

THE COAST ARTILLERY JOURNAL

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APRIL, 1925

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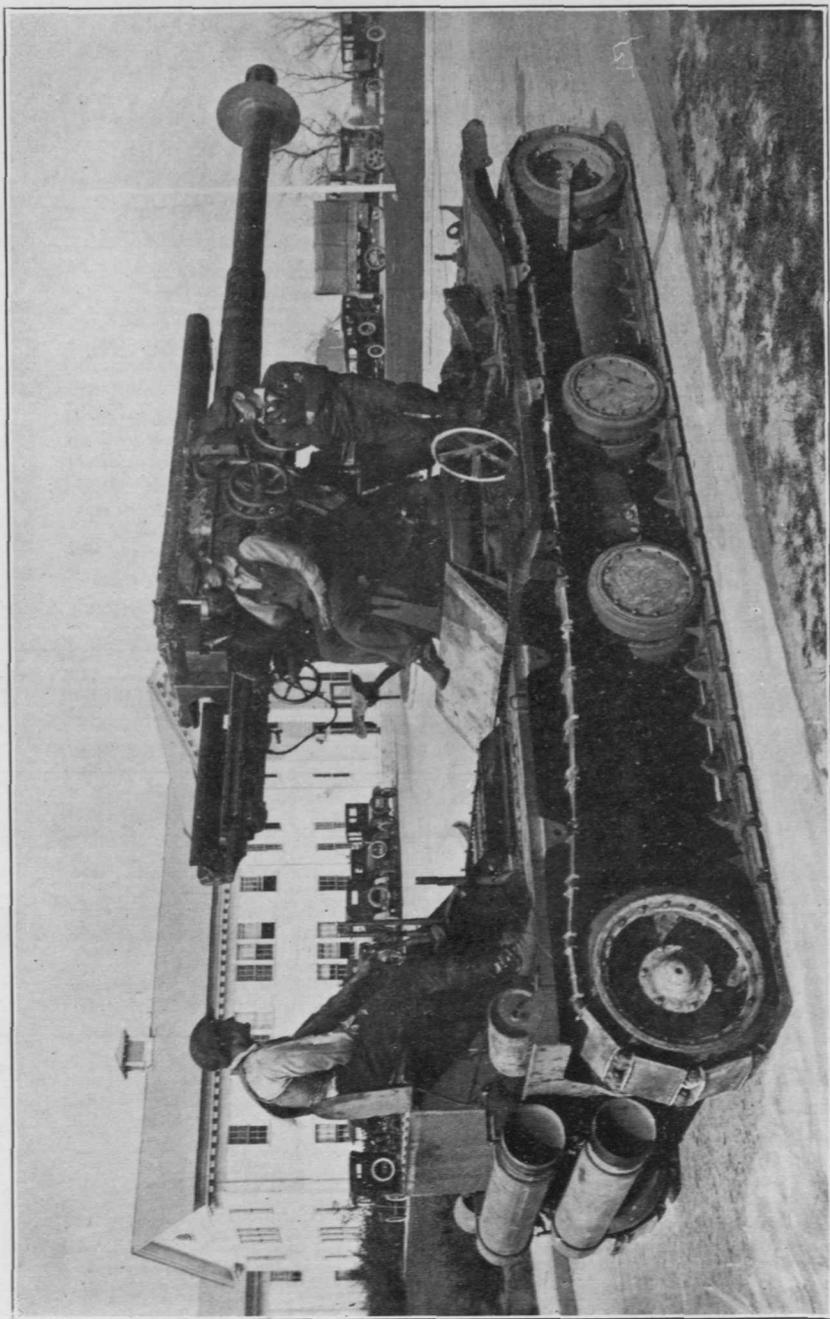
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4.7-INCH ANTI-AIRCRAFT GUN, MODEL 1920-E. (For complete description, see page 270, COAST ARTILLERY JOURNAL, September, 1924.)

The Gun Motor Carriage (Christie) has been declared obsolete. The gun has not proven very promising. A re-design is to be made on a 4.7-inch Anti-aircraft Gun, fixed mount only, at the present time. These guns probably will be used for defense of cities and vital points such as the Panama Canal. A fixed gun satisfies the requirements of such a defense. It is hoped to continue development work on a 4.7-inch Anti-aircraft mobile gun, but only after a satisfactory fixed gun has been developed.

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The Initial Organization of a Reserve Division

By COLONEL EDWARD CARPENTER, C. A. C.

THE initial organization of the Reserve Divisions of the Army of the United States may be considered to have taken place during the three years from July, 1921 to July, 1924. This period about coincides with my tour of duty as Chief of Staff of the 79th Division. It has been suggested to me that the readers of the COAST ARTILLERY JOURNAL might be interested in a somewhat detailed statement of just how one of these divisions was brought into being, and on the chance that this may be the case I have prepared this resume.

We are all familiar with the provisions of the National Defense Act of 1920 as amended, in so far as they define our present military policy with special reference to the Army of the United States, made up of three components, the third and largest being the Organized Reserves. It will be remembered that this latter force consists of divisions and non-divisional units distributed throughout the continental United States by substantially equal assignment to the several Corps Areas and therefore based on the geographical distribution of our male citizens of military age. Each Corps Area has assigned to it three reserve infantry divisions. In the 3rd Corps Area these are the 79th, with headquarters in Philadelphia; the 90th, with headquarters in Pittsburg; and the 80th, with headquarters in Richmond. It will be noted that two of these Divisions, the 79th and 80th, were originally organized in 1917 as infantry divisions of the National Army. The National Defense Act, previously referred to, specifically provides that in organizing the Reserve Divisions the National Army Divisions should be perpet-

uated by retaining their designations as the designations of the reserve divisions to be organized in the localities from which the National Army divisions were recruited. For this reason the 79th Division O. R. was allotted that divisional area within the 3rd Corps Area from which came the 79th Division, N. A.

Upon receiving my assignment as Chief of Staff and reporting at Corps Area Headquarters in Baltimore, I was informed that the divisional area for the 79th division would be that part of Pennsylvania known politically as Eastern Pennsylvania. It is less than half of the state and comprises roughly those counties lying east of the west branch of the Susquehanna river. It includes the important cities of Harrisburg, Williamsport, Wilkes-Barre, Pottsville, Reading, Lancaster, Stroudsburg, Bethlehem, Scranton, Allentown and Philadelphia.

I was further informed that until other arrangements were perfected we would also be charged with the organization of all non-divisional units allotted to our area and this was the case for some months. However, after we had secured between four and five hundred officers for these organizations we were relieved of this responsibility and the further development of the non-divisional units was continued under their own Chief-of-staff.

I was finally informed that only one officer was immediately available to assist me and that no allotment of funds had been made. Nevertheless everyone was interested. It was evident that all the Corps Area Headquarters could do for us would be done and that all hands were pretty much in the dark as to how the job should be done. It was an entirely new proposition.

The Assistant Chief-of-Staff having reported, we left Baltimore with a card index of 3000 names of alleged reserve officers alleged to reside within the limits of our area, kind wishes for the best of luck and an order which said "you will proceed to Philadelphia, establish headquarters in that city and proceed to organize the 79th Division O. R."

The first thing we did was to look for a suitable place for headquarters. There was no money to rent even one room and we were therefore limited to federally controlled buildings or gifts. We found a suitable building in the old Schuylkill Arsenal at 2620 Crays Ferry road and this was turned over to us and later permanently assigned to our use. We were beholden to the Philadelphia Quartermaster Intermediate Depot for everything at this time. They loaned us a limited supply of stationery, office furniture, etc., and within a couple of days two enlisted men, clerks, reported. A telephone was loaned, and we felt that we had an address if little more.

By the end of the week one other officer and four other enlisted men had reported and we had our full quota, viz.: One Colonel, two Lieutenant Colonels, two Staff Sergeants, and four Privates first class as clerks.

We now mapped out a general plan to be followed in the work of organization and divided the duty. Publicity was needed and lots of it. No one had ever heard of the reserves or of our headquarters and the work upon which we were engaged. We visited the newspapers and got our friends to do the same. The rebirth of a famous Pennsylvania Division was news and we got front page articles and plenty of them. We covered the upstate papers just as carefully as the metropolitan dailies. Next we called on the Governor, the Adjutant General, the Mayor of Philadelphia, the Commanding General of the Pennsylvania National Guard and others and explained fully our activities and the reasons for our presence in Philadelphia. We particularly desired the National Guard's approval and assistance, and this we received from the start.

The 79th Division was to be organized within the area of the 28th Division Pennsylvania National Guard and it was to be expected that the officers of the Guard would be apprehensive as to the effort that our activities might have on their organization. We said from the first that under no circumstances would we do anything to persuade or advise any officer or man who was eligible for service in the National Guard to take on in the Reserves and we rigidly lived up to this announcement. We firmly believed that it was the duty of any such individual to join the more active service if he was so situated as to business and family responsibilities as to make it possible. We also firmly believed that it was to the best interests of the United States that such individuals should serve in the Guard with its more advanced training and complete equipment than in the highly skeletonized units of the Reserves. Pursuant to this policy we were instrumental in sending a number of officers and men into the National Guard of the state.

None of us were experienced public speakers but it was evident that we must talk in public and we did. At first it was a bitter experience but it became easier as time passed. We continually made addresses, formal and informal. For myself I saw at once that I must be prepared to address gatherings of many different kinds on the subject of the Organized Reserves and I decided to plunge in instead of going in by inches. I accepted every invitation to speak that other engagements permitted regardless of the size or character of my audience. I had some cruel half hours but I got by. I soon realized that any man can talk about his own job, I knew more about

the reserves in those days, ten times over, than anyone in my audience and that gave me confidence to speak on that subject and after that it was plain sailing.

We built up the Division slowly at first. We wanted a framework of former officers of the old organization. We knew that they more than any others would have the welfare of the unit at heart. With but two or three exceptions, we found, to command each regiment, a field officer who had formerly commanded either the regiment or a battalion of the regiment in France. Those not already reserve officers applied for and received their commissions. This group of officers added to our working force as they at once interested themselves in bringing back others who had formerly held commissions in the 79th. From the start we placed all the responsibility the regimental commanders had time for on their shoulders. It varied with the individual. We saw very soon that although we regular officers were too few to do all that should be done we had a great force at our disposal in the reserve officers many of whom, under our direction, were ever ready to help, each a little, but in the aggregate a very great deal. Thus the reserve officers themselves helped to reorganize the Division.

We sought and received the support of the 79th Division Association, Inc. This Association is made up of officers and men who served in the division during the World War.

By the end of the first year we had approximately 800 officers assigned or attached. We were short in some grades and branches and long in others but we felt even then that we were far more ready for a mobilization than in 1917. At least these 800 officers each had his definite assignment and knew exactly what it was.

About this time things began to slow down. With our limited force we were never able to write personal letters to our officers and early in the year we got from salvage a mimeograph machine and became expert in drafting letters that would not be thrown into the waste basket. We developed a system of detachable slips with printed replies, requiring only check marks with a pencil and with enclosed addressed envelopes we raised the percentage of replies to our letters from about 10% to over 30% but there we stuck. One of our greatest handicaps was our inability to get our officers to answer our circular letters. We plotted a curve showing the growth of the division and kept it tacked on the wall in the office of G-1 and it told the story of our work better than any other record. A successful letter calling for eligibles to apply for commissions would show in the sudden upward movement of the curve, the same after good newspaper editorials or like publicity. But the curve had flattened out.

A little upward slope but not much. We realized that for some reason we were not reaching the men who lacked enthusiasm. The enthusiasts were all in the reserves by that time. Also there were still many ex-officers in the area who had not been reached by our efforts and who had not yet heard of the fact that there was a reserve division available to them if they would take out their reserve commissions.

We had already started a Division Bulletin. The cover carried the insignia of the 79th in two colors, blue and silver, and was noticeably handsome. It was expensive but was turned out at cost by one of our officers who was engaged in the printing business. This expense was met by the reserve officers. The Bulletin was issued each month and went to every officer. It was edited by the Surgeon in addition to his other and varied duties. It was a real help in getting information and appeals to our personnel for they all read it. We put additional efforts on this publication and increased the edition sending it to all American Legion posts in our area and other possibly productive addresses. It was a mimeographed publication and its monthly issue was a strain on our slender resources of men and material, but the salvage pile yielded a second mimeograph machine and an addressograph, the funds to repair them were found for us and the Depot disgorged more paper.

The strength curve in G-1's office responded. We had received a 7-passenger Cadillac, said to be the oldest in the Corps Area, to replace an ancient Hudson that was stopped by the police for excessive smoking every time we tried to get out of the city via the park. With some funds that now became available we repainted this car, put the division insignia in colors on both sides and had a creditable looking piece of transportation. We developed a standard method of covering our area with the help of this car and it was possibly the most valuable aid that we had in pushing our work. First, at least a month in advance, because reserve officers have many engagements and cannot be assembled on the spur of the moment, we wrote to some well known officer in each city on the circuit we had decided upon, telling him of the day and hour of our arrival and asking him to arrange a get-together meeting of Reserves and National Guard officers, of former officers and of any interested civilians. Of course we picked the right man to write to and early in the game had listed such individuals in every city and town in the area. They seldom failed us. Sometimes it was a luncheon or dinner, more often a meeting in some suitable hall or club.

There would be at least two of us. We tried to interest our hearers. We carried blank forms for application for reserve com-

missions. After our addresses we held more or less of a conference. Questions were welcomed. National Guard officers present were requested to extend facilities to our officers and they did. The correspondence courses were explained and eligibles urged to join. These lasted from two or three days to a week and covered from one to eight or ten cities and towns. Several times we had the Commanding General or his Chief-of-Staff with us and frequently the reserve officer commanding the infantry regiment through whose area we passed would accompany us for all or part of the trip. These tours did two things; first, stimulated interest and developed enthusiasm, and second enlarged our personal acquaintance among our officers. This latter is of first importance in the case of so inactive a unit as a reserve division. The personal touch means everything and gives opportunity to develop esprit and morale. If we had had sufficient funds available I would have kept two officers on the road practically continuously during those first two years. Later on when the regimental executives reported the need was not so great. Again our strength curve responded to each of these trips.

Many of our officers lived in or near Philadelphia. Our addressograph enabled us to segregate them and we frequently circularized them independently of the rest of the organization. For them we arranged a series of lectures and visits to places of interest such as Frankford Arsenal and the League Island Navy Yard. This helped to keep up interest and got our officers together during the winters. It was of interest to note the increasing fellowship that developed among the officers, especially of the same regiment. In some regiments the esprit was extraordinary when one considers their reserve status. All these meetings, for whatever purpose called, helped morale and morale was something we early realized would insure the success of our division could we but develop it.

We had an enthusiastic reservist in our assistant remount officer. He undertook to handle a class in equitation from among our mounted officers. This proved a success. The Philadelphia City Troop loaned us their riding hall and the use of their government horses and the class met one evening each week all winter.

Regimental lunch clubs or messes were tried with varying success. A rifle association was formed but did not get far due to lack of opportunity to shoot.

The strength curve responded to all this and by the end of the second year we had the Division fully officered with a couple of hundred surplus to take care of the casualties that are bound to occur on mobilization. We knew we had made a good start.

It is to be remembered that we did not have by any means 905 officers of grade and branch exactly according to the tables of organization, but we did have a suitable officer available for almost every position to be filled. For instance, we were long on Lieutenants of infantry and short on Captains. Therefore, some of our infantry companies were commanded by first Lieutenants, but these companies had each an extra Lieutenant assigned.

Our staff of regular officers had been increased to six with six enlisted men (five clerks and one chauffeur). We now received the first of our regimental executives. This marked a great step forward. These officers were assigned, as they became available, one to each regiment. Each was stationed in the city where the headquarters of his regiment was located. The executive took over the work of organizing his regiment working in closest harmony with his reserve colonel. This carried the assistance of regular personnel out into the regimental areas and greatly extended the possibilities of personal contact. About this time our automobile was ordered turned in; "no funds for upkeep," we were informed. This was a serious loss as there was no mileage for railroad transportation and we were tied fast to Philadelphia. I have never advocated the policy of assisting to run the Army out of one's own pocket, but I did offer to run that car because I knew what it meant to the success of our mission to keep in touch with our people. I was reminded of the fact that one may not extend charity of this sort to our government no matter how worthy the motive. Fortunately the executives were able to keep alive the contacts we had established and to greatly extend them.

Having our officer personnel substantially complete with a comfortable surplus we now bent our efforts toward enlisting our cadres of noncommissioned officers and enlisted specialists. We had found by experience that our resources in men and material at Division Headquarters were too small to enable us effectively to do more than one big job at a time. The routine work had to go on and our mail was very heavy. For instance in November, 1921, we handled 1047 pieces of incoming and 2700 pieces of outgoing mail. In December, 1922, it was 1916 pieces of incoming and 4285 pieces of outgoing. We had discovered and to our surprise, that we did not get any enlisted men to take on as a result of our talks, letters or newspaper articles. Here and there an individual would enlist but after two years we had less than fifty distributed among the many units of the division. We had studied the matter and felt that we understood the underlying cause. There was neither pay nor glory from the point of view of the enlisted man of war service.

He had been through one war and felt that he did not care to prepare to go through another as a noncommissioned officer. If he could have a commission immediately or reserve pay during peace he might enlist.

We called on our regimental commanders to urge their captains to interest themselves in getting at least a few men for the key positions. We directed the executive officers of the several regiments to assist in this in every way possible. We published in all parts of our area the fact that in the event of a draft an enlisted man in the reserves would not be drafted but would be called with his organization and that this might mean for him one or two months longer to adjust his affairs than in the case of the earlier classes of drafted men. Enlistments began to show. They came in slowly but surely. Finally one infantry company reported its entire authorized quota was filled. We were informed that it was the first unit in the Corps Area to reach a 100% standard and the company commander received a letter of commendation from the Corps Area Commander. It was therefore evident that all other divisions were experiencing the same difficulty that we were, in recruiting noncommissioned officers and enlisted specialists.

We had estimated that after our quota of officers was filled from former officers of the World War we would experience a turnover of about 10% a year beginning about the third year. This would require a yearly replacement of approximately 95 officers who would enter at the bottom of the ladder as second lieutenants. Unless such replacement was assured after the supply of former veteran officers became exhausted the division would in ten years be no more than a memory and our work would have gone for naught. For this reason we were vitally interested in the only available source of supply, namely the C. M. T. C. and the R. O. T. C. Our reserve officers earnestly supported us in this and we did a great amount of work in the C. M. T. C. procurement campaigns each summer to assist in making the camps popular with our young men and their parents. We received some 30 second lieutenants from the R. O. T. C. at the end of our first year and some 70 the second and we made a point of having a regular officer from Division Headquarters present at commencement at the colleges and universities having units of the R. O. T. C. to personally hand his commission to the young officer concerned and to welcome him into the Division. Our presence at these ceremonies was arranged for by correspondence with the heads of the institutions and pursuant to their invitation. In every case our suggestion was welcomed and our representative received with great courtesy and given opportunity to meet our

young officers. Frequently he was requested to deliver the commissions to the other graduating officers.

I have not mentioned our camps of instruction held each summer. No more important incident than these camps occurred during these first three years. To the average reserve officer this fifteen day period of training while on an active duty status is of prime importance. Correspondence school courses and occasional meetings do much to keep him in touch with his side line, the military profession, while he is busy with his main duty in life, the support of his family and dependants and the education of his children. The fifteen days in camp do much more. To the credit of our officers be it said that each year there were many more requests to take this training than could be granted under the limited appropriations made by the Congress. Each year we had a large number of officers attending camp as volunteers, at their own expense so anxious were they to seize the opportunity to better prepare themselves to discharge their duties under their commissions should they be called.

