the shooter.

In discussing the life of smokeless powder, it must be remembered that powder will not stand abuse any more than other every-day articles of common use. Wood rots under excessive moisture, woolen clothes must be protected from moths, and rubber deteriorates if exposed to sunlight or oil. So with smokeless powder—it must be protected by storage under normal atmospheric conditions.

At the Brandywine Laboratory there are a number of constant temperature magazines in which samples of every lot of the various du Pont powders are stored in bottles as shown in the illustration. This particular magazine is kept at 30° C. (86° F.) day in and day out. Every few years a portion of each sample is removed and subjected to storage at the very high temperature of 65.5° C. (150° F.) until the powder breaks down.

As an example of the resistance to decomposition of a high-grade nitrocellulose shotgun powder, consider the following record of Lot 1101 of du Pont Smokeless Shot-

gun Powder which was made during the latter part of the year 1915, and placed in the 30° C. magazine on January 12, 1916.

<i>Date of Test</i>	<i>Days the Powder withstood Decomposition at 65.5° C.</i>
2- 8-16	1195 days
5- 7-19	820 days
2- 1-21	745 days
1-28-26	887 days

The balance of this fourteen-year-old sample is still held in the 30° C. and will again be subjected to the high temperature test at future periods even though it is most probable that all the ammunition loaded with this powder has been used over the traps or in the field several years ago.

Du Pont powders are used by all of the principal ammunition manufacturers. They have selected du Pont powders because their ballistic qualities contribute so largely to the superiority of the ammunition, and the consequent success of its users. To maintain these standards of excellence, the ammunition companies will continue to load those powders ensuring the best ammunition possible for a specified purpose.

The du Pont Company with its experience of 127 years and its present resources can supply to ammunition companies the type and quality of powders required to maintain the reputation of ammunition manufacturers and the confidence of the shooters.

E. I. du Pont de Nemours & Co., Inc., *Smokeless Powder Department*, Wilmington, Delaware



Smokeless Shotgun Powders

the second was to include the entire period of the Revolutionary War. The purchase of the Sir Henry Clinton Papers and the Lord George Germain Papers by Mr. William L. Clements made available—particularly to Professor Van Tyne—such a wealth of hitherto unused material that it became necessary to expand the Revolutionary War to two volumes. The author states that the new sources changed his original perspective; he might perhaps have gone further and admitted that they also modified some of his views—something which occurs to few historiographers.

The present volume is the second in the series on the Founding of America. It starts with Lexington and carries the account through to the close of the Saratoga campaign and the open espousal of the American cause by France. Notwithstanding the fact that France had secretly aided the American colonists from the first and had regularly and continually intrigued against the interests of Great Britain, the author calls this period of the war the American phase to distinguish it from the period of active French assistance, which he calls the French phase.

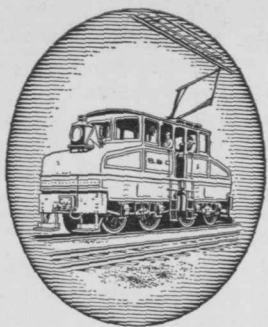
This division is both natural and logical. With a large Whig element in England and with the Army in America commanded by a Whig, there was always the possibility that Great Britain and America might come to terms. Prior to Saratoga, the high lights of the Revolution were the British success at New York and their repulse at Charleston, and the American repulse in Canada and their success at Trenton and Princeton. The character of these affairs was not such as to make it impossible to come to terms. Saratoga, however, closed the door to amicable negotiations and made it possible for France to come out into the open.

Since the first phase of the American revolution was more political than military, the author's account is political. Military events are submerged to their proper place in perspective. Much of the volume is devoted to the careful nursing and the gradual development of the revolutionary spirit in America and the imposition of the will of a minority upon the majority. The campaign of Burgoyne, which ended at Saratoga and which marked definitely the turning point in British affairs in America, is discussed at length.

The influence of new source material is most evident, perhaps, in the picture of George III which is presented. Nowhere does he appear as the insatiable monster that we have been taught to expect. Instead, he was an extremely popular king "who believed in the Bible, feared God, and loved the Queen." His court "was clean, and his conduct worthy of an Englishman, a Christian, and a king." In the light of available evidence, all this is easy to believe, but it is more difficult to think that Lord George Germain does not deserve more severe treatment than he receives.

In connection with plans for the Saratoga campaign, the author emphasizes one point which has been missed by other historiographers, save only Channing. "Since to march an army down from Canada, and to get control of the Champlain-Hudson line, would separate New England from the other colonies, and leave it to be conquered unaided by them, military experts have assumed that this was the aim of the British government and its generals. In all the available correspondence as to the aim of the campaign, not a sentence makes any such proposal. All the logic of the situation and military custom point to that as the object, but for this idea there is no contemporary document. . . . Burgoyne's plan . . . had just one aim—to bring aid to Howe so that his army could go against the entire army of Washington."

