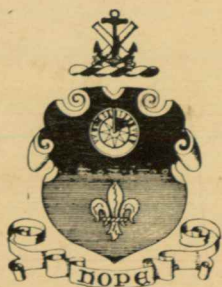


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COAST ARTILLERY JOURNAL



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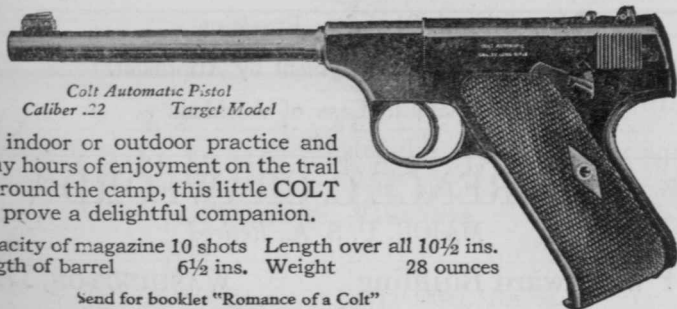
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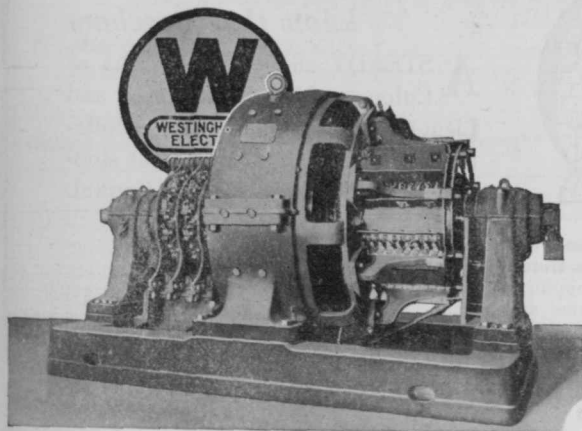
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Number 1

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THE MARINE CORPS LONG-RANGE TROPHY

This event was won by the Coast Artillery at Wakefield, Mass., August 18, 1925, score 197 x 200. The match was a two-man team event at ranges of 600 and 1000 yards, the winning team being: 1st Lieut. Samuel McCullough, 51st Coast Artillery (Hv. Trac.), Fort Eustis, Va., score 97 x 100, and Sergeant John P. Horwath, 65th Coast Artillery (A. A.), Fort Randolph, C. Z., score 100 x 100.

THE COAST ARTILLERY JOURNAL

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NO. 1

To the Coast Artillery Corps:

I am leaving active service to go on the retired list after nearly eight years as your chief. I feel that much has been accomplished in that time. It was a period of reorganization, renovation, and change. It was a period of opportunity. I feel that we of the Coast Artillery Corps have taken advantage of the opportunity. I feel that it has been a period of successful advances. But I want the Corps to know that I feel, still more deeply, that whatever of success has been our portion in that time is due in the first place to the able, effective efforts of the assistants in my office, and in the second place to the loyal, whole-hearted co-operation with which the Corps at large has always supported us.

My first objective has been to maintain the view that the Coast Artillery Corps was a part of a team—the Army. My second has been to give every man a square deal. I know well my successor, General Hero, will include these in his objectives—and if you give him the support you gave me, he will neither ask nor care for more.

F. W. COE,

Major General, Chief of Coast Artillery.

Washington, December 24, 1925.

Sea Power*

MARITIME WAR

By CAPTAIN T. C. HART, *U. S. Navy*

IN studying war or anything else, we base on classics. The military classical works are mainly those of continental European authors,—von Clausewitz for instance. Where they define war and expound its nature, the decided tendency is to name only two kinds—*Unlimited War* and *Limited War*. The latter gets only scant consideration. From those authors' viewpoint, that is correct treatment because of the pronounced tendency of Continental European wars to take the unlimited, "Nation in Arms" form.

Our situation is otherwise, and the kind of war which is most likely to confront us in the future needs an entirely different term in order that we may be using a name which really means something. The best descriptive name for it is *Maritime War*. To grasp its meaning and to understand how this variety of war affects international situations, it is necessary to study British writers on war. They are the natural source because it is Maritime War and its potentialities which have built up the British Empire and have maintained it. It is, in England, a long-used name.

We will attempt to impart a conception of Maritime War by means of an example. The Seven Year's War is a good sample of it—and one of live interest because it closely touched the development of this nation.

During most of that war the line-up was Great Britain and Protestant Germany against France, Austria, the Catholic German States, Russia, and Poland. Various conditions holding over from the unsatisfactory Peace of Aix-la-Chappelle lay behind the war, but its immediate cause was collision between the British and French colonists in America. At first both France and Great Britain wished to confine the war to America. But, being the weaker at sea, France had no good prospect of success in that way and soon decided to win the war in Europe. The means for drawing the war to a region where France could use her great strength in land forces lay in the British King's possessions in Hanover, which the British could not abandon—much as many of them would have liked to do so. To protect Hanover, an alliance was made with Prussia, just then emerging as a powerful state but with a strong natural enemy in Austria.

It was the time of Frederic the Great; he was the leader on the continent, throughout. When army officers study the Seven Year's War, it

*This article was not originally produced for the JOURNAL.

is quite natural to be most interested in Frederic's campaigns. At that time it was also natural that British army officers should desire to enter the continental war in full force. From the professional standpoint, it was the big show. The British people, however, had no pronounced desire to raise forces for direct participation in Frederic's campaigns.

For Great Britain, the outstanding leader was the elder Pitt, a cabinet Minister most of the time. Unlike Frederic he did not take the field but, like him, did manage the war in all its aspects for his own nation. History has to give him great credit for success.

Now Pitt often spoke of "his system,"—in explanation of British accomplishments. As a system it was simple; it amounted to his one-man control over diplomacy, army and navy, and using his power to handle those weapons in proper cooperation. Pitt was almost constantly engaged in political strife and had to cope with court intrigues. The Army's urge toward Frederic's campaigns was strong. The Navy inclined simply to go after the French sea-forces whether they were in the way or not.

But, on the whole, Pitt was successful in resisting all trends which did not conform to his conception of the war. The grand strategy which flowed from it was a defensive in Europe and an offensive in America. The defensive strategy was not a matter of directly reinforcing Frederic's armies in the hope of thus saving Hanover. Prussia was subdivided and British troops did fight in Germany. But Pitt's "system" was applied, in all its ramifications, toward a defensive European war and economy of forces therein.

The operations took the form of combined expeditions of large naval and relatively small land forces. There were many such, and some one of them was usually concentrated or ready; their effect was to threaten many points for long periods, in the aggregate. Some of the expeditions into the German North Sea rivers had a very direct effect on the German campaign. Several others attacked the Atlantic coasts of France. They were largely tactical failures and in any case were too weak for deep penetration. But the French could not face the possibility of more Gibaltars, and on their own coast. Consequently each attack and even each threat drew large forces to the coasts. Thus the situation in Germany was relieved time and again; Frederic approved these combined operations and urged more of them.

It can be claimed that Pitt's strategy in Europe dispersed forces which would have been better employed in Germany. The answer is that it would have been playing into the enemy's hands. They could have overmatched all the troops that England could have sent over, once they were permitted to settle down undisturbed from the seaward. Frederic would have been that much nearer to defeat. If such had occurred, Hanover

would have fallen and the French would have realized their concept of the war,—and won it on the continent.

Meantime the British, moving freely at sea, won the war in America,—largely through the same “system” of combined operations. The greatest one captured Quebec—with the result which is well known to all. Unlike many of the others its execution was well-nigh perfect and it forms a most instructive study in itself.

Now that was Maritime War. As it particularly touches us, it means making full use of our economic advantages and employing the Army and Navy as *one weapon* to gain our national ends when diplomacy has failed.

Our small wars and our unlimited War of the Rebellion had much of Maritime War in their make-up. There was not much of it in the World War after we went in. There was during the first two years of it, and at least one enormous mistake was made therein.

In the future our wars may be small or they may become full-sized, unlimited wars. In any case, they are bound to be Maritime in large measure; this because of geography if for no other reason.

SEA POWER

There seems to be no necessity for discussing anything on the subject which is merely academic. We will pass then to resolving Sea Power into its essential elements and then attempting to show how our nation stands under each of them.

First, however, we do wish to show one historical illustration of the *manifestation of Sea Power*. There are many to be had which may be read in several instructive and entertaining books on Sea Power. For our one example, turn back to the year 1492. Take a map of the known or partially known world at that date. Its significance lies in the line which then rather approximately separated the white race from the others.

The constitution of the white race was likewise,—somewhat approximate. It was Mediterranean in the south; the evolution of what is known as the Alpine branch was well along in the center; but the north was Nordic—the strongest branch. There was no well defined racial unity but it all was the white race.

Now what had been happening? Two separate movements of non-white peoples had been hammering at the whites in successive waves. Up from Africa had come invasion motivated by the Moslem religion. The Saracens, who really possessed the world's highest civilization during the ninth and tenth centuries, had reached well north in the Spanish peninsula. But they had in all respects passed their zenith by this time, and that particular inundation was receding.

Elsewhere the situation was not promising. The Mongols of the early Christian era were the worst barbarians the world has ever known. Hay-

ing slaughtered millions while surging about in Asia, they swept across Russia, devastated Poland and parts of Germany, and once were turned back only at Chalons. Another wave was stopped in Silesia. The Turks had the same origin and were the same sort of barbarians; having submerged Asia Minor they crossed into Europe with their impetus accelerated by the Moslem religion which they had assimilated. At the date of our map, 1492, the Turkish tide was still in flood and began actually to recede only two hundred years later at their defeat under the walls of Vienna.

These invasions of non-whites had severally been stopped by Nordic fighting men. However, it had been a defensive and none-too-hopeful struggle. Western civilization was restricted to a small area and had been fighting with its back to a wall—the wall of an unknown ocean, then terrible in its vastness and darkness. Up to this time, the ocean had been an impossible obstacle. But the Renaissance was on, carrying with it the technical development that was needed to convert the ocean from a terrible obstacle into an agency—the best kind of highway ever known. Only the whites had the ability and the common sense to make full use of it, and from the defensive they passed to the offensive—nourished by all the resources of the world. Very largely by means of their power on the ocean, the whites—and particularly its Nordic branch—became masters of the world. As a companion to a race distribution map of 1492, one of the whole world which shows the parts now dominated by the white race is interesting. The two constitute a sufficient illustration of the influence of sea power on history.

ELEMENTS OF SEA POWER

It is possible for a nation to be powerful at sea by virtue of a navy alone. But never for long; a navy exists only when there is good reason and it is only one of several elements that go to make up Sea Power. There are also:

1. Geographical features.
2. Natural resources and industrial development.
3. Character and numbers of the people.
4. Character of government.
5. Merchant marine and the accessories thereof.

As for geography,—there is both a military and an economic aspect and they are more or less in opposition.

From the military point of view it is clear that a nation which does not have to defend land frontiers is favorably situated. If so placed that injury by enemy land and air forces is inherently difficult but at the same time near enough easily to apply its own naval power, the military geogra-

phy is good. The extent of a nation's territory is not a factor, either way, provided it is well populated. Compactness is an important factor. To be in all respects geographically strong, the proper conditions should apply throughout a nation. For instance, the British Isles are strongly placed—that is if the continental air menace is not too great—but the Empire as a whole lacks compactness and has some weak frontiers; *vide* Canada. However, if the seat of the Empire, the citadel, is strongly positioned, weak military geography for outlying possessions is not so serious; for example, Japan, even if still more extended. Holland, on the other hand, is badly placed—extended into two hemispheres and with weak German and Belgian frontiers.

The conformation of coast lines is highly important; a harbor can always be constructed but usually only at enormous cost. Therefore, without plenty of good natural harbors, there is a great handicap for the development of sea power. It is also necessary that there be a sufficient contiguity in coast lines. An example of very poor situation is Russia of twenty years ago which had important maritime interests in the Baltic, in the Black Sea, and in the eastern Asiatic seas.

From the economic aspect, which also is very important, the essential condition is that commercial ports be so located that the country's commerce shall not be at a disadvantage. Too great distance from the natural markets is a handicap; a similar one is distance from raw materials which must be imported. The British Empire is a good example of a country which has, in general, favorable commercial geography. As mentioned above, what is favorable therein is not always good military geography.

Resources and Industrial Development. While the first sea powers of history were developing, the sequence was: production, commerce, colonies. Conditions are the same now if we substitute *markets* for *colonies*. And markets were what colonies really meant anyhow. When production of manufactured or of raw materials exceeds consumption, we try to trade off the surplus for something we prefer. That means commerce, and, in these days, highly competitive commerce. Therefore, industrial development and the possession or effective control of natural resources is an element of sea power. Moreover, in practice, it is needed to produce the more tangible elements. It is possible to acquire ships in the world's markets. But, for instance, a navy which cannot be built, repaired, and supplied from within its own country is too artificial an affair for full effectiveness.

The People. All peoples have not the qualities for attaining well-established, permanent sea power. Such may have favorable geography and produce surpluses, but not achieve any influence at sea or control of commerce. They may trend only to ease, luxury, and decadence. But

when those conditions are coupled with an adventurous, pioneering spirit, that people goes to sea and into foreign fields—unless, of course, their own country is underpopulated. That leads to mentioning another circumstance—pressure of over-population. That pressure has and does lead to simple emigration and life under a foreign flag. Instead of that, other kinds of people colonize or go to sea for a living.

The Government is of particular importance only in that foreign relations come into play. Forethought and continuity of policy is of more importance in dealing with external relations than for internal affairs only. In the latter there is quicker action, mistakes can be more readily rectified, etc. The form of government is not necessarily of consequence; but if a country is to be powerful at sea, its government must look outward, visualize the future, and attain continuity of policy in external relations. It may and should be a matter of leading its people rather than following its "public opinion."

The Merchant Marine is an essential element. It includes ships, of course, but far more. There needs be the ability to build, repair, and supply the ships *and* all the accessories for their successful operation against competition. This includes arrangements by virtue of which there is no disadvantage in foreign ports; better still are ports at or near foreign markets which are owned or controlled to advantage. In any case, adequate fueling arrangements, sufficient communication facilities, insurance, banking connections, commercial agents on shore, etc., are all required. A full-sized, overseas mercantile establishment is a costly affair—so costly that it is likely to run only at a net loss; many have so run and are doing so at present.

Then why struggle with a merchant marine? Trade in this world is highly competitive and it tends to be unfair competition. A slight advantage of any sort may mean the difference between success and failure. Such advantages, and disadvantages, frequently come from the ownership of the transportation. What has happened along those lines is well enough known to make manifest the desirability of possessing a merchant marine—even if it does run at a loss. And there is another factor, based on the fundamentals of international economics, which is at least as important—and somewhat more tangible. Money paid to a foreign merchant marine goes out of the country and is directly entered into the adverse side of the nation's balance of trade. If the freight charges go to one's own merchant fleet, they flow back into the country. Those are the circumstances which lead governments to foot the bills in subsidies in some form. So much for conditions during peace.

During war, if neutral, a nation is even more likely to be at a commercial disadvantage if it does not possess a healthy merchant marine.

Having one not only avoids those unfavorable conditions but enables a people to make full use of the trade opportunities which arise during war.

If at war, the role of a merchant marine needs only a mention. The commercial circumstances are likely to be too complex for analysis; but it seems safe to say that the cost of a war will be much greater to a nation without merchant shipping than to one which has it. As an auxiliary to the fighting forces, in a Maritime War, the value of a merchant marine is evident. It is a plain necessity. From the purely naval standpoint, it is difficult to differentiate merchant ships from strictly combatant ships. Three hundred years ago, ships changed from peaceful merchantmen to men-of-war almost over night. They did it also during the last war. A belligerent with a navy but without merchant shipping is at an enormous disadvantage against an opponent having an equal navy *plus* a good merchant fleet. In evaluating the power of the British Navy, merchant shipping must not be forgotten.

Navies, the final element of sea power, are a necessity during peace by virtue of potentiality and an essential in maritime war.

A navy must have combat ships but also, what is so often lost sight of, a personnel for them; there is also required the shore establishments and bases for building, repair, and supply. The primary function of a fleet is to control sea communications for the interests of its own nation and their denial to the enemy. To fulfill this function a fleet must have the highest mobility. That is, it must be "foot-loose" and able directly to apply its own power where it will do most good. A defensive role, where some point or line must be continually covered by combat ships, is weakening.

Avoidance of that situation means, in the long run, *bases*. It is best that they be established for the particular purpose but the facilities of a merchant fleet base can be made to answer the purpose. Whatever its origin, the essential qualities of a naval base are three, and in order of importance, as follows:

Geographical position.

Adequacy to the task of "tending" the fleet.

Defensive power.

Bases are even more necessary than when technical development was at a lower stage; the industrial equipment and skill must be much higher and geographical situation is even more vital. Incidentally, geography is the only one of the three requirements which cannot be artificially supplied or increased.

So much for a brief mention of the Elements of Sea Power. They are not given in any order of importance; it is not possible to do so for general application. The elements are inter-connected and their relative importance must vary for specific nations. It should be clear that, in the

aggregate, the magnitude is so great that Sea Power is not attainable for small and weak nations. Also, without it, no nation is likely to be a great factor in the affairs of the world at large.

THE UNITED STATES AS A SEA POWER

On this continent our position is generally favorable—from the strictly defensive standpoint, very favorable. We have an extensive area, but it holds a numerous people. We have long land frontiers, but there is little military strength opposed. Hawaii, Alaska, Panama, and our Caribbeian possessions are geographically detached but nearer to our citadel than to any foreign source of strength. We have no great wealth of natural harbors, and the improvement and maintenance of harbors commensurate with present and future requirements is expensive. The Pacific Coast is four thousand miles from the Atlantic Coast. That seems a dangerous lack of contiguity but the Canal makes the lines internal. Even counting these draw-backs, our geography is defensively strong; all real danger is across some ocean. That circumstance works both ways, —we have far to go to wage an offensive war.

Our commercial geography is none too good. We have an advantage in trade with northern and western South America and a stand-off for the remainder of it. But numerous peoples—and that means markets—are in Europe and Asia. The distance and lack of anything favorable in most foreign terminal facilities involves a handicap.

The Philippines are a special case. The weakness in military geography is too evident. From the economic aspect the situation is reversed. The Philippine Islands are rich and are estimated capable of supporting ten million; what that means to a people which trends so strongly to expansion, as we do, is manifest and is one thing. Another, and a more important one, is that Manila, which is set in the midst of these rich natural resources, is well located for a most valuable center for much of the far east. It is not as well placed for the China trade as, for instance, Hong Kong and the Japanese ports; but it is relatively near to the East Indies and to Australia. Anyhow, it is clear that in the Philippines is our only chance for our own commercial *point d'appui* near to a great foreign market. Moreover, half the people in the world live near it.

Our strength in natural resources needs no statement. We do tend to exhaust them too rapidly and have begun to import raw materials of several varieties. A more evident development—which has grown within a generation—is that we now manufacture more than we produce. We are definitely in the cycle,—production, commerce, markets; competition is not going to be easy and we shall need all the advantages which we are likely to get. Another change in our economic situation has taken place within ten years. We are now the creditor nation of the world; we have more to defend than we have ever had. Also we possess the wherewithal

to invest in and the agencies to produce all the material elements of sea power.

There is no current clamor on the part of Americans to go overseas on commercial pursuits or to go to sea. There are both pessimistic and optimistic opinions on their aptitude for it. On the one hand is the evidence of trend toward luxury and ease of living; also the multitudes who herd into our cities. Opposite are the others who, being by nature pioneering and venturesome, move outward. However, the increase of population and natural evolution will make it increasingly difficult to make a satisfactory livelihood at home. The movement outward will soon have more inducement and there seems no reason to think that when such stage is reached our people will not so move.

As far as sea power is concerned, there is nothing at fault in the character of our government. It reflects, of course, the ideas of the public, which for generations has been centered on internal affairs more than is the case with most other peoples. Such is still the condition. But during the last four administrations there has been shown a disposition to look farther ahead than before and to be considerably in advance of the people in all that concerns sea power. The latest evidence is the continued endeavor of the current administration to improve the status of our merchant marine.

Our merchant fleet is large but there is included a great proportion of inefficient ships and it is not well-balanced in types. Our building capacity is adequate but is rusting out from disuse; our yards have not, as a whole, been highly efficient.

Our operation of ships does not, in most cases, enable us to break even with foreign competitors. Throughout the world competition is extraordinarily severe; we are relatively inexperienced in a calling in which other nations are backed by long experience—and this applies to the shore agents, establishments, etc.

The restrictions of our coast-wise trade to our own flag is highly effective toward supporting our own merchant marine; but there its advantages stop. The commercial connections abroad, insurance arrangements, electric communications, and facilities in foreign ports are not favorable. There is nothing really concrete about it, but we, as newcomers, are too dependent on foreign good-will, and the older established shipping lines are naturally better served. For them, moreover, government subsidies are usual. We continue the competition but the outlook is far from a rosy one, and whether we shall even succeed in carrying fifty per cent of our own commerce (which is what has been aimed at) is problematical. It can only be hoped that improved conditions will insure at least that much.

The status of our combat fleet, as an element of Sea Power, is not in our present province.

An R. O. T. C. Target Practice

By CAPT. C. D. Y. OSTROM, C. A. C.

Second Prize Target Practice Essay Competition

MUCH interest in the activities of a Coast Artillery Reserve Officers' Training Corps Camp frequently is evinced. This interest should be encouraged and satisfied. The subject seldom is discussed in such form that the Corps generally may know what is required of these students or what is accomplished by them. Fifty R. O. T. C. students from three different universities attended a camp held at Fort Casey, Wash., during the past summer. Small as their number was, service practice was held on the 12-inch mortar, 10-inch, 3-inch, and 155-mm. guns. The schedule was so arranged that each student performed duty in the range section of one battery, gun section of another, and ammunition or reserve section of a third. All practices were considered satisfactory or better, in each case the practice being conducted entirely by students. Being more familiar with the practice held on the 155-mm. guns, I shall describe it.

This battery was assigned the problem of adjusting fire on a fixed point. Other firing being at moving targets, it was considered that such a problem would well round out the program. The group commander desired that the range be as great as reasonable certainty of satisfactory observation of fire would permit. This was estimated to be in the neighborhood of 10,000 yards.

There was assigned to the battery a sufficient number of students to provide a battery commander, a small B. C. detail, and one complete gun section. But one gun was available, nor was there sufficient personnel to man more than one gun. Students were assigned to duties without regard to the college from which they came. Spotting for all practices was conducted by a student spotting detail under supervision of the group commander.

Prior to attendance at camp, all students assigned to this battery had received some instruction on the 155-mm. gun at their colleges, the amount being quite variable, depending both on the method of instruction at the colleges and the number of years the student had been in attendance at his university. Most had participated in or had witnessed the firing of this type of gun. Many had received instruction in gunnery. The battery commander had fired an adjustment problem with the 3-inch field gun at a week-end camp held at his college. At the camp, the 3-inch and 10-inch

gun practices had already been fired, affording the spotting detail valuable experience.

The battery commander was furnished a chart of coordinates of batteries and stations in the defenses. From this he selected suitable data for orienting his battery. A simple triangulation system of two triangles sufficed to determine the gun position. Three observing stations pertaining to the defenses were selected, two observers manning instruments in one of these stations. The two R. O. T. C. spotting observers manned one base line to give data for adjustment of fire while two regular observers recorded data for later checking and analysis. The gun was laid in the selected direction for firing and the deflection to the aiming point, a point of known coordinates, was read. Selecting a map range of 10,200 yards, data was computed by members of the B. C. detail for the orientation of the observers and for the construction of the impact charts.

As no target was put out, each observer was sent the azimuth to the selected target position from his station. The impact charts were drawn to the scale of 1:5000. The spotting observers used Warner-Swasey Azimuth instruments, Model 1910, so the observing station rays on the spotting impact chart were graduated to correspond to the splash deflection scales on those instruments. The observation rays on the checking impact chart were graduated in degrees and hundredths of azimuth to correspond with the readings from the Lewis DPF's used by the checking observers. The least reading of observing rays on each chart was ten one-hundredths of one degree. The usual mil rays were put on the charts from the gun position with a least reading of two mils. Instead of the usual range graduation in yards, the spotting impact chart was graduated in terms of mils change in elevation. At the selected range a change of one mil in elevation corresponded to a range change of twenty yards. Each mil line was drawn on the chart, each fifth one being more pronounced and being numbered. The spotter reported to the battery commander the number of mils change in elevation corresponding to the range deviation; as, "short 5," rather than "short 100." This relieved the battery commander from having to convert yards of range deviation to the corresponding change in elevation with the resulting fractions of a mil. It eliminated that possible source of error, saved time, was as accurate as the sighting quadrant, and generally tended toward simplification of plotting and computing during fire. The firing table probable error was 80 yards or 4 mils.

The battery command post was established within sight of the gun. Commands and firing data were transmitted to the gun by voice and were recorded on a blackboard which was readily visible from the gun. The B. C. detail consisted of the battery commander, an operator on the telephone line to the spotter, and a recorder who also plotted the battery commander's record of range deviations. During practice the battery com-

mander conducted and adjusted fire without assistance. One instructor acted as safety officer, one as time keeper, and one as pointing checker, but, except as required by the performance of these specified duties, did not assist or interfere with the practice.

The gun commander conducted the gun drills, taking care to train reserves for each position. The depth of ramming was measured frequently, being found as accurate during firing as during drill. The drill was followed strictly as prescribed, though it is believed time could have been gained by diverging from it. A projectile dump was established in rear of the piece while powder was served from the magazine of a nearby battery. As the services of Nos. 10, 11, and 12 were not required during drill, they cleaned projectiles during these hours and filled them with sand to normal weight. The gun and carriage were carefully cleaned and tested. Bore sighting revealed a 9-mil instrument error in direction while

BATTERY COMMANDER'S RECORD

155-MM. GUN BATTERY—FORT CASEY, WASH.—JULY 15, 1925

Shot No.	Data Ordered		Deviations Reported		Corrections Ordered	
	Elevation — Mils	Deflection — Mils	Elevation — Mils	Deflection — Mils	Elevation — Mils	Deflection — Mils
1	279	755	short 16	left 6	+ 16	— 6
2	313	749	short 5	right 1	+ 3	0
3	316	749	over 1	right 2	0	0
4	316	749	over 1	right 2	0	+ 1
5	316	750	over 3	line		
6	316	750	over 7	line		
7	316	750	hit	line		
8	316	750	hit	line	— 2	0
9	314	750	short 5	line		
10	314	750	short 2	line		
11	314	750	over 2	line		
12	314	750	over 4	line	0	0

a clinometer test showed no quadrant error. A level on the trunnions showed the left gun trunnion 6.3 mils above the right. The Mark III projectile, sand filled to normal weight, with the Mark IIIA adapter and booster and type 40-S closing cap was used. DuPont CP X1760-1918 powder was issued, the normal charge only being used. There was no reliable data regarding this powder at hand from which an accurate value for expected muzzle velocity could be predicted though it was believed this certainly was somewhat below normal.

The spotting detail was given instruction in the duties of meteorological observers. For this practice, a determination of ballistic wind was made shortly before the hour set for firing. Other customary meteorological data were furnished by this section at the same time.

Making use of this data and using the expected muzzle velocity printed on the powder tag, the battery commander computed his firing

data. He had graduated the impact chart so that a deviation as great as 1000 yards short could be plotted and he believed that at least two of the four observers would pick up the splash if it were within this distance of the target. He contemplated using the trial shot method of adjustment if the first shot fell within two firing-table probable errors of the target (160 yards) but intended adjusting fire by the method of successive approximations if the initial range deviation were greater. He intended to use this latter method also in the deflection adjustment. From the accompanying Battery Commander's Record one may note that the initial range deviation was considerably greater than 160 yards, so fire was adjusted by the second method. The progress of the adjustment may be followed by an inspection of that record. He made no error in the range adjustment but should have increased deflection one mil as a result of the third shot instead of waiting until after the fourth. Applying the rules for this

COMPARISON OF DEVIATIONS

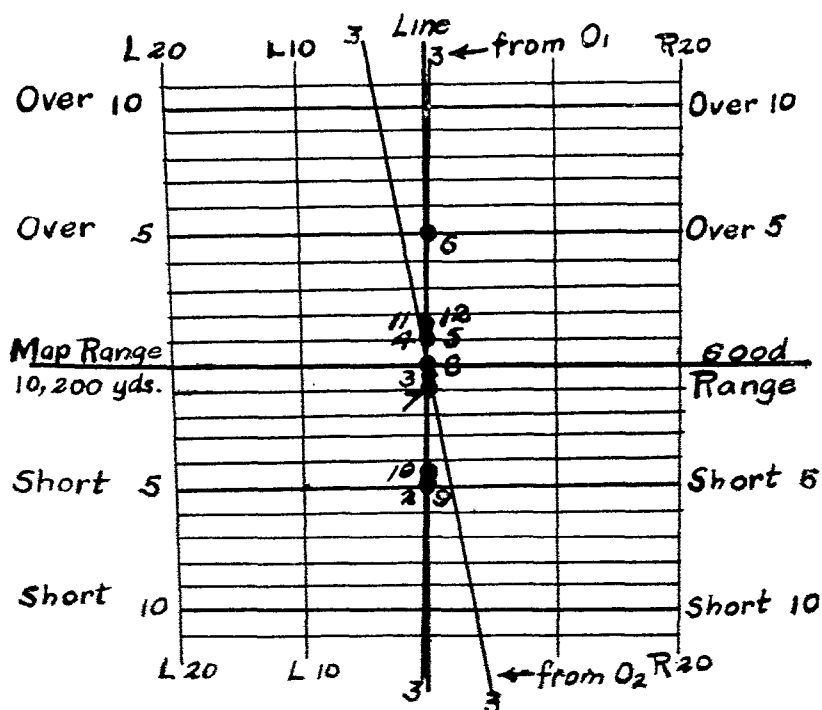
Shot No.	Reported by Spotting Section		Replotted from Spotter's Data		Plotted from Data from Regular Observers	
	Range Yds.	Deflection Mils	Range Yds.	Deflection Mils	Range Yds.	Deflection Mils
1	short 320	left 6	short 320	left 6	not observed	
2	short 100	right 1	short 100	right 1	short 100	line
3	over 20	right 2	over 20	right 2	short 10	right 1
4	over 20	right 2	over 20	right 2	over 20	right 1
5	over 60	line	over 60	line	over 20	line
6	over 140	line	over 140	line	over 100	line
7	good	line	short 10	line	short 20	line
8	good	line	short 10	line	good	line
9	short 100	line	short 100	line	short 100	line
10	short 40	line	short 50	line	short 90	line
11	over 40	line	over 40	line	over 30	line
12	over 80	line	over 90	line	over 30	line

method, fire was considered adjusted upon completion of the practice. The battery commander prepared the required analysis though the battery instructor made up the report of target practice. The analysis indicates that correct elevation would have been 315 mils with the deflection of 750 mils as used. The deviation of the center of impact, had all shots been fired with the adjustment correction of the last shot and had there been no personnel errors, was determined to be: range—short 21 yards; direction—zero. An armament range probable error of 37 yards was developed, with a deflection probable error of 0.2 mil. Fifty-eight per cent of impacts were within 50 yards of the target. The total time of practice was 46 minutes with a corrected time of series of 22 minutes 10 seconds, time being allowed for interference of ships and mechanical difficulties not chargeable against the battery personnel. Analysis showed but one personal error—the gun pointer made an error of —1 mil in the elevation setting for shot No. 2.