It is not intended to enter into a discussion as to how the training of these officers can best be provided for. It is of interest however to note the reaction of the first camp on our activities. Without any data to go on we thought it probable that our quota might be hard to find. We therefore began early and circularized our officers giving full information as to the camp and probable training program and urging all who could arrange their personal affairs so that they could get away for those fifteen days to apply for the duty. The appropriation bill had not been passed. We understood that practically all reserve officers who wished to be ordered to camp would go. We were delighted when nearly five hundred specified their probable intent to ask for duty orders. Later this number was reduced by withdrawals to something like three hundred. Then came the appropriations and the news of our allotment, one hundred and thirty-seven if my memory serves me. We now had the task of eliminating over half of our list of applicants and we bitterly resented the duty. Here were some one hundred and fifty officers of the reserves who said in effect "I am busy, I must earn a living for myself and my family, but I know what unpreparedness means and to do my bit that my country may be ready if the necessity for mobilization comes again I have accepted a position in the reserves. I realize that I am out of touch with the military profession, that much has been changed since I was on active service and I will make the effort to so arrange my affairs that I may take fifteen days field training. I realize the responsibilities of my commission in the event

of war and so I make what I feel is a considerable sacrifice." Then their offer to train was declined.

It took months of effort on our part to counteract the bad effect that this action had on morale. It was never entirely corrected. The same thing happened the second year but we were prepared for it and so were the reserve officers and the effect, though bad enough, was not so serious. The camps advertised themselves as they were distinctly successful. They are the culmination of the year's work in the case of the conscientious reservist and he derives great benefit from the instruction that he receives. Another important feature is the good effect on morale. Officers of the same organization live together and become well acquainted. Their enthusiasm is aroused and it is brought home to them that they are not merely a list of names in the archives of the War Department but men holding commissions in the Army of the United States from whom the country will expect effective and definite service in the event of mobilization for war.

On April 12th, 1924, two years and nine months from the date of our arrival in Philadelphia, the Division held its first annual banquet. I feel that this banquet marks the end of the period of initial organization. It could not have been held if we had not arrived at that stage in our history. Nearly four hundred officers dined together in the great ballroom of the Bellevue Stratford in Philadelphia. There were a number of distinguished guests. Among them the General officer who commanded the Division in France and who crossed the continent to be present. All speeches were broadcast and a full program of vaudeville and music was provided. The date selected was the fifth anniversary of the last time the complete division with its artillery brigade and trains was assembled in France. On that day it was given its final inspection by General Pershing in person before its return to the United States for demobilization upon the conclusion of the World War. A copy of the letter of high commendation that he sent the Division after this inspection was at the place of each officer at this dinner.

This banquet was arranged for, financed, and planned in every detail by the reserve officers.

Now just a word in conclusion. The success of this initial organization was due to the hard work, tact and professional attainments of the little group of regular officers on duty with me, backed up by the influence and assistance of a group of reserve officers. If, however, you polled their votes, they would tell you that our Sergeant Major and his five men armed with mimeograph machines and addressographs were the ones who really turned the trick.

Organization of Ground Means of Antiaircraft Defense in the Combat Zone

By MAJOR H. R. OLDFIELD, C. A. C.

First Prize Journal Essay Competition, 1924

THE MISSION OF GROUND MEANS OF ANTI-AIRCRAFT DEFENSE

STUDY of the operations of the World War has not led the nations of the world to a complete agreement as to the armament and organization or even as to the mission of ground means of anti-aircraft defense. There is an entire accord, excepting perhaps in the United States where ideas are not crystalized, as to the protection that must be afforded against enemy aircraft. It therefore may be stated that, in the future, each nation must be prepared to furnish protection against the operations of enemy aircraft from the moment relations with a potential enemy nation become strained.

This protection must be extended from the first to all of the following which are located within the radius of action of hostile aircraft from their existing land and floating bases and eventually to all such elements that are at any time within the radius of action of hostile aircraft from land bases established after the outbreak of hostilities.

- a. Troops in the field.
- b. The mobilization and concentration of troops.
- c. Bridges, tunnels, ports, canal locks and other sensitive points on the lines of communication of the field forces and in the zone of the interior.
- d. Large cities, especially those of first importance as railway and shipping centers or as manufacturing centers.
- e. Manufacturing plants.

This protection can be afforded only by a combination of air forces and ground means. The case is similar to that of coast defense which the last few centuries have shown to be best and most economically provided by a combination of naval and shore defenses. While some individuals in some countries appear to believe that air forces alone are sufficient to provide all needed protection and that

ground means of defense are of negligible value, the overwhelming consensus of opinion among military men is to the effect that both are essential in order that air forces may be freed for offensive missions and not tied down to defensive action. Only by being free to concentrate at the then decisive point and to conduct offensive operations can air forces exercise their maximum power at any particular instant during a war. If our air forces are to be free to conduct their operations in this manner, protection must be afforded all elements listed above either by ground means alone or by ground means supplemented by the smallest possible fraction of our air forces.

From the preceding discussion it follows that the mission of ground means of anti-aircraft defense is to protect all friendly ground elements against the action of hostile aviation and thus free all, or at least the major portion, of friendly aviation for offensive action. Experience taught all of the combatants, during the World War, that ground means of anti-aircraft defense have in addition a mission of collecting, reporting and disseminating information of all happenings in the air over friendly territory. Without this aircraft intelligence system, operated in every case by ground means of anti-aircraft defense, the defensive action of air forces would have been ineffective and their security would have been endangered. This intelligence system also insured the safety of the civilian population subject to enemy air attacks. It is evident to all that an appropriate organization of any unit must be based not only on the mission to be assigned the unit, but also on the powers and limitations of the unit. The powers and limitations of ground means of anti-aircraft defense are summarized briefly below.

POWERS AND LIMITATIONS OF GROUND MEANS OF ANTI-AIRCRAFT DEFENSE

Ground means of anti-aircraft defense consist of:

- a.* Anti-aircraft artillery.
- b.* Anti-aircraft automatic cannon.
- c.* Anti-aircraft machine guns.
- d.* Anti-aircraft searchlights.
- e.* Cannon, machine guns, rifles and pistols designed and supplied for use against ground targets, i.e., the armament of our combat forces exclusive of the air service and of the ground anti-aircraft troops.
- f.* Balloon barrages.
- g.* Camouflage.
- h.* Aircraft intelligence and alarm systems.

The following is a brief statement of the powers and limitations of each of these means.

ANTI-AIRCRAFT ARTILLERY

Powers. Ability to deliver fire on visible hostile aircraft with sufficient accuracy to: prevent or make very costly a successful aerial bombardment by such planes of any area protected by such fire; destroy a small percentage of attack, pursuit and observation planes and a large percentage of bombardment planes entering its field of fire during periods of fair visibility; and prevent or render hazardous and difficult the performance of any observation or pursuit mission within its field of fire. The effective ranges of our present armament are: 3-inch guns 8400 yards vertically, 7500 yards horizontally at 10,000 feet altitude and 6,000 yards horizontally at 20,000 feet altitude; and 4.7-inch guns 12,150 yards vertically and probably about 10,000 yards horizontally at an altitude of 15,000 feet.

3-inch guns on trailer mounts can be taken practically anywhere a tractor can go. When equipped with tractors and with tractors and trailers for ammunition they can be maneuvered at 5 m. p. h. on roads and 3 m. p. h. across country. When trucks instead of tractors are used the corresponding speeds are 6 to 8 m. p. h. on roads and 3 to 4 m. p. h. across country, but in this case roads must be hard and ground off roads firm. For most theaters of operation tractors are more dependable and are preferable to trucks. A combination truck and tractor is the most desirable prime mover. The larger guns are too heavy for front line use. They may be mounted upon trailers and pushed well forward when roads are very good, but ordinarily they are better suited for rear area defense.

With the equipment at present issued it will require not less than one hour and normally not more than three hours to emplace a battery. Equipment has been developed, however, which when supplied will permit a battery to be emplaced in from 15 to 45 minutes. The above is applicable at night as well as by day. It should be noted that no orientation is needed beyond identifying the assigned battery position and with the present equipment determining the relative locations of the two ends of a base line about 3000 yards in length. The new equipment eliminates the necessity for the use of such base lines.

Limitations. Antiaircraft artillery is vulnerable to enemy artillery fire to the same extent as other artillery. Therefore, it cannot be emplaced forward of the line of our divisional artillery,

frequently it must be emplaced even further back. Its field of fire thus rarely can extend far enough into enemy territory to reach all points from which enemy aircraft can observe within our lines. It is not yet equipped with auxiliary means—acoustic apparatus, etc.—to permit it to fire at targets invisible from battery positions. Acoustic apparatus, as at present developed gives sufficiently accurate data to permit of barrage fire across the path of enemy planes. That such fire is of considerable value, particularly against bombers, was shown by the operations of the defenses of Paris. Thus aimed fire on individual planes can be delivered only on targets visible from the battery. At night such targets must be illuminated by searchlights. Invisible targets can be engaged only by the less effective barrage fire. It is only a question of two or three years, perhaps of a few months, until acoustic apparatus will allow of effective aimed fire at any aircraft no matter how dark the night or how foggy the weather. Low flying planes, i.e., planes at altitudes less than 1500 or 2000 feet, can rarely be effectively engaged by anti-aircraft artillery, due to their great angular speed.

ANTIAIRCRAFT AUTOMATIC CANNON

Powers. Within their shorter effective ranges, they have powers equal to and coincident with those of anti-aircraft artillery. In fact they probably will be able to bring down a much greater percentage of targets fired at. In addition they will be very effective against low flying planes of all kinds. Effective ranges of 5000 yards vertically and 7500 yards horizontally are a probability of the near future. The effective ranges of the types so far constructed are limited to about 4000 yards vertically and about 6000 yards horizontally.

Limitations. Equipment is not yet perfected that will permit of their effective employment against other than visible targets. The development of such equipment in the very near future is probable. No service test of these weapons has yet been conducted. Means of transport are not yet developed. They may be carried either in trucks or in trailers or sleds pulled by tractors. A combination truck and cross country vehicle is the ideal means of transport.

ANTIAIRCRAFT MACHINE GUNS

Powers. Ability to hit practically any visible airplane quickly and often when within range. Ability to force low flying planes to climb to an altitude great enough to bring them within the effective field of fire of anti-aircraft artillery. The effective ranges of the

.30-caliber weapon are 1500 yards vertically and about 2000 yards horizontally. Those of the .50-caliber weapon are about 4000 yards vertically and about 6000 yards horizontally. The .50-caliber gun has not yet been issued to the service. The .30-caliber gun complete with ammunition and crews is carried in trucks. Guns can be emplaced and open fire in a few seconds.

Limitations. Their efficiency is greatly reduced at night and under other conditions of poor visibility. Being limited to truck transportation, they must be carried across country over which trucks cannot operate. A sled pulled by a small tractor is advocated in place of the truck or as a supplement thereto especially for the .50-caliber weapon. A combination truck and cross country vehicle, when developed, will be the ideal method of transport.

ANTI-AIRCRAFT SEARCHLIGHTS

Powers. Ability, under average atmospheric conditions, to locate, illuminate and identify enemy aircraft within the following effective ranges, 6500 yards vertically and 6500 yards horizontally. Such illumination permits targets to be fired at by anti-aircraft artillery, automatic cannon or machine guns. Ability to point out the location of enemy aircraft to our own aircraft and to illuminate them sufficiently to permit our aircraft to attack them. With the aid of our present acoustic apparatus the ranges at which the above is possible are approximately twice those at which enemy planes can be illuminated as targets for ground weapons, i.e., about 13,000 yards. Ability to confuse hostile aviators and in a considerable number of cases to break up hostile aerial formations, through the blinding effect of the searchlight beam. Ability to render ground features indistinguishable or misleading at night by luminous camouflage. They are limited to movements on fairly good roads. Their maximum speed is 12 m. p. h. They must be emplaced within 500 feet of firm ground. They can be emplaced in 15 minutes.

Limitations. They are useless in thick weather. Their range of illumination is less than the range of anti-aircraft artillery. They are vulnerable to enemy artillery fire when not in defiladed positions and when closer than 2000 to 2500 yards from the line of contact.

ARMAMENT OF GROUND FORCES OTHER THAN ANTI-AIRCRAFT FORCES

Powers. No cannon, other than anti-aircraft artillery cannon, are of any value for employment against hostile aircraft. Rifle and pistol fire by ground troops has never been of appreciable value against aerial targets. Machine guns of ground forces can be made effective against aerial targets only by furnishing them with proper mounts and sights and a different proportion of tracers in their

ammunition and by giving their crews special training in firing at aerial targets. Under present plans such measures are to be taken for only a small percentage of infantry and cavalry machine guns. A few machine guns are furnished artillery units for their local protection against both enemy aircraft and enemy ground troops. Automatic rifles are of little use against aircraft.

Limitations. All of these means, other than machine guns, have such limited ability to damage hostile aircraft that they should rarely if ever be used for this purpose. Foreign nations depend upon the machine guns issued to infantry and cavalry units to protect front line troops against low flying planes. There is nothing in their war experience nor in ours to indicate that these machine guns will be effective for this purpose. On the other hand, our own war experience shows the great value and marked efficiency of specially trained antiaircraft machine gun units. Ability to promptly and surely identify aircraft as friendly or hostile is essential in all firing on aircraft and such training is not simple.

BALLOON BARRAGES

Powers. Ability to cause hostile aircraft to shun their immediate neighborhood unless flying at an altitude well above their maximum height. They can be maintained at a height of 7000 feet when single balloons are used and of about 12,000 feet when a tandem arrangement is used. Their efficiency is probably due more to their psychological effect than to their actual ability to bring down enemy planes. The World War, however, amply demonstrated that all aviators give them a wide berth. They are of use only at night and are limited in their movements to good roads with few overhead obstructions. Complete mobile units have not been constructed as yet in our service but they will probably be capable of maneuvering at about 4 m. p. h. under favorable conditions.

Limitations. They are not suitable for employment in front line protection. So long as hydrogen is used for inflation they will be readily destroyed by a few incendiary bullets.

CAMOUFLAGE

Powers. Proper camouflage, including the use of smoke, renders ground objects indistinguishable to the eyes of aerial observers and when very well executed even to the aerial camera. Luminous camouflage when properly employed will mislead enemy aviators by causing them to attack an area adjacent to the one they intend to attack. Such use of ground lights was only beginning to come into prominence at the end of the World War. Expert opinion is not agreed as to the value of luminous camouflage.

Limitations. Luminous camouflage can be of little use in forward areas. It requires considerable means and great ingenuity in their use if it is to be effective. It is of limited application even in rear areas.

AIRCRAFT INTELLIGENCE AND ALARM SYSTEMS

Powers. Ability to alert all means of anti-aircraft defense, including our own air forces, in time to allow these means effectively to be employed. Ability to keep the command and our air service fully informed as to all enemy aerial activities. Ability to warn the civilian population in time for them to turn out all lights and take cover before the arrival of enemy aerial raiders.

Limitations. To be effective, these systems must be highly organized and they must be supplied with extensive personnel and signal communications.

FOREIGN PRACTICES IN ORGANIZING GROUND MEANS OF ANTI-AIRCRAFT DEFENSE

A brief statement of the organizations adopted by certain foreign governments is set forth below as a background for the discussion to be given later.

GREAT BRITAIN. Anti-aircraft defense formations are organized as follows:

Anti-aircraft aeroplanes in squadrons and in wings of from two to five squadrons.

Anti-aircraft artillery in brigades of from two to five batteries, each of eight guns. Light and heavy guns are assigned to the same brigade. The firing unit varies from two to eight guns according to the tactical situation.

Anti-aircraft searchlights in battalions of four to six companies, each of twenty-four searchlights.

These wings of the Royal Air Force, brigades of Royal Artillery, and battalions of Royal Engineers are grouped in mixed Anti-aircraft Defense Brigades. From two to five such brigades are grouped into an Anti-aircraft Defense Division. The composition of these formations varies with the requirements of the theater of war. A normal Anti-aircraft Defense Brigade consists of the following: One or more squadrons of aeroplanes; two brigades of artillery (one light battery per brigade); one battalion of searchlights; one signal section.

The senior officer of the anti-aircraft formations in the field will command all such formations directly under the commander-in-chief. Thus army, corps and division commanders have no author-

ity over the anti-aircraft defensive forces operating in their zones of action. Advance guard commanders and commanders of independent forces command the anti-aircraft agencies allotted to them.

Machine gun units are not included in anti-aircraft defense formations and when employed are not under the authority of the commanders of these formations. Searchlight formations furnish most of the intelligence personnel.

FRANCE. Anti-aircraft artillery is organized into regiments for administrative purposes only. The combat unit is the group which corresponds to our battalion. It is composed of three batteries of four guns each. There is no mixture of light and heavy guns in the same group. The firing unit is always four guns. Searchlights are organized into companies consisting of either six or four sections of four lights each. Groups of two or more companies may be formed when necessary. No special machine gun units are formed for anti-aircraft work. Artillery groups furnish most of the intelligence personnel.

Anti-aircraft units are allotted to armies and to the zone of the interior as required. There is also a general headquarters reserve of such units. Light guns, approximately 3-inch, are assigned to armies. The heavier guns are used in the interior and in the communications zone.

A minimum allotment to an army is one group of anti-aircraft artillery for each corps and one searchlight company of six sections. The army may attach artillery to a corps but rarely so attaches searchlights. Artillery may be attached to cavalry divisions, advance guards and independent commands in general.

Barrage balloons are employed in the zone of the interior to supplement artillery and searchlights. Pursuit aviation, if available, also is employed in the zone of the interior.

The anti-aircraft defense commanders of the theater of operations, of each army and, when such units are attached to a corps, of a corps are under the command of the air service commanders of the corresponding echelon. In the zone of the interior, there will be a superior commander directly under the ministry and a regional anti-aircraft defense commander directly under each regional commander. The above is the war organization. In peace, the anti-aircraft units are a part of the artillery as it has been found that the air service cannot efficiently handle the development, training and recruitment of such units.

ITALY. Accurate data concerning the Italian war organization is not at hand. In peace, ten anti-aircraft artillery groups and an anti-aircraft school are maintained. Each group consists of one

headquarters, two mobile batteries, one cadre battery and one special depot. These groups are under the Territorial Army Corps Headquarters of Artillery for training, discipline and mobilization.

Apparently there will be organized in war an "Aerial Defense Headquarters" for each territorial army corps area and for each corps and each army. It appears probable that these will operate directly under corps area, corps and army commanders.

So far as can be determined no special machine gun or searchlight units are to be organized during peace for anti-aircraft purposes. Intelligence personnel are specially and elaborately organized in war.

GERMANY. Little data is obtainable concerning the German organization. During the war, the anti-aircraft artillery was under an anti-aircraft officer in each corps. This officer was responsible for the aircraft information service and used his artillerymen as collecting agents.

ORGANIZATION OF MEANS IN THE COMBAT ZONE

MEANS TO BE EMPLOYED

The types of weapons to be employed in the combat zone are influenced by the topographical features of and the communications existing in that zone and by the character of operations expected. The discussion to follow is based on the assumptions that the combat zone will be one in which the operation of large forces is practical—it will therefore be fairly well supplied with roads—and that fronts of contact are not stabilized for long periods. Such assumptions should result in an organization capable of meeting the most exacting requirements and one not capable of meeting such requirements should not be considered.

The organization of means can be determined only after the weapons to be employed are chosen. All nations agree that mobile anti-aircraft artillery should be employed in the combat zone. In most, the best opinion favors a caliber of about 3 inches. No practical gun of large caliber has yet been perfected which insures the requisite mobility. One weapon to be used thus is the light anti-aircraft gun and the heavy gun is not to be included until future development insures that it has the necessary mobility.

Anti-aircraft automatic cannon are a post-war development. In our service a dependable piece is an actuality but its issue to combat units is delayed pending an attempt to increase its power. It has or can be given the necessary mobility. Although untried in actual warfare its characteristics of rapid fire, ability to obtain hits

rapidly through use of tracer ammunition, and power to bring down any plane with a few hits, together with its invulnerability—this is due to its small size—make it a particularly valuable weapon for front line use and it is therefore suitable for use in the combat zone.

Antiaircraft machine guns are universally agreed to be front line weapons and they should be included. Searchlights have amply demonstrated their value in actual operations and should be included. Balloon barrages are of doubtful utility in the combat zone. They require too much material and are too immobile. They should therefore be excluded. Camouflage is a means and not a weapon. Luminous camouflage, while useful on occasion, requires means too extensive to be supplied to the combat zone under ordinary circumstances and is excluded.

We conclude then that light antiaircraft artillery, automatic cannon, machine guns, and searchlights are the weapons which are suitable for employment in the combat zone. To make these most effective and to serve the whole command, especially the air service elements, an aircraft intelligence system must be included in our organization.