One matter of interest has not been answered by the researches of the author and his assistants. Sir William Howe still remains an unsolved enigma.



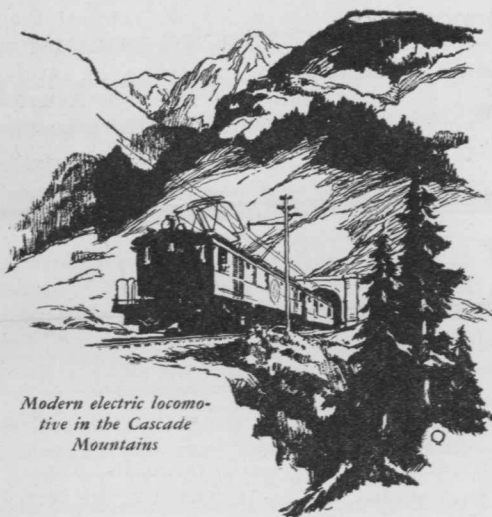
The Baltimore and Ohio electric locomotive of 1895

Transportation by Land

The first electric locomotive to be used in railroad service, designed and built by General Electric, was put into operation by the Baltimore and Ohio Railroad in 1895. Perhaps 1895 doesn't seem to be so long ago, but the 35-year period since that time has been rich in the development of electric transportation by land.

Great railway terminals, which once echoed to the din of the iron horse, have been made silent by complete electrification. Many sections of main-line railroad have been electrified. Electric street railways and city rapid-transit lines—recently supplemented by the gas-electric bus—are undoubtedly the most efficient carriers of large masses of people.

Transportation by land acknowledges the contributions of electricity, whether it be in a metropolitan subway or on the formidable grades of a mountain range.



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WHEN WRITING ADVERTISERS PLEASE MENTION THE COAST ARTILLERY JOURNAL

"Why," Professor Van Tyne asks, "did he play cat and mouse with Washington? Was he a tool of Burke and Pitt? Did the Ministry order him to have the sword in one hand and the olive branch in the other? Why did he sit around waiting for rivers to freeze or weather to cool, and fall just short of actually seizing his prey? It is all an historical riddle with many answers, none convincing."

Professor Van Tyne has had to work with the invaluable Clinton and the Germain Papers while they were in the process of classification and preparation for preservation. Followers in his footsteps will have an easier task when these papers reach the William L. Clements Library, but it is improbable that they will discover anything overlooked or that they will present a clearer or more able exposition of the progress of the American colonies toward independence.—R. A.

My Tropical Air Castle. By Frank M. Chapman. New York and London: D. Appleton & Co. 6" x 9". 417 pp. 48 plates, 30 Illustrations in Text. \$5.00.

Dr. Frank M. Chapman has stood high in my estimation since that far-off day in my boyhood when someone gave me a copy of his "Birds of Eastern North America." That is a great book for a New England bird-lover, boy or man, and is still one of my treasured possessions. The admiration and regard engendered by that book now gain an almost personal touch through the reading of Dr. Chapman's latest production—"My Tropical Air Castle." For I too have served a tour on the Canal Zone, and welcome the book as a reminder of happy hunting days in the Panama jungle.

Dr. Chapman, as all the world knows, is Curator of Birds at the American Natural History Museum in New York City. As an ornithologist he has travelled over much of the Americas and has given to the world the results of his studies in a series of interesting books. The scene of the present work is laid on Barro Colorado, that large island opposite Frijoles in Gatun Lake which the Government has reserved as a sanctuary for all kinds of wild life. On this island is a laboratory of the Institute for Research in Tropical America, a branch of the Federal National Research Council. In his "Air Castle" a typical Canal Zone shack near the laboratory, Dr. Chapman has spent several months in studying the fauna of the island. This book tells what he saw, did, and learned during his sojourns.

The book begins in an admirable way: by means of one sketch map and two airplane oblique photographs the author thoroughly orients the reader and leads him to the door of the Air Castle—evidently a naturalist's paradise, on one side the primeval forest and on the other the waters of Gatun Lake.

In general, the author is naturally most concerned with the birds of the island. He devotes considerable space to studies of the *Oropéndula*, the bird that builds those queer, long, hanging nests—like elongated nests of our Baltimore Orioles. He adds evidence on both sides of the long-mooted question—"Do buzzards hunt by scent or by sight?" And, for a few chapters, he leaves his beloved birds and writes entertainingly on monkeys, coatis, and other inhabitants of the island.