As stated previously, fire was adjusted from data furnished by an R. O. T. C. spotting section, while the analysis was made from data fur-

nished by regular observers. It is interesting to compare the deviations as determined from plotting both sets of readings. Most of the discrepancies, no one of them seriously affecting the practice, may be traced to one R. O. T. C. observer who transmitted readings to the nearest 0.°05 only.

A word concerning the action of the materiel. Over 2000 shots have been fired from this gun, many using the super-charge. The gun appears to fire with small armament probable errors, but all firings with it in the



SECTION OF IMPACT CHART SHOWING PLOT OF SHOTS

last few years have indicated low muzzle velocities for the different powder lots used. I am inclined to believe the forcing cone has moved slightly forward. The gun was found to have an uneven and jerky motion in counter-recoil, and there was more rapid expansion of the oil in the recoil cylinder than would normally be expected. These effects combined to make it advisable to bleed the replenisher after the seventh shot even though the distance in to the piston was more than normal at the beginning of fire. Time for this was allowed to be deducted as the condition could not be foreseen.

This practice did not deviate materially from the stereotyped. Its value lies rather in demonstrating the results that are being obtained from the R. O. T. C. instruction. With less than a dozen hours of drill and

preparation before practice, it shows the merit in the instruction on materiel and firing methods at our colleges. It indicates the close attention to instruction and the careful application to their duties shown by our future reserve officers at camp. The Group Commander forwarded the report of target practice with the remark: "This is an excellent practice—the problem was solved satisfactorily and the few errors made compare favorably with those usually made by regular troops."

An heroic record is not a reed to lean upon, it is a standard of achievement to be maintained. We can not be content to rest our cause upon the victory of American arms in Europe as the only evidence of our love of country and patriotic fervor. We were prepared to die for our country in that great struggle, but if we will live for it with half the devotion of our comrades who died upon the battlefields of France, America will become more glorious in peace than any nation in all history has ever been in war. We pay small tribute to our comrades who "went west" if we do not accept the challenge of service to our Community, State, and Nation in the peace they paid for with their lives. We are heartless indeed if we fail to heed the call from those who threw themselves upon that burning altar of freedom and are now crippled, disabled men for life. Little thought we give to the tiny feet we hear patting upon the ground behind us if we do not strive in our prime to raise higher ideals of citizenship and service to humanity to pass on when our columns are halted and they sound the march of America's men and women.—*W. A. Sirmon, in Bulletin, IV C. A. District.*

Antiaircraft Ordnance---Yesterday, Today and Tomorrow

By MAJ. G. M. BARNES, *Ord. Dept.*

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THE history of antiaircraft artillery does not go beyond the period of the World War. At least no antiaircraft materiel of any consequence had been built prior to that time. During the first part of the war-field guns were blocked up to give high-angle fire, and improvised mountings were used by both sides. New antiaircraft artillery was designed and put into production as soon as possible, so that toward the end of the war

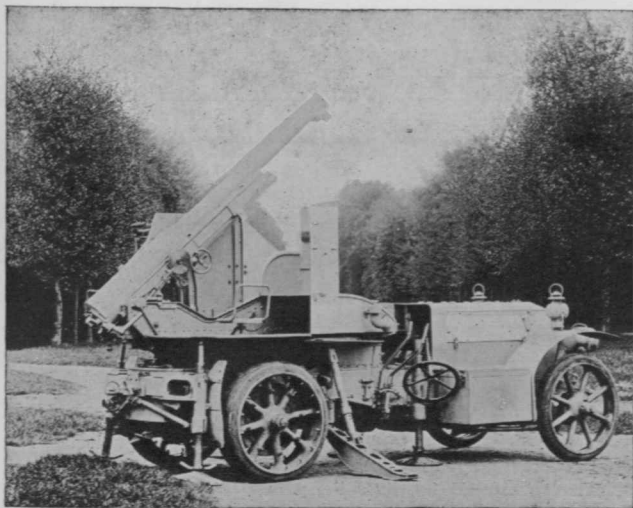


FIG. 1. FRENCH ANTI-AIRCRAFT TRUCK MOUNT

better types were available. At the same time great efforts were made to devise suitable fire control methods and instruments. Early systems were complicated and so slow in operation that the data were more or less useless when received at the guns. The first tendency was to use methods similar to those employed by field artillery against targets on the ground. These early systems were not very successful, due to the length of time required to compute the data. For example, the Italian Army used a clever manual plotting system which was very simple and ingenious, but,

with a target moving as fast as an airplane, it can be appreciated at once that systems requiring data to be computed by personnel, read off from charts and scales, shouted to the guns, laid off on scales on the gun carriages, etc., would never be suitable for directing the fire of antiaircraft guns against aircraft.

Also, for the most part, powder time fuses were used. These early fuses gave erratic results at the higher altitudes. Notwithstanding the crude fire-control apparatus, powder fuses, low-velocity guns and improvised carriages, antiaircraft artillery fulfilled important missions in protecting troops, concentration points, cities, etc., from aircraft. The records made with the antiaircraft materiel of the World War period are cited in the article by Major Mettler.*

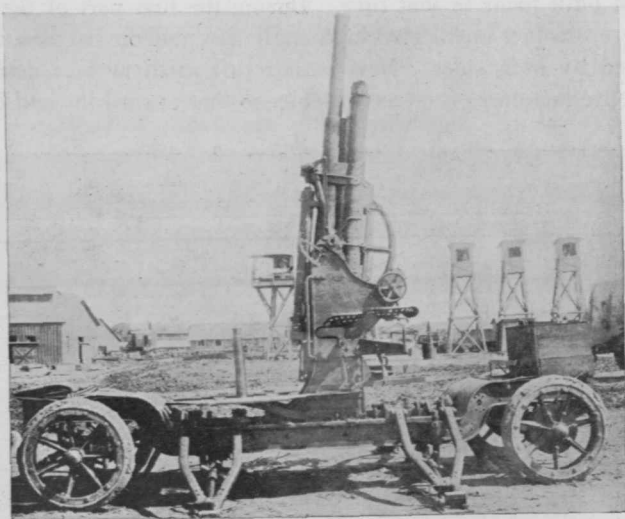


FIG. 2. 3-INCH ANTI-AIRCRAFT AUTO TRAILER MOUNT, MODEL 1918

In Fig. 1 is shown the 75-mm. antiaircraft truck mount. This is the unit which was extensively used by the French and also in part by the British and American troops. It was characteristic of the best antiaircraft materiel of the World War period, and it was with such guns that the records of the war, previously referred to, were made. This unit was constructed by mounting 75-mm. field guns on special auto trucks. Time would not permit the construction of special guns. It is now considered that such a gun is too low powered for antiaircraft fire. Our Army also has a number of very similar units built in the emergency by mounting American 75-mm. guns on White trucks. These units have been set aside for training purposes.

*See the COAST ARTILLERY JOURNAL for December, 1925.

During the same period the Ordnance Department was hastening the construction of a large number of 3-inch antiaircraft guns of a more powerful type. When the Armistice came, many units had been completed, and these now form the principal mobile antiaircraft material in the hands of our troops. This weapon is known as the 3-inch antiaircraft auto-trailer mount, Model of 1918.

The gun shown in Fig. 2 has a muzzle velocity of 2400 feet per second when firing a 15-pound projectile, and is a distinct improvement over earlier types. This is the gun now being used for the antiaircraft tests held this season, the results of which are given later. This materiel

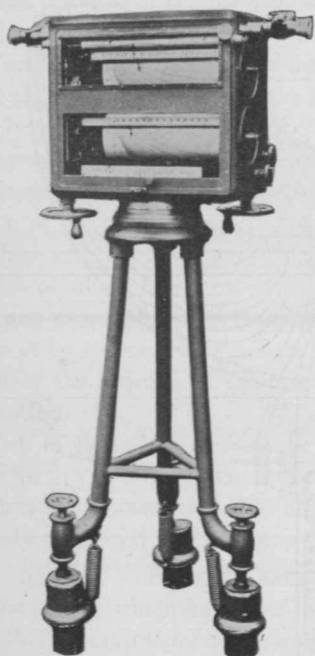


FIG. 3. ANTI-AIRCRAFT DATA COMPUTER, MODEL 1917

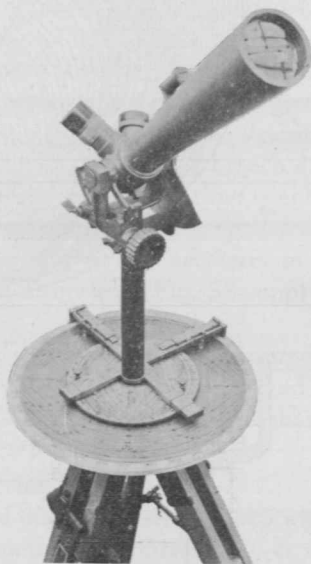


FIG. 4. WIND AND PARALLAX COMPUTER

is now seven years old. Antiaircraft defense is a new art which is being developed rapidly. These guns can therefore not be considered as modern. If funds were available, these weapons could now be replaced by antiaircraft guns many times more effective.

PRESENT FIRE CONTROL EQUIPMENT

The fire control equipment for these guns was built during the same period, and will be very briefly described in order to make more clear the great improvements in instruments for directing the guns, which are now in progress. Again it should be noted that all results obtained in target practice up to and including the season of 1925 have been made with the

equipment about to be described. Doubtless several years will elapse before funds will be made available for equipping regular regiments with the newly developed apparatus.

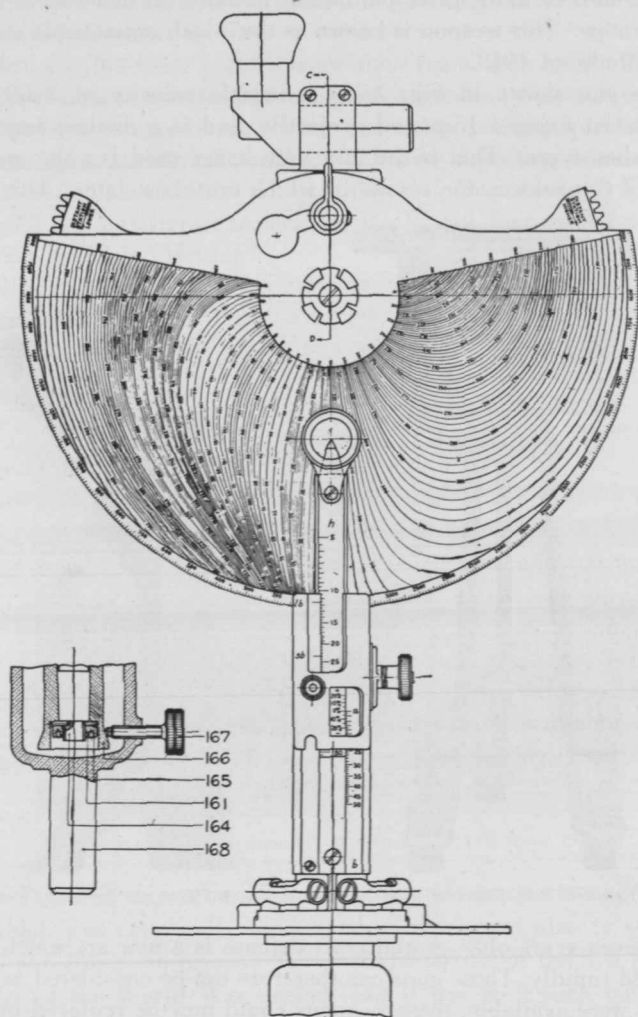


FIG. 5. ALTIMETER, MODEL 1920

The fire-control equipment for each 3-inch anti-aircraft battery of the 1918 materiel consists of the following instruments, in addition to the sight mechanisms on the gun carriages: 1 Data Computer, Model 1917 (R. A.) (Fig. 3); 2 Altimeters, B' and B'' instruments (Fig. 5); 1 Wind and Parallax Computer (Fig. 4); 1 Fuse Setter for each gun.

These instruments were selected from the best, developed up to 1918.

At the present time the gun carriage is equipped with the telescopic sight attached to the traversing part of the carriage by means of which the gun can be kept trained on the target.

The angle by which the gun must lead the target in the horizontal plane is set off on the horizontal deflection sight scale. The carriage is also equipped with an elevation disc actuated by the gun when elevated. By means of this mechanism the gun can be given the proper vertical lead and super-elevation.

The horizontal and vertical leads together with the proper fuse setting are computed by the data computer (Fig. 3).

This instrument is equipped with two telescopes, one of which is used for following the target in direction and the other for following the target in angle of site. If these telescopes are kept continuously trained on the target, the angular velocities in both planes can be measured. By multiplying these velocities by the time of flight of the projectile, the future position of the target can be obtained and the lateral and vertical angular displacements or deflections for setting the guns to the predicted position of the target computed. The fuse setting can also be determined.

These data are computed by this corrector, which is of French design. The data obtained from this instrument are at the present time telephoned to the gun as soon as read from the instrument.

In order to compute the data indicated above, it is necessary to know accurately the altitude of the target. The altimeters (Fig. 5) supply this information.

Two of these instruments are placed at the ends of a measured base line. The two telescopes are continuously directed at the target and reading taken simultaneously. The altitude of the target in yards is thus continuously measured and set into the corrector.

RECENT TARGET PRACTICE RESULTS

The results which have been obtained during the season 1925 with the 3-inch A. A. gun, model 1918, and fire control, are interesting. It would not be possible thoroughly to cover these tests in an article of this length.

The table submitted below was selected at random and shows in a brief way the results obtained by one antiaircraft battery in firings held between May 22 and July 1.

The target fired upon was a cloth sleeve in the form of a truncated cone $5\frac{1}{2}$ feet in diameter at the large end by $3\frac{1}{2}$ feet at the small end and about 20 feet long. This target is towed by a bombing plane at the end of a 2100-foot wire. The target is about one-fourth the size of a modern bombing plane which would have a wing spread of 74 feet 2 inches, a length of 42 feet 7 inches, and a height of 14 feet 8 inches. The altitude of the target varied between a mile and a mile and a half, while the horizontal ranges varied between two and three miles. At these altitudes this small target looks like a small speck and, unless the day is exceedingly

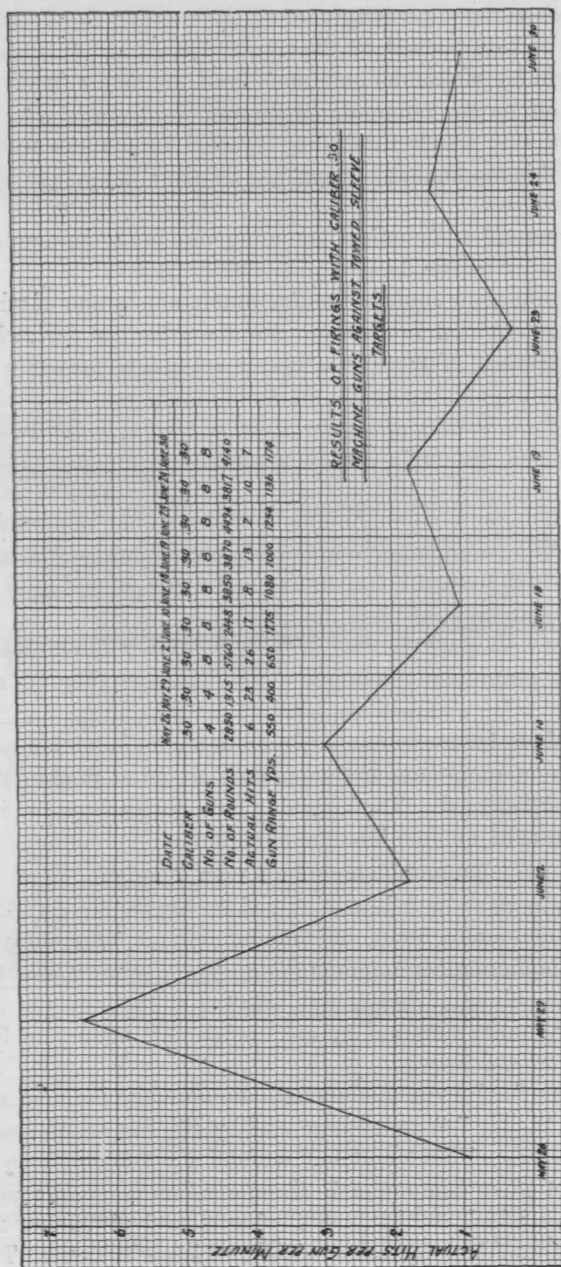


FIG. 6. CHART SHOWING RESULTS OF ANTI-AIRCRAFT FIRING DURING A PERIOD OF THE 1925 SEASON

clear, cannot be seen with the naked eye. On the other hand, the plane itself is plainly visible. It is hoped that it will eventually be possible to provide a larger target which can be seen more easily.

The second column of the table shows the number of hypothetical hits. To calculate hits other than those represented by actual holes, an observer rode in the towing plane and another was stationed on the ground, bursts above or below the target being watched by one and those ahead or behind by the other. Bursts are considered hits when they occur within 50 yards of the target as viewed from the ground, and within 35 yards short to 15 yards over as viewed from the plane.

The third column gives the actual number of shrapnel holes found in the targets, while the fourth column shows those targets which were lost at sea and could not be recovered for the purpose of counting the holes.

The table shows that out of eleven targets used, one was shot down, five had four or more shrapnel holes each, four were lost at sea and may or may not have had holes, while three targets showed no holes.

The records of this season's antiaircraft target practice, of which the above is a fair sample, have been very impressive, especially when it is known that such results have been obtained with guns, ammunition, and fire-control instruments now seven years old.

ANTIAIRCRAFT ARTILLERY PRACTICAL RESULTS

<i>Date of Firing</i>	<i>Hypo. Hits</i>	<i>Actual Hits</i>	<i>Target (Recovered or Lost)</i>	<i>Ammunition at T. R. Expenditure</i>	<i>Record Preliminary or Test</i>
May 22	None	None	Recovered	12	Preliminary
May 26	2	9	Recovered	52	Preliminary
June 2	2	None	Recovered	71	Preliminary
June 3	2	T. shot down	Lost	52	Record
June 4	4	?	Lost	79	Record
June 10	2	?	Lost	86	Test
June 17 and 18	6	11	Recovered	180	Record
June 22	6	?	Lost	65	Record
June 22	8	10	Recovered	185	Preliminary
June 24	4	17	Recovered	179	Record
July 1	11	4	Recovered	183	Record
	47	51		1144	

TARGET PRACTICE WITH MACHINE GUNS

No mention has thus far been made of the use of machine guns. The caliber .30 machine gun is, however, one of the most important antiaircraft weapons. Due to the high rate of fire of 400 to 500 shots per minute, machine guns are very effective within their ranges.

The accompanying chart (Fig. 6) is based on results obtained this season. The target was a cloth sleeve similar to that used for the guns and was towed at a speed of about 75 miles per hour. At the end of each practice the holes in the targets were counted. The chart shows the hits per gun per minute made by one battery for a period of several days.

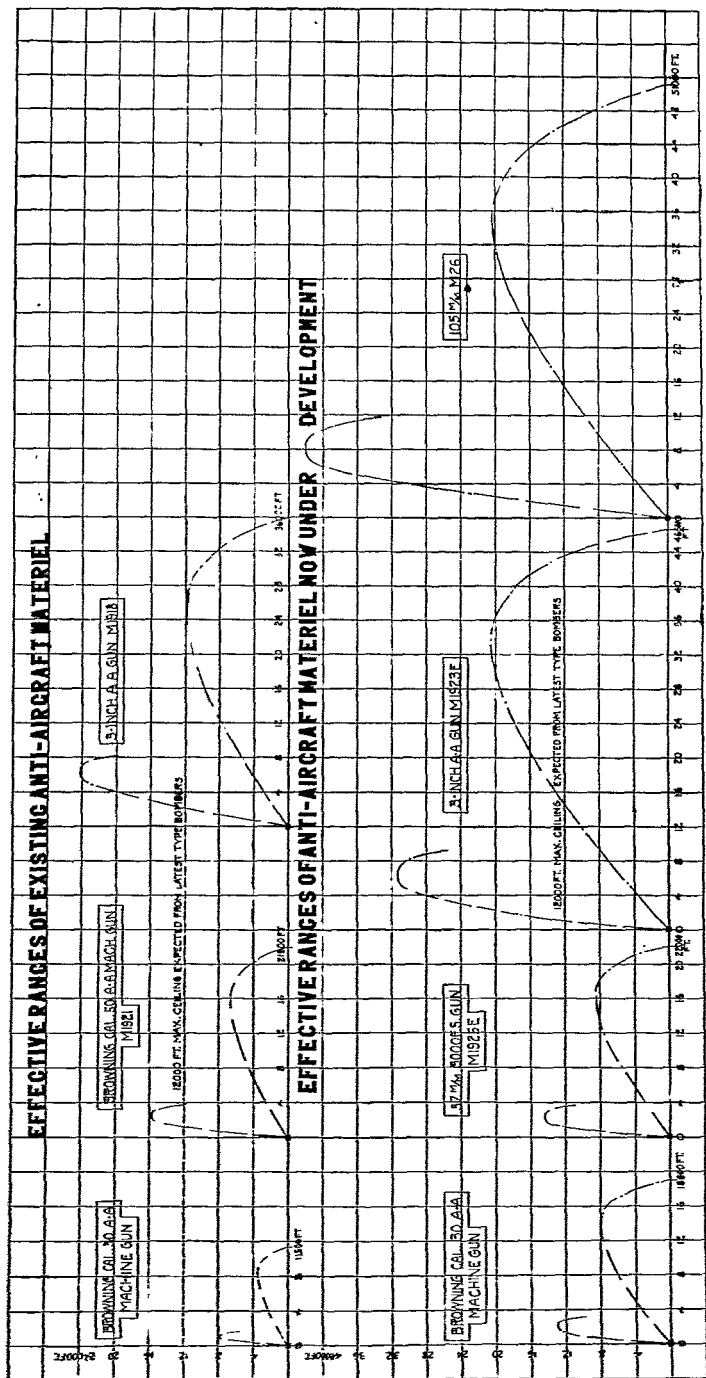


FIG. 7. DIAGRAMMATIC CHART SHOWING EFFECTIVE RANGES OF EXISTING ANTI-AIRCRAFT GUNS COMPARED WITH RANGES OF NEW MATERIEL NOW UNDER DEVELOPMENT

THE ANTI-AIRCRAFT PROBLEM

Before describing the developments of future anti-aircraft artillery it is of interest to know what performance may be expected from future airplanes.

The table below gives the maximum speeds, ceilings, and rates of climb of various types of planes. Observation and bombing operations are usually carried out at altitudes well below the ceilings of the airplanes.

<i>Type of Airplane</i>	<i>Max. Ceiling Height in Feet</i>	<i>Maximum Speed of Airplane Miles per Hour</i>	<i>Rate of Climb Ft. per Minute</i>
Pursuit	27,000	140 to 190	1500
Observation	18,000 to 21,000	110 to 160	750
Light Bomber	17,000	90 to 120	
Heavy Bomber	12,500	90 to 100	650

The ceilings, rates of climb, and maximum speeds given above are those which will probably be obtained with planes now under development and should be considered in designing future anti-aircraft artillery materiel.

Fig. 7 shows the effective ranges of our existing anti-aircraft guns as well as those of the new materiel now under development. These data show that the ceilings of airplanes are well below those of anti-aircraft guns.

FUTURE ANTI-AIRCRAFT MATERIEL

In the post-war development of anti-aircraft materiel, the following types of weapons are included: Cal. .30 machine guns and mounts; Cal. .50 machine guns and mounts; 37-mm. full automatic guns and mounts; 3-inch A. A. guns on mobile carriages; 3-inch A. A. guns on fixed carriages; 105-mm. A. A. guns on fixed carriages.

Machine Guns.—That machine guns have an important place in anti-aircraft defense is now becoming well established. The caliber .30 machine gun was used during the war for anti-aircraft fire, but little was done towards developing special mountings of fire control instruments. The caliber .50 machine gun is a post-war development and will provide a gun with the high rate of fire of from 400 to 500 shots per minute, a more effective projectile, and a greater range.

Under the present scheme for firing machine guns, a vertical wall of projectiles is established just ahead of the plane, and this wall is maintained until the plane has passed through.

Special sights have been designated to permit the gunner to build this wall just ahead of the plane, and to inform him when the plane has passed the wall, so that he can continually repeat the operation.

Further developments will doubtless be in the direction of special fire-control instruments for continuously measuring speed and range of target, and more refined sights.

Machine guns due to their great mobility will be relied upon to protect columns of troops on the march and for general ground defense against low-flying planes.

37-mm. Full Automatic Cannon.—Experiments conducted at the Army proving ground have shown that the 37-mm. projectile, when filled with high explosive and equipped with a supersensitive fuse is very destructive, and tests indicate that a single hit would probably effectively disable or bring down an airplane.

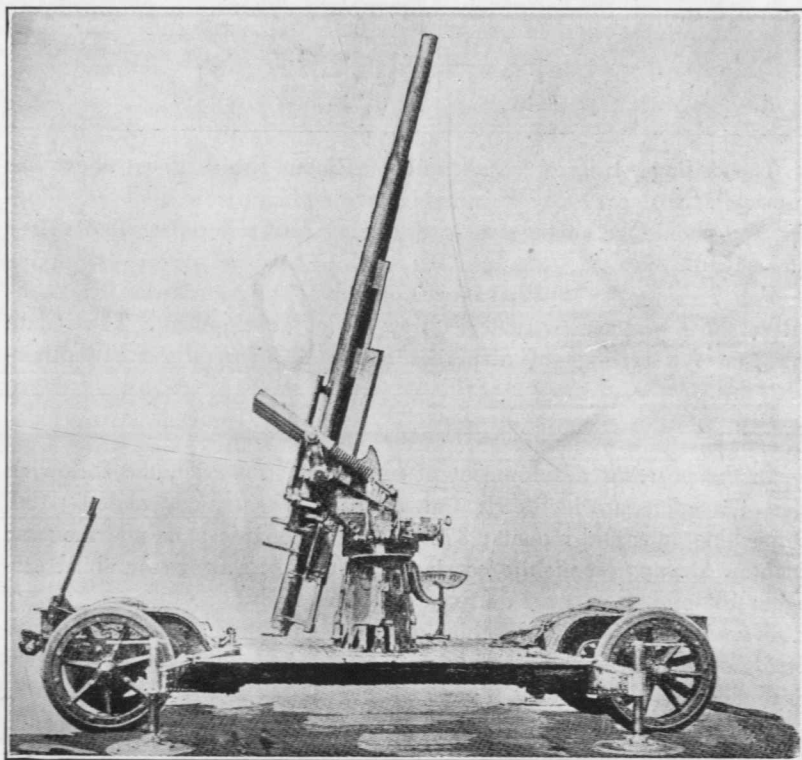


FIG. 8. 3-INCH ANTI-AIRCRAFT GUN MOUNT, MODEL 1923 E

This has led to the development of a high-powered full automatic machine gun of 37-mm. caliber. Experimental models of 2000 feet per second and 3000 feet per second muzzle velocities are being built. The rate of fire will be about 100 shots per minute with a projectile weighing $1\frac{1}{4}$ pounds. The projectile being developed for this gun will contain a high explosive charge and will be fitted with a supersensitive fuse designed to explode on contact with airplane fabric. The projectile will also have a tracer designed to burn for ten seconds. The tracer should prove valuable in assisting the gunner to place his stream of fire on the target.

3-inch and 105-mm. (4-inch) Antiaircraft Guns.—The principal improvements in antiaircraft guns have been in the direction of increased muzzle velocities, improved traversing and elevating mechanisms, and more stable and rigid carriages.

The 3-inch antiaircraft mount, Model of 1923-E, has been designed eventually to replace the 3-inch antiaircraft auto-trailer mount, Model of 1918 (Fig. 8). While the muzzle velocity and power of this gun have



FIG. 9. 3-INCH ANTI-AIRCRAFT GUN MOUNT, MODEL 1917, MI

been materially increased, the total weight of the unit has been decreased. Similarly the 3-inch antiaircraft mount, Model 1917 MI (Fig. 9), will replace previous fixed antiaircraft mounts. The 105-mm. antiaircraft gun will provide a more powerful type.

PROPOSED NEW FIRE CONTROL EQUIPMENT

Time of Flight.—Undoubtedly the most important single element in the antiaircraft problem is the time of flight of the projectile; that is, the

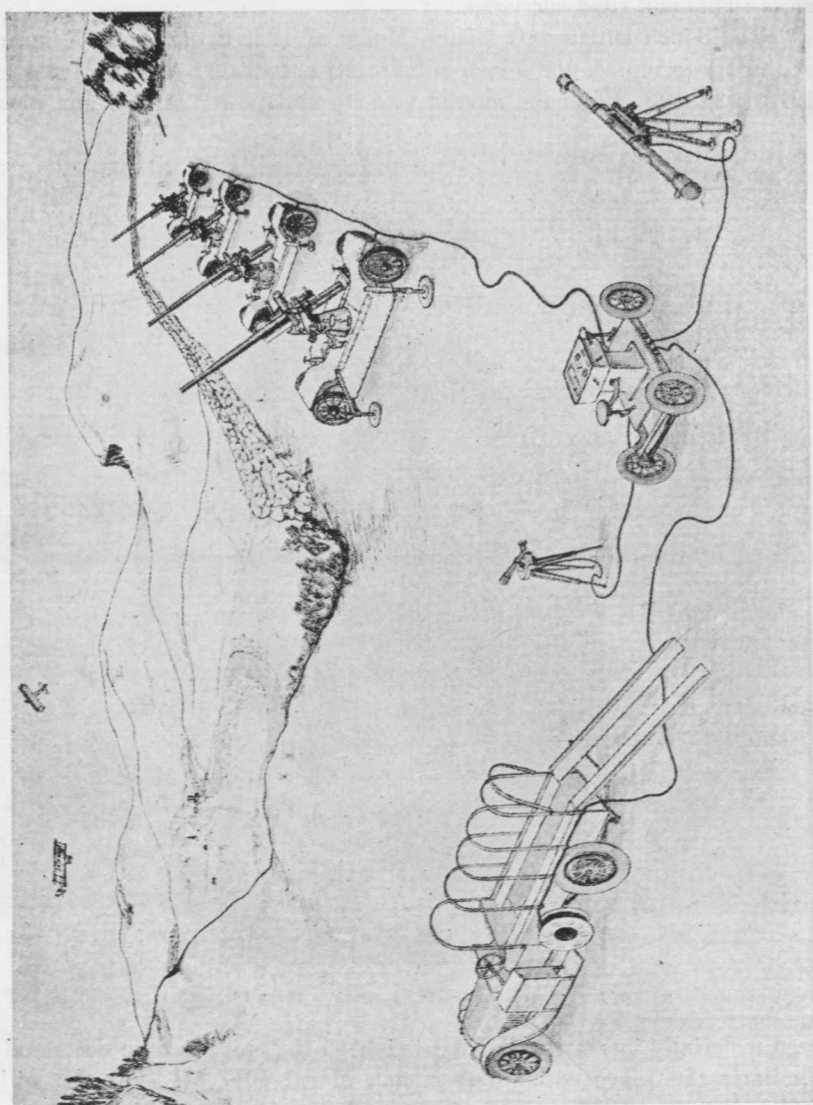


FIG. 10. DIAGRAMMATIC SKETCH OF A BATTERY OF 3-INCH ANTI-AIRCRAFT GUNS, MODEL 1923, WITH NECESSARY FIRE CONTROL APPARATUS AND EQUIPMENT

time which elapses from the fire of the gun until the projectile reaches the point of burst. Time of flight is a very important element because firing data must be calculated to give the location of the airplane at the end of the time of flight. If the time of flight is long and the airplane is flying a curved course, the position of the airplane at the end of the time of flight may be entirely different from that expected. If, however, the time of flight is short, the plane will have less chance to change its path, and the predicted position of the target at the end of the time of flight will correspond more nearly with its actual position.