ORGANIZATION OF MEANS AT THE FRONT

The artillery is everywhere recognized as the one means of ground defense having power to cope with aircraft to almost any altitude. Its employment at the front is almost standardized throughout the world. It is used to cover by its fire a zone along the whole front of contact and along exposed flanks, if any. Its range and power is such that under most conditions two lines of batteries can be installed completely across the front when three batteries per army corps are available. The weight of opinion seems to favor a three-battery group or battalion organization and a normal allotment of about one such battalion to every army corps. Such a battalion when installed at the front is so widely extended that the addition of another battery would render it uncontrollable by one man. It will normally have from two and one half to four miles of front between its battery positions. We thus conclude that our light artillery should be organized into three-battery battalions.

The four gun firing unit or battery is largely a post-war development. Most batteries consisted of only two guns during the war. This was due partly to the limited number of guns available and partly to the idea that two guns were the most that could be used as a unit in the zone of enemy artillery fire due to the effects of that fire. The lack of power of the two gun unit was universally recognized, however, and American and French opinion are agreed

that the four gun unit is the proper one. The basic combat element of anti-aircraft artillery thus should be the battalion of three batteries of four guns each.

All opinion agrees that anti-aircraft artillery is ineffective against low flying planes. Prior to the development of an automatic cannon suitable for anti-aircraft use, all agreed that anti-aircraft machine gun protection was necessary for all elements liable to attack by such planes. The theory has been that machine guns forward of the first line of anti-aircraft artillery should furnish the protection for the most advanced elements and by so doing drive enemy planes to heights at which anti-aircraft artillery fire is effective. Machine guns thus perform a double role. The question now arises as to the role to be played by automatic cannon. Additional complications result from the perfection of the .50-caliber machine gun with its increased ranges.

If we grant that the .30-caliber machine guns of our infantry and cavalry are incapable of acting as double purpose weapons and providing front line units with sufficient protection against low flying planes—our war experience indicates this clearly—we must then decide whether .30-caliber machine guns, .50-caliber machine guns or automatic cannon are to be specially organized as anti-aircraft troops. Economy of means would seem to preclude the organization of special anti-aircraft troops to man more than one of these weapons inasmuch as only one function is to be performed. The .50-caliber machine gun being now perfected and being more mobile than the automatic cannon as well as much more powerful than the .30-caliber weapon would appear to be the most useful of the three weapons pending the development of a more powerful automatic cannon. The hitting ability of machine guns and automatic cannon are both dependent on the use of tracer ammunition. Data is entirely lacking on which to base an estimate of the weight of ammunition required by each type to bring down a plane, but the odds seem to favor the machine gun. We conclude then that the .30-caliber machine gun is obsolete for anti-aircraft use due to lack of power and that the .50-caliber weapon should be employed in lieu thereof. Also that the automatic cannon should not be adopted for front line use until a service test of a more powerful weapon is held which demonstrates the superiority of this weapon over the .50-caliber machine gun.

Based on our war experience, we have allotted one anti-aircraft machine gun battalion of four batteries to each army corps. Theoretical studies including the solution of numerous map problems appear to prove that the forty-eight .30-caliber weapons of this battalion are as near the normal requirements of a corps front as can

be arrived at. When the .50-caliber gun is adopted, this battalion should still have four batteries as with a smaller number the elements of one battery would necessarily be too extended to be controlled by one man. Our present organization calls for twelve .30-caliber machine guns per battery. In front line protection against lowflying planes the range of visibility has as great an influence as the range of the weapon in determining the distribution—i. e., the allowable dispersion—of the elements of the defense. With the greatly increased range of the .50-caliber weapon some reduction in the number of guns is allowable. A battery manning eight .50-caliber machine guns is advocated to replace the present 12-gun battery of .30-caliber weapons. We thus conclude that there should be a battalion of four batteries of .50-caliber machine guns, each of eight guns, as the normal allotment of an army corps for employment in forward areas.

Our present searchlight battery mans twelve 60-inch searchlights. The French and English units man 24 lights, although their lights are smaller than ours. Searchlights have two distinct roles to perform. In one they illuminate targets for fire action by ground weapons, in the other they illuminate aircraft to be attacked by friendly air forces—night pursuit. For the former role they are required in the forward areas in the ratio of one section of four lights for each antiaircraft battery to be served, i. e., three sections are required for each antiaircraft battalion. Experience during the war and all training and experimental experience since indicate that for front line duty four lights per battery are essential. One or two lights alone are of little value. We then conclude that a battery of three sections, each of four lights, is required for duty with the antiaircraft artillery battalion normally allotted to an army corps. Those required for use with pursuit aviation will be discussed later.

We have so far determined that ground means of antiaircraft defense should be assigned to front line elements in the ratio of one battalion (3 batteries of 4 guns each) of light antiaircraft artillery, one battalion (4 batteries of eight .50-caliber guns each) of machine guns and one battery of twelve 60-inch searchlights per army corps to meet normal requirements.

It is now necessary to determine the higher organization, if any, of these units and their assignment. These units are sufficient to meet the normal needs of an army corps. There are many advantages in administration, supply, command and cooperation obtained by organizing these into a regiment and assigning it as an integral part of each army corps. Such an organization and assignment are now contemplated in our service.

It has the following tactical advantages. An army corps front is normally some 6000 to 12,000 yards in width. Division zones of action are rarely of uniform width and therefore it is difficult and often impossible to assign entire batteries to particular divisional zones. A corps organization to cover the entire front of the corps has proven more practical. All nations agree that ground anti-aircraft units should belong to no smaller unit than the corps. The intelligence system that must be operated by these units is, from the standpoint of practical operation, more efficient and prompt when operated as a corps function rather than as a division function. The corps headquarters is the highest echelon of command, having intimate knowledge of the details of march conditions and march columns in the forward area and is thus in a better position than is the army headquarters to regulate movements of these units.

On the other hand, the machine guns will be emplaced close enough to the front, both in attack and defense, to be able to exert a powerful influence on the infantry combat when their action against aircraft is secondary in importance to their possible action against enemy infantry. For this reason, these batteries should be assigned to divisions. However, such action is of secondary importance on the whole and when the necessity therefor can be foreseen, some batteries can be attached to divisions. It is also true that the most economical anti-aircraft defense demands coordination by army headquarters or perhaps even by G. H. Q. Such coordination is possible, however, even if these units be assigned to army corps. This will be elaborated on later.

We therefore conclude that all of the means determined to be normally required for each corps front, i.e., one battalion of artillery, one battalion of machine guns and one battery of searchlights should be organized into a regiment of anti-aircraft troops and assigned as corps troops. Before deciding upon just how these elements should be combined into a regiment, it is desirable to determine how this regiment, and the aircraft intelligence system it must operate, shall be administered and employed tactically by corps headquarters.

In each corps staff there are three major agencies for administering and employing tactically the combat elements of the corps. These are the corps General Staff and the corps administrative staff which deal with the infantry divisions and the major elements of corps troops, and the Chief of Air Service and the Chief of Artillery who deal with the corps air service and corps artillery respectively. These chiefs also advise on the coordination of all of the air service elements and all of the artillery in the corps. The corps staff

proper thus deals essentially with division commanders and with these two chiefs of branches. How should the antiaircraft defense be handled, directly under the corps staff, under the Chief of Air Service or under the Chief of Artillery?

Foreign practices are not uniform. In some armies the artillery is responsible for the recruitment, development and training of antiaircraft ground units but in none for the tactical employment of these units. In some it is a separate agency which cooperates with the air service and in France it is placed under the air service commander. In our service the matter is under discussion. Most officers who had war experience with such units or who have given the matter extended consideration favor making the commander of the antiaircraft regiment a direct subordinate of the corps commander under the supervision of the corps staff proper. Some other officers have very recently begun advocating the placing of this antiaircraft regiment under the command of the Chief of Artillery of the corps.

In favor of placing this regiment under the chief of artillery of the corps the following have been advanced:

a. The positions of the artillery batteries, normally only three per corps, can be better coordinated with those of the division and corps artillery.

b. The ammunition supply of the antiaircraft batteries can be handled by the ammunition train of the corps artillery brigade.

c. The supply of the antiaircraft regiment can be attended to by the corps artillery brigade.

d. The chief of artillery should administer and exercise tactical control over all corps artillery the antiaircraft regiment is artillery accompanying an army in the field and is therefore field artillery.

e. Movements of the antiaircraft regiment can best be made as a part of the corps artillery.

Some advantage in selecting and assigning battery positions would accrue by having the antiaircraft regiment subordinate to the chief of artillery of the corps. These advantages are very small due to the limited number of antiaircraft artillery batteries. The positions of these batteries are as often as not in the zone of divisional batteries and this reduces the stated advantage. In ammunition supply, no advantage would accrue due to the fact that the ammunition supply of antiaircraft units is limited in amount and is perfectly practicable by means of transportation necessary to the requisite mobility of the units, even if the ammunition train of the corps artillery were to be charged with this supply. On a long stabilized front some advantage might accrue if the transportation required for mobility were taken away from the antiaircraft units.

Even then, however, the corps pool of transportation could easily handle this supply.

The general supply of corps troops is a regimental matter and not a brigade matter. Amalgamation with the corps artillery brigade would be of no conceivable advantage in this respect. It is true that our present regiments are designated as anti-aircraft artillery regiments but only one battalion is an artillery battalion and its largest battery is a searchlight battery. Anti-aircraft troops are not artillery in the sense that field artillery is. They have different targets, different missions and cooperate with the air service where field artillery cooperates with the infantry. Where anti-aircraft troops do directly cooperate with the infantry they use machine guns and not artillery pieces. The anti-aircraft troops differ more from field artillery so far as tactical employment is concerned than does infantry, cavalry or engineers.

It is therefore particularly undesirable to have anti-aircraft troops administered and controlled tactically by a field artilleryman who is, and with our present organization must ever be, wholly unfamiliar with its powers, limitations and functions. It would be a faulty tactical organization even if anti-aircraft troops were a part of the field artillery in time of peace. This is due to the different functions of field artillery and anti-aircraft troops.

The movements of anti-aircraft are governed by entirely different considerations from those that apply to field artillery. Control of these movements by the chief of artillery of a corps would result in hampering such movements rather than in expediting them.

If the anti-aircraft regiment of the corps were placed under the chief of artillery of the corps it would be necessary for him to organize a section in his office to handle anti-aircraft defense. This personnel should know something about anti-aircraft matters. The personnel now available with more than a superficial knowledge of anti-aircraft defense is limited in numbers and none should be diverted from fruitful endeavor in war. Such an assignment of this regiment would place an extra and unnecessary echelon in the command and aircraft intelligence systems between the fighting units and the corps commander and his staff. This would slow up all operations and intelligence and be a wasteful, annoying and inefficient organization for that reason alone.

We therefore conclude that it is most undesirable from every point of view to have the corps anti-aircraft regiment placed under the chief of artillery of the corps.

Inasmuch as anti-aircraft troops cooperate with and furnish information for the air service, the theory might be advanced that

antiaircraft regiments of a corps should operate under the chief of air service of the corps.

Infantry and field artillery must cooperate most closely, yet they operate under a common commander. Neither is placed under the control of the other. The corps commander and his staff are perfectly capable of controlling the cooperation of the air service and the antiaircraft troops, and it is believed that they should do so. This is particularly true in so far as the corps is concerned in view of the fact that pursuit aviation is largely controlled by the Army and not the Corps, and it is with pursuit aviation that the antiaircraft units must cooperate most closely.

We conclude then that the antiaircraft units of the corps should operate directly under the corps commander and his staff.

We are now in a position to decide upon the organization of the corps antiaircraft regiment. The searchlight battery normally operates with the gun battalion and therefore should form a part of that battalion. The gun battalion should carry enough ammunition with it to permit it to remain in action until the trucks, or other means of transport necessary to the mobility of the batteries can replenish it. With batteries dispersed in action as these are, the demands of the different batteries for ammunition will not be uniform and it will be difficult to interchange ammunition between batteries. It follows that a central pool of ammunition should exist in the battalion in order that the total carried by the battalion shall not be too large. A battalion combat train is thus required.

The gun battalion is normally far enough in rear of the line of contact to be able to keep telephone lines in efficient operation. It must therefore play a large part in reporting information of enemy planes. It requires a considerable signal communications personnel as it is spread over considerable territory. It naturally requires a commander and staff to control its movements, emplacement, operation and intelligence agencies. We thus conclude that the gun battalion should consist of a commander and staff, a headquarters battery (chiefly for signal communications), a searchlight battery, three gun batteries of four guns each and a combat train.

The machine gun battery must be highly mobile and the transportation provided for the men and guns can carry a fairly ample supply of ammunition. Therefore no combat train is required. All intelligence and signal communications duties can be handled by a headquarters battery and a small staff. We thus conclude that the machine gun battalion should consist of a commander and staff, a headquarters battery and four batteries manning eight .50-caliber machine guns each.

The regimental organization should exist for the supply, administration, tactical control and coordination of the aircraft intelligence activities of these two battalions. There is need for a service battery to deliver rations and other supplies to the batteries and perhaps to assist in ammunition supply in unusual situations.

As the regiment will cover all of the corps front and for aircraft intelligence purposes the whole of the corps zone of action, it will require a considerable signal communications personnel. A headquarters battery therefore is required. The regiment must establish a command post and aircraft intelligence center at or closely adjacent to corps headquarters and an advance command post near its units at the front. It therefore requires a staff that need not be especially numerous but must be unusually well trained. We thus conclude that the antiaircraft units for employment on the corps front should be assigned to the corps; that they should be an independent command operating directly under the corps commander; and that they should be organized as a regiment consisting of a commander and staff, a headquarters battery, a service battery, a gun battalion and a machine gun battalion.

ORGANIZATION OF ADDITIONAL MEANS REQUIRED IN THE COMBAT ZONE

So far we have provided a normal allotment of antiaircraft troops for the army corps. These troops are just sufficient, under favorable conditions, to maintain a zone across the front through which hostile aviation will have difficulty in penetrating and to protect the troops disposed for combat on the army front. In rear of these troops and of this zone are many elements requiring protection. These include railheads, dumps, detraining and entraining points, railway yards, repair facilities, reserve troops, sensitive points on communications systems, airdromes, etc. In addition the means assigned to corps may need to be reinforced in many situations, the barrier zone across the front may need to be deepened along routes used by enemy planes to reach our rear areas and searchlights should be provided for use with night pursuit squadrons.

It would be uneconomical to attempt to keep hostile aircraft at considerable altitudes throughout the rear areas of the combat zone. Machine guns or automatic cannon are thus required only in sufficient numbers to force hostile low-flying planes to climb high enough to come under the effective fire of antiaircraft artillery. Inasmuch as ammunition supply will be a simple matter in these rear areas, mobility is of decreased importance and automatic cannon have actually more power than .50-caliber machine guns, it is be-

lieved that they should be employed in preference to machine guns in the rear areas of the combat zone.

It is desirable to use machine guns in groups of four. Due to their greater power automatic cannon in groups of two would probably suffice for rear area employment and five such groups should be sufficient to protect three batteries of anti-aircraft artillery against low-flying planes and to force such planes to climb to an altitude at which anti-aircraft artillery will be effective. We conclude then that machine guns should be replaced by automatic cannon in the ratio of three and one-third such cannon to three gun batteries.

There is one advantage in making the anti-aircraft units for employment in the rear areas of the combat zone uniform in organization and armament with the regiments assigned to the army corps. If this be done the corps and army regiments can be interchanged and the G. H. Q. Reserve regiments can be of the same composition and thus best reinforce either corps or rear area defense. While the advantages of such a system are important, economy in personnel and armament is of greater importance and the conclusions of the preceding paragraph should stand.

Searchlights in rear areas are not needed in such a large ratio to the number of gun batteries as must obtain at the front. For rear area defense, two lights per gun battery have been found to be sufficient. The best opinion, French, based on actual maneuvers and tests is to the effect that not less than twenty-four searchlights can be employed with advantage for cooperation with night pursuit aviation in any particular area. If we assume that one such area per army will be the minimum required then at least twenty-four searchlights per army are required for this purpose.

The experience of the World War indicates that gun batteries are required for rear area defense in the combat zone in numbers approximately equal to those required for front line employment. Our army organization is based on the normal assignment of three corps per army. We therefore need nine gun batteries per army for normal requirements. We will thus need eighteen searchlights and thirty automatic cannon for employment with these gun batteries. This makes a total for each army for all rear area purposes of nine gun batteries, forty-two searchlights, and thirty automatic cannon.

Heavy anti-aircraft guns are in some theaters of war suitable for use in the rear areas of the combat zone. The decision as to the numbers of these gun batteries that should be furnished must be based, in each case, on a study of the probable theater of operations and the nature of operations expected therein.

The organization of these elements, as in the corps, is dependent on the assignment to be made and the method of control to be used. For reasons similar to those existing in the corps, the army chief of artillery should not control these elements. There are many advantages, more than in the corps, in having these elements operate under the chief of air service of the Army. However, more time is available in which to arrive at decisions as to the employment of these units and for reasons similar to those cited for the corps, it is concluded that these elements should have a commander who functions directly under the army commander and his staff. The principle of giving commanders authority over all units operating in their zones of action whose action is confined chiefly to that zone is so firmly established that no argument need be given for assigning these elements to the army in preference to holding them under the direct command of G. H. Q.

The means to be allotted to the Army are so extensive that they should be given a brigade organization. The area to be covered is so extensive that questions of supply and communications require more than one regimental commander for their proper handling. An examination of the units to be organized shows, however, that a well balanced and economical regimental division is impossible. It is, therefore, believed that all of these units should be organized as one regiment. The antiaircraft commander of the Army should be a general officer because of the importance of his duties, the coordination of the action of the corps in antiaircraft defense and the experience and ability required of him. He should be a member of the staff of the army commander.

The natural organization of the army antiaircraft regiment is to divide it into three gun battalions, each consisting of three gun batteries, one automatic cannon battery of five sections of two cannon each, one combat train which is also a supply agency, and a headquarters battery consisting of the usual headquarters personnel and three searchlight sections of two lights each. The three battery battalion of guns is basic in antiaircraft work for reasons previously given. The battalion should include the elements that normally work with the gun batteries. The searchlights are too few in number to be economically organized as a separate battery. The ammunition supply is simplified due to the employment of these units in rear of the front. The elements will be so widely dispersed that supply will naturally be a battalion matter in many cases. A regimental service battery can be eliminated and the combat trains made to perform a double function.

The regiment should then consist of three such gun battalions, a searchlight battery of six sections of four lights each and a headquarters battery. Such a regiment could perform its function efficiently and is much more economical of personnel and materiel than our present army antiaircraft brigade.

The above covers the organization of the normal allotment of antiaircraft units to corps and to armies. There is no normal situation in war, however, and these allotments are so small as to be a minimum rather than a normal. To keep the number of these units small requires a pool of such units under G. H. Q. for attachment to armies as required to meet special conditions, i.e., a General Headquarters Reserve. Incidentally this reserve should be sufficient to meet all needs of the Zone of Communications. Its size will depend on the extent of the communications zone.

To whatever units may be required for the Zone of Communications it is believed that enough units should be added for employment in the combat zone to increase the normal allotment thereto by about 50 per cent. This percentage appears high but only by making it high is it possible to keep the allotment to corps and armies low. Inasmuch as we have decided to have regiments of different types for corps and armies it remains to be decided how many regiments of each type should be provided in the G. H. Q. Reserve. The corps type of regiment is essential for use in the corps, but is uneconomical for rear area use. The army type of regiment on the other hand is well designed to reinforce the regiment of a corps by detaching one battalion thereto. While some G. H. Q. regiments of the corps type should be available the majority of these regiments should be of the army type.

If we assume six field armies on which to figure the regiments needed in the G. H. Q. Reserve, 50 per cent of the combat zone regiments would be nine corps regiments and three army regiments. It is therefore concluded that there should be allotted to the G. H. Q. Reserve six regiments of the corps type and three of the army type. These should be in addition to the requirements calculated for the communications zone but they should be available for employment either in the combat zone or the communications zone as circumstances require.

The above organization meets all combat requirements and provides suitable means for operating an aircraft intelligence system throughout the combat zone. It thus is designed to carry out all missions of ground antiaircraft troops in that zone and to do this with the greatest possible economy in personnel and materiel.