He describes interesting experiments in photographing wild animals at night, and many of the forty-eight halftone plates show the results of his endeavors. Pumas, peccaries, coatis, ocelots, and even hawks recorded their presence by these auto-portraits. How many passengers on the liners which traverse the canal realize that they have passed within a stone's throw of a real live

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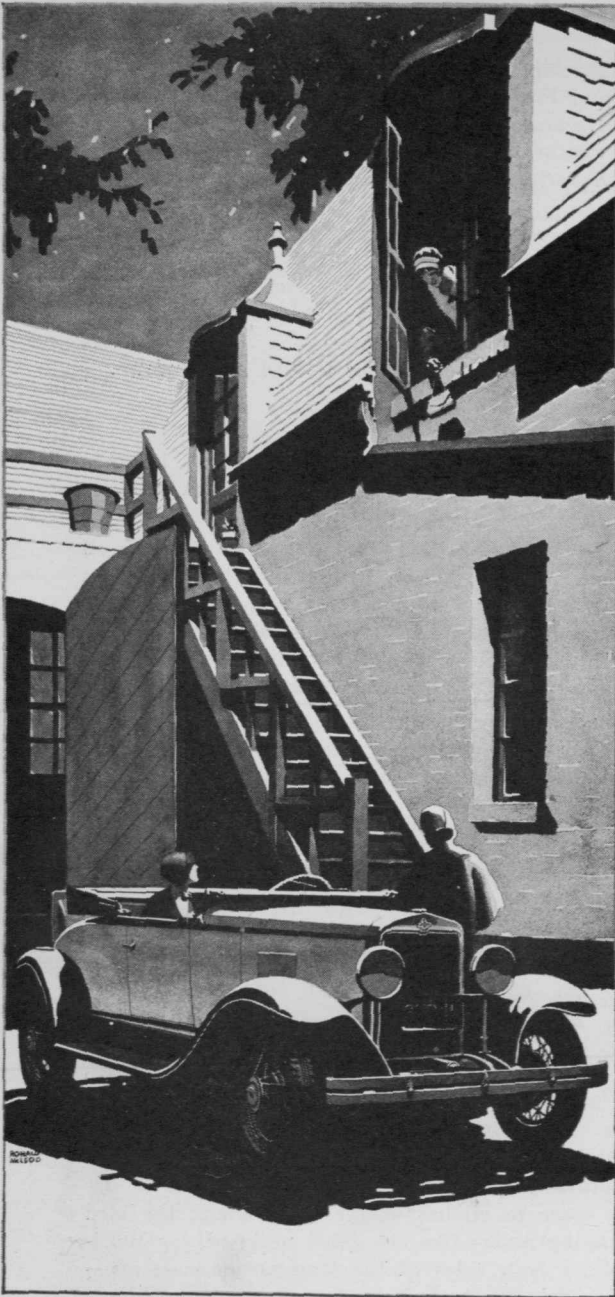
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IT'S WISE TO CHOOSE A SIX

wild tapir, that queer beast pictured in our old-fashioned "Joggerfy"? Yet Dr. Chapman produces the tapir's portrait—three of them, in fact.

"The Tropics, where the flowers are scentless and the birds are songless." As far as birds are concerned, it is with evident satisfaction that the author pricks this fallacy, showing that some of the world's finest songsters may be heard in tropical jungles and savannahs. And, after all, musical quality is but a matter of taste. Personally, the cooing of a Mourning Dove, reminiscent of Philippine mornings with bamboo fronds rustling dryly in the breeze, is far more "musical" to me than the twitterings of a tame canary.

In the last chapter the author bids good-bye to his island and, exploring the marshes of Pacora, brings back to us, among other treats, another of our childhood friends—that walker of the lily pads, the spraddle-footed Jacana. The penultimate sentence of the book refers to the view from Ancon Hill, where "the airplanes above their field, the troops at Amador, the fortified islands beyond, and the men-of-war at anchor in the bay are symbols of protection and hence of peace." We commend that sentence to all Pacifists. Pretty darn straight thinking, for a scientist.

We can easily believe that this book will be welcomed not only by the Old Timer on "The Line" (as they used to call the Canal), not only by those of us who have spent happy sweating hours hunting in the jungles and over the savannahs of Panama, but also by the wide circle of nature-loving Americans to whom this book will be a revelation.—P. D. B.

The Aircraft Handbook. The Construction and Care of Planes, Motors and Aircraft Instruments. By F. H. Colvin and H. F. Colvin. New York: McGraw-Hill Book Co. 1929. 5½" x 7½". 690 pp. \$5.00.

The authors have assembled into one compact volume a vast fund of information pertaining to things aeronautical ranging from "Simple Airplane Theory" to "Air Traffic Rules." There seems to be no phase of this subject that is not covered. One may learn how to repair a hole in a metal float, the details of construction and operation of the Wright Whirlwind, methods of trouble shooting, or the use of the earth inductor compass. Over two hundred pages are given over to the most detailed explanations of the different types of air plane engines now in service. There is a very full glossary of terms, and finally an excellent index. Plainly this is a technical text for practical airmen. A copy can now be found in the Library of the Coast Artillery School—H. C.

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