Another important time factor which must be added to the time of flight of the projectile is the so-called "dead time." The dead time includes the time between the determination of the fuse range and the firing of the gun. This is the time required for sending the firing data to the guns, setting deflections, fuses, etc. The fire-control instruments now in the hands of troops are designed for a dead time of eight seconds.

It is evident that the time of flight and the dead time must be kept as small as possible. The time of flight can be reduced by the use of higher velocity guns and improved stream line projectiles. The muzzle velocity cannot, however, be increased indefinitely due to the rapid erosion of the guns at the higher velocities. At the present writing 2600 to 2800 foot-seconds seems to be the maximum practical velocity for the 3-inch guns.

The dead time can be materially reduced by the use of automatic instruments for computing the firing data by transmitting data electrically and by the use of automatic fuse setters, etc. With such instruments it should be entirely feasible to reduce the dead time to three seconds for the 3-inch gun. These improvements in materiel should increase the effectiveness of antiaircraft materiel many times.

The trend of development in antiaircraft fire control is towards the indirect method. A diagrammatic sketch of a battery of 3-inch antiaircraft guns, Model of 1923, is shown with the necessary fire-control apparatus in Fig. 10.

The truck shown would be designed not only for carrying the fire control apparatus, but also for furnishing the electric power for data transmission and lighting. The chassis would therefore contain a small generator which could be clutched to the truck engine.

The altitude of the target would be continuously read by means of the stereoscopic height finder shown at the right (see Fig. 10), while the present azimuth and angle of site of target would be continuously measured by the telescope. These readings would go to the central-station instrument in which all firing data would be automatically computed. This instrument would compute the future position of the target and would make such ballistic corrections for wind and muzzle velocity of gun as were necessary. The future azimuth, future angle of elevation, and future

fuse number would be transmitted electrically to the gun, where these data would appear continuously on the proper dials. The gunners would have only to keep the gun continuously set for the predicted future position of the target by matching pointers. Fuses would be set in an automatic fuse setter, the readings of which would continuously change in accordance with data from the central station instrument.

The principal advantages of such a system of Case III method of fire control and automatic data transmission appear to be as follows:

- (a) Reduction of dead time;
- (b) No scales to read, and hence no errors of setting or reading scales;
- (c) Data is continuous and not intermittent as at present; therefore each shot is fired on more accurate data.

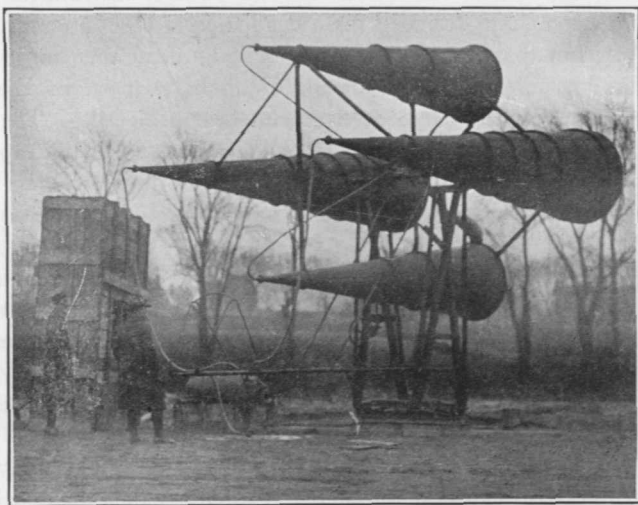


FIG. 11. SOUND LOCATING DEVICE FOR USE IN TRACKING AIRPLANES AT NIGHT

Sound Listening Devices.—The attack of airplanes from the ground at night presents new problems and requires additional apparatus. To locate accurately airplanes flying at high speeds in the dark, appears at first thought to be a problem which is incapable of solution. Fortunately the difficulties are on both sides, as night bombing operations also present tremendous difficulties to the aviators in locating the target to be bombed. The airplane is located at night by means of sound apparatus. The latest type in use is shown in Fig. 11. By means of these horns of special design, an airplane can be picked up about eight miles away. The horns give the location of the plane in terms of horizontal angles and angles of site. Two or more sets of horns separated by known distances are usually employed, and the readings sent continuously to a central

plotting board. The horn can be depended upon to give the position of the moving plane with an accuracy of about one degree. The plotting board computes the necessary data for setting the searchlights. Since the beam of the searchlight is about two degrees wide, the data obtained from the horns is sufficiently accurate for placing the beam on the target. The latest type of searchlight can be controlled from a distant station or directly from the plotting room. When the airplane comes within range of the gun, several searchlights are snapped on, and the plane illuminated. The guns can then fire by the same methods as are used for day fire.

New developments in sound locating apparatus will doubtless eliminate the plotting system and the horns will be interconnected with the searchlights through automatic instruments which will make the necessary corrections for sound lag, etc., and keep the searchlight continuously trained. It is also possible that sound apparatus may be so developed that the gun can be fired from the sound data without the use of the searchlights.

Imagine the moral effect upon an aviator flying a bomber in complete darkness, loaded with bombs containing high explosive, none too certain of his exact location, when suddenly caught in the searchlight beams and almost immediately surrounded by exploding shells. No one who has seen night exercises of this nature can believe that night attacks of planes against defended ground areas will be one-sided affairs.

To summarize, the writer believes that the anti-aircraft artillery of the future will develop along the following lines:

(1) More extensive use of caliber .50 anti-aircraft machine guns; further refinement of mountings and fire control.

(2) Extensive use of a large number of high velocity full automatic cannon on mobile mountings, firing high explosive shells of about 37-mm. caliber (1 $\frac{1}{4}$ lbs.).

(3) Higher velocity 3-inch and larger anti-aircraft guns.

(4) Central station director for 3-inch and 4-inch anti-aircraft guns which will accurately and automatically compute all firing data and deliver these data continuously to the gun.

(5) Electrical transmission of firing data for 3-inch guns and above from the central-station instrument directly to dials on the guns, giving continuously future azimuth, future elevation, and future fuse setting, or in other words, all data required for Case III fire.

(6) Mechanical fuse setters, continuously set.

(7) More accurate fuses for anti-aircraft shells and more effective fragmentation of high explosive shells.

(8) More refined sound locators or other apparatus designed for detection of airplanes at night, sufficiently accurate to supply firing data directly to the guns without the use of searchlights.

It is believed that the majority of those who have followed the anti-aircraft problem closely feel that the relatively slow-moving bombing airplane which must fly at relatively low altitudes and speeds will become an easy victim of the high-powered, rapid-fire, automatically-controlled anti-aircraft artillery of the future.

I am one who believes that, because of its intrinsic educational and character-building merit, military training makes for the individual's personal success. Soldierly qualities are valuable in the office, the shop and the farm as they are on the battlefield. The same, not a different kind of man, is needed in peace as in war. There is no doubt that military training strengthens a man physically, mentally and morally and develops those habits of thought and action which make him a more efficient, capable and reliable man to work with, for, or under. The preparation that fits anyone to hold his own and to co-operate with his associates for their mutual benefit when his life, their lives and that of his country are at stake will surely stand him in good stead at less trying and less critical and simpler tasks. Undoubtedly soldierly qualities can be and are developed by experience, but the school of hard knocks is slow and sometimes painful and its teachings are usually untimely and unscientific. Military training teaches a man to find himself in the most formative period of his life. I know of no substitute in our educational system that will so effectively help a young man before he has actually entered his life work—*John W. Weeks, Secretary of War.*

An Interesting Chapter in the Development of Small Arms

By LIEUT. COLONEL S. G. SHARTLE, *10th C. A.*

THE late Samuel Norris, of Bristol, Rhode Island, went as representative of the Remington Arms Company to Europe in 1865. The latter half of the 19th century was an important period in the development of the breech-loading rifle. The application of this principle occupied the attention of the arms experts of the greater military powers. The successful solution of the problem meant the re-arming of the armies of all countries; and this meant a thriving business for the companies able to place their orders. The activities in this connection in Europe at that time may be shown best by quotations from an article by Mr. Norris, published in 1898, in the *New York Times* and the *Bristol Phoenix*.

"Every European Government was seeking a breech-loading system either as a new arm or as a transformation for muzzle-loaders. The English Government were about the first to decide, and they adopted the Snyder as a transformation, really an American invention. Soon they began to transform their Enfields, the caliber of which was .57. Some years later the English Government adopted the 'Martini-Henry'—the name of 'Martini' applied to the breech mechanism, that of 'Henry' to the barrel. Again this system was mainly American, the invention of a Mr. Peabody of Boston.

"All the Continental Governments were alive to this important change of armament. The Germans had years before been the pioneers in breech-loaders in their needle gun. Its caliber was .78. In the base of the ball fulminate was placed, and the powder was held in a paper case. When the trigger was pulled the needle in the bolt shot forward, striking and igniting the fulminate, and the explosion followed. It had no effective gas check, hence the range was very small, and the gas came back into the face of the firer. However, the superiority of even this mechanism over muzzle-loaders was shown in the war between Prussia and Austria, and this hastened the efforts of Austria to get a breech-loading system.

"A grand commission was appointed in Vienna, the president of which was the Archduke William, cousin of the Emperor. The commission tested many systems, and decided to recommend to the Emperor the 'Remington.' His Majesty was invited to the arsenal to see the arm, and,

as was expected, to approve of its adoption. He came with a staff of some seventy officers. After the inspection he was invited to fire the arm. I was present and remember well the brilliant gathering on the green in front of the targets. A young officer first fired the 'Remington' most satisfactorily, then the Emperor took the arm to fire. This arm and the cartridges had been made in Vienna to conform to the ideas of the commission as to caliber, form of bullet, and charge of powder. American metallic cartridge machinery was unknown in Austria at that time, hence the cartridges used for this trial, which were rim fire, were very imperfect. The very first one used by the Emperor failed to ignite; all others were successfully fired. This failure, with which the arm had nothing to do, proved fatal in Austria. All the newspapers attacked the Government for considering the arm, echoing the wishes of the hundreds in Vienna at that moment who were interested in other arms. It was even cabled to Providence that an accident had occurred to the Remington in the hands of the Emperor—a wicked misrepresentation. So fiercely was the Government assailed that the adoption of the Remington was abandoned, and trials of all systems were stopped. A few months later they took up the Wendel arm, an Austrian invention, destitute of merit, and adopted it. The Caliber was about .43. Still later that Government adopted the 'Mannlicher' system.

"Meantime the French Government were testing many systems. They inclined to the 'Remington,' and gave a small order of the dimensions they desired for exhaustive trial. At the moment this order was received in America an improvement had been made in that arm and much valuable time was lost in their delivery in Paris. Gen. Le Boeuf, President of the Committee of Artillery, was greatly annoyed at the delay, and as war clouds were gathering they hastily decided on the 'chassepot,' a bolt needle gun, using what was called a silk cartridge—that is, the case which contained the powder was made of silk, in the end of which was placed the fulminate and the needle by means of a spiral spring in the bolt when the trigger was pulled passed through and exploded it. For the purpose of preventing the escape of gas at the rear, what was called the *tete mobile* made of rubber was fixed on the end of this bolt. This entered the chamber, the explosion compressed it, and theoretically it was expected that it would prevent all gas and the debris from the burnt silk case coming out at the rear. This was not wholly realized. The debris did pass into and around the bolt, clogging the spring and the easy and proper movement of the bolt in the shoe in which it moved. After six or eight shots I have seen that the bolt could not be moved unless lubricated with water.

"The Greeks closely followed the investigations of the French at Vincennes, near Paris, and they decided on the Remington, and we made a contract for 15,000. These finally went to France during the Franco-Prussian War. The Danes made exhaustive trials in Copenhagen, and de-

cided on either the Remington or Peabody, and sent a commission to America to contract for one of those arms. My brother, Mr. John Norris, devoted himself for some time to this effort, and finally the Minister of War, Gen. Rassloff, advised me to follow his commission to America, as the decision would be made there, but he would not give any assurance that the decision would await my arrival. However, I went. It resulted in a contract for 30,000 Remingtons, which was followed by other contracts. This was in 1867. Almost simultaneously my brother made a contract with the Swedish Government for a large quantity of Remington mechanisms, they proposing to complete the arm in Sweden. This they did.

"Meantime the Spanish Government had officers in America. The Remington was decided on by them for Cuba and orders were given. Then followed trials at Madrid, and the Remington became the adopted arm of that Government. I made three contracts in behalf of the Messrs. Remington, viz., for 10,000, 50,000 and 130,000. The Spanish Government had on its hands the war in Cuba and with the Carlists in Spain. It was an event to get either to or from Madrid, journeys which I made several times, and at considerable risk, when I passed through the Carlist lines having in my luggage abundant evidence of my dealings with the Spanish Government. However, I never had any serious trouble. The last order they tried to cut short by 30,000 arms, for they had more arms than were needed. When I heard of this, being in St Petersburg, I went directly to Madrid and was most fairly treated by Gen. Jovillia, the Minister of War and the former Governor General of Cuba. He had to refer the matter to several commissions, and finally I got a favorable decision from the Council of State and these arms were delivered and paid for. In fact, while these contracts amounted to several millions of dollars, all was paid with a good degree of promptness. My relations with all Spanish officials were always pleasant. The caliber of the Spanish arms was .43.

"When the Viceroy came to Europe to invite the various crowned heads to the opening of the Suez Canal, I was requested to meet Ratib Pasha in London for the purpose of negotiating a contract for 'Remington' arms. It resulted in a contract being executed in the smoking room of Buckingham Palace for 60,000 arms. Several other contracts followed, all the guns ordered being manufactured at Ilion.

"Early in the seventies I was in Vienna. My friend, Count Bylandt, afterward Marshal and Minister of War of the Austrian Empire, told me of a new arm which he had seen. All he knew about it was that it was the invention of two brothers, Mauser by name, and that it came to him from Stuttgart, Wurtemberg. It was shown to me. It was a bolt gun, and I saw in it features which I thought could be utilized in changing the Chassepot to a metallic cartridge gun. On my return to Paris I saw the Committee of Artillery, and found that if it could be done it would at least greatly interest them. I at once went to Stuttgart, and at the War

Office found the whereabouts of the Mausers. Their home was in Oberndorf—some distance from a railway line. I went there, and found they were at work in the small Government armory in that place. Soon I was introduced to them. They looked like crushed men—poor and working hard for their living. I found that the officials pooh-poohed their arm, and they had lost all hope. I asked them to my hotel, and soon I got the option to employ them and to exploit their invention if I should so elect within a certain number of days. My brother was interested with me, and later the Messrs Remington became interested. We employed them about two years in working out the invention, making models, etc. Mr. Samuel Remington, who was in Europe, discouraged its presentation to military authorities, being anxious that the Remington should be the only arm to be energetically pushed. It was a grave error, for the inclination of military men was in favor of a bolt gun, following the German and French systems. The Mausers got discouraged and went home to Oberndorf, and soon after most wisely took their arm to Spandau, near Berlin, where all trials of arms and other military material were made. Soon the German Government adopted it, and it became the arm of the most powerful army on the Continent of Europe.”

One object of this article is to show the activities of Mr. Norris in connection with the Mauser invention and how America through Mr. Norris came near to monopolizing the arms trade. Had the Remington Company taken advantage of the opportunity to obtain the Mauser patents, secured by their representative abroad, they would have controlled in actual manufacture or royalties the production of nearly all modern rifles,—for these are largely based on the Mauser principle.

The manner of securing the Mauser invention is very interestingly told by Mr. Norris in a letter to his wife, from which I quote:

“September 13th, 1867.

“Hardly was a journey commenced with as much doubt as this was when I left Stuttgart and with such overwhelmingly satisfactory results. Suffering a good deal from a boil on my leg after five hours in the cars, I must say my heart almost failed me, when I came to get into the Post carriage at 9 A. M. to ride till one o'clock.

“However, I did it and was very comfortable. I got a good bed and this morning started out with my interpreter. I ought to say that when the landlord showed us to bed I asked him what sort of a town they had here. That was enough and he went on to talk of the gun factory and then about ‘Mauser’s wonderful gun.’ Of course we were very ignorant. He offered to take us to the gun works and enable us to see this new gun. So you see the ice was broken at once. Well—so this morning we went and manifested great interest in the rude machines and work they were doing. Presently Mr. Mauser was brought forward and I told him I would go

to his room and see his gun—so we went and talked and talked and examined and all the time I gradually led on without showing what my desire was. We talked much about the cartridges, he having a new one, then I said I had one—and asked the two Mauser brothers to come to the hotel in the P. M. to see it. We said good-bye and came off. At one, they came and never left till eight this evening. Well, I have an agreement *signed*—giving me the right to the whole invention—gun and cartridges for the world for 6000 francs per year for ten years. Cheap enough. I have all the details in black and white and well understood. Strange to say in the course of a talk with my excellent men—one of them said—‘We have a brother in America working in Ilion.’ A man I know very well and one of the best men in Remington’s works. I said nothing, but when I found I was going to nail them I told them I knew him and saw him six weeks ago. They were surprised and delighted for they had not seen him for sixteen years. Besides they remembered that he had mentioned my name in his letters—(probably and naturally as Remington’s representative in Europe). It gave them increased confidence, they said. Poor men, they are most intelligent, capable men, but have been kept down by every means possible and are now working twelve hours per day for four francs each. They have been told that their gun was the best before this and the Bavarian Government and I think it is the one these Governments will take.

“In fact—it is the cheapest thing yet produced and in many respects the best. I wanted it, as you know, for changing the Chassepot and they say they can do it. I hardly mentioned that however—though in the paper they agree to give me France in consideration of the patents I obtain for them in the next ninety days, if I don’t carry out the whole agreement. So I have what I came for and more if I desire. I have not of course, determined what is best, but if E. R. and Sons do right, I think I shall let them in, in consideration of my continuing to act for them in the ‘R’—This will induce them to do this, otherwise it might lead to a split, which I want to avoid. Besides, while I should be served, they will be too, for we need not force this, when there is any chance for the ‘R’—then too, it’s a good thing for them for it’s the coming gun—and cheap as dirt and easily made, I mean quickly.

“Well, now I start at twelve midnight—ride in the Post carriage till four—then take the cars to Stuttgart arriving there at 9:30 tomorrow morning. Then at one, if I feel able and ride all tomorrow P. M. and night arriving Vienna, Sunday morning. Then I shall go to see Count Bylandt, he has one of the guns.

“It is certainly an incident this getting complete control of what promises to be an important gun in a little town in the interior of Germany through the tongue of a rather poor interpreter, for me and for them, as his German is quite different from theirs.”

"Hotel Suede, Liege, Sept. 25th, 1867.

"My German boys have come and I have had them examining the Chassepot and they say, without hesitation, they can easily change their arm as I want it changed. I am greatly pleased with them. They are so intelligent and earnest. Certainly it promises well and I pray it may result as well as we hope. I wrote you before today."

"September 26th.

"I am in my room, the two Mausers sitting at the table—my patent lawyer ditto at work at drawings. My interpreter examining the Chassepot—my cigar by my side—the table covered with all sorts of things—guns—cartridges—papers, etc. So much for the picture before me."

Of interest too is the contract made by the Mausers and Norris. It shows in detail the binding nature of the agreement and is further an important document in the history of small arms. This contract, drawn up in French, at Liege, Belgium, I have translated and given in full below. Accompanying it is a *brief* authenticated by all the authorities, but as it covers the same ground as the contract itself, it is not here produced. These papers are all from originals. I am indebted for the documents used here to the daughter of Mr. Norris, Miss Maria D. Norris, who lives in the charming old homestead at Bristol, R. I.

Mr. Norris' trip to Oberndorf brings to my mind a trip I made when Military Attaché in Berlin to Oberndorf,—by rail instead of coach, however, in the spring of 1910 (I think it was) for the purpose of inspecting the Mauser works and particularly their new automatic rifle. Every courtesy was shown me by Herr Paul Mauser, who entertained me at lunch and had the automatic rifle fired for me. As I remember, this arm took a clip containing twenty-five cartridges inserted below the magazine. Bursts of twenty-five shots in less than four seconds were fired, or single shots could be fired. A report describing this arm was made at the time. Two samples of the rifle had been ordered by my predecessor, General Wisser, for our Government, but they were never delivered because of the intervention of the German authorities. Doubtless our Ordnance Department has since secured some of these German automatics.

ME LOUIS DELBOUILLE

Notaire à Liège

Between *Samuel Norris*, manufacturer of arms, residing at Paris, rue de Berry, No. 2, ——— of the first part,

Wilhelm Mauser, armorer, residing at Oberndorf (Wurtemberg), and *Paul Mauser*, likewise armorer, and residing at Oberndorf, ——— of the second part,

The following agreement has been made:

1.—The parties of the second part, inventors of a system of breech-loading rifle and central percussion cartridge, agree to sell, cede, and transfer to the party of the

first part the ownership of the said invention, with all the rights which result therefrom in order to secure patents in all countries whatever; they engage likewise to transfer to him the ownership of every invention of this kind that they shall make hereafter and of every improvement that they shall bring to their system of rifle and cartridge.

2.—The parties of the second part engage accordingly to do everything that shall depend on them to help Mr. Norris in obtaining patents for the said system in the different countries.

They give him for this purpose one or more irrevocable powers of attorney to take these patents either in his own name or in the names of the parties of the second part.

They will sign all papers and documents that shall be considered necessary and engage in general to do everything that shall be necessary to help Mr. Norris in the execution of his task.

3.—Mr. Norris shall have the right to dispose as he shall desire of the patents obtained whether under his name or those of the parties of the second part, who renounce taking out for rifles and cartridges of this kind any patents in any country unless as explained above by the mediation of the party of the first part.

The parties of the second part engage to sign and ratify all contracts of transfer of these patents to third parties if their intervention be demanded by the party of the first part; in one word, to perform all the acts necessary to transfer legally their ownership, the case arising.

4.—The parties of the second part undertake during six months, from the 13th of September last, to work for Mr. Norris or his representatives, if the party of the first part requires it, at the price of three to four florins per day for each of them, according to the expenses which they shall have to incur—

Mr. Norris will pay to them their fare if they be required by him to go to Vienna, or Paris or any other place.

5.—All the costs of patents are at the expense of the party of the first part.

6.—Besides the said party of the first part will pay to the parties of the second part within the period of ten years counting from this day for all the patents obtained and to be obtained the sum of 80,000 francs as indicated in the following articles, to wit:

Three thousand francs	the first	year	3000
"	"	"	"
"	"	"	"
"	"	"	"
Five	"	"	"
Six	"	"	"
Seven	"	"	"
Nine	"	"	"
Ten	"	"	"
Eleven	"	"	"
Twelve	"	"	"
Fourteen	"	"	"
Total: Eighty thousand francs			80000

This sum shall be payable by fourths at the expiration of each quarter.

7.—This sum of eighty thousand francs, likewise each annual sum, shall be distributed in the following manner among the different patents to be obtained:

A sixth for the English patent.

" " " " French "

" " " " U. S. "

A portion by equal parts for all the other patents.

8.—If from year to year, the number of these last patents obtained happen to increase there will be accomplished a new distribution proportional to the recompense due for each of them.

9.—In case Mr. Norris elects not to continue the payment of the recompense due for one of the patents obtained by him, after the manner of distribution indicated, the parties of the second part will have no other right than to take possession of this patent, without indemnity for Mr. Norris, who retains nevertheless the ownership of the other patents of which he shall have paid the recompense.

10.—In any event, it is understood that in case Mr. Norris should cease to pay completely the annual sum stipulated above, he shall retain meanwhile as indemnity for his trouble the French patent.

If however he has or should hereafter sell this French patent, he shall pay the sixth of the annual sum, as it is stipulated above.

If it should happen that the system Mauser be adopted at the same time by three of the four Governments, England, Austria, America or France, the total of the annual sum shall be paid to the parties of the second part.

11.—The sum of five hundred florins already paid to the parties of the second part by Mr. Norris will be entered on the account of the third annuity.

12.—The parties of the second part at all events shall have the right to receive and retain altogether the first two annuities of three thousand francs each.

13.—The present arrangement shall become definite only if Mr. Norris gives notice of his acceptance within ninety days, dating from September 13 last.

14.—If the parties of the second part by their fault should cause delay in validating the patents, they shall be responsible to Mr. Norris.

Done in duplicate the 28th of September, one thousand eight hundred sixty-seven.

Approved, the preceding document except clause number 11 in which the words "on account of the third annuity" are replaced by the words "on account of the first annuity."

Signed { WILHELM MAUSER
PAUL MAUSER

Besides it is expressly stipulated that the Messrs. Mauser can not under any pretext, directly or indirectly, transmit to third parties the rights which belong to the present contract of which the stipulations are applicable to the heirs of both parties.

Done in duplicate at the date above.

Signed { WILHELM MAUSER
PAUL MAUSER
SAMUEL NORRIS

Witnesses:

EMILE DUPONE

WILLIAM SMITH.

General Spotting Requirements

COAST ARTILLERY BOARD PROJECT NO. 416

I. HISTORY OF THE PROJECT

1. Many spotting devices have been considered by the Coast Artillery Board. Some of these devices are very ingenious and indicate professional zeal and hard study on the part of the originator. As yet no device has been submitted that can be recommended by the Coast Artillery Board as a standard for Coast Artillery use.

2. A Coast Artillery officer of long experience has stated that a careful inspection of many target practice reports has shown that spotting details are not always well organized and in many cases are not well trained. He attributes these poor results to two causes:

a. "that battery commanders do not recognize the fact that spotting details now form part of range sections (see paragraph 11, T. R. 435-221) and should receive the same intensive training as the plotting detail does in this section."

b. "that there are so many different kinds of spotting boards being used in the service, many of which are not accurately made or are not suitable in design for the work."

3. It is evident that there is need of a spotting board or device that will be simple, accurate, inexpensive, and universal.

4. In order to stimulate interest in the spotting problem, to suggest lines for the labors of those endeavoring to devise spotting boards or devices, and to further the solution of the problem, it seems advisable to formulate first of all the general requirements of the problem. Accordingly, the Coast Artillery Board has prepared such a set of general requirements which appear later in this paper.

II. DISCUSSION

5. It is the policy of the Coast Artillery Board, in considering any fire control apparatus, to hold as a primary requirement that the apparatus be suitable not simply for conditions of target practice, but for conditions of service against an enemy. The difference between a target towed by a tug at a speed of five miles an hour on a uniform course, and a target moving at a speed of thirty miles an hour on a sinuous course, the target

itself a source of heavy fire and supported by the fire of other enemy vessels, should not require elaboration.

6. Were the training of troops of the Regular Army the only consideration, it would be desirable, but not essential, to have a universal spotting board. However, the consideration of the training of the National Guard, the Organized Reserve, and the Reserve Officers' Training Corps, makes it essential that a spotting board, to be acceptable as a standard, must meet all but the most exceptional conditions.

7. The entire spotting system should be characterized by simplicity.

a. The spotting board or device should require for its operation not more than three men,—a chief spotter and two assistants. Its operation should involve a minimum number of motions and computations, and a minimum of time. Range and azimuth of setforward point from battery are the only data the chief spotter should require of the plotting detail. Readings on splashes are the only data that should be required of spotting stations.

b. The personnel at each spotting station should be limited to one observer and one reader.

c. The system should not be complicated by having time-of-flight clocks or computing devices in the spotting stations. It should be sufficient for the spotting stations to receive indication of the instant of splash.

d. It is essential that the spotting board should require for its operation, in addition to range and azimuth of setforward point from battery, only the following data:

- (1) Polar coordinates of splash, or
- (2) Rectangular coordinates of splash, or
- (3) Azimuths of splash from two points, or
- (4) Deviations of splash from known or easily located point.

e. The spotting board should permit of a rapid change of the spotting base line.

f. The device for plotting or measuring longitudinal and lateral deviations of the splash from the setforward point should be such as to permit of use with any of the following methods of locating splashes and, with minimum delay, the adjustments necessary in changing from one method to another:

- (1) Terrestrial observation with two stations.
- (2) Terrestrial observation with one station provided with a depression position finder or a self-contained range finder, either coincidence or stereoscopic.
- (3) Airplane observation.
- (4) Captive balloon observation.

8. The Coast Artillery Board is of the opinion that in adjusting fire, corrections should be based upon the deviations of the splash from the setforward point—not upon the deviations of the splash from the target; and, consequently, that the spotting system should determine quickly and simply the longitudinal and lateral deviations of splash from setforward point. Where a spotting device determines the deviations between target and splash it becomes necessary to determine the position of the target at the instant of splash and to combine deviations of splash from target and deviations of target from setforward point in order to obtain data upon which to base corrections.

9. It must be possible to locate spotting observation stations to obtain the best possible observation. Their location must not be restricted by the type or construction of the spotting board. The offensive and defensive use of smoke is to be expected in the future. Conditions which will necessitate gun fire by Case III in general will preclude the use of observation stations located near the battery.

10. Under certain conditions when airplane observation is available for spotting, the problem may be solved more accurately by using the terrestrial observation station also. Consider conditions of visibility such that the target and splash are visible from the airplane but that only the target is visible from the terrestrial stations. Data from the airplane will enable the determination of deviations of splash from target, data from terrestrial stations will enable the determination of location of target at instant of splash, and hence the deviation of target from setforward point; and from these data can be determined the longitudinal and lateral deviations of splash from setforward point.

* * * * *

12. The Coast Artillery Board believes that the telephonic communications should be limited to the following:

- a.* A data line from spotting board to each spotting station.
- b.* A tactical line from the B. C. station to chief spotter and spotting stations. (Where a position finding and spotting observation station are combined, one tactical line should be sufficient for the station.)
- c.* Only where it is impossible to locate the spotting board in, or so near, the plotting room that the chief spotter can receive directly by word of mouth the gun azimuth and range to setforward point should it be necessary to have a data line from the plotting room to the spotting board.
- d.* The data lines between spotting board and spotting stations should be used almost exclusively for transmission to the spotting stations of the indication of the instant of splash, and to the spotting board of data concerning the splash. Complicated messages from chief spotter to the spotting stations should not be required or permitted.

13. A consideration of the foregoing indicates that probably the simplest and most effective spotting board, or device, would be a universal plotting board. However, the factors of space and cost must be considered. A spotting board must be so located as to have protection from the elements and to permit of its operation at night. At many a fixed battery this means that the spotting board must be in the spotting room. At many batteries the space required for an additional plotting board is not, and cannot be made, available. It is doubtful that funds can be obtained wherewith to provide each battery with an additional plotting board. With tractor artillery the size and weight of an additional plotting board would be objectionable.