After a Year at l'Ecole de Guerre

By MAJOR J. P. GLASSBURN, C. A. C.

EDITOR'S NOTE: *The author of this article is at present a student at the Ecole de Guerre, having entered that school in the fall of 1923.*

AS ONE crosses the Pont d'Iena to the left bank of the Seine, one enjoys all the length of the bridge the vista of the Champ de Mars, to where it is closed by the imposing facade of the Ecole Superieure de Guerre. The great plain, and the spreading buildings of the school are integrally a part of the history of France for the past century and a half.

It was the Champ de Mars that gave manoeuvring space to the mob in the early days of the Revolution, so that La Fayette and Bailly were forced to deploy their troops before the Ecole de Guerre to restore order. Not long after, in the same place, the mob terribly took its revenge on Bailly.

The Feast of Reason spread its orgies in the Champ de Mars. Later the mountainous Altar to the Supreme Being cast its shadow upon it. There, under the Empire, Malet took to task for their nervous manual the detachment of the Guard sent out to execute him and his fellow-condemned. He calmly drilled them until their precision was to his liking, then gave, himself, the command to fire. When the volley left him, of all the fourteen, untouched, he reproached the Guard for their bad marksmanship, and called upon a nearby platoon of reservists to shame the Guard by doing better. Them, too, he drilled until their nervousness had left them, and then gave the command which, this time, brought him death.

Tradition! Since Louis XV commanded that a military school should be built upon the Plain of Grenelle, to "accommodate four hundred sons of indigent gentlemen, destined for the service of the King," tradition has been building there. To this school came one day on 1784, for his final year of training, an insignificant looking young Corsican who had distinguished himself above his fellows at Brienne, and who was soon to cast his destiny over half the civilized world. And to the world's greatest war the Ecole de Guerre gave names that are indelibly engraved thereon: Joffre, Foch,

Petaín, Franchet d'Esperey, de Castelnau, Debeney, Fayolle, de Maistre, to mention but a few.

The royal military school for cadets established by Louis XV continued until near the end of the reign of Louis XVI, when the rising tide of belated economies forced its closing. During the Revolution the buildings served variously as barracks for the revolutionary troops, and as lodgings for the people.

In 1804 Napoleon converted the buildings into barracks for the Imperial Guard, and named them the Quartier Napoleon. With his characteristic forethought he built the Pont d'Iena to give the Guard quick access to the right bank, for the imperial crown was none too firmly fixed, and Paris has always had a coquettish ear for the whisperings of Revolution. It was before the Quartier that Napoleon distributed to the Guard the imperial eagles. Not many years after, on the same Champ de Mars, the remnants of the Guard piled them at the feet of a new king whom they thought a ludicrous figure, "with his puffy, fat legs."

Until 1876 the buildings passed through many fortunes—barracks, storehouses, lodgings. Then was established the present school for the preparation of officers destined for the general staff. It occupies in the French scheme of higher military education precisely the same situation allotted in our own to the Command and General Staff School.

For French officers the maximum age limit for entrance to the school is 38 years. The officer candidate must have had at least five years commissioned service. Attendance is entirely voluntary. Graduation from the school is not the sine qua non for eligibility for general staff duty. An officer may establish his eligibility, without going to the school, by passing certain examinations. The candidate who wishes to arrive by way of the school makes application a year, or two, before he wishes to enter. The application passes through channels to the Ministry of War where final action is had, depending upon the officer's record, considered in the light of the recommendations of the superior officers who have acted successively upon it. In January of the entrance year the officer whose application has been favorably received is subjected, at his station, to a written, eliminatory examination prepared by the faculty of the school. The successful candidate then presents himself, in February or March, at the school for the final oral examination, which is conducted by a board of generals who have no connection with the school. To the board is attached a member of the faculty of the school, who has an advisory capacity only. After oral examinations, requiring about a month, the candidate is examined in equitation.

For the written examination the subjects, and time allowed the candidate for each, are as follows:

Applied tactics, to include the division, 7 hours—Orders: organization of a defensive position; reports.

General culture, 7 hours—An analysis of documents; or, a report; or an article on contemporary history, international law, political economy, or a question of scientific military application. (The subject is not optional with the candidate. The documents are given to the candidate at the moment of the examination. He is judged on style, clarity of expression, judgment, logical method of approach, and evidence of general information possessed.)

Military history, 4 hours—Discussion of a question of military history. The documents and maps are given out at the examination, and the results are judged as in the examination in general culture.

Topography, 3 hours—Planimetric enlargement of a map.

Geography, 4 hours—Discussion of a geographical subject in its relation to international politics.

English, or German, 1¼ hours—Translation and composition.

The oral examination is confined to the applied tactics of infantry, artillery, cavalry, engineers, tanks, and aviation; and to either English, or German conversation. An officer may add to his points by taking an examination in an additional language.

An unsuccessful candidate is not barred from again presenting himself. The successful candidates spend the months intervening between the announcement of the result of the examinations, and the opening of the school year, in November, in successive tours of duty with the arms other than their own. On successful completion of the two years at school the officer is brevetted eligible for the general staff, and given a probationary tour of duty with the general staff with troops.

The school occupies a large part of the group of buildings which looks across the Champ de Mars to the Tour Eiffel. In the same group are housed the Centre des Hautes Etudes—the equivalent of our War College—the office of Marshal Joffre, and the residence of the Commandant of the school, and certain of his assistants.

The organization of the class—"promotion," in French—is strictly military, thereby eliminating all class politics. The senior French officer of the class is officially designated "Chef de promotion." He deals with the faculty in all matters which concern the class as a whole. The class is subdivided into groups for work, each group having as its "chef de groupe" its senior French officer, who is the administrator of the group. The groups average ten, or eleven officers, including the foreign officers, who are distributed equally among them. Each group is assigned an individual salle d'étude in which each officer is equipped with a combined desk and map-table.

At the beginning of the first year all officers are given a riding test, following which they are assigned to riding platoons—"reprises d'equitation"—according to proficiency. No one is excused from equitation. Until April 1st all riding instruction is in the riding-hall, at the hour of 7:25 A. M., particularly witching on cold, dark mornings. After April 1st one is required to ride at the same time, but at will, in the beautiful bridle paths of the Bois de Boulogne.

Technical military instruction is accomplished by conferences, *exercices sur la carte*, *travaux en salles*, *travaux a la domicile*, *exercices a l'exterieure*, *voyages d'etudes*, *visites*.

In addition to the above, instruction is offered in almost every written language, except French; and in the care and operation of automobiles. The language courses are voluntary for foreign officers. For the French two languages are required, one of which must be English, or German. The automobile instruction is waived for those who are already proficient in the subject.

To return to the military instruction, conferences are held, except in rare instances, in the morning. The entire promotion attends, in a large amphitheatre. For the first year the military subjects include the tactics and technique of all arms, the supply and auxiliary services, combined tactics, general staff functions and operations, and military history. In addition, a series of conferences is given by distinguished civilians on economics, and international politics. No outside preparation is required for conferences, which are entirely didactic, no questions being asked from either side of the rostrum. The conferences are conducted with great dignity, almost ceremony, are models of painstaking preparation, and leave no doubt of the speaker's mastery of his subject. It is interesting to note that the military history course included a most exact and dispassionate study of the Gettysburg and Wilderness campaigns.

Exercices sur la carte are single-action map maneuvers, conducted by groups, in the group *salle d'etudes*. The preliminary situation, together with the necessary maps, is distributed a few days in advance. Indications are given, at the same time, of the preparatory reading recommended, and of the phases to which will be devoted most of the discussion. It is characteristic of the methods of instruction at the *Ecole de Guerre* that no restriction is placed upon the books, or notes, which may be brought to any work of the school, whatever it may be. The exercises start at 2:00 P. M. The instructor in charge—a member of the section which prepared the problem—calls upon a member of the group to give a rapid outline of the situation. From that moment the action is developed by discussion, after the instructor has made assignments of command or

staff functions to the members of the group. During the course of the exercise the assignments are frequently changed. The instructor conducts the discussion by presenting additional, consecutive situations, by directing it away from unimportant phases of the action, by correcting mistaken statements of fact, and by developing important points which the problem was prepared to emphasize, or which are inspired by the discussion. The written work is limited to the preparation of a part of an order, or of a decision. A selected few of the written products are discussed immediately, after which all are handed back. The work terminates somewhere between 5 to 6:30 P. M. Due in part, I suppose, to the dramatic Gallic temperament, but mainly, I believe, to the remarkable atmosphere of free discussion encouraged, there is evoked an impression of reality, and consequent interest which I have never seen equalled in any of our schools.

The exercises a l'exterieure are conducted exactly as are exercises sur la carte, except that they take place upon the actual terrain. In other words, they are all within the definition of our terrain exercise. The group assembles at an early morning train and proceeds to the selected scene, some twenty to thirty miles out of Paris. From the moment of quitting the train the exercise is carried out on foot. One can usually count on a hike of about six miles, broken, at noon, by lunch in some village inn, with plenty of vin rouge on hand to drive off the morning's chill—for it usually rains! With punctilious courtesy the foreign officers are seated at the long table on either side of the instructors. Wherever two or more French are gathered together there always is conversation; and never dull! One gets back to Paris in time for a late dinner, tired, footsore, usually wet and cold, but always with some new, well-emphasized impression of the influence of terrain upon the possibilities and limitations of fire and movement.

Just as for the exercises sur la carte, and a l'exterieure, the situations and maps for the travaux en salles are handed out in advance. They also are held by groups, in the salles d'etudes, commencing at 2:00 P. M. The travail en salle is the exact counterpart of our map problem, time-limit included, usually three or four hours. At the beginning the details necessary to complete the situation are issued. At the appointed hour the chef de groupe relentlessly collects the papers, finished or not. After about ten days the officer who prepared the problem discusses it, and the general nature of the work of the promotion, at a morning conference. Immediately afterward the papers are returned, bearing the notations of the correcting instructors, which are in the form of personal, marginal

notes. There is a refreshing absence of the mimeographed form with its lettered enumeration of the failures to conform with "the approved solution." There is no approved solution. The instructor sets out from the hypothesis that he has before him a solution. He endeavors to interpret its fundamental idea. It remains then to be determined whether or not the student has developed effectively the idea; and whether or not the idea itself is sound. After a day or two, in which to study his returned work, in the light of the corrections on it, the student is given a rendezvous with the instructor who corrected the paper. At the rendezvous the student is given full opportunity, without limitation on time or freedom of speech, to make clear matters which the instructor may have misconstrued and to defend criticized points which the student considers defensible. At the close of this individual correction, the paper is retained by the instructor to be placed before the Commandant of the school. It is later returned to the student.

The "travaux a domicile" are done at home. There are five of them during the first year, one in each major subject. From a week to ten days is allowed for the work, during which conferences are suppressed or reduced to a minimum. A tremendous amount of detailed work is required, so that the time allowed is all needed, and that with deep inroads into the time usually consecrated to eating and sleeping. The work is corrected as in the case of the travaux en salles.

The system of correction employed at the Ecole de Guerre is worthy of careful consideration, particularly with regard to its moral effect. It would be difficult to present a system better calculated to develop in an officer that confidence in his own judgment, that willingness to translate his decisions into action, which are essential attributes of a commander.

Scattered throughout the year are various visits of instruction to the Artillery School; to the Motor Transport Center at Fontainebleau; to the military hospital of Val de Grace; to the Engineer Center; to the Balloon Center at Versailles; and to the great artillery center at Mailly, birthplace of our own Railroad Artillery Reserve. All of these visits are one-day affairs, except the one to Mailly, which lasts a week. During the latter the firings include all calibers from Stokes mortars to 240-mm. howitzers. It is not within the scope of this article to go further into detail regarding the week than to state that the problems and demonstrations are run off with admirable promptness, are very interesting and instructive, but present nothing new beyond a suggestion of the use of high burst to

contribute to the solution of the always difficult problem of liaison between the artillery and infantry front line battalions.

To digress a bit, Mailly-le-Campe has changed scarcely at all. Horizon bleu filled the doorways of the cantonments that had once sheltered so many coast artillerymen. The motor transport shops have disappeared. The climate is just as devilish as it ever was. To counterbalance that, champagne can still be had at the Cooperative for twelve francs the bottle. In the village no changes, except that the old church has been restored, and the cafes blossom and burgeon as the new bay tree, due in no small part to the friendly interest shown in them by the C. A. C. The large, gray building looms up just as large, gray, and mysterious as ever.

Summer brings the voyage d'études de situations tactiques, to give them their full name. They are conducted in the same manner as the exercises l'exterieure, except that the situations are continuous, progressive, and extend over several days. To this extent they resemble the General Terrain Exercises at Leavenworth. A rendez-vous is given at some village 50 to 60 miles from Paris, where the horses meet the groups. From there on transport is mounted until the return to Paris. The officers are billeted on the inhabitants, so that a minimum of baggage is needed. Although the voyages are classified as cavalry, artillery, et cetera, they are all actually conducted as studies in general tactics, additional emphasis being placed on the application of the arm whose section of the faculty is conducting the voyage. Their importance brings out the professor of that section, together with several of his assistants, and one instructor from each of the other sections. The Commandant follows the voyages very closely, spending most of his summer in the field with the groups. He makes it a point to complete at least one voyage with each group. At the end of each day, after arrival in the village which is to be that night's halt, the officers are assembled at the Mairie for a critique of the day's work, and a preliminary discussion to establish the ground work of the next day's situation. As in the exercises a l'exterieure and sur al carte, officers change function, from day to day. A certain amount of written work is required.

This is no place to discuss the tactical doctrine. First of all, the Ecole de Guerre places a minimum of emphasis on doctrine. If I grasp correctly the purpose which controls the present faculty it is to teach officers to visualize as accurately as may be the conditions which, so far as may be foreseen, will characterize the most dangerous, and most probable war which France may have to fight, and in accordance with those conditions, logically to solve the problems of

that war. What is of importance is the method by which the faculty of the Ecole de Guerre endeavors to accomplish its purpose, for in purpose it does not differ from our own schools. It seems to be generally agreed among military men that war is an art. It seems to me that the methods of the Ecole de Guerre arrive more certainly at a convincing demonstration of that belief. There are lovely reaches in the Seine which have been painted by many artists. Some of the results are filled with inspiration, still more are adequate, and more still present but obscurely, if at all, the intention of the artist. Although all be of the same scene and moment, no two may be judged by exactly the same standard, for each artist saw the same scene in varying measure incompletely, and so, differently, from each of the others. An approved solution is impossible. No art can be standardized. Any real situation, not artificially created to illustrate a rule, is an individual situation. It demands the application of principles for its solution, but it cannot be pigeon-holed. Any solution of the given situation which takes reasonable account of its actualities, and carries through consistently and coherently its basic idea—this is to say, its scheme of maneuver—should be an acceptable solution. After its conception, and reduction to terms, its success, in the actual, depends upon the imponderables of war, of which the greatest is the determination devoted to its execution. That determination is born of the commander's faith in his own judgment.

A school without a purpose has no reason for existence. Granted the purpose, the school does not enter upon the way to success unless the student body shares with the faculty a clear perception of its purpose. That clear perception is made difficult for the individual student in direct proportion to the emphasis placed by the school, by a rigid marking system, upon individual competition for place. The tendency is stimulated in the student to weigh the effect of the expression of opinion upon his own professional preferment, without considering its value to the organization of which the school is only an essential part. In such a situation the importance of sharp differences of opinion, and of errors of judgment, are magnified in the student's mind out of all proportion to their proper relation to his career. His morale suffers a succession of exaggerated depressions and elations, neither of which is good for it. And morale is the greatest product of any school. To quote from Foster: "A clear and persistent conception of a great common purpose is the backbone of morale." One has the definite impression, after a year at the Ecole de Guerre, that that "clear and persistent conception" is definitely harbored by the majority of both faculty

and student-body. Its value to the French army is incalculable, for, to paraphrase Foster, any army will be no better than its schools.

Morale—*esprit de corps*—is far more easily accounted for than developed. A search of the explanation of the *esprit* of the *Ecole de Guerre* leads one directly to the Commandant. From the moment of first taking up his work at the school an officer is made to feel, without the use of any obtrusive methods, that he is under the personal observation of General Dufieux. One is not many days old in the school before, in the dim light of an early November morning, one sees the general ride into the riding hall. Successively, he rides alongside each officer, shooting questions at him in his crisp, precise French. His engaging smile, his interest in one's personal difficulties, his almost uncanny perception of them almost before one has formulated them in one's own mind, set one immediately at one's ease. When the general rides on, one is left with the feeling that the general is an interested friend. Up goes the morale! Nor is this just an opening stunt. The same thing occurs again and again throughout the year, so that the sight of the general on his white horse is looked forward to from day to day. At least twice during the year the general sends for each officer, individually, to talk over with him his progress. One comes away with the feeling that one is an integral part of the school, and not just one more entry to put over the jumps. There is a proposition which the general makes at his first individual contact with the student, and which he repeats to him frequently thereafter: "Since most of our work is accomplished by discussion, don't ever agree with an instructor unless you are really convinced. If time is not available at the exercise, reserve the point. Hunt up the instructor afterward and discuss it with him until you have satisfied yourself." It would be difficult to add anything which could illustrate more clearly the guiding spirit of the *Ecole Supérieure de Guerre*.

Adjustment of Fire at Moving Targets

EDITOR'S NOTE: *The following is a reprint of that part of Gunnery for Heavy Artillery that relates to adjustment of fire at moving targets. Gunnery for Heavy Artillery has been approved for publication by the Adjutant General of the Army and will appear as T. R. 435-280. In view of the fact that its publication probably will not be completed until after the target practice season is well under way, the publication of this section at this time is believed to be appropriate.*

PRELIMINARY REMARKS

THE rules for adjustment of fire at moving targets are the same in principle as the rules for the adjustment of fire at fixed targets and consist, in general, in applying such corrections as will bring the center of impact on the center of the target, the danger space being considered, and keep it there. The determination and application of the corrections necessary to accomplish such an adjustment are quite different from these processes in adjusting fire on fixed targets. The fact that enemy vessels may be within range of the batteries for a short period of time only makes it essential that the particular method or methods of adjustment used be such that the rate of fire of the batteries need not be curtailed on account of the application of the corrections required for adjustment. In the case of moving targets, the position of the set-forward point (the point aimed at) and other conditions are constantly changing. An adjustment which is correct at one range or azimuth may not be even approximately so at widely varying ones. This happens because atmospheric conditions which affect the projectile at a certain range or azimuth do not have the same effect at other ranges and azimuths. Fire control apparatus provides the means for constantly applying corrections due to the changing conditions of atmosphere, wind, range, and azimuth, but these corrections, even when rapidly and accurately applied, can never be exact, and the conditions under which a series of shots are fired, though closely approximated for a short time, are not identical conditions. For these reasons corrections are usually necessary when firing at a moving target if the center of impact is to be kept on or near the center of the target. Observation of fire is, therefore, essential, and corrections as a result of such observation, as well as corrections due to meteorological changes should be applied when necessary. There may be many times when conditions will be such that observation of fire will fail and corrections necessary to keep the center of impact on the

target can not be determined. Reliable observations may be difficult for various reasons; first, there may be a large number of targets in the field, thereby making it difficult to insure that the spotting observers are on the target; second, if several batteries are assigned to the same target, the identification of splashes will be difficult; third, smoke screens may be employed by the enemy, thus obscuring the splash of the projectile if not the entire hull of the vessel. In these cases ballistic corrections only can be applied. It has been found, however, especially for short and medium ranges, that Coast Artillery weapons are sufficiently accurate to prove destructive to hostile vessels when firing on ballistic and other data that may be determined just prior to, or at the beginning of, an engagement.

b. From the foregoing it may be seen that for effective fire at moving targets the requirements are:

- (1) Thorough preparation of fire.
- (2) Careful adjustment of fire at beginning of engagement.
- (3) Constant application of calculated ballistic corrections.
- (4) Continual observation and adjustment of fire in so far as practicable throughout the engagement.

PREPARATION OF FIRE.—Prior to target practice or action, the records of the powder to be used and the records of the guns of the battery should be carefully studied as it is essential, before commencing the action, that every effort be made to determine what may be expected of the guns and ammunition. This information is doubly necessary when firing at fast moving vessels as they will be under fire but a short time and careful adjustment may not be possible. The amount of ammunition available and the time the moving targets are under fire will not permit the determination of accurate ranges and corrections by means of gun fire as may be done when firing with minor calibre guns at fixed targets. All the precautions given in Section VIII, TR 435-220, should be taken to insure that the armament and all fire control and other apparatus are in adjustment and functioning properly, and that work of the personnel is accurate. TR 435-221 gives in detail the apparatus used for fire control purposes and the manner and means of using same. Fire control apparatus affords a quick and accurate means of making ballistic corrections, and corrections from observation of fire.

CLASSIFICATION OF FIRE AT MOVING TARGETS.—Fire at moving targets is classified into the same phases of fire as fire at fixed targets, namely, adjustment fire and fire for effect. While these phases of fire are the same in principle, for both fixed and moving targets, they vary slightly to meet the different conditions due

to firing at the two different kinds of targets. The boundry between adjustment fire and fire for effect is not clearly marked. In view of the short time that may be available, tactical effect is normally to be sought throughout all firing at naval targets, except trial shots at a fixed point. Since an adjustment of the ballistic correction will usually not be final, no opportunity for observation and adjustment of fire must be lost. Generally speaking, the less the time available, the earlier does tactical effect supersede adjustment as the ruling consideration. As in the case of fixed targets, adjustment fire is divided into two distinct phases, trial fire and improvement fire. Trial fire has for its object the placing of the target within the zone of dispersion, or in other words, the placing of the center of impact so that the total zone of dispersion will include the target. By means of trial fire, range or elevation corrections are determined which are applied in improvement fire. Improvement fire at moving targets is carried out as soon as practicable after the completion of trial fire. The object of improvement fire is to determine corrections which, when applied to the determined ranges or elevations, will result in placing the center of impact on the target in which case approximately the same number of overs and shorts should follow. Except in case of deliberate fire at long range targets it is conducted without loss of time and with all available guns of the battery. The data for improvement fire are found by applying the corrections, determined as a result of trial fire, to the ranges or elevations which would otherwise be used. Fire for effect, as its name implies, has for its object the accomplishment of the tactical mission of the battery; normally this is obtained by securing hits on the hostile vessel, thereby disabling or destroying it. It may follow improvement fire without interruption, in which case reports of deviations of the last shot or two of the improvement phase may not be considered in the first corrections to be applied in the fire for effect phase. This will be especially desirable in case of firing at short or medium ranges when the time element is very important and hits may reasonably be expected during improvement firing. In the fire for effect phase the center of impact should be kept at or near the center of the target, and approximately the same number of overs and shorts should result. As conditions are changing rapidly observation of fire should, wherever practicable, be continuous. The impact board as described in TR 435-221 is a convenient device for determining the proper corrections based on reported deviations. The battery commander who is maintaining a continuous fire upon a moving target must be prepared at all times to renew the application of the principles of fire adjustment and to exercise sound judg-

ment as to what portion of the previous fire executed by his battery should be taken into consideration in such application. It is largely upon the exercise of such judgment that the effectiveness of Coast Artillery fire depends.

METHODS OF ADJUSTMENT—MOVING TARGETS.—a. While the underlying principles of fire adjustment are simple, their effective application may be difficult when the target is moving rapidly as will be the general case with naval vessels. This is a matter, therefore, which may frequently call for the exercise of trained judgment rather than arbitrary rule of thumb. Nevertheless certain well recognized methods should be thoroughly understood and every battery commander should be trained in their use, until he recognizes fully their values and will not lightly abandon them in practice or action.

b. A clear understanding of the trajectory and the methods of adjustment of fire used when conducting fire at fixed targets will be of assistance in determining the proper methods of adjustment to use when firing at moving targets. The same methods, namely, the trial shot method, the successive approximations method, the salvo center of impact method, and the bracketing method will apply, in general, in both cases, but variations in these methods, and desirable combinations of the methods, should be clearly understood. An excellent adaptation of these methods is illustrated in TR 435-221, paragraph 41, as applied on the Impact Board.

TRIAL SHOT METHOD—MOVING TARGETS.—a. Trial fire.—*Trial fire* consists in firing a group of 3 or 4 shots with the same data at a fixed point in the water to determine corrections to apply in carrying out the improvement phase of the firing. Conditions may arise when it will be necessary to fire the trial shots before the target has been designated, but data from them are more valuable if they are fired just before the improvement phase is to begin. The point chosen for the trial point should be as close to the expected target position as possible, and the shots should be fired as rapidly as is consistent with accuracy. The correction should be determined quickly and incorporated into the data so that fire can be immediately opened upon the target. When practicable, the regular plotting section should track the moving target during trial fire and the spotting section should determine the deviations of the trial shots. This method is desirable for the reason that as soon as the correction is determined, corrected data may be obtained with the least possible delay. There may be conditions when trial fire will be conducted by firing directly at the moving target or hostile vessel, and

the corrections to be applied for improvement fire determined by taking an average of the deviations of the shots from the points aimed at. When so conducted the shots of the trial fire phase are called ranging shots. This method of conducting the trial fire phase is justified only when it is important that firing at the hostile vessel commence at once and when there have been recent firings and conditions generally are so well known as to make it probable that a hit may be secured during this phase of the firing, and further, when the battery conducting the firing is so well trained that accurate data can be obtained during the firing.

b. Improvement fire.—Improvement fire is carried out immediately after trial fire by firing normally a series of not less than four shots, applying corrections determined as a result of trial fire to the data determined for each shot of the improvement phase. No other corrections, as a result of observation of fire, are applied to the shots during the firing of the series. The deviation of the center of impact of this series of shots from the center of the target, or preferably from the points aimed at, is determined and a correction therefor is applied during the fire for effect phase until such time as observation of fire during that phase warrants other corrections. Where the conditions are such as to make the time element of great importance, and to warrant the belief that hits may be secured, there should be no cessation of the improvement fire prior to commencing fire for effect even though one or two shots of the improvement phase can not be considered, on account of lack of time, in computing the corrections for beginning fire for effect.

c. Fire for effect.—Fire for effect follows adjustment fire. The corrections determined as a result of improvement fire are applied to the data determined for each shot or salvo of fire for effect phase until observation of fire indicates that the center of impact is not on or near the target. Thereafter, corrections determined as a result of observation of fire should be made. In general, these corrections should be based on observation of at least four shots. If the measured deviations of the shots are obtained, then the corrections should be based upon the measured deviations and should be of a magnitude sufficient to bring the center of impact on or near the center of the target, but if only the “sense” of the shots is known, or if “shorts” only are observed, corrections in terms of the probable error should be applied with a view to equalizing overs and shorts as called for in the bracketing method.

*d. Advantages and disadvantages of the trial shot method.—**(1) Advantages.—*

Trial shots are fired under conditions favorable to measuring the point of impact of each shot with reference to a fixed point. As a result of these measurements, corrections resulting therefrom are made upon reliable data.

Trial shots may be fired prior to the beginning of an engagement and little, if any, time need be lost in adjustment of fire at the commencement of the engagement.

If, at the beginning of an engagement, the fall of the shots can not be observed the firing may be continued with a considerable degree of accuracy on data determined as a result of the firing of the trial shots.

(2) Disadvantages.—

It may be difficult, under some circumstances, to determine the intentions of the enemy and, as a result, firing of the trial shots may not be followed by an engagement, thereby resulting in a waste of ammunition. Further, by following the normal procedure in this method there is no opportunity to secure hits during the trial fire phase of the firing. It may be, too, that the firing of trial shots would disclose the position of the battery to the enemy prior to the actual commencement of an engagement.

The following example illustrates the Trial Shot Method:

TRIAL SHOT METHOD.

Battery of 12-inch Seacoast Mortars.

Terrestrial Spotting.

Corrected range of trial shot point 12020 yds.—Probable Error 60 yds.

Salvo	Deviation				Correction	Remarks
	No. 1	No. 2	No. 3	No. 4		
1	+160					Trial fire is fired from a single mortar. Deviation of C.I. is +130. Correction for Improvement Fire is -130.
2	+240					
3	- 40					
4	+150				-130	
5	- 60	- 10	+ 40	- 30	+ 20	Deviation of C.I. is -20. Correction for Fire for Effect is +20.

SUCCESSIVE APPROXIMATIONS METHOD—METHOD TARGETS.—

*a. Trial fire.—*In the execution of this method the rule is to fire the first shot at the target on data determined from the firing tables and other available sources, ballistic corrections having been made. The deviation of the impact of the first shot, or the center of impact of the first salvo is measured and the pointing of the second shot or

second salvo is corrected by the full deviation thus obtained. The pointing of the third shot or salvo is corrected by one half of the deviation of the second shot or center of impact of the second salvo. Similarly, the pointing of the fourth shot or salvo is corrected by one third the deviation of the third shot, or the center of impact of the third salvo. If the first shot falls at considerable distance from the target, thus making it difficult to measure the deviation accurately, the adjustment will properly begin with the second shot, a correction for the estimated deviation of the first shot having been applied; the pointing of the third shot would be corrected by the full deviation of the second shot, the pointing of the fourth shot would be corrected by one half the deviation of the third shot, and so on. The trial fire phase will, in general, be regarded as completed when not less than four shots have been fired and the correction called for by the last shot is less than one probable error. If an adjustment has not been secured after four, or at most five, shots have been fired, a new series of shots should be begun applying the rules as in the first instance.

b. Improvement fire and fire for effect.—Improvement fire is taken up and is carried on in a manner similar to that described under the trial shot method; similarly for fire for effect.

The following example illustrates the Successive Approximations Method:

SUCCESSIVE APPROXIMATIONS METHOD.

Battery of 14-inch Disappearing Guns.

Terrestrial Spotting.

Corrected range to target at beginning of adjustment 15080 yds.—Probable Error 80 yds.

Salvo	Deviation		Correction	Remarks.
	No. 1	No. 2		
1	+300		-300	Full correction.
2	+180		- 90	Correct for one half deviation.
3	-100		+ 30	Correct for one third deviation.
4	- 70		+ 20	Correction for one fourth deviation is less than 1 Probable Error; Trial Fire is concluded.
5	- 20	+ 30	- 30	Fire four shots in improvement fire. Make full correction for deviation of C.I. and commence Fire for Effect.
6	+ 40	+ 70		

c. Advantages and disadvantages of the successive approximations method.—

(1) *Advantages.*—

This method may result in hits being secured on the target during trial fire. The position of the battery is not disclosed until the commencement of fire at the enemy. Again, it will assure the commencement of the improvement phase of the firing immediately after the completion of the trial fire phase. It is an appropriate method for long range deliberate firing with one or two guns.

(2) *Disadvantages.*—

The fall of each shot must be observed and corrections based on the fall of previous shots applied to each succeeding shot during trial fire. It is essential that there be sufficient time to permit of deliberate firing. It is necessary that observation continue unobstructed during trial fire and that the determination of the corrections to be applied be particularly accurate. Further, other batteries may be firing at the same target making it difficult to identify shots. These requirements make it essential that the organization so firing be very well trained.

SALVO CENTER OF IMPACT METHOD — MOVING TARGETS.—

a. The rule for this method is to apply, after each salvo, a correction equal in value to the deviation of the center of impact of the salvo. Firing by battery salvo is continued, corrections being applied as stated, until substantially the same number of overs and shorts is obtained. There is no distinction between trial fire and improvement fire in this method. Fire for effect is conducted immediately after the completion of improvement fire, but there need be no delay to permit corrections to be applied as is done in the case of trial fire. However, if observation of fire shows that the center of impact is not on or near the center of the target, corrections should be applied to bring the center of impact back to the center of the target. The magnitude of the correction will be determined by a consideration of the deviations of the center of impact of the latest shots, not less than 4 in number being considered. If the sense of the shots only is known the corrections should be applied as in the bracketing method. The last shots fired always give the best information. It will be a case for exercise of judgment by the officer conducting the firing.

b. Advantages and disadvantages of the salvo center of impact method.—

(1) *Advantages.*—

This is a rapid method of adjustment and for that reason responds quickly to atmospheric changes. The number of shots fired

assures a high degree of probability of securing hits and may permit spotting, especially by airplanes, to be carried out even at extreme ranges.

(2) *Disadvantages.*—

There may be considerable waste of ammunition at the beginning of an engagement and until the corrections to bring the center of impact on or near the target are determined. This disadvantage may be overcome by determining corrections to be applied to the first salvo in accordance with trial fire as prescribed for the trial shot or successive approximations method, using but one or two guns.

The following example illustrates the Salvo Center of Impact Method.

SALVO CENTER OF IMPACT METHOD.

Battery of 155-mm. G. P. F. Guns.

Aerial Spotting.

Corrected Range to target at beginning of adjustment 10060 yds.—Probable Error 80 yds.

Salvo	Deviation.				Correction	Remarks.
	No. 1	No. 2	No. 3	No. 4		
1	+300	+200	+250	+350	-280	Mean deviation of the salvo is +280.
2	+100	- 50	+ 50	+100	- 50	Mean deviation of the salvo is +50.
3	0	- 50	0	+100		Same number of overs and shorts. Open fire for effect.

BRACKETING METHOD—MOVING TARGETS.—*a.* This method is used when the “sense” and not the amount of the deviation can be determined. This is generally the case with rapid fire guns.

b. Trial fire.—Trial fire may be executed by a single piece or by battery salvo. Normally a battery salvo would be fired at moving targets. The original elevation or range is carefully calculated. The sense of each salvo or shot is reported, and shots not seen are considered as overs. Corrections of one fork are made after each salvo until two corrections are obtained differing by one fork, one of which gives overs and the other shorts. The mean of the two corrections is applied to determined ranges and gives the corrected ranges for improvement fire. In case of a hit or a bracketing salvo, the correction giving the hit or bracketing salvo is the proper correction for improvement fire.

c. Improvement fire.—This is executed by firing a series of 4, 6, or 8 shots as rapidly as is consistent with accurate laying, and unless approximately one-half of the shots are observed short, a correction is made as in the bracketing method at fixed targets; that is the difference between the overs and shorts divided by twice the number of shots times one fork is applied as a correction.

d. Fire for effect.—Range corrections as a result of improvement fire will be applied to the ranges determined during the fire for effect phase until such time as the observation of fire indicates that the center of impact of the shots is not near the center of the target, or, in other words, an equality of overs and shorts is not being obtained. In that case corrections will be determined from observation of fire during the fire for effect phase and applied in a manner similar to that prescribed for improvement fire, or if it is difficult to determine the relative number of overs and shorts, the officer conducting the practice will exercise his judgment and make corrections that will bring the center of impact on or near the center of the target.

The following example illustrates the Bracketing Method:

BRACKETING METHOD.
Battery of 155-mm. G. P. F. Guns.
Terrestrial Spotting.

Corrected range to target at beginning of adjustment 9080 yds.—Prob. error 80 yds. Fork 320 yds.

Salvo	Deviation.				Correction	Remarks.
	No. 1	No. 2	No. 3	No. 4		
1	S	S	S	S	+320	Up 1 fork.
2	O	O	O	O	-160	Order 8 rounds for Improvement Fire.
3	O	S	S	S		Number of overs and shorts is equal; commence Fire for Effect.
4	O	S	O	O		

e. Advantages and disadvantages of the bracketing method.—

(1) *Advantages.*—

Even with little equipment for observing and spotting, this method of adjustment may be used for minor caliber batteries where ammunition is plentiful and gun fire can be used, in part at least, to determine the ranges of the target. With major caliber batteries, if it is not possible to determine measured deviations but only the "senses" of the shots, effective fire may be maintained on the target by following the bracketing method. No spotting equipment other than an observing instrument is required for spotting for minor caliber batteries.

(2) *Disadvantages.*—

Time may be lost and considerable ammunition may be expended in locating the target even with minor caliber batteries and at comparatively short ranges. This may in part be overcome by firing trial shots, as in the case of the trial shot method, using the range finder equipment for spotting. It is essential to execute trial fire in this manner, especially if the target is a fast moving vessel such as a destroyer.

DEFLECTION ADJUSTMENT.—*a.* The foregoing paragraphs describe the various methods of adjustment in range. Deflection adjustment is made on the lateral deviations obtained as a result of observation, and those corrections are applied simultaneously with the corrections for adjustment in range. The correction for the first shot of a series may be applied on the deflection board. A change in deflection will be necessary every few shots when the target changes direction or is changing its range rapidly.

b. At short and mid range firing with guns, deflection corrections from observation of fire may be determined as follows:

(1) By each gun pointer independently as follows:

The piece is traversed so that the vertical wire of the sight is kept on the exact point aimed at, and at the instant the projectile strikes, the traversing is stopped and the cross wire moved by means of the deflection screw to the splash; this may be difficult. As an alternative, gun pointers should be instructed to move the cross wire in the direction of the splash the estimated amount of the error. The gun pointer applies the necessary correction.

(2) By a member of the B. C. detail who is furnished with an instrument for determining lateral deviation of the splash of each shot from the target. The correction determined as a result of these observations will, in general, be applied on the deflection board.

c. In long range gun firing, and with mortars, where deflection deviations may be relatively large, deflection adjustment is carried on simultaneously with range adjustment by any of the methods described for range adjustment modified to suit the particular case.

d. In making corrections, consideration should be given to the fact that the lateral dispersion, especially for guns firing at short and medium ranges, is very small, and it will usually be practicable to correct for the error in lateral deviation by applying but one or two corrections. If the lateral deviation is large the error in all probability is a personnel error and the proper correction should be determined by seeking out the error rather than applying full corrections for same.

The following example illustrates adjustment in range and deflection:

TRIAL SHOT METHOD.
Battery of 12-inch Seacoast Mortars.
Terrestrial Spotting.

Corrected range of trial shot point 12020 yds.—Range probable error 60 yds.
Defl. probable error 12 yds.

Salvo	Range Deviation				Deflection Deviation				Correction		Remarks
	No. 1	No. 2	No. 3	No. 4	No. 1	No. 2	No. 3	No. 4	Range	Defl.	
1	+160				R.40°						Trial fire is fired from a single mortar
2	+240				R.50°						
3	- 40				R.55°						
4	+150				R.35°				-130	L.45°	
5	- 60	- 10	+ 40	- 30	L.10°	R.05°	R.10°	R.10°	+20	L. .05°	Open fire for effect.

COMMON MISTAKES

Lacking constancy of purpose.

Worrying about things that cannot be helped.

Failing to live within your income.

Believing that individual advancement is made by crushing others.

Insisting that a thing is impossible because we cannot do it.

Attempting to compel others to believe and live as we do.

Forgetting that if you never earn more than you get you will never get more than you earn.

Believing that you can get more out of life than you put into it.

Neglecting development and refinement of the mind by not acquiring the habit of good reading.

Not knowing that 6 per cent beats all games of chance in the long run.

Refusing to set aside trivial preferences in order that more important things may be accomplished.

Not realizing that the best way to get even is to forget it.

Watching the dime and losing the dollar.

Believing that wealth is the measure of happiness.—*U. S. Army Almanac.*

EDITORIAL

A SEPARATE AIR SERVICE

CONGRESS adjourned March 4 without having received the report of the special committee of the House appointed to consider the merits of the Curry Bill, a bill to create a separate department of aeronautics, the committee having asked for and received permission to delay the report until the next Congress meets. In particular, the promoters of the bill would have Congress enact a law that would create a new executive department to be known as the Department of Air, which would be charged with the procurement and maintenance of all necessary aircraft, and would perform all aeronautical duties heretofore assigned to the War, Navy, Post Office and Treasury Departments. It would be responsible for the aerial defense of the country.

The measure is advocated by a majority of the commissioned personnel of the Army Air Service, by a considerable number of those assigned to Naval aviation, by former members of the Air Service, by aircraft manufacturers, and by enthusiasts who believe the next war will be largely fought and decided in the air. Some powerful newspapers seem to favor the measure. It is not favored by the Secretary of War, the Secretary of Navy, the General Staff of the Army and the vast majority of the officers of the Army and Navy. They are not in favor of a unification of the military and naval air forces operating under a separate agency.

Those favorable to the bill contend that there is but little difference in air operations carried on over land and over water, and that consequently both military and naval fliers can be trained at the same fields; that at present the two air services compete against each other for the procurement of personnel and materiel; that the commercial life and military activity of this country can be paralyzed by an attack from the air; that there is no practical defense either on land or water against air attack, except by planes; that the present system is both wasteful and inefficient; and that a united air service would be best for the National Defense of the country.