III. CONCLUSIONS—GENERAL SPOTTING REQUIREMENTS

14. To sum up, it is the opinion of the Coast Artillery Board that an ideal spotting system for general use in the Coast Artillery service should meet the following requirements:

a. Essential Requirements:

- (1) The system must determine as a result of its computations the gun range and azimuth deviation from the *setforward point*. Deviations from the target are not sufficient.
- (2) The system must possess entire flexibility with regard to the location of the spotting stations. The assumption that one of the spotting stations is located in the immediate vicinity of the battery or is located so as to permit axial observations should not be required. The system must permit the location of the spotting stations for most favorable observations of the splash, and with regard to the location of the battery, and there should be no limitation that spotting stations shall be both to the right or both to the left of the line of fire; one on the right and one on the left of the line of fire; or that either or both spotting stations should be nearer to the target than the battery; or that their line of observation shall make an angle of less than ninety degrees with the gun-target line.
- (3) The system must possess great flexibility in permitting change of spotting stations without material delay. It should be possible in about thirty seconds to change the spotting device so as to meet a transfer of one or both spotting stations.
- (4) The spotting system should be such as to require no extra operation of, or reading from, the plotting board used in position finding. It is to be noted that this requirement permits that the spotter may be furnished from the position finding plotting board the gun range and azimuth of the *setforward point* (from which he may readily obtain the time of flight)

b. Highly Desirable Characteristics:

- (5) The system should require the minimum of operations and computations in the spotting stations, as well as the minimum personnel therein. There should be in each spotting station one observer and one reader, but such apparatus as time-of-flight clocks or means of computing azimuth or range from spotting stations to setforward point should not be required in spotting stations.
- (6) Spotting data telephone lines should be used almost entirely for the transmission from the spotting stations of the necessary data with regard to the splash. Complicated messages from the chief spotter to the spotting stations are not permissible. After the assignment of target it should not be necessary to send out to the spotting stations any message except to indicate the instant of splash; e. g., "*Ready—Splash.*"
- (7) System should require the minimum personnel with the spotting devices in the central spotting room, preferably not more than one chief spotter and one assistant.
- (8) In general, the system should permit all the operations of spotting provided the splash (and not necessarily the target) is identified.
- (9) The system should meet present situation of the service as to cost and space required. It is unlikely that any considerable number of costly devices could be supplied to the service in the near future. As a rule, the space required for central spotting operation must be such as is available in present plotting rooms or cars without interference with other operations in position finding and fire control.

15. In general, the central spotting system should be such as readily, and without material alteration, to accommodate itself either to airplane spotting, to captive balloon spotting, or to vertical base or self-contained horizontal base spotting.

IV. RECOMMENDATIONS

16. The Coast Artillery Boards recommends:

a. That this project be published in the COAST ARTILLERY JOURNAL with the idea of stimulating professional interest and furthering the development of a spotting board, or device, that will be acceptable as a standard for Coast Artillery use.

b. That the Coast Artillery Board be directed to furnish a mimeographed copy of this project to any officer who may request it.

V. ACTION OF THE CHIEF OF COAST ARTILLERY

Ist Ind.

War Department, O. C. C. A., November 30, 1925.—To President, Coast Artillery Board, Ft. Monroe, Va. (Through Commandant, Coast Artillery School).

1. The study of the general requirements for spotting instruments contained in the report on Coast Artillery Board Project No. 416 covers the ideal specifications for such instruments. Publication to the service as recommended in paragraph 16 of that report is approved.

* * * * *

Responsibility for training is a function of command, therefore it is the duty of each commander to furnish his subordinate commanders with a statement of the objects or standards to be attained and the time available for the purpose. Means and methods for carrying out this mission will be left wholly to the subordinate; but if these means and methods are improper, or if observation shows that the subordinate is failing in his mission, corrective measures must be applied, such as further instruction of the subordinate in his command function, relief from command, or elimination from the service.—*TR 10-5.*

Annual Report of the Chief of Coast Artillery

* * * * *

1. I submit herewith my annual report as Chief of Coast Artillery.

2. *a.* In my reports for the years 1921 and 1924, I have set forth the reductions in the authorized strength of the Coast Artillery and the steps which have been taken to minimize the effects of these reductions.

My recommendations as to the remedial measures which should be taken, together with an analysis of the conditions which make these measures necessary, have also been included in these reports.

I shall not at this time take up again a subject which has been so exhaustively presented other than to state that the past year has served in no way to change my convictions as to the soundness of my previous recommendations.

b. During the past year the efforts of this branch have been directed towards:

The maintenance of the foreign garrisons.

The training of the officer personnel in the United States to insure the maximum professional advancement.

The instruction of the National Guard and the Organized Reserves.

The training of prospective Reserve Officers in the R. O. T. C. Units and the C. M. T. Camps.

The development of materiel and of training methods.

The preservation of materiel and protection of property at stations not fully garrisoned.

The distribution of the personnel and the training methods followed to accomplish above are set forth in the succeeding paragraphs.

As an incident of the above activities, there has been maintained a limited power for meeting an attack directed against our coasts.

It can not be assumed, however, that an effective defense could be made of our important harbors and naval bases with a Regular Army enlisted strength of approximately 3400 and a National Guard strength of approximately 7300 when there would be required 46,730 enlisted men for a complete manning of the fixed armament in war. The Regular Army and National Guard strength assigned to railway, tractor, and anti-aircraft artillery is fully as far below a reasonable minimum.

* * * * *

3. PERSONNEL.

a. Regular Army, Commissioned Officers.

DISTRIBUTION, MAY 31, 1925

(DATE SELECTED AS GIVING NORMAL DISTRIBUTION)

	Maj. Gen.	Colonel	Lt. Col.	Major	Captain	Lieutenants	Totals	Totals
With Troops in U. S.:								
Harbor Defenses.....		6	8	13	61	106	194	
A. A. Artillery.....		1	1	4	18	31	55	
Ry. Artillery.....		1		2	3	15	21	
Hv. Tr. Artillery.....		1	1	2	7	10	21	
Sound Ranging Co.....					1	2	3	294
With Troops on Foreign Service:								
Panama.....		4	2	7	19	37	69	
Hawaii.....		4	3	13	30	57	107	
Philippines.....		3	3	10	34	53	103	279
Coast Artillery District Staffs.....		5	2	3	1			11
Torpedo Depot and Coast Artillery Board.....		1	1	1	1			3
Office, Chief of Coast Artillery.....	1	1	1	4	2			9
Special Service Schools.....			2	42	45	22		111
Detached Duty:								
General Staff.....		6	11	8			25	
General Service Schools.....		2	6	47	1		56	
U. S. M. A.....				9	4	9	22	
Reserve Officers' Training Corps.....		3	1	15	21	8	46	
National Guard.....			4	13	14	3	34	
Organized Reserves.....		6	16	23	6	1	52	
Miscellaneous Details.....		4	4	19	8	18	53	290
Total.....	1	48	65	235	276	372		997

From the above it is seen that the following distribution to duties existed on the selected date.

With troops on foreign service.....	28%
With troops in United States.....	29%
Total with combat organizations.....	57%
Other duty related to branch activities.....	14%
Various other duties.....	29%

The large proportion of officers on foreign service and on various details compared to the number on duty with troops in the United States, when considered in connection with the necessity for rotating officers at regular intervals on these duties, indicates the reason for the relatively short tours of duty of officers on almost all assignments in the United States.

On May 31 the average time officers had been at their stations in the United States, excluding officers on student status, was:

Colonels.....	18 months
Lieutenant Colonels.....	21 months
Majors.....	20 months
Captains.....	19 months
First Lieutenants.....	16 months
Second Lieutenants.....	12 months

The unfortunate effect of such frequent changes of station on all activities to which these officers are assigned is obvious.

Relief can only be afforded by increasing the reservoir of officers with troops in the United States or by a decrease in the requirements for foreign service and detached duty.

b. Officers Reserve Corps.

CHANGES IN COAST ARTILLERY RESERVE OFFICERS DURING PAST YEAR

	Colonel	Lt. Colonel	Major	Captains	First Lts.	Second Lts.	Total
Commissioned, June 30, 1924.....	27	56	191	541	588	1888	3291
Gains: R. O. T. C. Units.....							
Transfer.....		1		4	3	318	318
Promotion.....		14	48	89	145	18	26
Other Sources.....	2	4	6	74	116	276	296
Total Gains.....	2	19	54	167	264	612	1118
	29	75	245	708	852	2500	4409
Losses: Promoted.....			14	48	89	145	296
Resigned.....	1			2	1	14	18
Discharged.....		1	4	13	15	18	51
Transferred.....		1	4	6	11	29	51
Death.....	1	1	1	1	2	7	13
Declined Recommission.....				2	3	3	8
Expiration of Commission.....			8	14	19	20	61
Total Losses.....	2	3	31	86	140	236	498
Total Commissioned, June 30, 1925.....	27	72	214	622	712	2264	3911

DISTRIBUTION OF COAST ARTILLERY RESERVE OFFICERS JUNE 30, 1925

Corps Area or Department	1	2	3	4	5	6	7	8	9	Pana-ma	Haw-aii	Philippines	China	Total
G. A. Group.....		1		1										2
B. A. Group.....	17	26	54	62	11	33	3	54	3					263
T. A. Group.....	634	603	494	518	159	319	321	98	466	11	13	8	2	3646
Total.....	651	630	548	581	170	352	324	152	469	11	13	8	2	3911

4. TRAINING.

a. (1) Under the provisions of A. R. 265-10 representatives of this office have made training inspections of all the regular regiments of Coast Artillery located in the continental limits of the United States. These inspections have indicated that training programs now in effect are too crowded and that in consequence of this regimental commanders are finding it difficult to maintain a high state of morale in their commands.

(2) Reports of target practice show improvement in fire against simulated naval targets during the year. There has been an increase in

the number of hits per gun per minute and in the firing ranges, and a decrease in the times of making adjustments from observation of fire by battery commanders.

(3) During one target practice in each Coast Artillery district battery personnel has been subjected to a gas attack. These firings have emphasized the need for gas masks suitable for the personnel operating telephones and optical instruments. This has been brought to the attention of the War Department and the development of a suitable mask is in progress.

(4) Under War Department instructions of April 18, 1925, exhaustive antiaircraft service training is now being conducted by the 62d Coast Artillery (A. A.) at Fort Tilden, New York, in conjunction with the Air Service personnel located at Mitchel Field, L. I., with a view to determining the degree of efficiency which may be expected from antiaircraft gun and machine-gun fire against air targets and the ability of searchlights, directed on data furnished by listening devices, to place their beams upon aircraft and to illuminate continuously a target while it remains within range.

These firings as well as those held during the year by other Coast Artillery antiaircraft regiments have demonstrated that this form of fire is more effective upon bombing planes than that of other classes of artillery against their normal targets.

(5) In order that a healthy rivalry in all classes of target practice may be stimulated throughout the Coast Artillery this office has issued tables showing the results of all firings of the regular regiments assigned to fixed, railway, antiaircraft, and heavy tractor-drawn artillery materiel held during the calendar year 1924.

* * * * *

b. The Coast Artillery School. The outstanding features of this year's work at the Coast Artillery School have been the lengthening of the Advanced Course from five and a half to nine months and the establishment of the Department of Correspondence Courses.

The following table shows the courses which were given in the Coast Artillery School during the past year, together with the number of officers in attendance and the number graduating.

Course	Duration	Number of Officers Attending Course	Number of Officers Completing Course
Advanced Course	9 months	36	34*
Advanced Engineering Course	4½ months	6	6
Battery Officers' Course	9 months	49	48**
Refresher Course for General and Field Officers	1-3 months	2	2
Special Course for National Guard and Reserve Officers	6 weeks for N. G. 8 weeks for O. R.	15 National Guard 8 Org. Res.	15 National Guard 8 Org. Res.

*Includes 1 Cuban Army Officer. **Included 2 Cuban Army Officers.

The following courses for enlisted men were also given.

<i>Course</i>	<i>Duration</i>	<i>Number Enlisted Men Attending Course</i>	<i>Number Enlisted Men Completing Course</i>
Artillery Course	9 months	6	4
Engineering Course	9 months	25	22
Radio Course	9 months	13	9
Clerical Course	9 months	34	23
Special Diesel Engine Course	10 weeks	9	9

c. Coast Artillery Organized Reserve Training.

(1) The predominant features of the training of Organized Reserves during this year have been the training of organizations as units, the more intimate supervision over active and inactive training by unit executives, the increased interest taken in the Army Correspondence Courses, the inauguration of periodical conferences on artillery subjects in certain centers containing a number of Coast Artillery officers, and the training of officers for wartime duty in this office and at the Coast Artillery School.

(2) Up to this time it has not been possible to train properly in antiaircraft methods the personnel of the seventeen antiaircraft artillery regiments located in the central part of the United States, owing to there being no regular Coast Artillery antiaircraft regiment to form a training center for these units of the Organized Reserves. Funds have been available to send only a few of the officers of these regiments to any of the three regular antiaircraft regiments located on the seacoast. Arrangements have been made to train this personnel with National Guard Antiaircraft regiments at Fort Sill, Oklahoma, and Camp Sparta, Wisconsin. To assist in this training, regular Coast Artillery teams have been sent from the nearest antiaircraft regiments. This arrangement is not satisfactory, and proper training can be given to these units and the three National Guard regiments similarly situated only by organizing and stationing a regular antiaircraft regiment at some point in that region.

(3) An improvement in the number of Reserve Officers taking Correspondence Courses has taken place during this year and at the present time 814 officers are taking one or more courses. This number is about twenty-two and a half per cent of the number of Reserve Officers of Coast Artillery.

(4) Camps for Coast Artillery units of the Organized Reserves were held during this year at nine regular Coast Artillery stations. The personnel of fourteen regiments which is about twenty per cent of the number of units now organized attended these camps.

d. Reserve Officers' Training Corps.

(1) The academic year just completed at institutions where Coast Artillery R. O. T. C. units are installed is the first one during which these units have been trained pursuant to the new course of instruction. This

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course of instruction has proved to be most satisfactory and produces graduates well qualified to perform the duties of Second Lieutenants.

(2) Coast Artillery R. O. T. C. units are established as follows in the several Corps Areas:

First Corps Area.....	2 units	562 students
Second Corps Area.....	0 units	0 students
Third Corps Area.....	2 units	948 students
Fourth Corps Area.....	4 units	1070 students
Fifth Corps Area.....	1 unit	439 students
Sixth Corps Area.....	2 units	437 students
Seventh Corps Area.....	4 units	1398 students
Eighth Corps Area.....	0 units	0 students
Ninth Corps Area.....	3 units	1059 students
Total.....	18 units	5913 students

Two hundred and fifty-nine graduates of the above institutions were commissioned this year as second lieutenants, Coast Artillery Reserves.

These graduates are filling the vacancies in the grade of Second Lieutenant in the Coast Artillery Organized Reserves at a satisfactory rate except in the Second Corps Area. It is very desirable that two Coast Artillery units be established in this Corps Area. Fordham University has requested authority to establish such a unit, and though I have urged that favorable action be taken on this request, approval has been withheld due to the nonavailability of funds.

The following R. O. T. C. Camps were held during the summer of 1924 with the attendance as noted:

Fort H. G. Wright, N. Y.....	50
Fort Monroe, Virginia.....	254
Fort Barrancas, Florida.....	89
Fort Casey, Washington.....	41
Total.....	434

e. Citizens Military Training Camps. Coast Artillery C. M. T. Camps were held during the summer of 1924 at six different locations with an attendance of 1378.

The instructions at these camps has been satisfactory but the graduates of the Blue Course cannot, without further training, make efficient second lieutenants of Coast Artillery. These students should be commissioned provisionally upon graduation from the Blue Course and should not receive their final commissions until they have attended at least one camp with the Reserve regiment to which they may be assigned.

5. MATERIEL.

a. The project for mounting 16-inch long-range guns in our harbor defenses has progressed slowly during the last fiscal year due to the limited funds available for the construction of emplacements by the Corps of Engineers. * * *

b. In my last annual report attention was called to the fact that a definite advance has been made toward providing adequate fire control systems for the long-range guns already installed through the approval by the War Department of a project for the completion of these systems within a certain number of years. The results expected have not materialized. The fire control projects for the United States were approved for completion on an eight-year basis. The appropriation made available for this purpose for the fiscal year 1926 will, if continued, provide for completion of these projects in not less than thirty-five years. * * * To make our modern long-range batteries effective, it is necessary that they be supplied with complete, permanent fire control systems. It is recommended that a program be established for the completion of these projects and that an effort be made to secure the funds necessary to carry the program into effect.

c. Development work on Ordnance equipment pertaining to the fire control for seacoast batteries has been pushed to the limit of funds available, and considerable progress has been made in the improvement of these instruments to meet modern conditions.

The Universal Deflection Board tested during the past year did not prove to be satisfactory but led to a new design that, it is believed, will meet all requirements at a reduced cost. The board is under manufacture and will be given a thorough service test without delay.

The Whistler-Hearn Plotting Boards are being modified to Cloke Plotting and Relocating Boards and issued to the service as rapidly as available funds permit. A special Cloke board, for use with the long-range 16-inch guns, is now under manufacture and will be placed in service at an early date.

The increase in range of modern armament has necessitated a re-design of our Depression Position Finders. The new design has been completed, and manufacture of the first ten instruments has been started.

The modification of the Pratt Range Board has been completed and the New Board approved for manufacture.

* * * * *

g. The .50-caliber machine gun has been adopted as the standard machine gun for antiaircraft defense. A new tripod has recently been developed for this gun which gives increased stability in firing. An experimental sight has been designed, manufactured, and issued for service test that is expected to give good results. As soon as funds can be made available, .50-caliber machine guns should be supplied to all Coast Artillery units for antiaircraft defense in replacement of the .30-caliber machine guns and automatic rifles still in service.

h. The new 3-inch antiaircraft gun, Model 1923-E, on mobile trailer mount, is now undergoing test at Fort Monroe, Virginia, and preliminary reports indicate that both gun and carriage will be satisfactory as soon as

minor defects have been corrected. This gun embodies many improvements and, when it is finally approved for manufacture, immediate steps should be taken to provide for the replacement of the 3-inch antiaircraft gun Model 1918, on auto trailer mount now being used by our antiaircraft organizations.

j. The urgent need for sound-locating devices for detecting and tracking airplanes at night with a view to their illumination by searchlights has been met by the design, manufacture, and issue by the Ordnance Department of experimental instruments. This development work is considered of great importance and will be pushed to completion as rapidly as funds permit.

k. The open type 60-inch searchlight was a wartime development and is not entirely satisfactory. A re-design has been completed. The new type is an inclosed light of greater power without increase of weight. Nine of these new lights, with improved control apparatus, have been ordered and are under manufacture.

* * * * *

7. CONCLUSIONS AND RECOMMENDATIONS.

a. From a survey of the past year I feel that the Coast Artillery personnel has been advantageously disposed, the training as complete as the limited strength permitted, and the progress in the development of materiel as great as could be expected with the funds available.

b. I have submitted in a separate communication detailed recommendations as to changes in training considered desirable, but I feel that I should mention in this report my conclusion that the instruction heretofore prescribed has been too varied. It is hoped that in future the training programs of units may be such that they may not only master the details of any assignment before passing to another but that they may have opportunity to become so expert in every duty assigned them that they may serve as models for the other components of the Army.

c. In addition to my suggestions made throughout this report and to my recommendations of former years, referred to in the second paragraph above, I wish especially to urge at this time the necessity for increased activity in the development of our antiaircraft service.

Other Coast Artillery developments are either refinements or extensions of well tried out ideas.

The antiaircraft service is, however, at a point where original investigations and extended trials of new designs and methods are imperative.

Every assistance should, therefore, be given this new service both by supplying the organizations assigned thereto with the latest developed equipment and by affording them the maximum opportunity for perfecting themselves in its use.

It is only in this way that a true estimate may be had of the value of a service which bears such an important relation to the national defense.

* * * * *

British Coast Defense

THE functions of the Army, Navy, and Air Service in respect to the cost defense of the United States and the coordinating and overlapping of the operations of these services, as brought out in the investigation of the President's Air Board, serve to indicate the importance with which this subject is viewed. In this connection, the functioning and co-operation of these three services as applied to coast defense in Great Britain may be of interest.

Prior to the World War it was generally accepted that the British Navy, by the maintenance of sea supremacy, would be entirely responsible for the protection of the coasts of Great Britain against organized invasion from the sea, and that the army would be responsible only for the protection of the coast against raiding forces which might elude the navy. As a result of this policy, comparatively little was done in the way of building fixed coast defenses, except to fortify the sea approaches to the larger cities and strongly to fortify the principal naval bases. The armament of these fortifications consisted of comparatively small-caliber guns, the largest of which were 9.2-inch. This made the problem comparatively simple for the army and made little occasion for conflict in the relations between the army and navy.

Primarily due to the development of aircraft, this problem has become more complicated. The protection of the larger cities and the naval bases can no longer be assured by the army and navy unless assisted by air forces against an attack by air. Continental air menace seems to preclude the possibility of the maintenance of a British fleet in the English Channel or in the Irish Sea for coast defense. It is believed that, in the event of a war with a continental power, Britain must obtain air supremacy before being able to protect her southern coasts. It is thus generally accepted that a strong air force in instant readiness must be maintained for this purpose. The British aviation program calls for seventy-two squadrons, twenty for use abroad and fifty-two for home defense. Of these, forty-six have already been organized. In addition, the equivalent of ten squadrons has been organized for operation and cooperation with the fleet.

The heavy artillery, which operates the fixed defenses, comprise forty-two batteries, twenty-three of which are stationed in Great Britain. These are located as follows:

Defenses of Portsmouth:

6 batteries at Clarence Barracks.

3 batteries at Fort Brookhurst.

Defenses of Plymouth and Falmouth:

4 batteries at Plymouth.

Defenses of Edinburg:

2 batteries at Leith Fort.

Defenses of Inverness:

1 battery at Fort William.

Defenses of Queenstown, Ireland:

2 batteries at Spike Island.

1 battery at Fort Templebreedy.

1 battery at Fort Carslake.

Defenses of Lough Swilly, Northern Ireland:

1 battery at Lough Swilly.

Defenses of Berehaven, Ireland:

2 batteries at Bere Island.

Of these batteries, only those in the defense of Portsmouth and Plymouth are maintained at peace strength and these mainly for training purposes. The remaining batteries are manned only by caretaking detachments. Batteries are grouped for tactical and administrative purposes into fire commands, sectors, and fortress commands in accordance with their location and with tactical considerations. There is no fixed organization for any unit larger than a battery.

Under the present system, fixed fortifications are commanded by an army officer who is fortress commander. He is actually in charge of the army personnel and nominally in charge of the naval personnel which handles the mines, bombs, nets, and crafts for mine-sweeping and patrol purposes. In time of war he would also be in control of any air force units assigned to his command. At present no such air force units are so assigned. Due to the lack of a fixed policy for employment and coordination of the three services in time of war and to the conflicting opinions of the members of the different services, this system is undoubtedly unsatisfactory.

Since the establishment of a separate Air Ministry, coordination between the three fighting branches has proved so difficult that attempts have been made by influential men to establish a single ministry of defense. These attempts have failed up to the present time. It is believed there is a great lack of coordination and considerable overlapping in the functions of the different branches. The views of the different services as to their common operation and coordination in coast defense here follows.

Navy.—Although the navy and the air force both appreciate fully the need of close cooperation between their forces, and though repeated efforts have been made to obtain an understanding, practically nothing has been accomplished due to the extreme divergence of opinions held by the heads of these services. The fleet air arm comprises twenty flights of six planes each, the major part of which is used with the fleet and a small part for coast defense. The results obtained by the latter are deemed extremely unsatisfactory.

Army and navy relations on coast defense seem to be on a better footing. Complete war plans, covering different situations, have been prepared, though no coast defense organizations of the navy are at present operating. These plans provide for coast defense districts which shall comprise such naval forces as circumstances require. Commanders of these districts are to cooperate with the commanders of the fixed defenses and mobile units of the army allotted for coast defense.

Practically all naval officers are unanimous in the belief that they should have a separate air force completely under naval control.

Army.—Practically nothing was done to improve fixed coast defenses during the War, since they were little used; and, since British policy does not apprehend a major war within ten years, no improvements have been made to the present time. These, however, are under consideration, and it is thought that soon a new policy will be adopted, that fixed fortifications will be remodeled, new armament installed, and probably new fortifications built. The absolute necessity for fixed fortifications and for larger-caliber guns, probably 15-inch naval guns, is understood. These larger calibers will probably be adopted. The employment of caretakers at most of the fortifications at present is dictated purely by economy. It is understood that in time of war fortress commanders will have air units assigned and that the army officer so commanding will be completely responsible for the defense of his locality.

Favorable consideration has not been accorded to railroad artillery because it takes too much time to move it and put it into action at threatened points, and because fixed armament is considered more accurate.

From the army viewpoint, present relations with the navy and air force in coast defense matters are not satisfactory. Coordination of the duties of the army and navy personnel assigned to fixed defenses is difficult—no air force units are now assigned for training with coast artillery, which should be done in peace time. In time of war, coast defenses at threatened points must have definite air support.

Air Service.—Air service officials believe that, in the event of an attack by a hostile air force or navy, it would be the duty of the air force to go out independently and defeat the enemy, and that the only necessity for cooperation with the navy would be when the navy desired the augmenta-

tion of the fleet air arm. Such calls for help would be met by such air units as are available at the time.

The present plans of the air force for coast defense contemplate the division of England into two commands designated as the "Fighting Area" and the "Wessex Area." The former command comprises the fighting units designated for home defense and the latter the bombing units for home defense. The Air Ministry places great reliance on bombing squadrons for home defense.

Air Ministry defense plans contemplate bombing attacks against cities and airdromes located near the coast of the continent and the employment of fighting aviation to deal with hostile air raids reaching the British coast.

Antiaircraft artillery is relied upon to annoy and break up hostile aircraft formations enough to enable the defense fighters to attack with advantage. In peace time antiaircraft defense units are trained and operated by the army, but in war come at once under the air officer commanding the air defenses in Great Britain. (The army disputes this change of status.)

The air force assigns no planes to coast defenses of England in peace due to scarcity of planes, and no air force officer is on the staffs of those commands. In Malta, an air force officer is a member of such a staff.

In time of war, coast defense forts, if liable to attack, will have air forces assigned for reconnaissance and artillery spotting. These units will be directly under the orders of the army officer commanding, who would transmit his orders through the air officer on his staff.

The navy now has practical control of the fleet air arm which is permanently assigned and which now comprises twenty flights of six planes each, consisting of fighting, reconnaissance, bombing, and torpedo planes. Naval air force policy permits young officers to choose their own branch of aviation, and those choosing naval aviation are left there, if possible. If the navy gains full control of its aviation, the present status of the fleet air arm with respect to home defense will not be materially changed.

At present the units which will be assigned to the defense of Great Britain will be gradually taken over by the air officer commanding the air defenses of Great Britain and all combat units will be operated from his office.

Considering the forty-six land squadrons in the air force, thirty-four are fighting squadrons and twelve are for army cooperation. As for overlapping functions, it will be seen that twenty per cent of the air force is under the navy for operation, twenty per cent is for army cooperation, and sixty per cent is for offensive and defensive bombing and fighting, a distribution which, it is believed, will not materially change.

CONCLUSIONS

That there is an actual overlapping of functions and lack of proper coordination between the services for the following reasons:

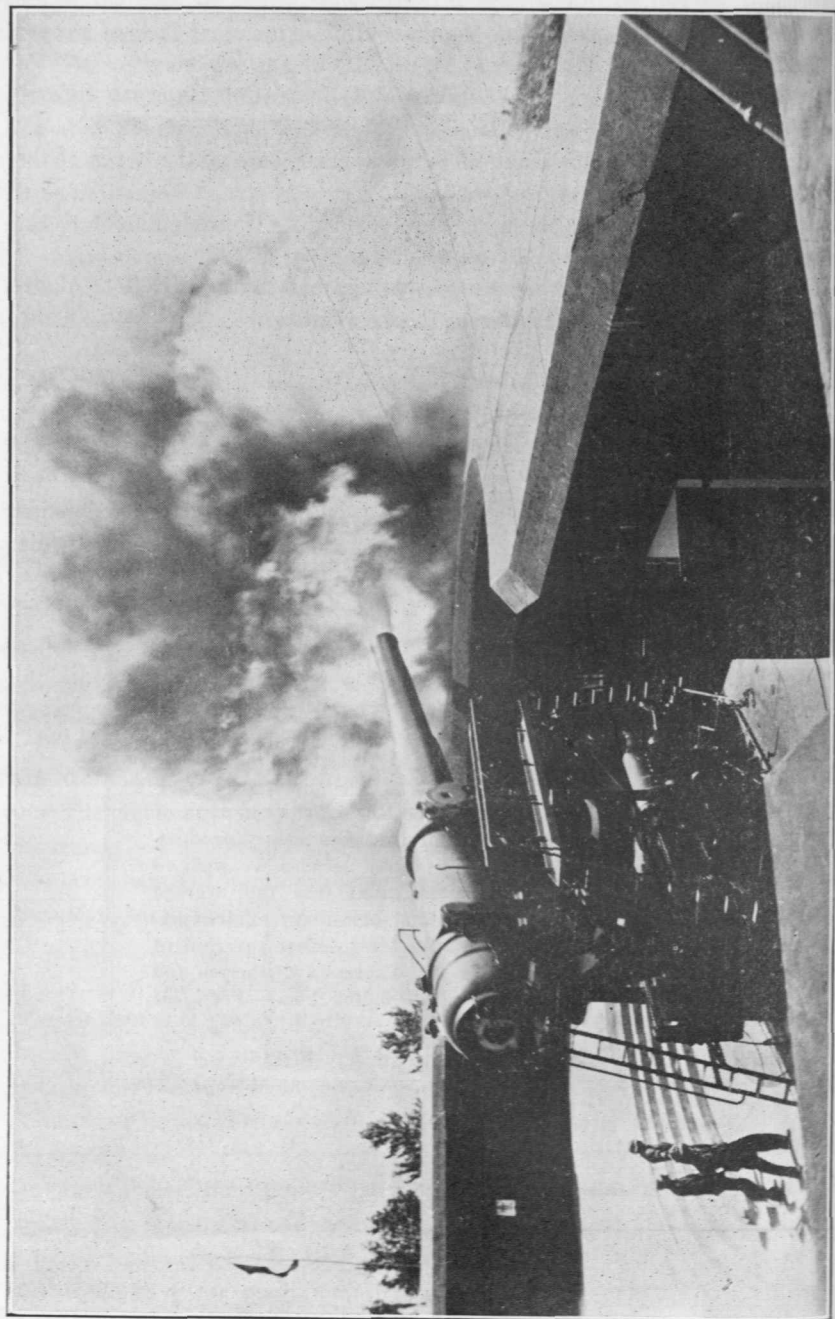
(a) Lack of power of the Imperial Defense Committee to enforce its defense policies.

(b) Failure of adjustment of the divergent views of the heads of the different services.

(c) Tendency of each service to consider itself predominant at the expense of the others.

(d) Failure of heads of services to appreciate the full effect of developments of the other services in future wars.

Freedom, independence, self-government are all opposed to anything that resembles a mercenary force. But while military science has advanced to such a degree that it is necessary constantly to maintain a considerable body of trained experts in that profession, the true spirit of American institutions requires that each citizen shall be potentially a soldier, ready to take his place in the ranks in time of peril, either in the field or in the necessary productive activity. * * * It is exactly because we wish to keep our standing forces small that the average citizen must give some time to military affairs, precisely as he gives some attention to other government affairs, in order that he may express a deliberate and informed judgment at the ballot box.—*President Coolidge.*



BATTERY PARROTT IN ACTION

EDITORIALS

Warlike America

NOT so very long ago a distinguished officer of the United States Navy remarked in the course of a lecture to a large number of students at a midwestern university that "America is the most warlike nation on the face of the globe." In this we fear that the Admiral was in error; and yet his error was one of words, not of ideas. His line of reasoning was good, but his conclusions were faulty.