Those in favor of a continuation of the present system are of the opinion that in the present state of development of aircraft, there is no conceivable reason to believe that this country can be attacked seriously from the air; that the relative importance of the air power of a country is tremendously influenced by its geographical location; that as far as can now be foreseen, wars of the future will be decided just as wars of the past, by armies on the land and fleets on the water; that the air services are components of these just as are artillery and destroyers and are just as essential to success in battle; that officers commanding air units operating with the Army and Navy must be thoroughly conversant with the manipulation of these two branches; that a separate air force would be a needless and extravagant waste of government funds; and that combined army and air operations or navy and air operations, due to lack of unity of command, would have little chance of success. Those in favor of a continuation of the present system assert there is no justification for a separate Air Service, and that its organization would be a most serious blow to the military policy of this country.

In advancing their arguments to prove that the only real defense against aircraft attack is by planes, some witnesses were inclined to belittle or almost entirely ignore the efficacy of antiaircraft gun and antiaircraft machine gun fire against planes. The Coast Artillery Corps, together with the Ordnance Department, is responsible for the development of antiaircraft materiel and alone is responsible for the training of its personnel. Moreover, because warships are the presumptive targets of its harbor defense weapons it followed closely those bombing operations carried on against the *Ostfriesland* and *Frankfurt* in 1921 and against the *New Jersey* and *Virginia* in 1923, and reported upon them in these pages. The COAST ARTILLERY JOURNAL ventures the assertion that had the ships that were bombed been armed with the newly developed .50-caliber antiaircraft machine gun and with the latest type of antiaircraft 3-inch gun, and manned by well trained crews, vastly different methods of attack would have had to be used, otherwise the attacking planes would almost surely have been shot down and the warships, although anchored, would have escaped serious damage.

The principal question to be decided by the Committee is whether the military and naval forces of this country should each continue to have an air arm as a component of its organization, officered and manned by personnel of the Army and Navy respectively; or whether a separate department of aeronautics should be created and air units attached to the Army and Navy as needed.

The report, rendered by a committee that will have been deliberate and thorough in its investigation, should have great influence on any future action of Congress dealing with the Air Service and National Defense.

RESULTS OF 1924 TARGET PRACTICES

It is a recognized fact that those who progress farthest and fastest profit by the experiences of others. The reports of target practices conducted during 1924 have been received and studied in the Office of the Chief of Coast Artillery. As a result of this study letters have been sent to each of the District Commanders commenting upon the practices in his district. In the Professional Notes department of this issue of the JOURNAL are published extracts from these letters, a study of which it is believed will be of material assistance to battery and higher commanders in conducting better practices during 1925.

Lest someone might think after reading these extracts that the practices as a whole were not as good as should be expected, it is well to remember that they are from comments on firings at all batteries whether manned by Regulars, Reserve Officers, or members of the R. O. T. C. or C. M. T. C.; that many of the practices were conducted at the battery's secondary and not primary assignment; that in many Coast Defenses it was necessary to conduct practices in the late spring or early summer in order to be able to devote the summer months to the training National Guard and Reserve units; and that in many batteries there was an appalling lack of personnel. Verily, a Battery Commander has a man's size job. Too great credit cannot be accorded those who carry out successful practices.

THE 1924 ESSAY COMPETITION

The Committee of Award for the JOURNAL'S 1924 Essay Competition, consisting of Colonel Marcellus G. Spinks, C. A. C., Colonel Frank K. Fergusson, C. A. C., and Colonel Robert S. Abernethy, C. A. C., has reached a decision resulting in the following awards:

First Prize. One Hundred and Twenty-five Dollars

To Major H. R. Oldfield, C. A. C., Washington, D. C., for an essay entitled "Organization of Ground Means of Antiaircraft Defense in the Combat Zone."

Second Prize. Seventy-five Dollars

To Major R. B. Colton, C. A. C., Fort Mills, P. I., for an essay entitled "Coast Artillery Shooting."

Honorable Mention

To Major R. B. Colton, C. A. C., for an essay entitled "Fire Adjustment Errors."

The First Prize Essay appears in this issue of the JOURNAL.

The JOURNAL and its readers owe their sincere thanks to the Committee of Award for the thoughtful effort which was involved in the consideration of the essays submitted and the attainment of a decision.

The custom of the JOURNAL to hold a Prize Essay Competition annually will be continued for the year 1925. The conditions for the Competition will be published in the June issue of the JOURNAL.

FOREIGN MILITARY NOTES

With its present issue, the JOURNAL inaugurates a new department entitled "Foreign Military Notes," the information contained therein being secured from the Military Intelligence Division of the General Staff. This department will be continued monthly in future. It is believed that a knowledge of foreign armies and their armament is essential to all officers and that this important and interesting subject has not received the attention of our service which is its due.

PAST AND FUTURE

[REPRINTED FROM *Liberty*]

Most of us have a tendency when we think of human affairs to divide human history into two parts, one before we were born and one after. This is especially an unconscious assumption of youth, but it is found not infrequently in the thought of mature and even distinguished men.

For example, Mr. H. G. Wells discloses it in his remarkable survey of human life, *The Outline of History*. He begins his work with a description of the making of the earth. He tells of the coming of the first forms of organic life and follows through the ages the struggle of beasts and of men for existence, their conflict with blind nature and its vast forces, and with one another. He shows us what is known of the world before recorded history. He shows us in brief the beginnings of primitive human life and of primitive society in the family and the tribe. He shows us the beginnings of what we call civilization and the birth and course of nations.

It is a tremendous story and it is a story of perpetual conflict, the story of the struggle to survive, to seize what is desired whether it is the savage's capture of a wife, the nomad's sweep into richer

pastures and luxurious cities, the great empire's conquest of colonies and continents. In all is the law of struggle, of competition, of conquest. In all is the law of birth, growth, and death, whether of suns or plants, of individuals or of nations. They are created, they develop, they decay, and pass away.

Mr. Wells does not flinch from this lesson as he tells us the story of the past, but when he begins to project his thought into the future, and to outline for us the society of tomorrow, he takes leave of the lessons of the past and offers us a picture of a world which has escaped the laws of survival by struggle, a human society without competition, without conquest, without the forces which build for self and which disintegrate existing things. He offers us in short a stable world and promises us progress without the mainspring of conflict which he has shown us in his previous vivid pages at work from the earliest appearance of organic life.

This is very much as if a young muskrat coming out of its burrow on the banks of the Mississippi should look upon that mighty current and discover that it is muddy, destructive, moving aimlessly beyond its ken, and, viewing that vast force, should declare it must be changed to meet his thought of what it ought to be, clear, still, controlled to the ends approved by muskrat intelligence.

A current illustration of this fallacy is to be found in the layman's estimate of the importance of the aeroplane or of the submarine or of poison gas in future wars. Each enthusiast asserts that all previous military instruments are obsolete. Aeroplanes will wipe out armies and navies and cities or whole nations by dropping explosives or devastating gases upon them. Submarine enthusiasts declare the surface ship is of the past. Gas, it is foretold by others, will do destruction on a scale surpassing all former modes. In other words, those harboring the "after this it will be different" delusion do not believe there will ever be another war, because war will be too ruinous.

This is not true. As a fact, no weapon has ever been invented which killed so large a percentage of those opposed to it as the Roman's short sword. The institutions of war, like those of peace, are a gradual evolution through infinite trial and failure, one apparently novel thing rising to meet and offset another. Means and methods are modified, added to, improved, relinquished, but to those who look deeper beneath the changing surface of events, the main stream of human progress is seen to move with slow and gradual majesty, and the saying of the preacher, "There is nothing new under the sun," has a deeper truth than all the sensational predictions of sudden transformation in the affairs of men.

PROFESSIONAL NOTES

Does the Coast Artillery Need a Battle Commander?

By MAJOR W. K. WILSON, C. A. C.

EDITOR'S NOTE: *It is probable that some officers will not agree in its entirety with the subject matter of this study. Their views will be welcomed by the JOURNAL.*

It is believed that in the development of the coast artillery fire control, two principles have been firmly established. The first principle is, that one artillery commander, and only one, should control the sea fight in any water area not too large for one man to exercise control. The second principle is, that one artillery commander, and only one, should control all searchlights used to search for or to illuminate war targets in any water area not too large for one man to exercise control. The application of the first principle does not mean that the artillery commander who is exercising control is prohibited from giving to any of his subordinate commanders, control within any specified area, control for firing on any specified targets, control within any specified time, or control within unlimited time, but it does mean the artillery commander must have the power to withdraw the control from his subordinates at any time he considers it desirable. Furthermore, the application of the second principle does not mean that the artillery commander exercising control is prohibited from turning over to one of his subordinate commanders, a searchlight for any particular purpose, but it does mean that he has power to change such assignment at will.

It is not believed necessary to discuss at length the soundness of these two fundamental principles. To have artillery firing into any one area controlled by several independent commanders, would cause great confusion, and to have searchlights operated independently over any water area would seriously impair the efficiency of searchlight illumination.

The term, "Battle Command" was first introduced into the Coast Artillery in the Drill Regulations for Coast Artillery, 1909. In those regulations, the following definitions appear: "A battle command consists of all fire and mine commands which may be controlled advantageously by one man in the defense of a harbor," and "battle area."—"The area covered by the armament of a battle command."

Under the 1909 Regulations, the battle commander controlled the sea fight, and the water area over which he exercised his control was made as large as could be controlled by one man. Practically all of the coast artillery fire control installations are laid out so as to enable one commander to control from one station all fixed artillery firing over the water area visible from the commander's station. In the approved fire control diagrams today, these control stations in each locality are called the "C" stations. They correspond exactly with the battle command stations under the 1909 Regulations.

The Drill Regulations for Coast Artillery, 1914, eliminated the term "Battle Commander" and substituted the term "Fort Commander." In those regulations, a fort command is defined as follows: "A fort command consists of all means of seaward and landward defense, including both personnel and materiel located at any coast artillery fort." Battle area—as applied to a coast defense or a fort

command, "the area covered by the armament of the coast defense or the fort command, respectively." In the 1914 Regulations, the following paragraph appears: "When two or more fort commands cover the same water area, the seaward defense for that water area will be controlled by the senior fort commander of those fort commands which cover that area."

It will be noted that, under the 1914 Drill Regulations, the term "Battle Area" has different meanings according to whether applied to a fort or to a coast defense command, and the battle area applied to a fort command is included in the battle area applied to a coast defense command.

The principal objection to the organization described in the 1914 Drill Regulations was the confusion caused by the term "Fort Command." Practically all of our coast defense commands consist of several coast artillery forts. These forts are so closely related, that the armament from several forts fires over the same water area. In many cases, the base lines are laid out with stations on two different forts, but, as noted in paragraph 4 above, the installations have been laid out so that the control can be exercised from a "C" station. Furthermore, the word "fort" has been used for a great many years to signify a permanent military post, and under the organization prescribed, it is difficult to define clearly the authority of the various fort commanders. In fact, in the minds of all officers other than Coast Artillery officers, the terms "Fort Commander" and "Post Commander" are synonymous and, even in the minds of Coast Artillery officers, there is no clear distinction between a post commander and a fort commander.

When the 1914 Drill Regulations were written, such a possibility as a battery firing into more than one battle area (as defined in paragraph 3 above) was not considered. However, at the present time, we find long range fixed batteries constructed or being constructed which can fire into two or more battle areas. The question naturally arises as to who is to control the fire of these batteries into the various battle areas concerned.

When the Drill Regulations for 1914 were written, heavy mobile artillery designed to fire against ships had not been developed and the possibility of a coast artillery battery moving its position so as to fire into two battle areas (as defined in paragraph 3 above) was not considered. Today, we have both railway and tractor artillery which can be moved from place to place and the question naturally arises as to who is to control the fire of such artillery into the various battle areas.

The principal mission of the Coast Artillery is to destroy enemy ships. These ships may approach any portion of our shore line. From a strategical standpoint it has been assumed that enemy ships are more likely to approach certain portions of our shore lines than others. Based upon this assumption, our fixed defenses have been located so as to cover what are believed to be the more important approaches to our shore line. The development of railway and tractor artillery has not changed our mission, but it has very greatly increased the possibilities of performing our mission not for selected points only, but for the entire coast line.

Under Training Regulations 435-295, issued in 1924, a fort command is defined as "a fortified area within a coast defense command. It is both a tactical and administrative command." From that definition, it might appear that the fort command was intended to include armament at several forts, but in the same training regulations, paragraph 2 specifies that "a fort command consists of all means of seaward, landward, and antiaircraft defense, including both personnel, and materiel located at any coast artillery fort, except personnel and materiel not assigned to the fort command." Taking these two definitions together, it is seen that a coast artillery post is still a fort command, and that the question of control has not yet been clearly established.

It is believed that the water area adjacent to the entire coast line to be defended should be divided into battle areas. Each battle area should be made as large as can be controlled advantageously from one control station. The

areas should be called "Battle Areas," and the officer exercising control should be called the "Battle Commander." The installations, whether permanent or temporary, should be such that the battle commander can control from his station all coast artillery firing at ships within his battle area and all searchlights used for searching for or illuminating ships within the battle area.

The battle commander should be charged with the sea-fight only and should not be hampered by any responsibility for the land defense. The control of the sea fight in any battle area cannot be exercised properly by a coast defense commander or any other commander from some headquarters charged with many other duties in addition to the sea fight. The battle commander's control would normally be exercised through fire commanders, but under certain conditions an individual battery might be controlled directly by the battle commander through the battery commander.

The coast defense commander is virtually an area commander who commands all coast artillery troops stationed within his area. He should be charged with the assignment of artillery and searchlights to battle commands and should be authorized to change such assignments whenever necessary. He should also be charged with the responsibility for removing artillery from control of the battle commanders when necessary to use such artillery against land targets. Naturally, he would not take any artillery away from one of his battle commanders, unless convinced that the situation demanded it. The coast defense commander should exercise general control of the sea fight through his battle commanders who exercise direct control. He should exercise general control of the artillery land fight through his regimental or battalion commanders depending upon the regimental organization within his command. The coast defense commander could occupy a battle station and assume direct control of the battle command whenever he desired. In such case, the coast defense commander would become the battle commander temporarily.

From the discussion above, it is believed desirable to eliminate the "Fort Commander" from the tactical chain of command and substitute the "Battle Commander" instead. The chain of command as recommended would then be (1) Battery Commander, (2) Fire Commander or Battalion Commander (3) Battle Commander, (4) Coast Defense Commander, (5) Coast Artillery District Commander. If it is desired to retain the term "Fort Commander" for administrative purposes, it is recommended that the fort commander be defined as the senior coast artillery officer other than the coast defense commander on duty at a coast artillery post.

It will be noted that the Coast Artillery District Commander is placed in the tactical chain of command. This is believed necessary in spite of the fact that the sector and sub-sector commands are contemplated. The sea fight is essentially a coast artillery fight, and should be controlled by the coast artillery commander. Coast artillery district commands which involve control of the sea fight over the entire water area adjacent to long stretches of the coast line could be included in the sector and sub-sector commands, but the Coast Artillery District Commander should be the commander to decide when long range fixed guns located in one coast defense should be assigned temporarily to coast defense commands or battle commands outside their normal assignments.

This is especially true in departments such as the Hawaiian Department, where long range guns can fire into six or more battle areas. Furthermore, the Coast Artillery District Commander should be the commander to decide when railway or tractor artillery firing at water targets in one battle area should be moved so as to fire into other battle areas.

The principal mission of the coast artillery is very important, and to carry out its mission it is essential that the organization for fire-control be so clear-cut as to leave no room for doubt as to which commander is responsible under any situation which may arise. It is believed that the organization for control of fire as recommended herein will eliminate considerable confusion.

Letters and Bulletins from the Chief of Coast Artillery

EDITOR'S NOTE: *The following has been furnished by Office of the Chief of Coast Artillery.*

The following policy has been inaugurated by the Chief of Coast Artillery in order that all officers of the Coast Artillery Corps may be kept informed on matters affecting the status of training of the regular regiments of the Corps.

There will be issued, from time to time, the following letters and bulletins from the Office of the Chief of Coast Artillery:

1. Letters to all Coast Artillery District Commanders sent through military channels in which is given a resume of all target practice reports of firing batteries in the Coast Artillery District concerned for the current training season, based upon studies made in the Office of the Chief of Coast Artillery.

These letters are now being sent out to all District Commanders as fast as target practice reports for the season of 1924 are received, and reviewed in the Office of the Chief of Coast Artillery.

2. A bulletin, showing in tabulated form, certain pertinent data extracted from target practice reports of all firing batteries of the Coast Artillery Corps for the current training season, including average range of practice, hits per gun per minute, methods of adjustment employed and ratings of the practices as to proficiency.

This bulletin for the 1924 training season should be distributed not later than the first of March.

3. A bulletin showing in what training regulations and other texts the contents of C. A. M. No. 1, War Department, 1923, is to be found.

This bulletin will be issued about March 15th.

4. A bulletin giving the several District Commanders proficiency ratings of all batteries of the regular regiments of the Coast Artillery Corps for the current training season under the provisions of paragraph 24, C. A. M. No. 1, War Department, 1923 (proficiency requirements will shortly be issued as Par. 35-d-2, T. R. 435-55).

This bulletin for the 1924 training season will be issued as soon as the necessary information is obtained from the District Commanders.

5. A bulletin, showing in tabulated form, certain pertinent data regarding small arms qualifications for the current training year for all regiments of the Corps.

This bulletin for the 1924 training year will be issued as soon as reports on small arms qualifications have been received from all regiments.

6. A letter to all Coast Artillery District Commanders sent through military channels in which will be given a resume of the results of training inspections of commands in the Coast Artillery District concerned for the current training year, made pursuant to Par. 1, A. R. 265-10 by representatives of the Chief of Coast Artillery.

These letters for the 1924 training year will be sent out shortly after the completion of the present training year, October 30, 1925.

Artillery Ordnance Development

By CAPTAIN AARON BRADSHAW, JR., C. A. C.

12-INCH 20-CALIBER HOWITZER RAILWAY MOUNT.—The Westervelt Board Report calls for a 12-inch 20-caliber howitzer. The 12-inch 20-caliber howitzer railway mount, model 1918, was designed to meet this requirement. The characteristics of this mount are as follows:

Caliber of gun, 12-inch; muzzle velocity, 1950 f.s.; range, 22,000 yards; elevation, 20° to 60°; Traverse, 360°.

This railway mount has been so designed as to permit the howitzer being fired through a horizontal arc of 360°. A very simple type of ground platform is used so that the mount can be put in position in about a half hour's time. Special loading facilities are provided so that a rate of fire of one shot a minute can be maintained using hand appliances.

The 12-inch 20-caliber howitzer railway mount, model 1918, has been tested at the Aberdeen Proving Ground and found to be satisfactory. Some difficulty has been encountered due to the instability of the mount when firing at 20° elevation and 45° traverse with the track. This difficulty can be remedied by increasing the length of the outriggers and increasing the size of the outrigger fleets. When this is done the mount can be considered as satisfactory for the purpose for which it was designed. It is intended to turn this mount over to the Coast Artillery Board for test at an early date.

8-INCH GUN RAILWAY MOUNT PROJECT.—It was found that the 8-inch 50-caliber gun weighed about the same as the 12-inch 20-caliber howitzer, so that these two weapons could be mounted on the same carriage. In designing the 12-inch 20-caliber howitzer railway mount provision was therefore made for mounting an 8-inch gun. An 8-inch 50-caliber gun was designed but none was built, due to lack of funds. In the meantime the Naval Bureau of Ordnance has turned over to the Ordnance Department forty-eight 45-caliber high-power 8-inch guns made surplus as a result of the Disarmament Conference. A cradle has therefore been designed which will permit the 8-inch naval gun to be mounted on the 12-inch 20-caliber howitzer railway mount. The manufacture of one cradle has recently been approved by the Technical Staff and an order will be placed with the Watertown Arsenal at an early date. When completed range firings will be held at the Aberdeen Proving Ground to determine the maximum range and the dispersion of the navy 8-inch gun. It is expected that a maximum range of about 35,000 yards can be obtained. The Chief of Coast Artillery is very much interested in the development of a high-power 8-inch gun at this time, due to the construction by various foreign powers of light cruisers mounting high-power intermediate caliber guns. Unless our fortifications are provided with high-power intermediate caliber guns, it will be necessary to use major caliber high-power guns against these smaller warships.

14-INCH GUN, RAILWAY MOUNT, MODEL 1920.—The 14-inch gun, railway mount, model 1920, was designed to meet the general specifications of the Westervelt Board. Four carriages are under manufacture. Twenty-eight 14-inch guns completed during the World War are on hand available for this project. The first carriage has been tested at the Aberdeen Proving Ground. All firing tests have been completed. A number of mechanical defects were found in the carriage which are being overcome by suitable modifications. It was found by actual trial that the mount could be fired at a rate of one shot per minute, being in this respect equivalent to the latest type of fixed armament. The 14-inch gun, railway mount, model 1920, can be placed on a semi-permanent concrete platform for use against moving naval targets. This platform provides all around fire. A 150-horsepower Sterling engine has been mounted on the front truck directly connected with a 50-kilowatt generator. This power plant furnishes all electrical power for traversing the mount, elevating the gun, raising ammunition from the

ground to the level of the loading platform, compressing air for the operation of the breechblock and for gas ejection, and furnishes current for electric lights required for night firing. This mount can also be fired directly from the railway track with very little preparation. In this case 7° total traverse can be obtained by moving the gun on its carriage. Additional traverse can be obtained by operating the mount on a curved track. The carriage would therefore be satisfactory not only as a seacoast defense weapon, but also for use in the field with an army. The mount was run down from Watertown Arsenal to the Aberdeen Proving Ground on its own wheels and no difficulties were experienced. It is intended to give the mount a still further transportation test by sending it from the Aberdeen Proving Ground to the west coast, where it will probably be put into service.

The 16-inch 25-caliber howitzer designed for seacoast defense can also be mounted on this same railway mount. It was found that the weight of the 16-inch howitzer was so near that of the 14-inch gun as to make it possible to mount the 16-inch howitzer on the same carriage. This has been done. It is only necessary to remove the 14-inch gun and its cradle and substitute the 16-inch howitzer and its cradle.

37-MM. A. A. GUN.—Request has been made to have Aberdeen Proving Ground furnish a 37-mm. 3000 f.s. A. A. gun for test of the ammunition now under development.

EQUILIBRATORS FOR 3-INCH A. A. GUN, MODEL 1923E.—An experimental set of equilibrators for the 3-inch A. A. Gun Mount, Model 1923E, was approved on December 1, for manufacture and test. The special feature of these equilibrators is the adjusting device whereby the nitrogen pressure in pounds per square inch in the cylinders and the effective lever arms thereof may be simultaneously increased or simultaneously diminished, as conditions may require.

CHANGE IN NOMENCLATURE, 3-INCH A. A. GUN.—On December 1st, approval was given for a change in nomenclature of certain units comprising the 3-inch A. A. Gun Materiel, Model 1918, as follows:

"The gun will retain its present designation—3-inch A. A. Gun, Model 1918 (A. A.) and 1918 MI (A. A.); the mount will be known as 3-inch A. A. Gun Mount, Model 1918; the trailer as 3-ton A. A. Gun Trailer, Model 1918."

RAPID FIRE TEST, 155-MM GUN.—Report of test of 155-mm. Gun, Model 1918, to determine the effect of continuous rapid firing on recoil mechanism has been received. The results indicate that the gun may be fired continuously for thirty rounds without necessity of bleeding the replenisher, if it is set at 200 mm. at beginning of shoot. The test is to be extended further to determine what limit should be set. The results at Aberdeen do not agree with results reported from Hawaii.

FIRING LANYARD FOR 16-INCH HOWITZER.—On December 11th a design of an experimental firing lanyard for use on 16-inch Howitzer, Model 1920, was approved for manufacture and test. Test of this device will be made at one of the seacoast emplacements.

MODIFICATION OF A. A. DATA COMPUTER.—A project was approved on December 1st for the modification of one A. A. Data Computer, Model 1917 (R. A. Corrector), with a view to improving upon its adaptability and accuracy for case III firing. The test of the modified computer will be conducted by the Coast Artillery Board, Fort Monroe, Va.

FUSES.—Preliminary studies and test of mechanical time fuses have been very promising and a lot of 1000 of these fuses are to be purchased in the near future. Contingent upon satisfactory ballistic tests of this lot, it is expected that about 40,000 additional fuses will be purchased.

CALIBER .50 RECOMMENDED AS STANDARD A. A. MACHINE GUN.—The caliber .50 Browning machine gun, water-cooled, has been recommended for adoption as the standard antiaircraft machine gun. Further experimental and development work is being conducted with a view of obtaining a tripod which will mount either the caliber .30 water-cooled machine gun or the caliber .50 machine gun. The specifications prepared specify that the tripod shall be more stable than the previous experimental tripod and the gun so mounted as to give better control of the gun by the gunner. The cost of manufacturing the tripod is to be materially reduced without the sacrifice of efficiency of the mount.

CONTRACT FOR CALIBER .50 MACHINE GUNS.—A contract has been placed with the Colt's Patent Fire Arms Manufacturing Company for the manufacture of 298 caliber .50 Browning machine guns and spare parts. These guns are required by the Army and the Navy.

Results of 1924 Target Practice

The following comments on the results of the 1924 target practice have been extracted from letters prepared in the Office of the Chief of Coast Artillery and mailed to the various District Commanders. Reference this, attention is invited to an editorial in this issue of the JOURNAL.

3-INCH GUNS

The two practices were fired at short range, an average of 3100 yards. Adjustments were secured and 20 hits were made on the material target out of 80 shots, at the rate of 2.005 hits per gun per minute for the first practice and 1.56 hits per gun per minute for the second practice.

In this practice excessive deviations developed. The records of the range section were poorly kept and would indicate that numerous and large errors were made. The gun section also made large errors. This practice cannot be rated satisfactory.

The air service observer only reported on two shots due to difficulty in distinguishing the splashes.

The spotting section did not plot the angular deviations from their base-end stations until after the practice—this on account of the rapidity of fire. The ordinary spotting system is not rapid enough to give satisfactory results to a rapid fire battery and "Battery Spotting" should have been arranged for in advance of the practice.

The personnel errors were excessive and no hits were obtained on the hypothetical target.

The air photographs were of little value in that there is no data on them which would indicate the deviations of the shots—many of the photographs did not include the target.

6-INCH GUNS

The two practices held by this battery were very good. Adjustments were obtained in both practices. Nine hits on a hypothetical target at an average range of 6548 yards and at the rate of .89 hits per gun per minute were obtained in the first practice. Ten hits were secured on a hypothetical target at an average range of 6940 yards and at the rate of .82 hits per gun per minute in the second practice.

The practice held by this battery shows a decided lack of training of the personnel.

Good adjustment can rarely be obtained unless the spotting section is so trained that the battery commander gets his information promptly and can rely upon its accuracy.

10-INCH GUNS

An excellent adjustment was obtained in this practice. Five hits were registered on a hypothetical target which was at the rate of .45 hits per gun per minute. This practice shows the results of careful training, frequent analysis of drill, and an adequate amount of subcaliber practice prior to the service practice.

The Ordnance Department had been notified of the disruption of the first shot fired in the practice after leaving the gun. That an excellent adjustment was obtained is evidenced by the fact that two material targets were destroyed and five hits registered on a hypothetical target, which was at the rate of .312 hits per gun per minute.

This practice was unsatisfactory. The powder charges were not properly prepared; reduced charges were used. The proper size powder bags were not at hand. Four shots were lost by the spotting section, probably due to a 1000-yard error made by the prediction board operator. The time was slow. The spotting section did not give satisfactory data.

12-INCH GUNS

The first practice by this battery was unsatisfactory. There was a constant error of the range correction ruler of 360 yards which should have been detected by the range officer. No hits were made; no adjustment was obtained, the time was slow.

An adjustment was secured at an average range of 8400 yards; two hits were registered on a hypothetical target at the rate of .28 hits per gun per minute. The time was medium, and the personnel errors were negligible.

The first practice by this battery, rated as excellent by the Coast Defense Commander, is considered satisfactory. A good adjustment was not obtained, as all shots were short; two hits were registered on a hypothetical target at an average range of 8825 yards and at the rate of .16 hits per gun per minute. The second practice by this battery was very good; five hits were registered on a hypothetical target at an average range of 10,684 yards at the rate of .384 hits per gun per minute. The vertical base spotting compared favorably with the camera reports. The personnel errors were negligible.

The firing was held at an average range of 23,600 yards, the target not being visible from the battery. No adjustment was obtained. An error of 1000 yards was made in receiving the aerial observer's report of the deviation of the first shot. Only one other deviation was received from the observer prior to the fourth shot, so no corrections were made by the battery commander. The spotting board lost all shots. The airplane spotted all shots, but the results were not all received by the battery commander until after the practice. The personnel errors were large, an error of 340 yards being made at the range board.

At the night practice a good adjustment was obtained at an average range of 7061 yards. The personnel errors were small.

No hits were obtained. No impact chart was used as is evident by the mistake of the battery commander in applying his corrections after the seventh shot. The spotting errors were large, and the adjustments obtained were very wide.

The "Angular Travel Method" of position finding was used. In spite of the fact that every shot was short of the target, one hit was registered on the material target.

12-INCH MORTARS

The two practices by this battery were both very good. Firing was held in four zones. Adjustments were obtained and hits were registered on a hypothetical target at the rate of .053 and .027 hits per gun per minute.

There were several small personnel errors in the practices conducted by this battery.

An adjustment was obtained at 12,975 yards. Several large errors were made by the spotting sections. Numerous small errors were made by the range section.

A good adjustment was obtained at 8138 yards. Six hits were registered on a hypothetical target at a rate of .082 hits per gun per minute. Photographic prints were poor.

In the practices by this battery adjustments for range were obtained in both practices, but the deflection deviations were excessive. The spotting section made several large errors. The photographic prints were poor.

One 10-degree error was made in the azimuth setting of one shot in the first practice. Good adjustments were obtained in both practices.

In this practice the work of the spotting section was very good; a good adjustment was obtained at an average range of 13,673 yards, five hits being registered on a hypothetical target at the rate of .083 hits per gun per minute. There was a constant plotting error due apparently to the use of a worn pantograph predictor.

The night practice held by this battery was satisfactory. An error made by the assistant plotter resulted in the loss of one shot. Other personnel errors were not excessive. A good adjustment was secured at an average range of 10,130 yards.

No adjustment was obtained; no hits were made; the spotting was poor; there were many personnel errors; the photographs were worthless; the battery was not well drilled.

In this night practice an adjustment was obtained at 7625 yards. The time of the practice was slow. Several personnel errors were made by the range section. It is noted that the illumination was furnished by the mobile searchlights.

Large errors were made by the spotting sections, and the difficulty of identifying individual shots due to the number of batteries firing rendered adjustment difficult.

14-INCH GUNS

A good adjustment was obtained at an average range of 14,991 yards and hits were registered on a hypothetical target at the rate of .117 hits per gun per minute.

An adjustment was obtained at an average range of 15,994 yards, and hits were registered on a hypothetical target at the rate of .143 hits per gun per minute.

In this practice a large error was made by the time range board operator. Excessive pressure, 38,263 pounds, developed on the second shot, causing it to fall 1200 yards over the target.

The practice held by this battery was not satisfactory. An adjustment was not obtained. The dispersion of shots was very wide. The time was medium. The method of adjustment was not strictly adhered to.

This battery obtained an adjustment at an average range of 19,330 yards which registered one hit on a hypothetical target at the rate of .176 hits per gun per minute, with a minimum of personnel errors, indicating that the battery command personnel was well trained.

155-MM G. P. F. GUNS

In the two practices by this battery adjustments were obtained at average ranges of 11,351 yards and 12,286 yards respectively.

The problem consisted of an adjustment by successive approximation at a stationary target and was suitable to the state of training of the C. M. T. C. candidates. An adjustment was secured.

The firing held by this battalion was not satisfactory, and showed a lack of training of the personnel. In the majority of these firings good adjustments were not obtained, and the time of the practices was slow.

The problems assigned the battalion and batteries were well suited to the armament and clearly indicated the marching ability of the battalion was good, thus insuring satisfactory mobility of the regiment.

The practice conducted by this battery with its secondary armament was not satisfactory. With proper training of the personnel, excellent results should be obtained with this materiel even at maximum ranges. The rating of "unsatisfactory" is concurred in.

The practice was full of errors, and the training of the personnel did not warrant the attempting of adjustment at a moving target.

The report was not submitted promptly, no adjustment was obtained, the time was slow, and the results given by the spotting section were poor.

MINE PRACTICE

This practice was satisfactory, although personnel errors caused a miss of the first mine fired.

The practice held by this battery was very good. Both mines fired registered hits.

The practice held by this battery was satisfactory. Two hits were made and the conduct of the practice was very good.

The time of the practice was good and the target was within the 100 per cent zone for both explosions.

This battery conducted an excellent practice. The records were well prepared and the results obtained were very satisfactory.

In future mine practices, aerial photographs should be taken, and the data obtained utilized in the preparation of target practice reports.

ANTI-AIRCRAFT ARTILLERY

Hits were obtained by this battery at the rate of 1.3 and 2.95 hits per gun per minute respectively.

The practices held by this battery were satisfactory. Hits were obtained at the rate of 7.21 and 2.42 hits per gun per minute for the two practices respectively.

The consolidated report of the practices held by this regiment indicated that good instruction was received by the gun, machine gun and searchlight batteries. No firing was held against a towed aerial target, but good results were obtained in the wind, trial flight, trajectory and adjustment at bursts problems and in fire at free balloons. The searchlight battery coordinated its work with the practices of the gun and machine gun batteries. The machine gun batteries received valuable training firing at free balloons, both day and night. In 1925 the provisions of Antiaircraft Bulletin "Antiaircraft Target Practice" distributed June 10, 1924, should be followed.

The ammunition used by the .30-caliber machine guns was defective, as it was Grade II ammunition; many stoppages occurred due to ruptured cases. The firings were conducted and the reports rendered in compliance with Antiaircraft Bulletin, O. C. C. A., on Antiaircraft Target Practice.

This battery obtained 10 hits on an aerial target in the day practice and five hits in the night practice at the rate of 3.55 and 2.44 hits per gun per minute, respectively, showing that this organization was well trained and capable of handling its secondary armament.

With the short amount of time available for training with the secondary armament, the organization secured hits at the rate of 1.7 and 1.5 hits per gun per minute for the day and night practices, respectively. The rate of fire could undoubtedly be speeded up with sufficient drill.

In the conduct of antiaircraft firing a towed sleeve target should be used whenever a towing plane is available, and firing personnel should be drilled with this end in view.

The work performed by this regiment not only in their own target practice, but in the instruction of the Organized Reserve, National Guard, R. O. T. C. and C. M. T. C. has been very satisfactory. An effort should be made during the coming target practice season to develop the use of sound locating devices, to assist in night firings of the antiaircraft materiel.

RAILWAY ARTILLERY

The firing of railway artillery at a moving water target is of course a primary mission. However, the secondary mission of firing at a land target should not be neglected, and whenever practicable, one land firing should be conducted annually with each type of battery manned.

A strenuous effort should be made by battalion commanders to insure that sufficient subcaliber practices are held by the firing batteries prior to the service practices.

In the night practice of this battery an adjustment was obtained at an average range of 10303 yards. The firing was at the maximum range of illumination of the searchlights. The time was good.

An adjustment was obtained at an average range of 13,750 yards, and three hits were obtained on a hypothetical target. The personnel errors were small. The time of the practice was good. The photographic prints were worthless.

No adjustment was obtained. No hits were registered. No reports were received from the spotting airplane until after the practice. The method of adjustment was not followed exactly. The time was good. The errors of the range section were negligible.

COAST DEFENSES

The spotting reports from the airplane were entirely too slow in reaching the battery commanders and were of little value during the practices. Efforts should be made to modify the system used so that airplane spotting results will reach the batteries in time to be utilized. The reports were in general well prepared. The personnel errors were not excessive.

There were comparatively few personnel errors and the only unsatisfactory practice was due largely to excessive powder pressure causing erratic deviations. The spotting reports from the airplane were too slow in reaching the battery commanders. Reports were in general well prepared.

It is noted that in practically every firing very short ranges were used, which facilitated the solution of the problem. It is suggested that in future firings, longer ranges be used. The reports were well prepared.

A variety of armament was fired by a relatively small personnel. The instruction leading up to service practice by Reserve Officers, R. O. T. C. students and C. M. T. C. candidates was good, as is evident from the results obtained in the practices conducted by these units.

The handicap requiring the combination of several batteries to secure sufficient enlisted personnel to man the batteries fired, was successfully overcome, and the target practice reports indicate that good drill was obtained.

In general the target practice of this coast defense was satisfactory, although there is considerable room for improvement, which can be effected only by the intensive training of the personnel.

It is noted that certain batteries did not hold target practice due to these batteries being employed in the mounting of new armament. It is desired, if practicable, that all firing batteries conduct target practice during 1925.

The Coast Defense Commander deserves credit for the variety of calibers and type of guns fired either as primary or secondary assignment. The practices of the Reserve Officers and C. M. T. C. candidates were for problems that were too difficult for the state of training of the personnel. Better results probably would have been obtained had the problem been simplified to meet the state of training of the personnel.

Special attention should be paid to the training of the personnel in that they be required to secure an adjustment. The officer conducting a battery practice should be so thoroughly conversant with the rules of adjustment that he should make his corrections without hesitation as soon as the results of the fall of the preceding shots have been reported.

The work performed by the personnel of this coast defense incident to target practice during 1924 has been very satisfactory, not only in the training of the units themselves, but in the training of many units of the Organized Reserve, National Guard, R. O. T. C. and C. M. T. C. leading to service practice by these organizations.

The practice of this regiment might be considered satisfactory. The desired degree of efficiency can only be obtained by constant drill and sufficient subcaliber practice. The necessary personnel should be made available during the drill hours and proper targets should be provided for drill of the range section.

The spotting section should be so thoroughly trained that the battery commander can rely on their data. In many cases the spotting sections by their faulty data have prevented battery commanders from securing an adjustment of their firing.

The period of time between the trial fire and improved fire should be reduced to a minimum. This requires thoroughly trained officers, spotting and plotting sections. Blackboard instruction and the use of hypothetical data will help to obtain the desired facility.

Antiaircraft Demonstration

On March 6th at Fort Monroe, Virginia, the 61st Coast Artillery, in conjunction with the Air Service, carried out a program drawn up by a local joint Air Service-Coast Artillery Board, and approved by the War Department, for the purpose of showing the use of antiaircraft guns, machine guns, and searchlights.

The firing was witnessed by Congressmen O'Sullivan, Rogers, Fitzgerald, and Seving, Major General Mason M. Patrick, Chief of Air Service, Brigadier General Hugh A. Drum, Assistant Chief of Staff, Rear Admirals Hughes, Straus, and Moffatt, Brigadier General John W. Jones, Assistant to Chief of Ordnance, Brigadier General William Mitchell, Assistant to Chief of Air Service, and many other naval, military, and civilian guests.

The following is the joint program:

EXERCISE 1. 3-inch gun firing at towed sleeve target; firing battery, two 3-inch A. A. guns; target, sleeve target, towed by Martin Bomber; target course—altitude between 3000 and 6000 feet, horizontal distance between 6000 and 9000 feet.

EXERCISE 2. 3-inch gun firing at towed sleeve targets: Time, 3:00 P. M.; firing battery, two 3-inch A. A. guns; targets, three sleeve targets, each towed by a Martin Bomber. Target course, each target to be towed across the field of fire once. Targets to cross the field of fire from either direction. While in field of fire, course of target to be straight and approximately at right angle to the firing battery. Altitudes to be between 3000 and 6000 feet, horizontal distances to be between 6000 and 9000 feet. Only one target to be in field of fire at any one time. Second and third targets not to start for limiting line of field of fire until firing has ceased on preceding target.

EXERCISE 3. Machine gun firing, at towed sleeve target: Firing battery, six .30-caliber A. A. machine guns; target, sleeve target towed by Martin Bomber; target course, altitude between 1000 and 2000 feet, horizontal distance between 1000 and 2000 feet.