The American nation, as a nation, is peace-loving to an extreme. Our forefathers, hardy men though they were, skilled in the use of fire-arms, accustomed to battle, and inured to hardship, danger, and sudden death, did not transmit to their posterity the militaristic policy, the belligerent attitude towards the world, the partiality for organized warfare, which we might, perhaps, have expected. The religious zealots of New England escaping persecution in the Old World, the phlegmatic traders of New Amsterdam, the conscientious objectors of the central Atlantic colonies, the luxury-loving planters of Maryland and Virginia, and the political refugees of the south bequeathed us a pacifistic attitude, a desire for peace, and an objection to a standing army.

At the same time, they transmitted other characteristics which at times run counter to our national desire for peace and which have played an important part in our history. They built up a strong sense of pride, a sensitiveness to slights, and a form of mutual self-sympathy which has broadened to a sporting feeling of sympathy for any "under dog." But above all, forced by their surroundings to learn the trade of a soldier, they developed a marked ability to take care of themselves in conflict and an equally marked consciousness of that ability. As a result, we find in America two strong counter currents. On the one hand, we, as a nation, (1) decry the need of maintaining an adequate standing army, holding it an unwarrantable tax upon our citizens; (2) disdain Washington's admonition to prepare for war in time of peace; (3) profess a peaceful attitude toward all the world; and (4) look upon war as a disaster which may occur to others but not to us. On the other hand, we, as individuals, are sensitive to foreign slight. In the full consciousness of our ability as fighters, we do not hesitate to admit our prowess. We carry a chip on our collective shoulder. We may not desire to fight and we may decry fighting; but when some one treads upon our toes, we rise to our feet and cry: "Fight! Fight!"

The Revolutionary War was a popular out-burst at a time when there was no central government which could play upon the popular mind and create a desire for war. As early as 1808 a second war with Great Britain threatened, but a peace-loving administration withheld a declaration of war until public clamor could no longer be denied. The war with Mexico, while it did not result from a general demand for war, was nevertheless a popular war and received the enthusiastic support of the people. The Civil War needs no comment; no one can pretend that President Lincoln desired war nor that he reasonably could have prevented war. And we can still remember the cry of "Remember the Maine" and the other, "Remember the Lusitania," which spread like wildfire over the country.

All our wars have originated with the people. Our nation has never desired to make war; but our people, when occasion arose, have demanded it. Our nation seeks for peace, but our people honor its military heroes. Our greatest military leader was our first President. Practically every public office within the gift of the electorate has been filled by military men. We have provided the veterans of our wars with grants of land and pensions and preferential treatment in the Civil Service and bonuses and life insurance and homes. We are not a warlike nation but we favor military men.

No other nation can claim a record such as ours. No other nation has never had a war forced upon the people. No other nation has placed a comparable number of military men in the chair of the Chief Executive. The Admiral may not have been accurate when he stated that "America is the most warlike nation on the face of the globe," but he would not have been so far wrong had he said: "The American people are the most warlike people on earth."

Great Artillerymen

We live in an age of comparisons. All human effort is a matter of competition, and every line of endeavor has its outstanding men or women. By comparisons we seek to determine the individual or group of individuals standing superior to all others in any form of activity. All games, all athletic tournaments, all "bathing beauty" contests, all prize essay competitions, all scholarships, all scholastic grading systems, all selections of "All-American" teams, exist primarily or in large part to determine the question of the relative superiority of the participants. Business itself is a struggle to establish a supremacy over competitors. From cards to football, from street cleaning to railroad operation, from checkers to warfare, we are interested in "champions."

Ask almost any member of the military service the names of the ten great military leaders of all times or of ten famous cavalry leaders or of ten great aviators, and he will scarcely hesitate. Such names as Napoleon, Washington, Grant, Lee, Stonewall Jackson, Gustavus Adolphus,

Hannibal, Alexander, Cæsar, and Stuart, come without requiring a thought. From the Infantry, the Cavalry, the Engineers, the Air Service men have climbed to fame. But what of the artillery?

Who are the ten greatest artillerymen? Who are ten great artillerymen? One will probably start with Napoleon; but who comes next? Knox? Hunt? Summerall? The JOURNAL would like to have your opinion. Consider the fact that the artillery commander, as such, has not the opportunity of achieving a niche in the Hall of Fame as has an independent commander. Consider the fact that fame may have come only after rising to high command, but give credit for work done as an artillery commander through which came the promotion to high command. Then make your choice and send to the JOURNAL the results of your study. There have been ten great artillery commanders who may properly be considered to stand at the top of the list. Who are they?

What Are the Causes of War

[Reprinted from the San Francisco *Examiner*]

What causes war? What causes any particular war? War generally results in profiteering. Does the desire to profit by war lead to conspiracy to bring on war?

Bernard Baruch, who in the World War was chairman of the War Industries Board, recently gave \$250,000 to the International Relations Division of Johns Hopkins University for the purpose of investigating these causes. The investigation will include the study of all plans for the elimination of war. If war is a disease, a terrible disease on a grand scale, Mr. Baruch thinks it may be possible to find its germ and stamp it out of existence.

It was Baruch who insisted in 1917 and 1918 that "there ought to be not only mobilization of man power, but of things and dollars." If you must draft young men to fight, he asserted, you must draft older men to work, and property to serve. The opportunity war offers for profiteering he thought was too great to be resisted, unless every material energy of the country was conscripted for the country's service as inevitably as man power was conscripted to fight. Otherwise the rights of property were exalted over the rights of human life; otherwise war, which summons many young men to death, summons other men, older, to profit.

We do not understand that Mr. Baruch, in giving his \$250,000, has announced any previous theory of what he expects the investigators to discover. He knows that though the war made some men rich, it made others of the same type poor; and he knows too, that there were many rich men who, like himself, gladly made financial sacrifices themselves, as their sons sacrificed their lives for the country. We do not think he expects this investigation to result in any blanket charge that all wars are

bankers' wars, manufacturers' wars, financially conspiratorial wars. He hopes, however, that it is idle to lament war's existence without seeking finally to discover what is behind it.

This is, of its kind, real "preparation" for war. Of it General Pershing says: "I sincerely believe that complete preparation of this sort would be the greatest possible safeguard against jingoism at home or aggression from abroad."

You Can Do It Better With Gas

[Reprinted from the *Chicago News*]

Every so often somebody discovers the utter depravity of the chemical warfare service. The latest disclosure is that the experts of the service have prepared a manual covering the use of various poison gases in dispersing civilian mobs. Our Army has been forbidden by international treaty to use gas against a foreign enemy but is preparing to use it against our own citizens, we are informed with mingled horror and indignation—horror that we would use so infamous a weapon, and indignation that we would use it against our own people.

We do not share these emotions. The thought of inhaling deadly gases is not a pleasant one, but we note that the service recommends the use of tear gases for the purpose in hand. These do not kill in ordinary concentrations; they do not even cause permanent injury. They do make the neighborhood distinctly unpleasant for any one not equipped with a mask. The members of a mob attacked with tear gas will clear out as rapidly as their legs will carry them. They will scarcely be able to see for the blinding tears, but they will be all right again in a few hours. We do not like to think of subjecting any of our fellow citizens to such discomforts even when they have assembled in anger to lynch an innocent man. Unfortunately the alternatives to gas are even less agreeable. We fancy that the survivors of the massacre at Amritsar would agree that tear gas would have been preferable to the machine gun fire which the British poured into the mob, killing 500 and wounding 1500 more.

Almost inevitably the choice will lie between gas and the machine gun because both are effective weapons in the hands of small groups of soldiers against far larger but less well organized groups of civilians.

The opponents of the use of gas are outraged that the War Department has deliberately planned to meet an emergency not uncommon in our country. They seem to think that gas will be used tyrannously to break up peaceful assemblages. The fear is groundless. The chemical service is as much a part of the Army as the Infantry, and it will be used as the Infantry and Cavalry have been used from time to time, to "inspire domestic tranquility," as the constitution phrases it. The possibility of employing a new weapon for an old object need alarm no one.

a redoubt on Signal Hill, the elevation on the Staten Island side, which is now embraced in the limits of Fort Wadsworth.

Undoubtedly this redoubt sufficed for a number of years. New York, however, began to feel uneasy in 1808 about its defense. Perhaps this was simply public opinion freeing itself from the pacific lethargy which followed the Revolution as it follows all wars; perhaps it was a premonition of the conflict of 1812. At any rate, Governor Tompkins of New York reported in his "Papers" that "during the winter of



FORT WADSWORTH

1808 and 1809, some two hundred and fifty persons were given steady employment on the fortifications at the Staten Island side of the Narrows, the legislature of New York having appropriated \$100,000 for the purpose. Three works were under construction, the principal of which was Fort Tompkins." A temporary blockhouse had been added to the redoubt formerly constructed to cover the workers engaged on the new permanent fortifications. It is elsewhere mentioned in the "Papers" that the laborers were paid twenty-five cents and one ration per day. The value of the ration is certainly problematical.

Work did not proceed rapidly on the defenses. In a time of national unpreparedness the defenselessness of New York was a matter of notoriety. Consequently, the State of New York appropriated \$22,000 in 1813 for further fortification of Signal Hill, this amount presumably being required to supplement the grand total of \$11,500 expended for all the defenses of New York City in 1812. Conflicting reports followed in 1814, the Governor reporting the works incomplete, Jonathan Williams, Colonel of Engineers, reporting that five hundred men could withstand an attack on the fort by five thousand, and furthermore that the works could accommodate fifteen hundred.

The colonel's report stated: "The fort from its superior force and commanding position over all the subordinate ones and the surrounding adjacent country has a pre-eminence for its protection and the dependence on it for a resort in case of surprise or secret sorties being made against them; as well as from its own force in an extensive fire upon the enemy in any direction." Thus the natural advantages of Signal Hill were supplemented by works, which from their location and design were considered impregnable, and doubtless were at that time.

It is interesting here to note that Colonel Jonathan Williams, who constructed the works on Staten Island and others on Governors Island, was the first Superintendent of the Military Academy at West Point. In a controversy which arose as to the selection of the location of the Academy, he expressed himself as follows: * * * but I think I can shew undeniably that the numerous deficiencies in the site of West Point will be amply compensated in that contemplated at Staten Island; while every advantage that can be attributed to the former exist in an equal or greater degree at the latter place." The effect which the location of the Academy at Staten Island instead of at West Point might have had upon its development and functioning is a matter for speculation as interesting as it is futile.

The fortifications on Staten Island, however, retained their purpose of protecting New York Harbor and the city, instead of being diverted to use as a military academy. In 1814 the armament consisted of ninety-seven guns variously distributed among Forts Hudson, Richmond, and Tompkins, the redoubt and blockhouse, and "the small battery south of Fort Tompkins." Fort Richmond, named after the county in which it was located, was an effective water battery and the earliest of the forts in time of completion. Fort Hudson was another effective water battery, and Fort Tompkins, honoring the governor of that name, had the many advantages claimed for it by Colonel Williams. Two thousand militia from the Hudson River counties were sent to garrison the forts.

A good many peaceful years followed without bringing any material change in the status of the forts, until in 1847 the United States Government acquired them by a grant from the State of New York. Adjacent lands were acquired from individuals by purchase. The titles bear unfamiliar names, German or Dutch, because those nationalities predominated in the settlements on the nearby parts of the Island.

When the Federal Government obtained the post two major works were commenced: Fort Richmond, jutting out into the waters of the bay, and Fort Tompkins, replacing the old fort of the same name crowning Signal Hill. Both forts were designed after the school of Vauban, and stand as interesting relics. Fort Richmond is the companion work to Fort Lafayette, which is on a small island off the opposite shore of the Narrows, bearing the same relation to Fort Hamilton which Fort Richmond bears to Fort Tompkins. The new fortifications were first garrisoned on August 8, 1861.

The Civil War did not affect the post, except that an event growing out of the war gave the name of "Fort Wadsworth" to that part of the works formerly called

Training Camp, 601st Coast Artillery (Railway)

By 1ST LIEUT. DAVID A. PFROMM, C. A. Res.

Among the Reserve unit camps held in the First Corps Areas during the 1925 training season, one of the most interesting, from various standpoints, was that of the 60st Coast Artillery (Railway), allocated to Massachusetts and Connecticut. It afforded a practical example of not only how a schedule for a skeleton mobile heavy artillery regiment may be formulated and executed so as to apply wholly to its special class without any of the materiel pertaining to that class of artillery and with a minimum of troops, but of how much really consistent work may be profitably done in the short space of two weeks under those circumstances.

This was the first year of the "unit camps" and the first regimental assembly of this unit, which is the only regiment of its class in the Corps Area. Although the majority of our officers are veteran heavy artillerymen, with few exceptions they had no previous experience with railway artillery. Consequently we expected the camp to be along new lines and looked forward to instruction of a more special character than at those camps any of us had attended in previous years.

The camp was held at Fort Andrews, Boston Harbor, August 9 to 23, under command of Colonel C. E. Kilbourne, C. A. C. (commanding H. D. of Boston), the regiment being commanded by Lieut. Colonel Horatio Alden, C. A. Res. Thirty officers and seven enlisted specialists attended for training, of whom ten officers and four enlisted men were attached from the 615th Coast Artillery (Hr. Def.), the Reserve unit assigned to Boston Harbor. That more did not attend is ascribed largely to the fact that the camp period did not synchronize with the commercial vacations, which normally are granted in calendar half months. Nevertheless, considering that this was the first camp of the regiment as a unit, that attendance was above the average in like cases.

Hardly any post could have been better adapted. Fort Andrews is compact and easy to get about, and the armament conveniently corresponds, in calibers if not in type, to that of a railway regiment of 8-inch guns and 12-inch mortars. The regular infantry garrison was away at Camp Devens for its own summer training, so that the entire post was turned over to the purpose of the 601st Coast Artillery. Another appreciable advantage was that Fort Andrews is in attractive surroundings, only half an hour from Boston by the Nantasket S. S. Company's line of hourly boats.

Colonel Kilbourne suspended all other activities in the Harbor Defenses so as to give the fullest possible strength to Batteries A and C of the 9th C. A., which were concentrated at Fort Andrews for the service of our camp. These Regular companies were not attached to the 601st C. A., but only supplemented it for camp and armament service, in all other respects being under the Camp Commander. The men were provisionally divided for duty: those for camp service—guard, fatigue, officers' mess, phone operators, barrack orderlies, etc., were placed under one battery commander; all others were formed into a provisional unit under the other battery commander for armament service—manning parties, artillery maintenance, boat operation, instruction details, etc. This worked very satisfactorily, as it permitted more intensive artillery work and smoother running of camp routine, each person having a definite and continuing assignment.

Three Regular officers were assigned as instructors, one of whom was also the Camp Executive, and these were supplemented by the three officers on duty with the batteries of the 9th C. A. In addition three special subjects were voluntarily covered by officers from outside the camp—Major F. E. Hanson, Engr.-Res., Capt. T. J. John-



OFFICERS ON DUTY AT UNIT TRAINING CAMP 601ST COAST ARTILLERY (RY.), FORT ANDREWS, MASS., AUGUST, 1925

(Reading from left to right)

FRONT ROW: Capt. A. Morris, 601st C. A.; Chapl. S. C. Lang, 601st C. A.; Capt. H. Linsert, 9th C. A.; Major C. C. Tracy, 601st C. A.; Major F. J. Toohy, C. A. C. (DOL); Lt. Col. H. Alden, 601st C. A.; Lt. Col. F. Geere, C. A. C. (DOL); Maj. I. C. Whittemore, 601st C. A.; Major J. P. Hadfield, Med. Res.; Capt. G. W. Ricker, 8th C. A.; Capt. D. H. Hoge, 9th C. A.; 1st Lt. W. D. Hohenthal, 9th, C. A.

SECOND ROW: Lt. R. F. Miller, 601st C. A.; Capt. S. G. Barker, 615th C. A.; Capt. D. C. Jackson, C. A. Res. (BAG); Capt. H. A. Fasicck, 430th Ord. Co.; Capt. W. R. Russell, 615th C. A.; Capt. G. H. McKinnis, 615th C. A.; Capt. E. A. Rice, 615th C. A.; Capt. L. C. Hough, 601st C. A.; Capt. I. T. Hook, 601st C. A.; Capt. B. B. D'Ewart, 615th C. A.; Capt. M. L. Haselton, 615th C. A.; Lieut. R. C. Allen, 601st C. A.

THIRD ROW: Lt. W. T. Cook, 601st C. A.; Lt. A. T. Rose, 601st C. A.; Lt. J. Nissenbaum, 601st C. A.; Lt. H. T. Griswold, 601st C. A.; Lt. M. Weisman, 601st C. A.; Lt. W. A. Sweet, 615th C. A.; Lt. M. S. MacNaught, 601st C. A.; Lt. A. D. Thompson, 615th C. A.; Lt. D. A. Pfromm, 601st C. A.; Lt. E. F. Praetz, 615th C. A.; Lt. G. B. Nutting, 601st C. A.; Lt. R. L. Hayes, 601st C. A.;

ston, Corps Area C. W. S. Officer, and 1st Lieut. Robert J. Brown, Jr., A. S., Commanding Boston Airport.

Notwithstanding there was no railway artillery materiel whatever available, all instruction and work applied strictly to railway artillery service. The chief features of the schedule were its embracive character, the presentation of subjects in more or less progressive connection, a stepping up process in each subject itself, an avoidance of too much detailed technique without being wholly academic, and a minimum of lectures, those being most always preparatory to practical work. Thus the instruction was arranged so as to give us a visualization of the practical features of railway artillery as a whole and a comprehension of the scope of proficiency to which we must attain if ever called to active service. As was pointed out to us, all the subjects were those which are related to "the team," and the training generally was tactical, in distinction to those camps where the Reserve unit is blended with a corresponding Regular unit for organizational training.

A good half of the program consisted of artillery firing and co-related work, the entire morning periods being given to this. The first week it consisted of instruction and drill at the armament, culminating in subcaliber firing, which was followed the second week by service practice, concluding with the requisite analyses, critiques, and preparation of reports. Contemporary with these preparatory drills, every officer fired an adjustment series from a 3-inch battery, and on the first three afternoons judgment in fire adjustment was practiced by means of blackboard exercises and puff-board problems, using the parade ground as a terrain board. With this systematic preparation, the firing groups took over the batteries and executed the service practices, without coaching or interference, with excellent results. The two mortar battalions each fired an adjustment problem of nine shots, and the gun battalion two such problems totaling twenty-two shots, at ranges of 10,000 yards and over. In those problems the fixed guns and mortars were assumed to be railway artillery elements duly emplaced, and their firing was conducted with regard for the principles employed with that class of artillery.

The afternoons were devoted chiefly to training in subjects pertaining to the various phases in the operation of railway artillery or the employment of its materiel, other than firing. This was made as practical as conditions permitted, though it involved more or less simulation. Working in battalion teams, we went through the processes of laying out and organizing a railway artillery position and of establishing the stations for and orienting a battery; worked a map problem in reconnaissance and selection of a position in full detail, including the draft of orders and memoranda incident to its establishment; executed a terrain problem along the same lines, with the Nantasket peninsula as the focus for our group sectors; actually laid out firing spurs from a road assumed to be a main line track; and received practical instruction in the use and emplacement of machine guns for local defense, including actual machine-gun firing. The last hour of each afternoon was given to a lecture, either preparatory to the work of the next day or on those subjects for which practical instruction was precluded by the lack of equipment, such as railway guns and carriages, railway artillery communications and fire control equipment, tactical employment of railway artillery, or the movement of a railway battery. For these, recourse was usually had to stereopticon slides. At the conclusion of every discussion, problem, or lecture a fully written copy of it was handed to each officer for further reference and review if desired.

Among other items was a talk on smoke screens for position movements and gas protection, followed by demonstrations, and instruction on air observation of heavy artillery fire and pre-combat air liason by officers of those branches, respect-

ively. The latter was intended as part of our preparation for service firing, for which we expected to make all corrections by means of airplane observation, typical of railway artillery combat conditions, but for some reason our plane was not able to leave the ground on the practice days, so terrestrial observation was used instead.

From this it may be seen how generally the ground was covered. Yet there was no intensive work, all training being over by 4:30 P. M. at the latest, with the evenings and Saturday afternoons free, and a half afternoon on Wednesdays. This gave ample time for athletics—tennis, baseball, and swimming, and for the other diversions that were provided. By the way, each day started at 6:15 A. M. with a 20-minute period of invigorating physical exercise under one of the regimental officers, which was both enjoyable and beneficial.

Administratively the 601st C. A. functioned throughout as a regimental unit, which included running its own mess, operating the guard, and getting out its own reports, but in all tactical training it functioned as a groupment, with the battalion as the basic tactical unit. Here the team idea was carried out in everything. The officers in each battalion were dormitoried together, tabled together at mess, and worked together under the battalion commander whether in target practice or terrain problems. The Battalion C. O. made his own assignments, served as group commander, supervised analyses, and conducted the critique.

General Barrette, commanding the First Coast Artillery District, spent a day at camp and followed the training with close interest. After dinner he gave a most instructive and interesting talk on the tactical dispositions of railway artillery during last year's maneuvers in Hawaii, where he was in command. On another occasion we were visited by Lieut. Colonel Azel Ames, C. A. Res., who commands the 602d Coast Artillery (Ry.), the corresponding unit of the Second Coast Artillery District. In an after-supper talk Colonel Ames told us of the recent training camp of the 602d C. A. at Fort Hancock, and was agreeably surprised at the conclusion when the 601st officers sang his own regimental songs.

Camp routine went very smoothly. Two principal factors contributed to this: the care with which everything was prepared beforehand, and the splendid good-feeling and cooperation among the officers. Everybody seemed to enjoy the work equally with the play. This regiment has a full officer quota, both as to numbers and grades, seventy-six per cent of whom are veteran artillery officers of the World War, and a great many of them follow technical civil professions. These things account in great measure for the easy swing with which the training went along, and we all left feeling that our first regimental camp had been a real "unit camp" morally, technically, and tactically, and that it had been a profitable and enjoyable two weeks.

More Dope About Spotting

By 1ST LIEUT. LOUIS H. THOMPSON, C. A. C.

In Lieut. Brand's recent article on spotting he advocates measuring deviations from the self-forward point only and goes into considerable detail as to how it is to be done. It is conceded that there is a much greater advantage in measuring deviations from the self-forward point than from the target, but Lieut. Brand evidently assumes that self-forward points will be determined only every thirty seconds and that the gun will be fired on the 30-second bell; otherwise the dope sent to the spotting section will be of no value. It would be impossible with the system that he describes to do it any other way, since it is necessary for the spotters to have the azimuths of the self-forward point set on their instruments at the time of splash, and the necessary data could not be obtained any faster, especially since the spotting section is dependent

upon the range section to furnish the range and azimuths of setforward points. In case a reading is lost by the range section, the spotting section, of course, could not report the deviation of splash, since the range section could not determine a setforward point. To use this system would slow down the rate of fire of the battery. Under the present system of rating batteries by the hits per gun per minute no battery commander will fire on the bell but will expect each gun to fire just as soon as it is ready. To do this he will either send ranges to his guns every ten seconds or allow his range setter to creep, which of course would make the dope all wrong in using the system proposed by Lieut. Brand.

Now the only object in spotting is to find the difference between the range actually set on the gun and the range to the splash. If we know this difference we know the total correction that should be applied to the map range to hit the target. If we then base our spotting on ranges actually set on the range drum it will make no difference when the gun is fired as our dope will still be good, and there is no chance of errors of the range section throwing us off. For instance, suppose that under Lieut. Brand's system the gun is fired just before the new data gets to the range setter, then the spotters will not know which data were fired upon, the old or new, unless the gun pointer has instructions to fire only on the bell, and in this case the data must get out in plenty of time to be set before the bell rings. Now suppose that instead of getting our dope from the plotting room we put a man with telephone connection to spotting station at the gun and let him read the range actually set on the range drum to the operator of the spotting board. The usual time of flight will be over ten seconds so that a range sent to the spotting board after the gun fires will be there in plenty of time to be set on the gun arm of the spotter's plotting board before the reports of observers come in. It will not be necessary actually to plot this point but merely have a sliding scale a few inches long graduated from zero in the center towards each end and set the zero of this scale to the range on the gun arm that was sent from the range drum. When the azimuths of splash come in from observers, the arm setters set the azimuths, and the gun arm is brought up to the intersection and the deviation read on the sliding scale without plotting a point. No data will be transmitted in this system unless a shot is fired, whereas with the setforward point, data must be sent to the spotting section for each setforward point as they will never know at what time the gun is to be fired, and if they actually wait until the shot is fired it will be too late to get the data.

Let us consider the kind of data that we are getting from our spotting section. Assume that the range to the target at instant of splash is 8000 yards but the actual range set on the range drum that we expect to obtain his range with is 8200. Now if the splash falls exactly at 8000 the spotting section will report 200 short although the shot went through the target. This report goes to the range percentage corrector and the operator knows that the total ballistic correction applied was correct. Suppose that the shot strikes at 8100 then the spotting section will report 100 short and the operator of the range percentage corrector knows that the total correction which should have been applied to that shot was 100 up instead of 200 up. If the battery commander wants to use successive approximations for adjustment, the percentage corrector operator will go down the full 100 yards, or a total of 100 up. If the next shot is reported 100 over he will merely have to move down one half the difference between what he has set and the reported deviation, or 50 yards, and for the third shot one third the difference, etc. By holding the tape at an even hundred mark while he is resetting his pointer he will have no difficulty. In case the battery commander wants to wait for four shots before making a correction, the deviations can go to the impact board and the operator will call off the average deviation at the end

of four shots. This average deviation represents the actual ballistic correction that should be applied to the percentage corrector. Since we know of no reason why a correction should be necessary, other than to place the blame on the powder, we can have our Pratt range board operator make his reading check with the correction used on the percentage corrector by moving his velocity pointer over the desired amount. This gives him a new velocity to be used until another correction is ordered. In the meanwhile he keeps giving new corrections to the percentage corrector which are caused by changes in range and azimuth.

It seems evident that if we use this method the corrections will actually be applied much quicker than if we send the deviations to the battery commander's station for him to figure out the proper correction and send it to the plotting room. Since the battery commander is required to use a standard method of adjustment, why is it any more necessary that he should do this himself than it is for him to do any of the other work of the range section? It can be done much more accurately and much more quickly in the plotting room and leaves the B. C. free to supervise the work of his battery. Suppose that the time of flight is twelve seconds and it takes three seconds for the spotters to read the azimuth of splash and three more seconds for the arm setter to set arms and the gun arm to be brought to the intersection; then the man reading the deviation will have it to the range correction box in two seconds more. The range correction box operator will have it applied in two or three seconds more and it will be at the gun before it is ready to fire again. The correction can be sent to the gun within twenty-five seconds from the time the gun is fired, and if the rate of fire is thirty seconds per shot, which is as fast as we can expect with major-caliber guns, the range setter will have five seconds to set the new range before the gun is ready to fire. If the time of flight is longer or the spotting section slow there will still be ample time to get the correction in before the next shot, which is all that we are expected to do anyway.

The principle of taking the difference between the gun range and splash range as a basis for adjusting fire is not original with the writer, but was first demonstrated by Major R. B. Colton, C. A. C., while he was Mine Commander at Corregidor. During actual adjustment firing at two batteries, Major Colton showed that this system can be used successfully and with greater accuracy than any other system. He did not have the necessary spotting equipment nor the time to train personnel sufficiently to attain any great speed in using the system. It is believed that it would be of great benefit to the service if some battery commander with two plotting boards at his disposal would give this system a service test and let the results be known through the COAST ARTILLERY JOURNAL.

Our Navy and Navy Day

By MAJOR JAMES S. DUSENBURY, C. A. C.

October 27, 1925, was the one hundred and fiftieth birthday of the United States Navy and the birthday of Theodore Roosevelt, Assistant Secretary of the Navy, President of the United States, and one of the best friends the Navy ever had. This day has been set aside as "Navy Day" with the approval of the President of the United States for nation-wide observance when American citizens may pay a deserved tribute to the splendid service the Navy has rendered in making and keeping us a nation, when we may study what our Navy is, and what it does for us.

On October 13, 1775, the Continental Congress appointed a Naval Committee. On October 27, 1775, this committee presented a resolution to Congress recommending

*An address delivered at the student assembly of the Mississippi Agricultural and Mechanical College.

the purchase of a number of merchant ships to be converted into men-of-war. On October 30, the first two of these ships were authorized; early in December the merchant ship *Black Prince*, then at Philadelphia, was bought in the name of the Continental Congress and renamed the *Alfred* at the suggestion of General Washington. The *Alfred* was therefore the first vessel of the U. S. Navy. The first lieutenant of the *Alfred* was John Paul Jones, who is now called the father of our Navy.

Our first President in a message to Congress said: "To be prepared for war is one of the most effectual means of preserving peace. There is a rank due the United States among nations which will be withheld, if not absolutely lost by the reputation of weakness. If we desire to avoid insult, we must be able to repel it; if we desire to secure peace, one of the most powerful instruments of our rising prosperity, it must be known that we are at all times ready for war."

Some among us teach the doctrine that it is best to secure ourselves against attack by means other than a strong Army and Navy. At the Women's Conference in Washington in January, 1925, it was urged that love should be relied upon, that children should be trained to non-resistance, and that such a national attitude on our part would engender a forbearing generosity in our opponent. They use the words of the Master where He said, "If thy enemy smite thee on the right cheek, turn to him the other also." They overlook the fact that if thy enemy smite thee on both cheeks, the Good Book gives no further instructions. They overlook the fact that when the Master found God's Temple overrun by money changers, He took a whip and, single-handed and alone, drove them from the Temple. The Episcopal Book of Prayer prays, "From the violence of our enemies, Good Lord, deliver us." Now, the Bible says, "Faith without works availeth not." In other words, God helps those who help themselves, and we must use our own strength and our own efforts as well as rely upon the Lord. It is vain to hope that others will exert themselves in our behalf if we ourselves remain passive. If some strong nation seeks advantage over us by war, new international law for peace will aid us little, for among those who should enforce the law will be the very ones who hope to gain at our expense.

We believe that the Army and Navy of the United States are necessary to its industrial security. Our forefathers wrote in the Declaration of Independence that we are entitled to life, liberty, and the pursuit of happiness, and promptly improved the Army and Navy to bring this about. As individuals, we now have liberty under protection of the law, which itself is backed by the police, by the courts, by the jails, by our National Guard, and by our Army and Navy when needed, but, as a nation, we shall have liberty only by the protection of our own strength. Liberty and security for us does not always mean peace.

President Coolidge once said, "Great light is always shed on the question of what ought to be done by finding out what has been done." The secret of the success of our great President, Woodrow Wilson, in bringing our country to a quick and lasting peace in the World War was, to a great extent, due to the fact that he was a diligent student of history, that he studied the life of another War President, Lincoln, and avoided meddling in the management of the internal affairs of our Army and Navy and let the admirals and generals, the gobs and doughboys, the leathernecks and the other combatants, fight it out.

If you will study history, you will find that no able-bodied man has lived twenty years in our country who has not had the privilege of fighting for its welfare in our Army or Navy. So far, we have spoken only of a fighting Navy; but one historian tells us that some of the greatest victories our Navy has won are the battles it has never fought, meaning that its apparent strength has forbidden our opponent to declare war. The service the Navy renders the nation in peace by the development

of navigation, radio, aviation, medicine, improvement in the manufacture of steel, and many other industries and sciences, is worthy of our attention as well as the part it plays in character building of its men and the aid it gives the poor boy otherwise unable to secure an education who enlists and secures the benefit of schooling in the arts and industries offered by the Navy. The relationship of the Navy to the merchant marine and the necessity of a merchant marine for the proper development of our national foreign trade merits our attention.

Our prosperity rests on free world communications in peace and war. We should not further limit our ability to protect those communications and lines of ocean traffic. We need a strong Army and a strong Navy. A poet teaches us, "To be weak is miserable." The world is more likely to be miserable if our country chooses to be weak. So long as our present national spirit lasts, our Army and Navy will not be used to the injury of those nations who do not attack us.

Doctoring the Searchlight Controller

By CAPT. R. V. LADD, 16th C. A.

I take it for granted that all who have had anything to do with seacoast searchlights and their distant control have had some of the same difficulties as I have had.

It is on this assumption that I offer the following suggestions as a remedy for some of the ills with which the distant controls are afflicted. I am talking about what is known as the "eight wire synchronous control."

Most of the troubles occur in the "Pilot Motor," and having salvaged enough parts for a complete motor I have had it doctored up as follows. After a long test in service I find that it works without the usual stoppages and trouble.

First. The one-quarter-inch rotor shaft is too frail and permits the cam cylinder to move laterally, causing the finger contacts to open slightly when they should be fully closed. The quarter-inch shaft quite frequently bends entirely out of alignment and necessitates a replacement before the motor will function.

Remedy. We have replaced the quarter-inch rotor shaft with one of three-eighths inch steel. The rotor was put in a lathe and the shaft trued. The cam cylinder was given a bearing fit on this shaft and trued to run concentric with it.

Of course when you have enlarged the parts to take the larger shaft you cannot replace a shaft or cam cylinder and gears with parts furnished by the Engineer Department; however, if you can obtain authority and a larger shaft you can ream out the cylinder and gears to fit. With this change it is believed that replacements would be quite infrequent.

Second. The excessive sparking of the finger contacts pits the surfaces and sometimes fuses them together. This is caused by the continual starting and stopping of the traversing and elevating motors.

It is impossible for the searchlight to traverse continually while following a target. The traversing, to be slow enough, must be a series of stops and starts, with the traversing motor under full load each time.

Remedy. We have installed some spare condensers of 2 M. F. capacity between the contact fingers and contact plates. This reduces the sparking and stops the pitting of the surfaces, allowing perfect contact of the fingers.

Third. The contact fingers get out of adjustment and must be removed to adjust the spring tension.

Remedy. A small angle of brass with an adjusting screw bearing against the spring of the finger was attached with each finger and allows the spring tension to be adjusted while the distant control mechanism is operating.

These last two improvements can be made without any alteration of the pilot motor, and it is hoped that authority will be obtained for making the first alteration.

In making these improvements I wish to acknowledge the valuable aid and co-operation of Master Sergeant P. L. Toft.

Heretofore it has been necessary to make adjustments to the pilot motors anywhere from thirty to sixty minutes apart. Now we can run for several months for night drills and practices and it has not been necessary to stop for a single adjustment.

“War or Peace”—The Forum, October, 1925

It is perhaps a sign of the end of the period of purely sentient pacifism (which always follows a great war) when popular magazines like the *Saturday Evening Post* feature war articles and stories and when the more serious periodicals face the question of war or peace from the point of view of scientific probability rather than that of fervent desire.

In the October number of *The Forum* appears an article by Dr. Frederick Adams Woods, lecturer at The Massachusetts Institute of Technology and “one of the most eminent of living biologists.” In blunt language he makes the following points:

“The records of history prove that for the last thousand years mankind has fought about half the time. * * * There was not as much warfare eight hundred years ago as there was four hundred years ago. * * * For England and France the second of the four hundred year periods is just the same as the first or earlier of the four hundred year periods,—fifty per cent in each case,—half peace and half war. * * * The past is an index to the future because what we call ‘human nature’ is nothing but man’s heredity predisposition to act in a specific way under the stimulus of similar circumstances. These similar circumstances keep recurring. The continuity of human nature and the extremely slow changes that can be induced through natural processes make history repeats itself, if not in detail, at least in its broad aspects. The central fact to bear in mind is the dominance of heredity, because of which it becomes extremely difficult, or well nigh impossible, to effect any sudden change in man through changing his environment. The human brain is probably the most difficult of animal tissues to change from its normal functioning.”

We share with other animals the fighting instinct, but we alone have the instinct for war. “It is the failure to distinguish between the single-handed or individual fighting instinct and the self-sacrificing or true war instinct that has led so many people to suppose that because dueling has been abolished warfare can also be made to go the same way. The two tendencies have almost nothing in common. Indeed, they have marched in diametrically opposite directions.”

“Great autocrats are, more often than they should be on the laws of chance, associated with periods of war and especially with great wars.” But “there are nearly always at work in any nation, whether at peace or war, certain constant forces tending in the direction of autocracy, or caste formation. * * * The forces working towards democracy may be going on all the time, but these counter forces appear to be even stronger, and, since autocracies are especially associated with warfare, here is still another complication that makes it difficult to think of the abolition of war.”

On the score of internal disorders, he finds “the Nordic peoples have an instinctive horror of anything other than well organized government. * * * We in the United States have nothing to fear from internal upheaval as long as the stock remains the same or as long as the Nordic element remains in a reasonably pure condition and in a substantial percentage of the whole population.”

He is not impressed by the theory of the economic cause of war. "It may be true that most periods of war have an economic or commercial origin. But so do most periods of peace. Self-seeking groups cause war, and self-seeking groups continue to function during long periods of peace. Economic pressure and the food supply problems are always with us. Therefore, being constant and continuous, it does not get at the heart of the problem to explain the war periods by a factor that is always more or less with us."

"People are not anxious to go to war, but they are willing. And this war willing instinct is likely to remain for many generations to come. * * * War is to a certain extent like seasickness, horrible while it lasts, but in a little while on shore we are over it and it is soon forgotten; and furthermore, when ashore we do not believe that we will ever be seasick again. After every great war most men are pacifists."

Washington's Crossing of the Delaware

The tale of one of the most heroic and significant chapters in American history, that of Washington's Crossing of the Delaware and the resultant victories at Trenton and Princeton, will be told in terms of stark realism to the millions of visitors to the Sesquicentennial International Exposition which opens in Philadelphia, June 1, 1926.

In the exhibit of New Jersey, which embodies the reconstruction of the Hessian barracks at Trenton, will be portrayed the site of the battle that marked the turn of the tide of American fortunes during the Revolutionary War.

The winter of 1776 marked the darkest days of the Colonial cause. When the fate of Independence seemed doomed to disaster, when the colonists felt that theirs was a struggle without gain, and when faith gave way to dismay, it was Washington to whom the people looked for hope and courage. The tale of his crossing of the Delaware has become an epic.

Howe held Philadelphia, Cornwallis was at Princeton, and Rall with 1400 men, mostly Hessians, was at Trenton. The small army at Valley Forge, challenged by the hardships of a severe winter, endured the ordeals of starvation and cold. Weary, half clad, poorly-shod men responded to Washington's orders to advance. In a cold and blinding snow the army began its march to Trenton. Undaunted by the distance the soldiers trudged the white snow for twenty miles, leaving behind a trail in their footprints of blood.

On the night before Christmas, 1776, on the west side of the river and nine miles above Trenton, Washington determined to attack the force of Hessians quartered in that city. He divided his forces into three columns and ordered them across the Delaware. Two columns were forced to turn back because of the difficulties of the passage. A terrific storm and an ice-filled river demanded every atom of strength. It remained for the third column, with which Washington himself marched, to cross the river to the north bank, advance eight miles through sleet, and surround the Hessians.

On Christmas morning in the midst of the revelry of the Hessians, who, boasting of their prowess and invincible strength, were celebrating the Yuletide, Washington made his surprise attack. He forced them to battle and captured a thousand men. Rall was killed in battle and the Hessians were taken to Pennsylvania as prisoners-of-war.

With renewed impetus, Washington and his forces recrossed the Delaware and again faced the enemy, who concentrated a strong force at Trenton. Leaving the camp fires burning brightly, he slipped away during the night, passed the British flank, and on the morning of January 3, 1777, defeated a strong force at Princeton.

The Origin of Insignia of Rank

The officers' insignia of rank in our Army differ from insignia in use in other countries and have been of gradual and interesting development. In 1780 the major generals were ordered to wear an epaulette on each shoulder each with two stars, and the brigadiers were to wear one star on each epaulette. In 1832 the colonel's eagle appeared. The Infantry wore silver epaulettes, all other arms gold; and the eagles were of the opposite metal. A few years later the silver oak leaf for the lieutenant colonel appeared, the two bars for the captain and one bar for the first lieutenant. The major and the second lieutenant needed no mark of rank on their epaulettes, for the uniform of the former indicated that he was a field officer just as did the uniform of the latter show him to be a company officer.

When, for the sake of uniformity, the epaulettes of all of the branches of the Army were made of gold, the smaller shoulder strap without fringe was devised for field service and the uniform simplified; the easiest way to designate the major was to reverse the metal of the oak leaf and so the system as finally established became four stars to indicate a general, three for a lieutenant general, two for a major general, one for a brigadier general, a silver eagle for a colonel, a silver oak leaf for a lieutenant colonel, a gold oak leaf for a major, two silver bars for a captain, one silver bar for a first lieutenant, and finally during the World War one gold bar for a second lieutenant.

The company is commanded by a captain and his title is derived from the Latin word for head, *caput*. His second in command was his lieutenant, the man who held (*tenant*) the command in place (*lieu*) of the superior officer. The third in command was the sergeant, one who served (*servir*). When several companies were put together, they formed a column and the column was commanded by a colonel (*column*); the spelling still exists although the pronunciation was changed long ago. For the titles of the other two field officers the company titles were taken as the roots, and the second in command became a lieutenant colonel, and the third in command became not a sergeant colonel but a sergeant major, or big sergeant. The word "sergeant" was gradually dropped and for several hundred years this officer has been a major—literally a big or large or great—an adjective with no noun expressed.

Antiaircraft Artillery

By LIEUT. VAUCHER, *Engineers*

Translated from the *Revue Militaire Suisse* by Captain Aaron Bradshaw, C. A. C.

I read with interest the article in the January number by M. Jaques, pointing out the necessity for having a strong air service. One point of his paper seems to me, however, to be open to discussion; I mean his denial of the necessity for antiaircraft artillery.

To be sure, we can do nothing else than agree with M. Jaques' conclusions: we must develop our air service, we need airplanes and pilots equal to their task. But, starting from that, to show so absolute a scorn for the part that artillery may play in defense against airplanes is a step which one may refuse to take. Does not this question, passed over as a settled matter, categorically and without discussion, deserve more attention? In fine, cannot the cannon do anything against the airplane?

It is evident that we shall have to give up hope of ever bringing down an airplane, the probability of a hit being zero, if we think of using makeshift means in the combat against airplanes, for example, our field artillery materiel, securing the elevation required by the gun by means of embankments (raising of the wheels, with a circular trench for the movements of the spade)

At first sight, it would seem sufficient to proceed as we have stated when firing at an airplane. In reality the problem is quite different. Antiaircraft artillery is not composed solely of a cannon turned heavenward with, as accessories, those of a field artillery battery: aiming, circle, telescope, etc. That would make an antiaircraft artilleryman smile. Such artillery consists, in addition to the gun (of high muzzle velocity, firing in complete azimuth and at any elevation), of a whole altimetric station, of all the apparatus required for determining the speed, the direction and the altitude of the airplane which it is desired to attack, and above all, of specially trained men, who cannot be put into such work on short notice, even if men of the best type are available.

Moreover, the method of antiaircraft fire itself is entirely different from that used by the field artillery; it pays no attention to the adjustment of fire so well known to our artillery, but on the other hand, it is familiar with the preparation of fire which we know little about.

Let us consider the reasons which operate in favor of the antiaircraft artillery and the objections made to it.

Let us first see what has been done in the belligerent countries: each has developed an antiaircraft artillery. In France, it has been the theme of numerous articles in magazines, reviews, etc., a sign of great "inside" activity, if I may use the expression; and (a significant fact) the Treaty of Versailles forbids Germany to have artillery for defense against airplanes. Why is this the case if antiaircraft artillery deserves as little consideration as is claimed? In England it is also being developed, and the United States is testing a new antiaircraft gun having a muzzle velocity of some 800 meters per second.

If this brief survey of what the different countries are doing may give us cause to reflect, consideration of the part which a well-trained antiaircraft artillery would play will convince us of the need for it.

Can it be affirmed that "a swarm of pursuit planes" can stop a bombing expedition? No. In the first place, where will the pursuit planes be? At the front, I presume: Or will they be left at the rear to await there any raid which may be made? Between the moment at which they are given the alarm and that at which they meet the enemy's expedition, some time will pass. To take off, to gain altitude, to cover the distance, may take a large part of an hour. Then where will the encounter with the enemy take place? In view of the small extent of our territory, there is much likelihood that it will occur close to the enemy's objective. Let us assume, however, that it occurs before the latter has reached this objective: is the fight already won by us? No; for such an expedition is also covered by pursuit planes. So the combat would begin with a fight between equal arms. Let us suppose that this covering party is disabled, a supposition which is in itself false and over-optimistic; does this mean that the bombers will be compelled to turn around and will necessarily be brought down because of their lower speed in comparison to that of the "pursuit planes"? No; for a bombing plane is armed, sufficiently well-armed to inspire respect in one or more pursuit planes. Thus the bombing squadron will succeed in flying over its objective.

Then what will happen? Let us suppose that we have no antiaircraft artillery. Will the enemy drop his bombs from a height of 5000 meters or more, which is bound to render his bombardment inaccurate, and consequently of slight effectiveness? Certainly not; he will not be prevented by the pursuit planes which annoy him from descending to a low enough altitude to make certain of completely destroying the objective.

What would be the part taken by antiaircraft artillery in this combat? According to M. Jacques, it is nothing. But if we consult the experiences of the war, we see that by the end of it the antiaircraft artillery, having passed the period of feeling its way, had acquired redoubtable power, which has since done nothing but increase because of the gradual raising of the muzzle velocities of the projectiles and the improvement in precision and rapidity of the altimetric and other measurements. Let us note in passing that we can scarcely "measure" this gain in power that has been made since the war, for airplanes would not voluntarily undergo the test.

To be sure, the opponents of antiaircraft fire will show us figures. They find, for example, that the volume of the possible positions of the airplane, counting from the moment at which the gun is fired to that which the shell bursts, in comparison with the volume made dangerous by the shell, may reach 200,000. From this, it is only a step to the conclusion that the probability of striking the airplane is 1:200,000 or 0.000,005, and moreover, it will be said, dispersion in time and along the trajectory is not taken into consideration, and that an airplane has not been brought down when it is hit.

But (there is a but) we must take into consideration the way in which the matter works out in practice. In the first place, these figures apply to the case where the airplane is at a great height, say 5000 meters. If we admit that at this height antiaircraft fire is not very accurate, the converse is true; at 5000 meters, and at a speed of 50 meters per second, bombing is not very accurate either; and this is what we are interested in. Taking the matter from another angle, the course followed by the airplane is arbitrary and depends only on the will of the pilot; as the antiaircraft artillery cannot fire throughout the whole "volume of possible positions of the airplane," it has to make an assumption as to the course followed. This assumption is: that the course followed is a straight line, is in a horizontal plane, and is covered at a constant speed. Now these are exactly the conditions occurring in normal flight, and the probability that the airplane will be at the point where the artillerist has undertaken to meet it is unity, and no longer 0.000,005.

This condition of the straight line must also be met to a greater or less extent at the time the bombs are dropped, to permit of sighting. Hence the antiaircraft artillery will have to act by surprise, executing bursts of fire. To defend itself against fire rising from the earth, the airplane is obliged to turn incessantly and to go through every one of the evolutions possible to an airplane, although a modern bomber is not exactly suitable for performing stunts.

At this moment the dropping of the bombs will be very inaccurate just because of these evolutions. Hence, even if the antiaircraft artillery has not brought down the airplane at the first bursts of fire, it "neutralizes" it to a certain extent, if this term may be used. But this is not all.

If the swarm of pursuit planes can not prevent the bomber from descending to be more certain of attaining his end, the antiaircraft artillery can do so, for in proportion as the airplane comes lower, the time of flight of the projectile diminishes, the volume of possible positions diminishes much more rapidly, and the probability of a hit increases fast. Let us call attention to the fact, however, that if the airplane is too close, it moves too fast for the gun to be able to follow its changes of direction (at present, at least), but on the other hand the machine gun then comes into play.

We see that the pursuit plane and the gun complement each other rather than that one makes the other unnecessary, and that each participates in the defense of any important strategic point: a mobilization center, railroad station, bridge, munitions plant, depot, etc., which might be selected as a target for a bombing expedition by the enemy.

What is true of the example of a bombardment by the enemy also holds good at the front when it comes to preventing adjustment of fire by observation airplanes; if the enemy's airplane has nothing to fear from the ground, it can approach the earth as much as it likes; to look for the battery to be fired on or to photograph our system of trenches, as our country is better adapted to camouflage than the chalky soil of Champagne.

The possible uses of the antiaircraft artillery are not restricted to these. While the field artillery can not do the work of the antiaircraft artillery, the latter, on the contrary, can carry on fire against objectives on the ground and is the arm best suited for combatting objectives which move rapidly, and tanks in particular; for let us not forget that at present we do not possess any artillery fitted for combatting such objectives.

In regard to the materiel, it is to be remembered that in warfare the waste is much less in the artillery than in the air service; a gun is not worn out as soon as an airplane, and it is important that the enemy should not be able to come and strike all the vital spots of our organization with impunity, in case our air forces should be temporarily decimated.

We must not conclude from this that the antiaircraft artillery should be developed at the expense of the air service. Just the opposite; the latter should be enlarged to the necessary extent and the former developed at the expense of all less useful arms, so that, though not overloading our budget, we may be ready if some day we have to defend our liberty by force of arms.

In the light of history it is clearly our duty to support an adequate military establishment during peace or else the next generation will have to pay the price that has always been paid for past neglect. It is sad in retrospect to realize that even while paying war costs inherited from their fathers no generation of Americans has been wise enough or unselfish enough to provide against the wars that have fallen upon their sons. It has been said, and with truth, that the Government is a poor business manager. It is too often penny wise and pound foolish, and often only the political consideration of the moment seems to count.—*Gen. John J. Pershing.*

MILITARY NOTES

furnished by

THE MILITARY INTELLIGENCE DIVISION, G. S.

Great Britain

INDIVIDUAL EQUIPMENT.—The British military authorities are making efforts to reduce the weight of field equipment now carried by the soldier, which normally is as follows:

Dismounted

	<i>lb.</i>	<i>oz.</i>
Clothing worn.....	14	11
Arms.....	10	8½
Ammunition.....	9	0
Tools.....	2	9¼
Accoutrements.....	8	4¼
Articles in pack.....	10	1¾
Rations and water.....	5	13½
Total	61	0¾

The weight which must now be carried by the cavalry horse is as follows:

1

	<i>lb.</i>	<i>oz.</i>
Clothing, etc.....	26	3¾
Arms.....	13	7¾
Ammunition.....	6	0
Accoutrements.....	5	12
Rations and water.....	5	13½
Saddlery, etc.....	44	12
Rider (approximately).....	150	0
Total	252	1

The first step in this direction is the adoption of a new rifle, which is to be an improvement on the existing arm, and at the same time to be lighter by approximately one pound, although the barrel will be heavier, in order more satisfactorily to take the present charge. The reduction in weight will almost wholly relate to the bayonet.

The present sword-blade pattern bayonet is to be replaced by a smaller and more pointed pattern. It will have a resemblance to the old triangular bayonet, but will be much shorter and does not look so strong and effective, but the authorities maintain that it possesses all the qualities of the present and older bayonet without the disadvantage of weight.

Morocco

FRENCH MEDICAL EVACUATION SERVICE.—The principal evacuation hospital operated by the French in Morocco is located in old Fez. It consists of a number of small buildings, each having twenty beds, with a total of two hundred and eighty-five beds. Cases from this hospital are evacuated to Meknes and thence to Casablanca.

By far the greater proportion of the casualties are from rifle fire, as might be expected; the number of casualties from machine gun projectiles, artillery, and grenades being comparatively few. The most difficult cases to treat are the grenade wounds because of their many small fragments.

Wounded are collected at company and battalion aid stations from which they are evacuated by litter, carried between two mules, to collecting stations, which is the point furthest forward to which trucks can proceed. In addition to the 2-mule litter, the French are using ambulance sections to follow the firing lines. The equipment of each mule consists of a pack with a folding frame which can carry either a sitting or lying case on each side.

Many evacuations are made by airplane from landing fields near the front. Two types of planes are used for this service: one, a large plane which can carry two lying and one sitting cases; and the other, a small plane which has been constructed to land and take off from a small space. It carries one lying and one sitting case. The French have been using thirty of these small planes in recent operations with great success, as many as thirty cases being brought in from the aid stations in a single day.

Italy

COMBINED ARMY AND AIR SERVICE MANEUVERS.—The combined army and air service maneuvers in Italy were held in the Piedmont district between September 22 and 30, 1925.

The maneuvers consisted of a series of exercises designed to test the new *Ternaria* Division (i. e., a division of three infantry regiments, instead of one of two brigades of two regiments each) to verify theories regarding the use of aircraft as an independent arm and in cooperation with the ground forces and to experiment with antiaircraft defense measures.

The forces engaged in the maneuvers consisted of one *Ternaria* (3-regiment) division and 168 airplanes forming the "Blue" side, and 48 airplanes constituting the "Red" side. The "Blue" air force of 168 planes was composed of:

4 squadrons (32 planes)	day bombers
6 squadrons (36 planes)	night bombers
8 squadrons (96 planes)	single-seater pursuit

The "Red" force of 43 planes was composed of:

1 flight (4 planes)	strategical reconnaissance
2 squadrons (12 planes)	day bombers
3 squadrons (36 planes)	single-seater pursuit

In addition to the above, 4 squadrons (36 planes) of observation aircraft took part in the maneuvers.

The following comments were made by the director of the exercises on the conclusion of the operations:

1. The fronts were too extended. On the first day the division covered a front of five kilometers. Later the front was shortened to three kilometers which is normal.
2. Concealment from aircraft was not good. This must be studied until it becomes such a habit that no soldier could walk down the streets of Milan without creeping under the eaves of the houses on the shady side.
3. Aircraft often took photographs at a height of 200 meters. As this would be impossible in war, aircraft must fly at a height of at least 800 meters on these missions.
4. Communication between ground troops and airplanes was good but by no means perfect.

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. R. S. ABERNETHY, Coast Artillery Corps, President Coast Artillery Board.

Projects Initiated During the Month of November, 1925

Project No. 400, Use of Tractor Type Truck (Four Wheel Drive) in Towing Mobile Artillery.—The Coast Artillery Board was directed to submit an opinion as to the use of tractor type trucks, i. e., those of the four-wheel drive class, for use in towing mobile Coast Artillery materiel. It was the opinion of the Board that the F. W. D. is satisfactory for towing the 3-inch antiaircraft gun on roads, but that it is not satisfactory for towing the 155-mm. gun. The Board recommended the development of a towing vehicle capable of maneuvering the 155-mm. gun on difficult ground and of towing it at a speed of 10 m. p. h. on a hard-surfaced road.

Project No. 401, Powder Charges for 16-inch Guns, .50-Cal. Mark II, Model I (Navy Type).—The Coast Artillery Board was directed to study the desirability of three powder charges for use with the 16-inch Navy type gun. It was the opinion of the Board that two charges only would be sufficient,—two-thirds charge for target practice, and full charge for service.

Project No. 402, Danger Space, 3-inch Antiaircraft Shell.—The Coast Artillery Board was directed to make studies to determine the location of the center of impact to give the greatest probability of hitting; to determine the practicability of making a correction to place center of impact short of target by amount determined to be desirable; and to determine correctness of method prescribed in proposed Changes No. 2, C. A. Memorandum No. 6, for use in determining hits.

Project No. 403, Bennett Spotting Board.—Two models of spotting board were submitted to the Board by 1st Lieut. R. K. Bennett, C. A. Res., and are under study.

Project No. 404, Modified Reservoir Pump for 155-mm. Gun Carriages, Model 1918.—A modified reservoir pump for 155-mm. guns has been manufactured and is to be shipped to the Coast Artillery Board for test.

Project No. 405, Lenhart Plotting and Relocating Board for All-Around Fire Guns (From Fixed and Movable Baselines).—Drawing and description of a plotting board designed particularly to solve the plotting problem at Fort Tilden were submitted to the Coast Artillery Board by Sergeant Harvey Lenhart, Caretaking Detachment, Fort Tilden, New York. It was the opinion of the Coast Artillery Board that the plotting board did not offer promise of development into a satisfactory piece of fire-control equipment.

Project No. 406, Alterations of Sighting Mechanism for 3-inch A. A. Materiel, Model 1918.—A test of a dual sighting system developed by Major W. K. Richards, Ordnance Department, for the 64th Coast Artillery. This system is being compared with the present follow-the-pointer system having ball bearing modifications.

Project No. 407, Musham T. O. G. Diagram.—This diagram was submitted by Major Harry A. Musham, U. S. A., retired, as an appendix to the Musham Triangle

Diagram (C. A. B. Project No. 399). It was the opinion of the Coast Artillery Board that this diagram could not be used advantageously by the Coast Artillery.

Project No. 408, Carrying Case for Panels.—This is a test of a canvas carrying case for panels. The case has been turned over to the 61st Coast Artillery for service tests.

Project No. 409, Watches for Service Test.—Two pocket watches, two wrist watches, and one stop watch have been purchased by the Ordnance Department and sent to the Coast Artillery Board for a six-months' service test.

Project No. 410, Pouches, Carrying, for Knives and Pliers.—Two types of pouches have been received, one leather and the other canvas. They are designed to be hung on the belts of communication details in order to make knives and pliers readily accessible. The canvas case is submitted as an alternate design in case of a shortage of leather during an emergency.

Project No. 411, Test of Adamson A. A. Machine-Gun Sights.—A machine-gun sight designed by Major K. F. Adamson, Ord. Dept., now in the hands of the 61st Coast Artillery, is being considered to determine its value as compared with other recently developed types and also the possibility of its principle being applied to .50-cal. machine guns.

Project No. 412, Test of Pneumatic Equilibrators on 3-inch A. A. Gun Mount, Model 1923-E.—Pneumatic equilibrators containing compressed nitrogen gas have been placed on the 3-inch A. A. mount, Model 1923-E, to relieve the elevating mechanism from the preponderance of the tipping parts resulting from setting the trunnions for back on the cradle. These are being tested to determine their proper functioning.

Project No. 413, Comparative Test of Self-Contained A. A. Height Finders (Schneider and Levallois).—A modified type of the self-contained height finder described on page 576 of the June, 1925, COAST ARTILLERY JOURNAL is being tested in comparison with a Schneider instrument of similar type.

Project No. 414, Adjustment of Antiaircraft Fire.—The Coast Artillery Board has been directed to make a study of the practicability of adjustment of fire in A. A. gun firing by applying to the firing data certain corrections obtained from the results of observing the bursts.

Project No. 415, Trial Shot Problem for Antiaircraft Artillery.—A study of present and improved methods of handling the antiaircraft trial shot problem with particular emphasis on the following: (a) method of observing the burst; (b) method of computing the results of observation; (c) method of applying the results of computation to subsequent firing data.

Project No. 416, General Spotting Requirements.—This project, of Coast Artillery Board origin, has as its object the stimulation of interest in the problem of developing a spotting board or device that will be acceptable as a standard for Coast Artillery use.

Project No. 417, Test of Range Adjustment Board (Impact Board) and Percentage Corrector with Interpolator.—The Coast Artillery Board was directed to arrange for the test of these devices, of arsenal construction, by troops at Fort Monroe. The devices are now under test.

Project No. 418, Study of Fire Control for Antiaircraft Machine-Gun Battery.—An investigation of methods, sights, and instruments desirable for use in firing antiaircraft machine guns. This study is to include a comparison of the value of tracer ammunition as compared with sights. The design of an improved sight is also to be taken up.

Completed Projects

PROJECT NO. 360, TEST OF RADIO EQUIPMENT FOR D. B. BOATS

I—HISTORY OF THE PROJECT.

1. In 5th Ind. to Coast Artillery Board Project No. 171 the Coast Artillery Board recommends that one SCR-133 radio telegraph and telephone set be sent to the Coast Artillery Board for tests to determine its suitability for use on D. B. boats. In making this recommendation the Coast Artillery Board had in mind the undesirability of requesting the Signal Corps to go to the additional expense of developing a special set for D. B. boats if a set already designed could be found to operate satisfactorily. The SCR-133, the airplane interplane set, seemed to be the one most suitable for the purpose.

2. The SCR-133 set was received June 1. Mr. C. P. Berg, an engineer from the Radio Laboratories, arrived on June 5 and the tests were initiated the same day. Daily tests, Sunday, June 4 excepted, were conducted until the completion of the tests on June 11.

II—DESCRIPTION OF THE MATERIEL.

3. The transmitting equipment consists of the following parts:

a. A type BD-46 dynamotor unit connected to a 12-volt storage battery. The dynamotor supplies 350 volts to the plate circuit, the filament circuit being supplied from the 12-volt line. The motor and generator armature windings are on the same shaft. A relay is mounted under the dynamotor for controlling the 12-volt supply to the dynamotor and transmitter filament circuit. A four-point socket and plug provide for connection of the dynamotor to transmitter by means of a four-conductor cord. The dynamotor unit overall dimensions are $7\frac{1}{2}$ " x $9\frac{3}{4}$ " x $6\frac{1}{4}$ " and weighs 18 pounds.

b. The radio transmitter, type BC-129, contains all of the transmitting circuits and equipment except the antenna tuning inductance and ammeter which are located in the radio control box BC-130. The master oscillator-power amplifier circuit is used. Three VT-2 vacuum tubes are used as speech modulator, master oscillator, and power amplifier, respectively. The frequency range of the transmitter is from 800 to 1600 kilocycles. The overall dimensions are 14 " x $10\frac{1}{4}$ " x $7\frac{7}{8}$ " and weighs $13\frac{1}{4}$ pounds.

c. The radio control box, type BC-130, contains the antenna tuning circuit. On the panel of the BC-130 are mounted an antenna current thermo-ammeter, the transmit-receive switch, and variometer adjustment knob. The control box overall dimensions are $6\frac{1}{8}$ " x $8\frac{1}{2}$ " x $5\frac{1}{2}$ " and weighs 4 pounds.

4. The receiving equipment is a super-heterodyne receiver consisting of the following parts:

a. A 4-volt storage battery for supplying receiver filament current.

b. A 60-volt dry battery for supplying receiver plate current.

c. A radio receiving tuner, type BC-115, which contains the heterodyne circuit and oscillator tube. Two sides of the tuner have bakelite panels. On the front panel are mounted a knob for varying the condenser and variometer comprising the tuned circuit and a second knob for tuning the separate heterodyne condenser. The latter has a scale graduated in hundreds of kilocycles and gives a range of from 250 to 1500 kilocycles. On the lower part of the front panel is a metal cap which is lifted to insert the heterodyne oscillator VT-5 tube in its socket. The filament rheostat knob is located centrally on the front panel. On the second panel, which is on the under side of the box, are mounted the binding posts and sockets for making the

necessary connections to other parts of the equipment. The overall dimensions of the tuner are $6\frac{1}{2}$ " x $7\frac{3}{8}$ " x $5\frac{1}{2}$ " and weighs 5 pounds.

d. The Radio-Audio Frequency Amplifier BC-116 is contained in a box $15\frac{1}{8}$ " x $8\frac{13}{16}$ " x 5" with a total weight of 9 pounds. The amplifier contains 7 sockets for 7 VT-5 tubes; the first tube is the detector, the next three are intermediate frequency amplifiers, the next a second detector, and the last two tubes are radio frequency amplifiers. There are no controls on the amplifier and it is provided with suitable sockets by means of which the amplifier is connected to various other units of the set with suitable cords. The amplifier can be installed under cover at a distance from the tuner and control box.

5. The set is so designated that the operator need have accessible only the control box and tuner; the other units can be installed in any convenient place under cover.

III—PROCEDURE.

6. The SCR-133 Radio set was installed in the pilot house of the *L-41*. The regular antenna of the boat was used. Its capacity was measured and found to be approximately that for which the set was designed. The ground connection was made to the heating system and to various other parts of the boats.

7. After the installation the set was tested for operation and range.

8. All tests were conducted during the daylight hours when conditions for radio communications were least favorable.

IV—DISCUSSION.

9. The set operated satisfactorily throughout the tests, except as follows:

a. The side tone could not be heard during transmission. It was found that by pulling out the receiver plug until normal contact of the receiver jack was made that the side tone was audible. No satisfactory explanation for this could be found.

b. The *L-41* is propelled by a 125-H. P., heavy-duty gasoline engine. It uses battery starting ignition and magneto ignition when running. It was found that considerable ignition noise was picked up by the set. A Navy 1420-C receiver with a SCR-72 amplifier was tried but the ignition interference was nearly as bad as with the SCR-133 receiver. The ignition was shielded with copper wire screen. This reduced the interference somewhat but it still gave considerable interference. It was then noted that the coil of the battery ignition system was mounted in the engine room on the back of the pilot house sheathing. After the engine was started and switched to magneto ignition the leads to the battery coil were removed. This cut down the interference until it was barely noticeable. When the ignition interference was a maximum no difficulty was experienced in reception. The engine speed is so slow that it did not blot out the signals, either telegraph or telephone. Its result was to make it very uncomfortable for the operator.

c. The antenna current was at first found to be 0.65 amperes. Normal antenna current for this set is 0.8 amperes. The low antenna current was attributed to high antenna resistance, and an attempt was made to decrease this resistance. Grounds were tried to various parts of the boat including the copper sheathing of the hull. This did not increase the antenna current to any great extent. It was noticed that the superstructure consisted of a considerable number of metal parts including a wire rope stay, directly below and near the antenna. All metal parts of the superstructure were carefully grounded. This grounding increased the antenna current to about 0.9 amperes.

10. The range obtained was all that could be expected of this set and is as great as it is expected will be required. The rated range, plane to plane, for the set is

five miles. In the tests a boat to land station range of 18 miles was obtained under very unfavorable conditions when there was considerable static. At 18 miles transmission was satisfactory with very few repetitions. Throughout the tests the range varied in general from 6 to 12 miles when the signals at all times were heard loud and clear.

11. The SCR-133, as now designed, does not provide for telegraph signals. The set tested was arranged for transmitting C. W. signals by placing a key in the negative plate lead. With this arrangement satisfactory C. W. signals could be transmitted.

12. The SCR-133 receiver unit will receive only telephone and tone modulated signals. The receiver is very satisfactory and works very efficiently for the purpose for which designed. However it is believed that a cheaper and less sensitive receiver would be satisfactory since the D. B. boat will usually work with mine-planter and shore sets of greater power than the SCR-133, so that no trouble in two-way transmission would be experienced if the receiver were much simpler and less sensitive in design.

13. A Delco charging set is provided for charging the 30-volt storage battery on D. B. boats. When this set is operating the commutator interference is so great that reception is impossible. No remedy for this can be suggested except that there must be coordination between the engineer and radio operator so that this interference will be cut down to a minimum.

14. That the SCR-133 radio set is satisfactory for Distribution Box Boats as now V—CONCLUSIONS.

designed with the exception of the side tone arrangement. It is believed that the set tested was at fault and not the design.

VI—RECOMMENDATIONS.

15. The Coast Artillery Board recommends that:

- a. One SCR-133 radio set be issued to each mine command.
- b. If a suitable, cheaper, and less sensitive receiver is subsequently developed by the Signal Corps, it be issued in place of the BC-115 and BC-116. Such development for this special purpose alone is not recommended.
- c. That the battery ignition system be installed as distant from the pilot house as possible with a switch to disconnect it entirely from the engine when magneto ignition is used.
- d. That all metal parts of the superstructure of D. B. boats be grounded.
- e. That when new antenna are installed on D. B. boats, their characteristics be designed to conform to the SCR-133, that is, the antenna capacity should be 250 mmf.

VII—ACTION BY THE CHIEF OF COAST ARTILLERY.

1st Ind.

War Department, O. C. C. A., August 31, 1925—To Chief Signal Officer.

1. The recommendations of the Coast Artillery Board, contained in paragraph 15 of Project No. 360, are concurred in except that the number of SCR-133 radio sets furnished should be one per Mine Group and one per post where Mine Group is located as recommended in 7th Indorsement, O. C. S. O., 413, 44-Vessels (10-27-23). Feb. 18, 1925.

2. Attention is invited to the remarks of the Coast Artillery Board contained in paragraphs 9 a, 11, 12, and 14. Comments and recommendations are desired as to steps that can be taken to eliminate the difficulties reported.

3. Subject to such modifications as may be considered desirable in view of the remarks referred to in the preceding paragraph, it is recommended that the SCR-133 radio set be approved as the standard for issue for D. B. boats and launches engaged in submarine mine work.

COAST ARTILLERY SCHOOL LIBRARY

BOOKS CATALOGUED

Unless noted thus " * " these books may be obtained by any Regular Coast Artillery Officer; Warrant Officer, A. M. P. S.; or Non-Commissioned Officer (Grades 1-3), C. A. C., upon request to the Librarian, C. A. S. Library.

- American Bar Association. Committee on American Citizenship. *American Citizenship*. 1925. 88 pp.
- Andrews, C. M. *The Colonial Background of the American Revolution*. 1924. 218 pp.
- Army. Continental Army. *Revolutionary Orders of General Washington*. 1844. 255 pp.
- Army. Military Division of the Missouri. *Record of Engagements with Hostile Indians within the Military Division of the Missouri*. 1882. 120 pp.
- At Anchor: A Story of Our Civil War*. 1865. 311 pp.
- Barbiere, J. *Scraps from the Prison Table at Camp Chase and Johnson's Island*. 1868. 397 pp.
- Baring-Gould, S. *Curious Myths of the Middle Ages*. 1882. 453 pp.
- Barrows, W. E. *Light, Photometry and Illuminating Engineering*. 1925. 412 pp.
- Benton, C. E. *As Seen from the Ranks; A Boy in the Civil War*. 1902. 292 pp.
- Bigelow, J. *The Mystery of Sleep*. 1897. 139 pp.
- Birkbeck, M. *Notes on a Journey in America, from the Coast of Virginia to the Territory of Illinois*. 1818. 144 pp.
- Blaisdell, A. H. *Problems in Thermodynamics and Steam Power Plant Engineering*. 1925. 163 pp.
- Blakeslee, G. H. *The Recent Foreign Policy of the United States*. 1925. 368 pp.
- Blanchard, H. F. *My Automobile, Its Operation, Care and Repair*. 1924. 394 pp.
- Bolton, S. *Famous American Statesmen*. Rev. ed. 1925. 375 pp.
- Brockett, L. P. *Woman's Work in the Civil War*. 1867. 799 pp.
- Browning, R. *Poems of Robert Browning*. From the Author's Revised Text of 1889. 1896. 512 pp.
- Burge, D. S. *A Woman's Wartime Journal*. 1918. 54 pp.
- Carrington, H. B. *Crisis Thoughts*. 1878. 108 pp.
- Clark, J. H. *America and World Peace*. 1925. 145 pp.
- Coggins, J. C. *Abraham Lincoln, A North Carolinian*. 1925. 100 pp.
- Colebrook, F. M. *Alternating Currents and Transients*. 1925. 195 pp.
- Crawford, S. W. *The Genesis of the Civil War*. 1887. 486 pp.
- Davis, R. H. "Miss Civilization." A Comedy in one Act. 1905. 47 pp.
- Devens, R. M. *The Pictorial Book of Anecdotes and Incidents of the War of the Rebellion*. 1866. 705 pp.
- Dixon, W. H. *Her Majesty's Tower*. 1869. 263 pp.
- Didgson, C. L. *The Hunting of the Snark*. 1903. 248 pp.

- Gebhardt, G. P. *Steam Power Plant Engineering*. 6th ed. 1925. 1036 pp.
- Gilmore, J. R. *On the Border*. 1867. 333 pp.
- Goodwin, T. S. *The Natural History of Secession*. 1864. 328 pp.
- Grayjackets: and How They Lived, Fought and Died for Dixie, The*. 1867. 574 pp.
- Greely, A. W. *Handbook of Alaska*. 3d ed. 1925. 330 pp.
- Harbord, J. G. *Leaves from a War Diary*. 1925. 407 pp.
- Hart, J. *The Ordinance Making Powers of the President of the United States*. 1925. 339 pp.
- Hunnicut, J. W. *The Conspiracy Unveiled*. 1863. 454 pp.
- Hyde, S. A. *A Captive of War*. 1900. 389 pp.
- Jones, J. W. *Confederate View of the Treatment of Prisoners*. 1876. 330 pp.
- Kelsey, D. M. *Deeds of Daring by the American Soldier, North and South*. 1901. 672 pp.
- Kerbey, J. O. *On the War Path*. 1890. 301 pp.
- Korner, A. *A Description of the Hotchkiss Revolving Cannon*. 1874. 46 pp.
- Lacombe, P. *The Growth of a People*. 1883. 224 pp.
- Linn, W. A. *The Story of the Mormons*. 1902. 637 pp.
- Lossing, B. J. *A History of England*. 1872. 647 pp.
- Mahaffy, J. P. *Rambles and Studies in Greece*. 1913. 439 pp.
- Meyer, H. C. *Civil War Experiences Under Bayard, Gregg, Kilpatrick, Custer, Raulston, and Newberry*. 1911. 119 pp.
- Military Order of the Loyal Legion of the United States. New York Commandery. *Personal Recollections of the War of the Rebellion*. First Series. 1917.
- Millikan, R. A. *The Electron, Its Isolation and Measurement and the Determination of Some of Its Properties*. 1924. 293 pp.
- Milne, J. *Earthquakes and Other Earth Movements*. 1886. 363 pp.
- Mitchell, W. *Winged Defense*. 1925. 261 pp.
- Moore, F. *The Civil War in Song and Story*. 1889. 560 pp.
- Morena Jeréz, L. *Los Prisioneros Españoles en Poder de los Tagalos*. 1900. 211 pp.
- Morgan, T. H. *The Mechanism of Mendelian Hereditary*. 1923. 357 pp.
- Osgood, H. L. *The American Colonies in the Eighteenth Century*. 1924. 4 v.
- Oudinot, M. C. E. J. *Memoirs of Marshal Oudinot, duc de Reggio*. 1896. 474 pp.
- Pais, E. *Ancient Italy*. 1908. 441 pp.
- Pollard, A. F. *Political Pamphlets*. 1897. 345 pp.
- Post, L. *Personal Recollections of the American Revolution*. 1859. 251 pp.
- Pupin, M. I. *From Immigrant to Inventor*. 1923. 396 pp.
- Reed, W. H. *Hospital Life in the Army of the Potomac*. 1866. 190 pp.
- Rice, S. P. *The Challenge of Asia*. 1925. 256 pp.
- Ridley, B. L. *Battles and Sketches of the Army of Tennessee*. 1906. 662 pp.
- Roberts, L. B. *Topographic Mapping*. 1924. 150 pp.
- Robison, S. S. *Robison's Manual of Radio Telegraphy and Telephony*. 6th ed. 1924. 895 pp.
- Rosengarten, J. G. *American History from German Archives*. 1901. 26 pp.
- Royle, C. *The Egyptian Campaigns*. 1900. 606 pp.
- Salm-Salm, F. C. A. J. N. *My Diary in Mexico in 1867*. 1868. 2 v.
- Scoffern, J. *Projectile Weapons of War and Explosive Compounds*. 3d ed. 1838. 306 pp.
- Seitz, Don C. *Braxton Bragg, General of the Confederacy*. 1924. 544 pp.
- Shaler, N. S. *The Citizen; A Study of the Individual and the Government*. 1904. 346 pp.
- Shriver, W. P. *Immigrant Forces*. 1913. 277 pp.
- Smith, E. P. *Incidents Among Shots and Shells*. 1868. 512 pp.

- Stevens, G. T. *Three Years in the Sixth Corps*. 1866. 436 pp.
- Stillé, C. J. *Major-General Anthony Wayne and the Pennsylvania Line in the Continental Army*. 1893. 441 pp.
- Swain, G. F. *How to Study*. 1917. 65 pp.
- Tenny, W. J. *The Military and Naval History of the Rebellion in the United States*. 1866. 843 pp.
- Theal, G. M. *History of South Africa*. 1889. 448 pp.
- Theal, G. M. *History of Emigrant Boers in South Africa*. 2d ed. 1888. 392 pp.
- Thomas, R. G. *Essentials of Applied Calculus*. 1924. 408 pp.
- *Thomas' Register of American Manufacturers and First Hands in all Lines. The Buyers' Guide. 1925.
- Thoreau, H. D. *The Maine Woods*. 1868. 328 pp.
- Timbie, W. H. *Elements of Electricity*. 2d ed. 1925. 624 pp.
- Townsend, T. S. *The Honors of the Empire State in the War of the Rebellion*. 1889. 416 pp.
- Tralle, H. D. *Psychology of Leadership*. 1925. 234 pp.
- United States Infantry Association. *Reserve Officers' Examiner*. 1925.
- Urban, J. W. *Battle Field and Prison Pen*. 1882. 422 pp.
- Vedder, E. B. *The Medical Aspects of Chemical Warfare*. 1925. 327 pp.
- Velazquez, L. J. *The Woman in Battle*. 1876. 606 pp.
- War Dept. *Field Service Regulations, United States Army*, 1923. 1924. 195 pp.
- Wells, J. *Oxford and Its Colleges*. 7th ed. 1906. 337 pp.
- Whipple, G. M. *How to Study Effectively*. 1916. 44 pp.
- Wiggam, A. E. *The New Decalogue of Science*. 1923. 313 pp.
- Wilkeson, F. *Recollections of a Private Soldier in the Army of the Potomac*. 1887. 246 pp.
- Williams, H. M. *A Narrative of the Events which have Taken Place in France from the Landing of Napoleon Bonaparte on the First of March, 1815, till the Restoration of Louis XVIII*. 1895. 272 pp.
- Willoughby, G. A. *House Wiring*. 1925. 219 pp.
- Wormeley, K. P. *The Other Side of War; With the Army of the Potomac*. 1888. 210 pp.

A General-in-Chief should ask himself frequently in the day, "What should I do if the enemy's army appeared now in my front, or on my right, or my left?" If he have any difficulty in answering these questions, his position is bad, and he should seek to remedy it.—*Napoleon*.

BOOK REVIEWS

The True Story of Woodrow Wilson. By David Lawrence. George H. Doran Co., New York. 1924. 5½"x 8½". 368 pp. \$2.50.

A President there was—

Some called him great, some called him petty; to some he seemed cold and ungrateful; to some, warmly human and always mindful of service rendered; to some, contemptuous of advice, stubborn, and egotistical; to some, open-minded and self-forgetful; to all he must seem a man who had a great vision, a vision of a world of nations applying the principles of Christianity, a vision that shone forth even in his defeat, an ideal, unattainable, perhaps, but worth even the feeblest steps towards its attainment.

This, in effect, is the theme of David Lawrence's intimate biography of America's War President. Whatever you may think of the opinions held and the conclusions drawn by the author, who was probably best able of anyone in America to speak authoritatively on the subject, you will not find your time wasted nor hanging heavy on your hands during a reading of it.

From the President's boyhood, through the days of the Presidency of Princeton, the Governorship at Trenton, the period as the Democratic candidate, as President-elect of the United States, the early years at the White House, Mr. Lawrence comes to a mention of the private life of Woodrow Wilson, tracing to baseless beginnings the many whispers that gained wide circulation for so long, and giving the reader an intimate glimpse of his exceptionally happy home life, and the need for the stimulation and inspiration of feminine brilliance that was so large a part of the President's makeup.

It is interesting to note, as Mr. Lawrence touches upon the beginnings of the friction between the United States and Germany in 1916 and 1917, that the President is described as being not merely the dilatory, vacillating note-writer he is credited with being, but rather that he was one who waited to form public opinion, to have it solidly behind him before taking the great step that would plunge the country into war. It is brought out that the country was in no condition for war at the time of the Punitive Expedition to Mexico, in March, 1916, that the President himself had brought about the measures toward preparedness that produced, eventually, an army far beyond even the most extravagant proposals Colonel Roosevelt and others had been so loudly advocating. It is interesting, likewise, to realize that, out of one thousand newspaper editorials commenting on the sinking of the *Lusitania*, only six were in favor of war. It was in his speaking tour that the President awakened and organized the public sentiment that he wanted behind him when he went before Congress to ask that a state of war be declared to exist between the United States and the Imperial German Empire.

Whatever one's political opinions or prejudices, one cannot help admiring the man who fought so valiantly for the principles he held, and who, forced to accept

compromises and make bargains for the sake of the most important concessions, presented the Versailles Treaty to the Senate as the best possible, and literally killed himself in the effort to get before the people the thing upon which he had centered his life.

It is in his often childish obstinacy, the willingness to listen to malicious rumors against the men who had stood by him, worked for him, served him unselfishly, that he falls short. One cannot quite forgive him, on any grounds, for the smallness and the ingratitude that marked his treatment of House, of Tumulty, nor the pettiness that caused his breaks with Lansing, with McCombs, with Harvey. In these things he falls beneath the place among the great which his idealism, his strength of principle, his work for humanity deserves.

That the United States never ratified the Treaty of Versailles ranks as the great defeat of Woodrow Wilson's life, but there is little doubt that, had it not been for the irritability and stubbornness induced by his ill-health, he would surely have accepted the Lodge reservations, and thereby made possible America's membership in the League of Nations.—A. B. N.

The Monroe Doctrine. Edited by Alejandro Alvarez. Oxford University Press. 1924. 6½"x 9⅞". 573 pp. \$3.00.

One hundred and two years have elapsed since President Monroe, after consultation with his predecessors, Jefferson and Madison, and careful consideration by himself and Cabinet, declared to the world in a message to Congress:

The occasion has been judged proper for asserting as a principle in which the rights and interests of the United States are involved, that the American continents, by the free and independent condition which they have assumed and maintain, are henceforth not to be considered as subjects for future colonization by any European powers.

It is interesting to note how this declaration by President Monroe has developed into a traditional policy. This development has been traced by the editor, Honorable Alejandro Alvarez, the distinguished Chilean publicist, who gives us in his own contribution to the book, a classification of the various declarations of the United States concerning the Monroe Doctrine which is so clear that it is briefly given here.

FIRST CATEGORY

MAINTENANCE, APPLICATION AND DEVELOPMENT OF THE MONROE DOCTRINE

1. *Cases of Maintenance and Application of the Monroe Doctrine.*

- a. To prevent the European States from subjecting American States to their domination.
 - (1) Declaration of Secretary of State Buchanan in 1848.
 - (2) Declaration and attitude of the United States on the occasion of French intervention in Mexico in 1862-66.
 - (3) Protest of U. S. on occasion of the War of Spain against Chile and Peru, 1864-66.
 - (4) Declaration of U. S. with regard to dispute on the boundaries of Guiana between England and Venezuela in 1895.
- b. To prevent the European States from interfering in American affairs.
 - (1) Declaration of President Polk in 1845 with reference to the annexation of Texas.
 - (2) Refusal in 1852 of the proposal of England and France providing that one of the three powers should have exclusive control over Cuba.

- (3) In 1875, in the course of an insurrection in Cuba, President Grant suggested the idea of a collective intervention with the European Powers in order to reestablish peace, but the proposal had no results.
2. *Cases of Development of the Monroe Doctrine.*
- a. Opposition of the United States to the acquisition by the States of Europe, under any title whatsoever, even with the agreement of the American countries, of any portion of their territory or to the placing of any portion of territory under the protectorate of a foreign power.
- (1) Declaration of President Polk in 1848 when Yucatan revolted against Mexico.
- (2) Declaration of President Grant in 1870 regarding San Domingo that no European Power can acquire by any means whatsoever any part of the American territory even when the interested people demand it.
- (3) Declaration of U. S. in 1895 relative to the intention of Nicaragua to cede to England the Island of Corn to serve as a coaling station.
- b. Opposition of the United States to the more or less permanent occupation by a European State, even in consequence of war, of any portion whatsoever of the American territory.
- (1) Declaration of President Van Buren in 1840 that the United States would prevent by force the military occupation of Cuba by England.
- (2) Declarations of President Roosevelt on the occasion of the coercive action of England, Italy, and Germany against Venezuela.
- (3) Declaration of President Roosevelt in 1905 on the subject of his plans of financial intervention in San Domingo.

With regard to his first category, i. e., the maintenance, application and development of the Monroe Doctrine, Mr. Alvarez remarks:

This form of policy of the United States includes only simple applications or examples of development of the Monroe Doctrine on which all the Latin States of the New World are in agreement with the United States, as is shown by the declaration of American statesmen, the pacts signed in the international congresses of the first era, the pacts signed by various States, the declarations of the parliaments, etc., and finally this circumstance that whenever one of the Latin States of America found itself in one of the situations coming under this first category it turned towards the United States and requested its aid.

SECOND CATEGORY

HEGEMONY OR IMPERIALISM

1. *Policy of the United States with a View to Assuring Its Preponderance in the New World.*
- a. Opposition of the United States to the transfer from one European State to another, under any title whatsoever, or to the acquisition by them of the colonies which they possess in the New World, without the consent of the United States.
- ("The Monroe Doctrine" con.)
- (1) Declaration of Clay in 1825 to the Governments of France and England that the U. S. would not permit transfer of Cuba and Porto Rico by Spain to other European States.
- (2) Declaration of President Van Buren in 1840 to Spain that the U. S. would prevent by force the military occupation of Cuba by England; repeated by Webster, as Secretary of State, in 1852 and by President Grant in 1870.
- b. Intervention of the United States at the time of establishment of any new State in America by emancipation, secession, or any other cause.
- (1) Emancipation of Cuba.

(2) Secession of Panama.

- c... Claim of the United States that it is the sole arbiter and sole guardian of all ways of communication connecting the two oceans between Panama and the United States.
2. *Policy of Intervention of the United States in Foreign Affairs of Certain Latin-American States.*
- a. Intervention of the United States in 1895 in the disputes of Venezuela and England on the boundaries of Guiana.
 - b. Intervention of the United States in the coercive action of England, Italy and Germany against Venezuela in 1902.
3. *Policy of Intervention in the Internal Affairs of Certain States, Especially Cuba and Panama.*

In discussing the difference between acts of application or amplication of the Monroe Doctrine and those of imperialism of hegemony the author states:

The Monroe Doctrine represents the interests of the entire continent and all the States of America have agreed to maintain it. Furthermore, although up to the present time the United States has been its sole defender, Latin States would now be found who are powerful enough to maintain it should the United States refuse.

This is not the case with the policy of hegemony. If in its second aspect it is approved by these States, this is not true in the first and third cases. The Latin States are afraid that the United States will extend this policy to their prejudice.

This distinction between the Monroe Doctrine and the policy of hegemony explains consequently the contradiction to which, according to the European and North American publicists, the Latin States expose themselves by asking aid and protection of the United States in certain cases in the name of the Monroe Doctrine, and by denouncing now and then the policy that it applies in the name of this Doctrine.

Hegemony, just as the Monroe Doctrine, has been objected to because it does not rest on solid foundations in international law. But both of them are a part of international law and they should be taken into consideration since they are known lines of conduct respected by the States and because, in spite of exceptions, they have been constantly applied and have force behind them.

Our policy of "isolation" began with Washington's warning against "foreign entanglements." The policy was extended under President Monroe and his very able Secretary of State, John Quincy Adams, and has continued to the present day when we find the United States refusing to enter the League of Nations.

The book is a contribution of the Carnegie Endowment for International Peace. It consists of two parts:

Part I. History, practice, ideas and facts concerning the Monroe Doctrine.

Part II. Declarations of statisticians and opinions of publicists of Latin America and the United States in regard to the Monroe Doctrine.

There are shorter books upon the subject, but nowhere, it is thought, can be found such an admirable study of the Monroe Doctrine and such a complete compilation of the best thought of South and North American statesmen. This valuable book is worthy of a place in the general library of an Army officer.—W. W. I.

Makers of Naval Tradition. By Dr. C. S. Alden and Capt. Ralph Earle, U. S. N. Ginn & Co., Boston. 1925. 5½"x 7¾". 332 pp. \$1.50.

We are often advised to study the lives of men most distinguished in our profession that we may learn the secret of their success. Repeated experiences have shown us that biographies, although they usually contain a vast deal of irrelevant

matter, omit the secret. Yet the study of the lives of former leaders has ever characterized the lives of military and naval officers, as must ever be the case in professions where much of the law is but inflexible custom, where the standards of personal conduct are singularly high, and where the opportunities for gaining professional experiences are narrowly restricted.

Twelve out of the fifteen chapters in this very readable book are biographical in character, but they contain less than one-half of one per cent of boredom. A dozen naval officers, chosen by the authors not only because they exemplify the best customs of their service, but also because they were unconsciously the creators of its best traditions, are presented to the reader as very lifelike and vivid characters. Their biographies are but lightly drawn; the authors have wisely chosen to stress the influences which formed the character of each, the situations he encountered, and his consequent reactions. The data which relate most directly to the elusive "secret" of their success are clear and condensed.

Exactly as in the case of men now living, a better acquaintance with these leaders teaches us to know them by their daily work rather than by their occasional spectacular feat. Jones's defiance of the *Serapis* and his raids upon British commerce were not the sole services he rendered our country. The fiery career of Decatur forms a curious contrast to the austere, laborious life and uneventful work of Sampson prior to the Spanish War. From Farragut's bluff curse upon the rebel mines, it is a long cry to the scientific and studious lives of Dahlgren and Maury, the educational labors of Luce and Mahan, or the diplomatic victory Perry won in Japan. Wholly without argument, the authors show that no one can rate the relative value of the services of these leaders in such singularly different phases of naval work.

The professional soldier, familiar with the disastrous effects of political generalship in most of our wars, will be especially interested to read of the political admiral who so handicapped our Navy in the early part of the Revolution. The story of the cooperation between our Army and the fleet of Porter—"the naval Roosevelt"—is especially worth reading.

There is so much interesting reading in the body of this book that the reader forgets its purpose and enjoys it as a tale of adventures. In this light, the last two chapters seem an anti-climax. In the last war, the opportunities to win naval distinction were limited. It is seldom that fate allots to one man during his entire lifetime such adventures as befell Farragut before he was thirteen years old. Perhaps we are too close to the World War and to the events which followed it for us properly to appreciate them. We feel that radio restricts the opportunities formerly enjoyed by young captains; that combat between closely organized fleets lacks some of the personal touch of a duel between ships; that the suddenness of modern destruction, leaving few survivors on the losing side, leaves half the story untold. Yet remembering the British submarine which penetrated the Sea of Marmora, and realizing the importance which will attach to light craft in the next war, we believe it would be premature to conclude that romance is vanishing from sea-combat.—F. M. G.

A History of American Privateers. By Edgar Stanton Maclay. D. Appleton & Co. 1924. 6½"x 9¼". 519 pp. Ill. \$3.00.

This book was written to complete the history of American vessels in our wars with England, the author having previously written "A History of the United States Navy."

Seldom does one have an opportunity to read a history as accurate and as interesting as this. It reads more like fiction as throughout the book the reader follows the privateersmen through their most thrilling adventures whether it be in an engagement with a British frigate or in the escape from an English prison.

The field covered by this history is new and therefore difficult. The sources of information for the work were "the periodicals of that day and the private letters, logs, and traditions that have been preserved by the descendants of our privateersmen."

The following *instructions* will best explain what a privateer was:

IN CONGRESS

WEDNESDAY, APRIL 3, 1776.

INSTRUCTIONS to the COMMANDERS of Private Ships or Vessels of War, which shall have Commissions or Letters of Marque and Reprisal, authorizing them to make Captures of British Vessels and Cargoes.

I.
YOU may, by Force of Arms, attack, subdue, and take all Ships and other Vessels belonging to the Inhabitants of Great-Britain, on the High Seas, or between high-water and low-water Marks, except Ships and Vessels bringing Persons who intend to settle and reside in the United Colonies, or bringing Arms, Ammunition or Warlike Stores to the said Colonies, for the Use of such Inhabitants thereof as are Friends to the American Cause, which you shall suffer to pass unmolested, the Commanders thereof permitting a peaceable Search, and giving satisfactory Information of the Contents of the Ladings, and Destinations of the Voyages.

II.
You may, by Force of Arms, attack, subdue, and take all Ships and other Vessels whatsoever carrying Soldier Arms, Gun-powder, Ammunition, Provisions, or any other contraband Goods, to any of the British Armies or Ships of War employed against these Colonies.

III.
You shall bring such Ships and Vessels as you shall take, with their Guns, Rigging, Tackle, Apparel, Furniture and Ladings, to some convenient Port or Ports of the United Colonies, that Proceedings may thereupon in due Form before the Courts which are or shall be there appointed to hear and determine Causes civil and criminal.

IV.
One of your Chief Officers shall bring or send the Master and Pilot and one or more principal Persons of the Company of every Ship or Vessel by you taken, as soon after the Capture as may be, to the Judges of such Court as aforesaid, to be examined upon Oath, and make Answer to the Interrogatories may be propounded touching the Interest or Property of the Ship or Vessel and her Lading; and at the same time you shall deliver or cause to be delivered to the Judge or Judges, all Passes, Set-Briefs, Charter-Parties, Bills of Lading, Cockets, Letters, and other Documents and Writings found on Board, proving the said Papers to be Affidavit of yourself, or of some other Person present at the Capture, to be produced as they were received, without Fraud, Addition, Subduction, or Embezzlement.

V.
You shall keep and preserve every Ship or Vessel and Cargo by you taken, until they shall by Sentence of a Court properly authorized be adjudged lawful Prize, not selling, spoiling, wasting, or diminishing the same or breaking the Bulk thereof, nor suffering any such Thing to be done.

VI.
If you, or any of your Officers or Crew shall, in cold Blood, kill or maim, or, by Torture or otherwise, cruelly, inhumanly, and contrary to common Usage and the Practice of civilized Nations in War, treat any Person or Persons surprized in the Ship or Vessel you shall take, the Offender shall be severely punished.

VII.
You shall, by all convenient Opportunities, send to Congress written Accounts of the Captures you shall make, with the Number and Names of the Captives, Copies of your Journal from Time to Time, and Intelligence of what may occur or be discovered concerning the Designs of the Enemy, and the Destinations, Motions, and Operations of their Fleets and Armies.

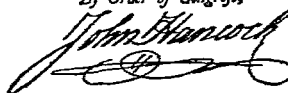
VIII.
One Third, at the least, of your whole Company shall be Land-Men.

IX.
You shall not ransom any Prisoners or Captives, but shall dispose of them in such Manner as the Congress, or if that be not sitting in the Colony whither they shall be brought, as the General Assembly, Convention, or Council or Committee of Safety of such Colony shall direct.

X.
You shall observe all such further Instructions as Congress shall hereafter give in the Premises, when you shall have Notice thereof.

XI.
If you shall do any Thing contrary to these Instructions, or to others hereafter to be given, or willingly suffer such Thing to be done, you shall not only forfeit your Commission, and be liable to an Action for Breach of the Condition of your Bond, but be responsible to the Party grieved for Damages sustained by such Mis-variation.

By Order of Congress,

 PRESIDENT.

The author has divided his work into two parts; the first covering the period of the Revolution and the second covering the War of 1812.

The importance of our sea forces can be seen from the statement that "while fewer than six thousand prisoners were taken by our land forces in the War of 1812, fully thirty thousand were taken by our sea forces." The privateers, numbering eleven hundred and fifty-one commissioned during our struggle for independence and five hundred and fifteen commissioned in the War of 1812, formed by far the major portion of our sea forces. The history of them, therefore, is really a part of our naval history.

It would be hard to pick the most interesting incident in the work. One full of thrills and adventures was the escape of Lieutenant Joshua Barney from Mill Prison, Many, equally exciting and interesting, are recorded.

The history is particularly well written and a most valuable and readable volume.—H. B. H.

Recent American History. By Lester Burrell Shippee. The MacMillan Co., 1924. 6"x 8¾". 554 pp. \$3.25.

Starting with the Reconstruction Period after the Civil War the author, who is Associate Professor of History in the University of Minnesota, takes the reader through the economic and political history of the United States to include the spring of 1923.

The work is particularly distinctive on account of its freedom from conclusions or statements founded on sectional or political bias. All subjects, although covered briefly, are discussed with vigor and an impartiality which is very pleasing.

The first two chapters are devoted to Reconstruction in the South and in the North. The third and fourth cover the period up to the Hayes Administration, the politics of which are the subject of the fifth chapter. Chapter six deals with The Tariff and Politics. The Coming of Big Business is pictured in the next chapter, while The Labor Side is presented in chapter eight. Cleveland's First Term, Triumphant Republicanism, The Coming of Populism, Politics and the Panic, and The Silver Campaign are headings of chapters in the order named. Foreign Relations, The War With Spain, and The Parting of the Ways bring the reader to the turn of the century. The New Age and The Age of Big Business are then discussed.

Under the Heading "The Fruits of Imperialism" the subjects of The West Indian Dependencies, The Isthmian Canal Project, Obtaining the Canal Zone, Work on the Canal, Extension of Caribbean Interests, Oriental Problems, The "Open Door," the Russo-Japanese War, Rise of the Japanese Question, and European Entanglements each receive comprehensive paragraphs.

Chapter twenty covers The Domestic Policies of Roosevelt. William Howard Taft is the subject of chapter twenty-one. The Progressives and the election of Woodrow Wilson are covered in chapter twenty-two.

The remaining chapters, which are especially interesting since remembrances of the times are still clear, are devoted to President Wilson's Peace Program, Latin America and the Monroe Doctrine, The Trials of a Neutral, America Enters the War, The Forces at the Front, The Peace Treaty, Post War Problems, and the Return of the Republicans.

A bibliographical note at the end of each chapter calls attention to a wider range of reading on the topics indicated in the chapter.

While the book probably has been written principally for use in college courses it will be of value to anyone interested in studying the tariff controversies, labor disputes, industrial expansion, and social forces during the later years of American development.—H. B. H.

Germany. By George P. Gooch. Charles Scribners' Sons, New York City. 1925. 6"x8 $\frac{3}{4}$ ". 360 pp. \$3.00.

This volume purports to provide a balanced survey of the tendencies and forces which are operating to shape the future of the German nation. It is the forerunner of a series of such volumes under the general title "The Modern World, a Survey of Historical Forces." "Ireland" has now made its appearance, and others, such as "Russia," "Turkey," "Argentina," "America," and others are soon to appear.

In this volume the author briefly reviews the history of the German states before Bismark, the development of political unity under the guidance of that able statesman, and the rapid political and commercial growth of the German Empire during the quarter century ending in 1914. He then makes a survey of the internal forces operating during the war beginning with the enthusiastic plunge into the war and ending with the revolution of 1918 which marked the toppling of the Empire of the Hohenzollerns. The remainder of the volume is devoted to the social and political history of the German Republic—a history replete with difficulties and misfortunes.

What can be said for the Germans and their policies under the sway of Imperial control or during the period of Republican leadership Gooch has here set down in a generous manner. He is an authority on German history, and the first part of the book is written in a masterly, even if somewhat sketchy, fashion. In the latter part of the volume he has faithfully traced in detail the course of events in the Republic. But to say that he has clearly interpreted this turpid stream of events would be only to flatter. We are left somewhat in a daze. We finish the volume, however, with the profound feeling that the Republic is not yet firmly established and that a lack of sympathetic treatment from without may yet lead to the fall of the Republic and the rise of another monarchy.—C. S. H.

Psychology of Leadership. By Henry Edward Tralle. The Century Co., New York City. 1925. 5 $\frac{3}{4}$ "x7". 234 pp. \$1.75.

This volume presents in an entertaining manner the psychologic fundamentals on which leadership is based. It discusses briefly each of the many qualities which combine to produce the successful man or woman in any field of endeavor and shows how these qualities may be developed by environment, training, and repetition.

Lucidly and in simple language, the author presents an excellent introduction to the psychology of leadership. Beginning with the importance of giving attention both to eugenics and to euthenics, he discusses instincts and intelligence, personality, subconscious resources, memory, observation, habits, custom and progress, learning, and will power, as factors in the development of the powers of leadership. He explains the advantages to be gained by proper training during childhood in the home, in the school, and in the church; and he shows how the more mature youth or the adult may take full advantage of his early training or may overcome the disadvantages of faulty training by developing his instincts, habits, customs, and powers of observation along correct lines.

The author is perhaps a little too prone to cite his own experiences, but his illustrative examples are always apt, his style is engaging, and his advice is excellent. The book is easy to read; its typography is good; its psychology is sound. It is recommended to the youth or to the adult as a preliminary to further study of psychology or as a brief summation of the qualities of leadership, complete in itself.

Gettysburg. By George Gordon Meade. Published by the author. 1924. 6"x 9". 109 pp. 24 sketch maps, Paper. \$0.50.

A brief narrative of the campaign of Gettysburg, including not only an account of the battle, but of the events leading up to it, and the successful withdrawal of Lee's army after the battle. It is written by the grandson of General Meade, commander of the Army of the Potomac. Perhaps unconsciously on his part, the author's purpose to present a simple story of the battle is constantly colored with apology for General Meade's decisions—or more exactly—lack of decision.

While the development of the situation is freely illustrated by maps, these maps are exceedingly small and trying to the eyes, and meagre in topographic detail. It is suggested that the book be read with the aid of a 3-inch Gettysburg map of the General Service School. Perhaps the perusal of this pamphlet will be particularly interesting to graduates of "These Schools." It is easy to be wise after the fact, and criticism of leaders who were facing as best they might the crisis of a great war, is apt to be petty; yet the careful study of this narrative reveals page by page the naked fact in the light of today's progress of the military art, an officer who at Leavenworth tried to follow in General Meade's footsteps, would acquire at least one "CU" for every day of the campaign.—F. S. C.

Field Artillery Manual (Volume I). By Arthur R. Wilson. George Banta Publishing Co. 5¾"x 7¾".

Lieutenant Wilson is a graduate of The Field Artillery Technical School and is Assistant Professor of Military Science and Tactics at the University of Missouri.

In publishing these two volumes it has been the aim to furnish a text which will not only cover the subjects required by the War Department for Field Artillery units of the R. O. T. C. and for Field Artillery training in the C. M. T. C., but to broaden their scope by including all the essentials and fundamentals for the instruction of a Field Artillery battery. An endeavor has been made to provide subject matter for the study of the basic principles of military science in general, and of Field Artillery in particular in a manner and in form, which, the author believes, will prove especially well adapted to the needs of the training schools of the Army.

Volume I of the manual is well written and arranged. The author has, of course, obtained most of his material from Training Regulations or other books already published. The source of information for each chapter is listed. The chapters however are more than mere compilations of the matter covered.

Excellent halftones and line cuts, both drawings and sketches, make the reading matter readily understandable to those not familiar with military phraseology.

The book will undoubtedly fill a long left want for the instruction of hte classes listed in the above quotation from the preface.—H. B. H.

Dyke's Automobile and Gas Engine Encyclopedia. A. L. Dyke. Goodheart-Willcox Co., Inc., Chicago. 1925. 6¾"x 9½". 1233 pp. Ill. \$6.00.

The fourteenth edition of this justly popular automobile encyclopedia, recently appeared, is the first revision since 1922, and is bigger and better than ever. With 512 pages changed and 221 illustrations changed or added, the book now contains over 1200 pages and 4200 illustrations, and treats of all aspects of automobile instruction, operation, maintenance, and repair. Some of the new miscellaneous subjects added are: Late ignition systems, ignition spark, interrupter points, balloon tires, Borg and Beck clutch adjustments, constant-potential battery charging, electric horn adjustments, Skinner fuel and oil rectifier, Franklin carburetor, gasoline gauges, Stewart

vacuum fuel-feed system, Oil-vac gasoline fuel-feed system, Ricardo cylinder head, vibration damper and balancer, Louvre covers, four-wheel brakes, automatic radiator shutters, rear-axle types, shock absorbers, stabilators, vibration, Zenith carburetors, overhauling a car, etc.

The book is complete. The text is clear, the language essentially non-technical, and the illustrations adequate. Whatever can be learned of the automobile from a book is to be found here, whether it be the initial steps in learning to drive or the operation of a garage. One may disagree in some debatable details of operation, as in switching off the ignition on a down-grade, but everyone interested in automobiles will derive great benefit from the book as a whole. To the car owner, chauffeur, the student, the instructor, the apprentice, the automobile mechanic, the station manager, the garage owner, the automotive electrician, the storage battery repairman, the automobile salesman, this book will be equally valuable. All Army officers who own or operate automobiles should possess a copy of this instructive work and should use it.

Vision by Radio—Radio Photographs. By C. Francis Jenkins. Jenkins Laboratories. 6¼"x 9¼". 139 pp. Ill. \$2.50.

A very interesting non-technical treatise on the development of apparatus for the transmission of pictures by radio. The author believes that the application of ideas to control light at distant points is the next great advance in electricity, and his book is written to assist the research worker and the application engineer in such development.

Since the initiation of broadcasting, a great number of engineers have been devoting themselves to "radio service for the ear." For the past twelve years Mr. Jenkins has confined his efforts to the development of this service "for the eye" and has recently produced a machine for the transmission of letters, photographs, and moving pictures by radio. By modulating the carrier wave with voice frequency, speech accompanies the picture with no interference.

With the perfection of the "telorama" we shall have radio movies in the home; with the "teloramaphone" there will be simultaneous reproduction of music or sound accompanying the living scene.

From a military viewpoint, the value of a machine which can reproduce before the Commanding General the entire view of the field of action as observed by an airplane is inestimable. Military message, in active operations, may contain diagrams, sketches, or entire maps. Recent laboratory demonstrations disclose few difficulties yet to be overcome. We may confidently expect they will be, and, in the very near future "Vision by Radio" will be an accomplished fact.—G. W. W.

Practical Public Speaking. By Bertrand Lyon. Lathrop, Lee & Shepard Co. 1925. 5¾"x 8". 436 pp. \$2.50.

Today comes the realization that the exchange of ideas is essential to the further progress of the human race and it should be evident that each member of a community should be prepared to contribute his share, whatever might be his station or occupation in life. The men who have worth-while knowledge on live subjects are

not all able to communicate their ideas to others in a clear, logical, and concise manner; the good that might result therefrom is lost; and no real progress is made.

The executive, the manager and the foreman must control and direct the efforts of those under them; they must be able to indoctrinate their employees with the latest principles and technique of their respective professions and lines of endeavor. The citizen, to be worthy of the name, must participate in the government of his locality, his county, state and nation if he is to further and protect his civil rights and privileges and the interests of his business or profession. To do these essential things well he must be able to express himself forcibly and understandingly to those with whom he comes in contact.

The ability to speak in public is the only correct solution to this problem, and Professor Lyon in his "Practical Public Speaking" shows the busy man how he can overcome his natural diffidence and fit himself to play a more important and worthy part in the world about him. There is nothing mysterious about public speaking; one does not have to be an orator to be able to tell others what he knows and believes, but there is a certain well defined technique to be learned and followed by those who aspire to address their fellow citizens.

Professor Lyon's treatment of the several basic requisites necessary for the production of a real public speaker is practical, full, clear, and concise, and will require but a few minutes daily by the busy man of affairs to enable him to express his thoughts and ideas in a simple and acceptable manner in public.

Professor Lyon's book should have a prominent place in the professional library of every man of affairs who needs public speaking for practical purposes.—W. H. W.

Reserve Officers' Examiner. U.S. Infantry Association. Washington, D.C. 6¼"x 9¼". 252 pp. \$2.00.

A book of five chapters dealing respectively with Administration, Military Law, Military Courtesy (customs), Field Service Regulations, and Military Hygiene. For all officers who desire preparation for securing a certificate of capacity or review on basic military subjects, required of officers of all branches of service in connection with promotion, the book should prove very helpful. It portrays all elements necessary for the "Part A" section of the professional examination.

It is in catechism form and as concise as possible so that it may be studied or reviewed with a minimum of effort. The introduction gives items of information relative to physical requirements, age limits, minimum service in respective grades, etc.

The book has already been endorsed by many division staffs of the organized reserves. It is an invaluable book for refreshing an officer's knowledge, irrespective of his branch of service.—W. V. A.

A Guide to Good Golf. By James M. Barnes. Dodd, Meade & Co., New York. 1925. 6½"x 8¼". 137 pp. Ill. \$2.00.

In this volume the author presents a brief discussion of golf, which is novel only in arrangement and in the use of line drawings rather than the customary photographs for the purpose of illustrating grips, stances, strokes, etc. He begins the book with a description of the full swing and follows with chapters on the swing with irons, mashie play, the niblick, and putting. Stances and grips follow. The remainder of the book is taken up by such topics as the selection of clubs, the mental side, timing, balance, and hip and shoulder action. There is also a valuable chapter on questions and answers in which common faults are discussed.

Mr. Barnes is a player of exceptional ability, an instructor of experience and a close student of golf. What he has to say about the game should be helpful to any

player or to any prospective player. His book is therefore recommended to all golfers, notwithstanding the fact that, although typographically accurate, it evidences poor copy editing. We can forgive split infinitives and similar errors if the subject matters be otherwise of sufficient value, as is the case in this case.

Principles of Auditing. By Eric L. Kohler, M. A., C. P. A., and Paul W. Pettengil, C. P. A. A. W. Shaw Co., Chicago. 1924. 6"x 8½". 231 pp. Ill. \$4.00.

This book outlines the procedure in making an audit of the various accounts of a business, explaining how the auditor proceeds in determining the financial condition and earnings of a business. The authors show how to start an audit, explain what procedure to use in auditing, and give special attention to closing the audit and preparing the exhibits and certificates and to preparing the audit report. A complete set of auditing working papers and an audit report are contained in the book.

The Table of Contents includes: Auditing—A Profession; Audits—Their Scope and Purpose; Starting the Audit; Mechanics of Auditing; Cash and Cash Resources; Accounts and Notes Receivable; Inventories; Deferred Charges; Investments and Funds; Plant Assets and Intangibles; Current Liabilities; Funded Debt, Reserves and Net Worth; Contingent Assets and Liabilities; The Profit and Loss Accounts; Completing the Audit; Exhibits and Certificates; The Audit Report; and an Appendix—Review Questions on Auditing; Audit Working Papers; Text of Audit Report and Financial Statements.

A Graphic Table Combining Logarithms and Anti-Logarithms. By LaCroix and Ragot. The Macmillan Company. 1925. 7"x 10". 64 pp. \$1.40.

This is a very clearly printed and convenient table, giving directly without interpolation the logarithms to five places of all five-place numbers and the numbers to five places corresponding to all five-place logarithms. There is also a similar graphic table reading to four places. The latter, although complete and surprisingly legible, requires only six pages,—an excellent measure of the compactness of the entire book and of the small amount of page turning necessary.

The method of using the tables is acquired in a few minutes, and it is believed, as the result of comparative tests with other tables in ordinary use, that the graphic tables give results more quickly and with much less eye-strain.

The main advantages of the tables are described as follows in the preface.

It is evident to all who use logarithms that in every computation involving their use, the table must be consulted not only to find the logarithms of numbers but also to find the numbers corresponding to the logarithms of the results obtained in the computations. The tables which have been in general use are essentially "one way." It is necessary, therefore, to have recourse to the process of interpolation. * * * Ordinary tables give five-place logarithms of only those numbers which have four places, or a total of 9000 logarithmic values. Since there are in all 100,000 five-place logarithms (.00000 to .99999), it is clear that ordinary tables give only 9% of all possible five-place logarithms. It follows also that of the 90,000 five-place numbers (10,000 to 99,999) ordinary tables cover only 10%, namely the four-place numbers given in the table, to which a zero should be annexed to bring to five places. The remaining values must be determined by interpolation.

The graphic five-place table contains in one graphic scale all five-place numbers and all five-place logarithms, either one of which can be read directly in terms of the other without interpolation.

It is hoped that this excellent graphic table will be supplemented by a graphic table for trigonometric functions and their logarithms.—R. V. C.

The Vast Sudan. By Major A. Radclyffe Dugmore. Frederick A. Stokes Company. 1924. 5¾"x 9". 312 pp. Ill. \$4.00.

The vast Sudan, covering 1,025,000 square miles, is being rapidly redeemed, under British rule, from its former state of barbarism and perpetual war. Unostentatiously its new rulers are improving the country, developing its agricultural and mineral resources, building railroads and dams, introducing new grains and vegetables, and bringing peace and civilization to this "darkest Africa," whose peoples, for thousands of years, have known only war and oppression.

Major Dugmore started with an idea of making motion pictures of animal life along the banks of the Nile, but the animals he wished to photograph forestalled him by not appearing at their usual haunts along the river. Thereupon, at the invitation of the Sudanese officials, he undertook a much more difficult expedition into the interior of the Sudan. The book, *The Vast Sudan*, is a record of the expedition.

The author travelled fast and covered a great deal of territory, using boat, train, automobile, truck, and even bicycle. The book moves with equal rapidity. Unnecessary detail is omitted, and the author's activities, sensations, and detailed experiences are largely subordinated to the tale he has to tell. He stalks birds, deer, elephants, hippopotamus, and other animal life with his camera; he photographs natives in their villages, at their dances, and at fiestas and celebrations; he watches the British build railroad on the Kassala line at the rate of a mile and a quarter a day, stopping work at one o'clock each day; and at Mahawa, two thousand miles from the Mediterranean, he visits the immense Sennar dam, two miles long, with its foundation a hundred feet below the bed of the Nile. With this variety of interests the book becomes very readable; its style is easy; and it is well illustrated.

The Kasidah. By Sir Richard Burton. Brentano's. 1926. 8½"x 6". 169 pp. Ill. \$2.50.

Under the *nom-de-plume* of Haji Abdu el Yezdi, Sir Richard Burton wrote this delightful Oriental verse which has hitherto been available only in limited and expensive editions. In many respects it reminds one of *The Rubaiyat* of Omar Khayyam, but, so we are told, *The Kasidah* was written eight years before its composer was made acquainted with *The Rubaiyat*. The present edition is delightfully illustrated and will be welcomed by all lovers of poetry.

The Immigrant Press and Its Control. By Robert E. Park. Harper and Brothers, New York. 1922. 5"x 7½". 488 pp. \$2.50.

This study is one of a series of eleven, each embodied in a separate volume, covering the general problem of Americanization. The investigation as a whole was financed by the Carnegie Foundation of New York.

The present volume covers in a painstakingly thorough fashion the history of the foreign language press in the United States, the causes which called it into being, the conditions under which it carries on as an enterprise, and the good and ill results which have flowed from its operations.

In addition the book devotes a great deal of attention to the efforts which have been made during and since the war to control the foreign language press, with a concluding analysis of the measures of control which can be expected to operate with success.

Briefly, the conclusions to be drawn from reading this book, may perhaps be stated as follows: the immigrant press has developed to meet the cultural aspirations of groups who shared the natural desire to maintain the heritages of their old-world environments, and besides reached out for a means of contact with the new environ-

ment; this foreign language press meets this need at a period when the English newspaper would be useless to the newcomer; the immigrant press has done some harm but a great deal of good; it will be most useful if helpfully guided, but this control should not extend beyond that naturally resulting from the commercial assistance of advertising.—L. M. C.

Aeronautical Meteorology. By Willis Ray Gregg, Meteorologist U. S. Weather Bureau. The Ronald Press Company, New York. 1925. 6"x 8¾". 144 pp. Ill. \$2.50.

The volume opens with an introduction giving general information, definitions, units, and abbreviations. This is followed by a chapter on the general circulation of the atmosphere. A chapter on instruments and methods of observation gives briefly the practical means of obtaining meteorological information. The next chapter on vertical structure of the atmosphere is illuminating and well covered. Winds are treated specifically in a well illustrated and interesting chapter. The chapter on fogs and clouds is very well written and the illustrations of the various types of clouds are excellent. A short chapter on visibility covers the essentials. Thunderstorms are interestingly covered, giving statistics which set forth the facts. Cyclones and anticyclones are covered in a short chapter leading up to an instructive and interesting chapter on weather forecasting which is really the crux of the whole volume. A short chapter on flying over the North Atlantic and in the North Polar Regions closes the volume except for the four appendices, which take up distribution of weather forecasts by radio, a list of meteorological services of the world, bibliography, and conversion tables and factors, in the order named. An alphabetical index facilitates reference to the subject matter.

As indicated above this book is a volume of the Ronald Aeronautic Library, and it has therefore been written especially to furnish the aviator with necessary information about meteorology. The Ronald Aeronautic Library, in the words of the editor, being, "a series of volumes by specialists able to speak with authority." Without a doubt this volume will fulfill its mission admirably. It is necessarily quite brief, considering the subject of meteorology as a whole, but it has the essential facts from the aviator's view point presented in an attractive and readable manner. It is very well illustrated and the author's method of citing specific instances and of referring to figures has the effect of removing any objection of too dry technical reading.—I. B. H.

Spark Photography and its Application to Some Problems of Ballistics. By Philip Quayle, Assistant Physicist, Bureau of Standards. Government Printing Office. 1925. 7"x 10". 276 pp. \$0.20.

The first spark photographs of bullets were taken about forty-five years ago, and in 1893 there were produced the first shadow-pictures in which the flying bullet is silhouetted against a transient source of light so that refraction effects reveal the accompanying air-waves. In this paper, the author describes modifications of the earlier methods, especially his means of triggering the spark by the impact of the head-wave on a Joly chronograph interrupter, or by electric connection to the firing mechanism of the piece. By such methods, he avoids disturbing the flight of the bullet in any way, and keeps his pictures clear of the triggering wires which so disfigured the earlier photographs.

The military reader will be more interested in the evidence presented than in the manner in which it was obtained. Notable among his results is a clear proof that the bullet from the service rifle reaches its maximum velocity within one foot of the muzzle, which contradicts previous theories and the results obtained in certain Ger-

man pre-war experiments. (See JOURNAL OF THE U. S. ARTILLERY, Vol. 41, No. 2, pages 233-240.) His revolver photographs are interesting but inconclusive, since M-1911 ammunition was used in a M-1909 revolver, giving gas-leakage far in excess of that to be expected with the cartridge for which that arm was designed; it is to be hoped that these pictures will be repeated with suitable ammunition, and that pictures will be obtained to show the operation of our automatic arms. (See JOURNAL OF THE U. S. ARTILLERY, Vol. 43, No. 1, pages 109 and 114.)

Nowadays many officers find themselves in positions where it is necessary to awaken the interest of an audience indifferent or openly hostile to military affairs. Not even the most resolute pacifist can fail to appreciate and enjoy photographs such as these, and their military value for such purposes is no less than their ballistic interest to the professional soldier.—F. M. G.

The Bright Islands. By Padraic Colum. Yale University Press. 1925. 6"x9". 233 pp. Ill. \$2.50.

This is the second volume of Hawaiian folk tales, retold in all their fascination and imagery as only Mr. Colum can tell them. The first volume, *At the Gateways of the Day*, consisted, in the main, of purely mythological tales. Other sources enter in the tales of *The Bright Islands*. The first section of the book, "Kings of the Islands," is essentially historical, consisting of chronicals passed on by oral historians. The four tales of the second section, "In the Bright Islands," are based on material drawn from South Seas sources but known only fragmentarily in Hawaiian tradition. The third section is quite a long story called "The Princess of Pali-uli." "Skies, Lands, and Waters," the fourth and last section, is made up of five tales resembling those in *At the Gateways of the Day* in that they are essentially mythological in character. The simplicity and poetry of the Polynesian folklore, written in Mr. Colum's charming style, produce a volume which readers of all ages will find fascinating.

Handbook of Alaska. Its Resources, Products, and Attractions. By Major General A. W. Greely, U. S. A. Charles Scribners' Sons. 3d Ed. 6"x8¼". 330 pp. Ill. \$3.50.

This edition has been almost entirely rewritten in order to make it up to date with respect to the rapid and extensive development of Alaska. New chapters treat such subjects as Fur Farming, Reindeer, Fur Seals, Forests, Volcanos, and Reorganized Transportation. Three chapters in this edition are devoted to the fishing industries. The status of the ever-changing mining industry is treated fully. The chapter devoted to the Native Inhabitants is extremely interesting, as well as instructive. Other chapters treat such subjects as Education and Missions, Tourist Trips, the Canadian Klondyke, and the Glacier Regions.

For many years General Greely has been a close observer of Alaskan development. Twice he has been in military command of the territory. His duties have required him to make a number of inspection tours throughout the entire territory. He is therefore qualified to write in an authoritative manner. Fortunately, too, he writes with a pleasing style. This book is valuable for reference and has particular interest for those who contemplate an Alaskan journey for business or for pleasure.—C. S. H.

How to Write. Corona Typewriter Co., Inc. 1925. 4¼"x6¾". 92 pp. Ill. \$1.00.

A novel little book, full of suggestions on various subjects for the improvement of writing, covering rather a wide field in a few words.

The principal chapters of the book are: Developing a Style, Etiquette of Private Correspondence, How to Prepare an Advertisement, How to Write a Business Letter, How to Get Interviews, How to Prepare a Manuscript, Scenario Writing, The Writing of Fiction, and a Bibliography. The volume will be of interest mainly to the inexperienced writer. It is, of course, not exhaustive in any field, but it can very well serve as a handy "reminder list."

Armaments Years Book of the League of Nations. World Peace Foundation. 1924. 6¼"x 9¼". 844 pp. \$4.00.

A year book of information regarding the scale of armaments in the various countries, presented in the form of a series of monographs, each of which relates to a separate state.

Beyond Khyber Pass. By Lowell Thomas. The Century Co. 1925. 5½"x 7⅞". 255 pp. Pho. ill. \$4.00.

There are three "forbidden lands" where the East is the East and the West is not welcome,—"Holy Arabia," Tibet, and Afghanistan. Since the collapse of the power of Turkey, Afghanistan is the most powerful Mohammedan state. Mr. Thomas, after years of effort, secured permission from the Emir, one of the few remaining despots, to visit Afghanistan. It is his experience there and the impressions he gained that form the narrative.

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Mr. Thomas is one of very few that have gone through the pass and into Afghanistan. Banditry and murder seem to be the principle occupations. The Emir, it appears, has little chance of experiencing the infirmities of old age. It does not appear to be a place that one would care to visit; yet, as written, it is a most thrilling narrative that one does care to read. It has been one of the most important states, strategically, in the world—and it may be again. The Bear on the North and the Lion on the south watch it, and it is the buffer between east and west, which may meet.

Mr. Thomas was accompanied by Harry Chase who proves his ability in the many interesting photographs with which the book is illustrated.—B. F. H.

Musical Rifle Drill. By Colonel E. L. Butts, U. S. Army. The Quartermaster Association. 5⅝"x 7½". Ill. \$0.35.

An adaption from the Manual of Physical Drill by the same author. The pamphlet contains instructions and cuts covering the various exercises. Appropriate drill music is included.

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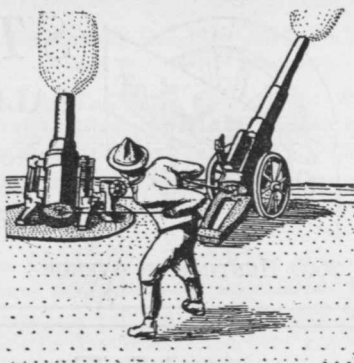
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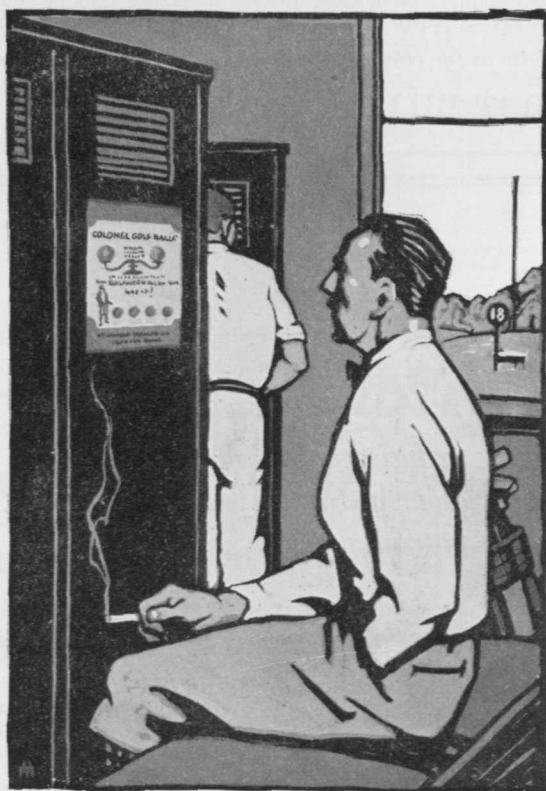
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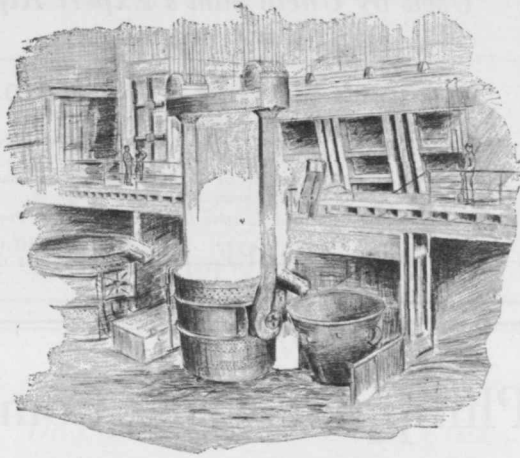
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