EXERCISE 4. Machine gun firing at target glider: Firing battery, two .50-caliber and four .30-caliber A. A. machine guns; target, a target glider; size of target is approximately that of double cockpit and vital portions of fuselage of an attack plane; target course, target to be released from plane at an altitude of approximately 5000 feet and at a horizontal distance of approximately 1500 feet.

EXERCISE 5. Use of Antiaircraft Searchlights against airplanes: Searchlights used, five 60-inch A. A. searchlights; target, Martin Bomber; target course, altitude between 3000 and 6000 feet, horizontal distance between two and three miles.

EXERCISE 6. Simulated bombing attack on Fort Monroe: Attacking force, three flights of Martin Bombers of three planes each; each flight represented by one Martin Bomber; one DH plane; defending force, seven 60-inch A. A. searchlights, two batteries of four 3-inch A. A. guns each, each battery represented by one 3-inch gun. Conditions of exercise: Attacking planes to carry weight equal to that carried by loaded bombers; planes representing flights to approach Fort Monroe from any direction but to arrive over objective with not less than two minutes interval between flights; each bombing plane to drop one flare at time that bomb would have been released in a real attack; the DH plane to drop flare over Fort Monroe at any time after 8 o'clock and prior to the attack by bombing planes; no flares to be dropped from an altitude of less than 1500 feet; bombing planes to drop flares from altitudes not greater than 8000 feet; bombing planes will approach objective in the same manner as employed for actual bombing; sensitive area at Fort Monroe to be the beach strip from the lighthouse to Crisp Park.

Object of exercise: The attacking force to endeavor to drop a flare from each bombing plane before plane is illuminated by the searchlight; the defending force to endeavor to illuminate each bombing plane before the plane releases its flare.

In carrying out Exercises 1 and 2, about 59 shots were fired with three hits, under the provisions of par. 5e, Bulletin Antiaircraft Series O. C. C. A. In Exercise 3, one actual hit was made on the sleeve target, which, under the provisions of par. 6d of the above bulletin is counted as four hits. Exercise 4 was not held, as the glider was not released within the field of fire. In Exercise 6, the three airplanes succeeded in dropping flares before being picked up by searchlights.

In addition to the approved program, the Air Service at Langley Field gave an exhibition in the morning of a simulated attack on a battleship silhouette, which had been laid out on the ground. This attack consisted of:

- a. A flight of pursuit planes at altitude of 5000 feet simulating the clearing of the air of enemy pursuit.
- b. Simulated attack by a pursuit flight with machine guns and bombs of antiaircraft defense.
- c. Smoke screen demonstration.
- d. Attack with machine guns and bombs to within 75 feet of target.
- e. Attack by heavy bombardment forces from altitude of 5000 feet with 100-pound bombs.

A Correction

In the March, 1925 issue of the JOURNAL was published an article entitled "Fuses," its authorship being credited to Major F. A. Green, C. A. C. This was due to a typographical error. This most excellent study was prepared by Major Fred M. Green, C. A. C., at present a student at the General Service Schools, Fort Leavenworth, Kansas.

Increased Effectiveness of Antiaircraft Gunfire

Though it is a well known fact that the effectiveness of antiaircraft artillery increased three-fold during the last year of the war, it is pointed out by Regular Army officers that this increase in the efficiency is due to the great strides made in the development of ammunition, training of the personnel, fire control and the improvements in the design of the guns.

Since the close of hostilities, the American army ordnance experts have been working on various gun construction projects which has greatly improved the fire control instruments, muzzle velocity, etc.

The latest addition to antiaircraft artillery which is declared by experts to be the best weapon of its kind yet designed, is the 3-inch antiaircraft gun, model 1923E (photograph p. 154, *COAST ARTILLERY JOURNAL*, February, 1925.) The weight of the gun, carriage, and trailer is extremely light which insures great mobility. The muzzle velocity of this new antiaircraft creation is 2600 f.s., which, ordnance experts point out, is of greater power than any antiaircraft unit used during the war.

In his recent testimony before the Congressional committees, Major General F. W. Coe, Chief of Coast Artillery, proved the effectiveness of antiaircraft firing. Figures submitted by him were the results obtained by the 61st Coast Artillery (A. A.), Fort Monroe, Virginia; 62nd Coast Artillery (A. A.), Fort Totten, N. Y.; and the 64th Coast Artillery (A. A.), Hawaiian Department.

General Coe called attention especially to the record made by "B", "D" and "G" Batteries of the 64th regiment—all night firings. Out of 21 rounds fired, "B" Battery made seven hits, or 3.02 hits per gun per minute, the average horizontal range to the target being 9150 feet.

Nine hits were made by Battery "D" out of twenty rounds fired, the average horizontal range to target being 10,368 feet, while the hits per gun per minute was recorded as 7.09. "G" Battery fired twenty-one rounds, made ten hits, at an average horizontal range to the target of 10,620 feet. The hits per gun per minute was 5.54.—*Army and Navy Journal*.

Report of General Board of the Navy

In September, 1924, the President directed that the Secretary of Navy convene a board to study recent progress in aviation and to recommend a policy for development and upkeep of the Navy and all its branches. The Board's report, one of the most exhaustive ever made on a naval subject, has just been made public. In its opinion the fleet must be depended upon for control of the sea, with the battleship as its principal weapon, all other elements including aviation being contributory to the battleship's mission.

In their studies, the Board considered every aspect of naval aviation, and dwelt upon the bombing of the *Ostfriesland* and *Frankfurt* in 1921, the *New Jersey* and *Virginia* in 1923 and the *Washington* in the fall of 1924. The report contends that a study of these tests not only does not prove the uselessness of the battleship, but on the contrary proves that the battleship must be maintained as the backbone of naval defense. It further states that the recent test of the *Washington* affords ample proof of the ability of a battleship to stand up against aerial bombardment.

In speaking of the efficacy of antiaircraft gun fire against airplanes, the report states that "the Navy has antiaircraft guns which fire 13-pound projectiles to a height of 24,000 feet, while the new antiaircraft 5-inch gun fires 50-pound projectiles to a height of 28,500 feet. Each of these guns fires about 14 times a minute, so that a battery of eight will deliver 112 shots at an airplane attack every minute, or nearly two a second. These guns are supplemented by numerous machine guns each firing 400 half-inch projectiles a minute to a height of 8,000 feet.

"Using World War records as evidence, the report finds that where the anti-aircraft defense was efficient the aeronaut was reluctant to attack at heights of less than 12,000 or 14,000 feet. While the airplane has improved, so has anti-aircraft defense.

"There has been sufficient target practice at towed aerial targets in the fleet to enable us to form a fairly correct estimate of the chance of hitting an airplane with our larger anti-aircraft guns. The target consists of a sleeve of some suitable fabric, 14 feet in length with a diameter of 54 inches at its forward end tapering to 44 inches. This presents a projected target area of about 50 square feet, much less of course than any presentation that a bombing plane would afford. The height of the target is about 4,500 feet, and it shares all of the movement of the plane that tows it. The target records show that in not less than 75 per cent of these practices the target is struck with one or more shell fragments and often is shot away entirely. It has been held by many that the best defense against aircraft is other aircraft, but the board believes that in defending a battleship against air attack, the anti-aircraft gun, which is always ready for use, probably holds first place, and as it improves in design and skill in use it will in the end be found quite sufficient to insure reasonable security to a ship against bombarding attacks." * * *

The final conclusions of the Board, embodied in an 80-page report, were as follows:

"It is a fundamental truth that sea power is necessary to the commercial life and prosperity of a nation that is engaged in overseas commerce.

"The three most important elements of sea power are:

"(a) A powerful and efficient navy.

"(b) Properly equipped and defended bases for the use of the fleet in areas where hostilities may occur.

"(c) A merchant marine adequate to the task of carrying on the nation's trade and of supplying its fleet in time of war.

"The mission of the Navy is to support the national policies and guard the national interests in all parts of the world.

"The Navy of the United States should be maintained in sufficient strength to support its policies and its commerce and to guard its continental and overseas possessions.

"The policy consistently urged by the Navy Department is sound, i.e., to create, maintain and operate a navy second to none, and in conformity with the ratio for capital ships established by the treaty limiting naval armament.

"The fleet, which includes all types of combatant and necessary auxiliary units, is the ultimate force employed in the exercise of sea power.

"A properly constituted fleet consists of battleships, battle cruisers, cruisers, aircraft carriers, destroyers, submarines, mine layers and auxiliaries.

"The battleship is the element of ultimate force in the fleet, and all other elements are contributory to the fulfillment of its function as the final arbiter in sea warfare.

"The other elements have their important and, at times, indispensable functions.

"From time to time apparent threats to the supremacy of the battleship have appeared. Each has resulted in some modification of its design and in the methods of its employment in war, but its supremacy remains.

"With the invention and development of offensive weapons have always come the counter-invention and development of defensive means and methods, so that in the end a fair balance is struck between them. The history of the gun and armor and of the torpedo and interior subdivision merely repeats the process by which offense always begets defense.

"Aviation has introduced a new and highly important factor in warfare both on the land and on the sea. It was utilized on an enormous scale and with great effectiveness in land operations during the World War, but did not seriously

influence sea operations. Its influence on naval warfare undoubtedly will increase in the future, but the prediction that it will assume paramount importance in sea warfare will not be realized.

"The airplane (heavier-than-air) is inherently limited to performance by physical laws.

"The airship (lighter-than-air) has some valuable characteristics, but due to great vulnerability is of doubtful value in war.

"Aircraft cannot operate from territory that is not controlled by the military or naval forces of their own country.

"Airplanes cannot occupy territory, nor can they exercise control of the sea.

"Airplanes cannot reach distant oversea areas under their own power with any effective military load, and therefore cannot operate there offensively or defensively until supplied with weapons and fuel.

"Airplanes cannot fulfill the functions of the service of supply for themselves or for other forces in distant oversea areas.

"Airplanes cannot fly across the Atlantic Ocean or the Pacific Ocean to any point on our coasts or within our continental territory with bombs heavy enough to do any serious damage. The situation as to other continental or insular powers having potential enemies contiguous to their borders is wholly different and bears no analogy to ours.

"Within a distance of 250 miles from their bases or carriers, airplanes may constitute a serious threat to surface ships, land forces, cities and industrial centers, for the reason that they can transport to the above distance heavy bombs of 2000 pounds in eight at present, which may reach 4000 pounds in the future. To answer such a threat antiaircraft defense must be provided, and hostile carriers should not be allowed to approach within that distance of our coast.

"The battleship of today, while not invulnerable to airplane attack, still possesses very efficient structural protection as shown by the experiments on the *Washington*. The battleship of the future can be so designed as to distribution of her armor on decks and sides, and as to interior subdivision, that she will not be subject to fatal damage from the air. The effect of plunging long range gun projectile hits on a ship's deck has now become closely analogous to the effect of hits by heavy aerial bombs. By armoring the battleship's deck with six to seven inches of armor we at one and the same time effectively meet any practicable attack from the air and also the attack by gun projectiles, fired at the greatest probable battle ranges. The interior subdivision will resist any mining effect from aerial bombs. It cannot be said, therefore, that air attack has rendered the battleship obsolete.

"The observation value of the airplane has been extended to assist gunnery by observing and reporting the fall of shot relative to the target. This has given great value to high angle gun elevation, has made possible the accurate control of fire at long ranges and has vastly increased its effectiveness.

"Airplanes have demonstrated their great value to the fleet in scouting, observation and bombing. The use of torpedo planes, gas and smoke screens is still in the process of development. Airplane carriers are necessary elements of a properly constituted fleet to carry airplanes to the scene of action.

"Aviation has taken its place as an element of the fleet and cannot be separated from it.

"The separation of aviation from the Navy and its incorporation in a separate department of the Government would be most injurious to the continued efficiency of the fleet in the performance of its mission.

"The development of commercial aviation in this country will prove of very great value to the Army and the Navy by stimulating further development of aircraft and expanding the industry. It will furnish a reserve of pilots, observers and aviation ground forces for times of emergency. It should be encouraged by

all the appropriate agencies of the Federal Government. Establishment of airways, inspection of aircraft, examination of pilots and licensing of machines and pilots should be regulated by Federal statutes.

"The further development of military aviation for both the land and sea forces should be encouraged liberally, in order that this very important element intimately connected with the operations of the Army and Navy in the national defense may be brought to the high point of efficiency necessary to insure the national safety.

"Cruisers are indispensable to the fleet in war for scouting and screening, attack on enemy commerce, defense of our commerce, patrolling trade routes and participating in major engagements by operating against enemy light forces, as well as for many other duties.

"The destroyer is designed to use its torpedo against larger vessels. It can engage other destroyers and small vessels with its guns, submarines with its depth charges, and is of great value in the screen.

"Substantial progress has been made in the development of the submarine since the World War. Its radius of action and surface speed have been so increased that it will be of great value in distant scouting, mine-laying and offensive operations with the fleet.

"Our national policies are all defensive and are well known to the world. Foreign powers are embarked on building programs designed to augment their fleets materially in types not limited by the treaty limiting naval armament. As long as foreign powers continue such policy the United States is forced to do likewise."

Big Business and Summer Training Camps

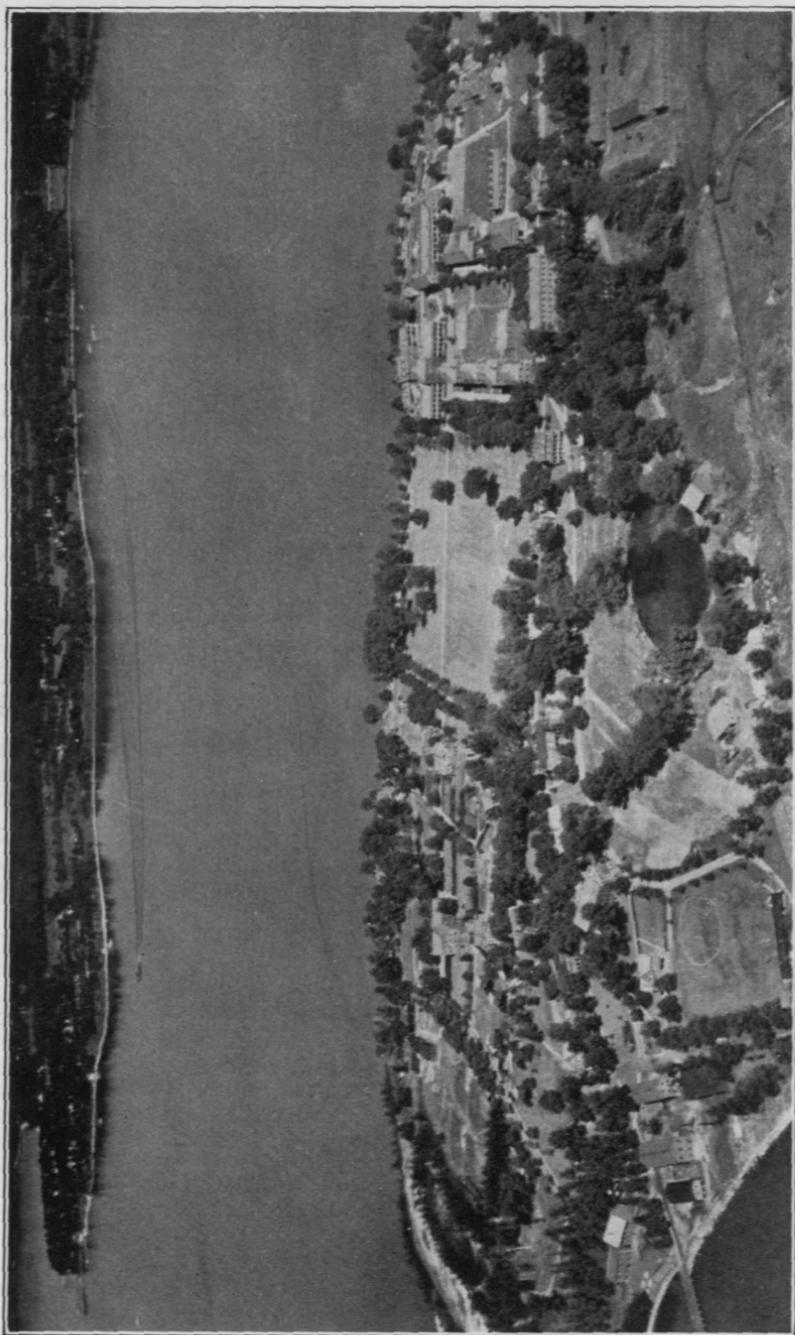
At a recent dinner of the Military Training Camps Association at the Harvard Club in New York, General G. E. Tripp, Chairman of the Westinghouse Electric and Manufacturing Company, and a recognized authority on the management of large commercial enterprises, in speaking of the willingness of big business to cooperate in the summer training camps movement, made the following interesting remarks:

Corporations are said to be without souls; but, in the matter of military training camps, they really were actuated by ideals when they made it easy for their young men to take each year an unusually long vacation and with pay; but, alas for their attempts at idealism, it has developed into a profitable undertaking; that is to say, the Army has through this new development established a new social science which has at least two sides—one, that of obtaining the maximum amount of self-defense with the minimum amount of expense, or perhaps better with practically no expense.

But, beyond the saving of taxes to industry, there is yet another benefit. The government borrows a young man from industry for a short space of time and returns him healthier, more ambitious, with a broader outlook upon life and a better conception of his own responsibility. Men of accepted physical and mental standards are benefited by a few weeks sojourn in our military training camps and they become better workers in whatever line they may be engaged because of the training they receive and the better understanding of human nature they obtain as a result of their unusual contact with their fellow men.

Therefore, you are making more valuable men for us and the men whom you improve are the highest type which we have in our employ because it is only those young men having high physical, mental and moral standards who are attracted by the service.

It is, therefore, evident that you need rest under no obligation to industry because your camps benefit us quite as much as they do the Army.



VIEW OF FORT TOTTEN

This mutual enterprise of the War Department and industry is encouraging. It indicates a higher type of civic intelligence than existed a generation ago. In business this is shown by a comparison between the period immediately following the Civil War with all its public corruption with the present similar period when one or two minor scandals are all that can be mustered. In the War Department it is shown by immeasurably superior methods of mobilizing an army during the late war as compared with the methods of the Civil War.

And, again further, in my opinion it is shown by one more intelligent type of army officer who now visualizes a defense problem to be something more than a standing army living apart from the rest of the community.

The Second Corps Area has always been favored by having an unusually high type of modern officer in command at Governors Island, but we have never been more fortunate than at the present time when there comes to us that splendid officer and fine gentleman—General Summerall.

Fort Totten, New York

Fort Totten, New York, is situated on the south bank of the East River in the Borough of Queens, New York City, two miles and one-half from Whitestone, Long Island, and seventeen miles and one half from Governors Island, New York. Directly opposite on the north bank of the river is Fort Schuyler. The river narrows between the two forts to about three-quarters of a mile in width.

The site for the military reservation now known as Fort Totten was purchased in two parts. The first purchase was a tract of about 110 acres, in July, 1857, from George Irving, who had used it as a farm and summer residence. A second tract of 26 acres was purchased in May, 1863, from Henry Day.

The reservation, then known as Willets Point, was not used for military purposes until 1862, when the Engineer Agent Officer in New York City commenced the work of building the fortifications as approved by the Chief of Engineers.

During the Civil War a portion of the reservation was used as a recruit depot and temporary encampment for troops enroute to the front. Among the regiments stationed at Willets Point (Fort Totten) during that period were the 15th New York Volunteers, 2nd Maine Infantry and 9th Indiana Infantry. In 1864 a general hospital was established there, consisting of 37 wards and accommodating about 1500 patients. During the one year the hospital was maintained, June, 1864-June, 1865, 5283 patients were cared for.

At the close of the Civil War the post was used as an Engineer Depot, and Companies A, B, C, and D, Corps of Engineers, formed the garrison under command of General J. C. Duane.

Shortly after the close of the Civil War it was decided to experiment with the use of high explosive in submarine mines. Accordingly an Engineer school was established at Fort Totten for this purpose and Brigadier General Henry L. Abbot was placed in command of the school. During the 20 years that General Abbot remained in command the submarine mine, now one of the most valuable means of harbor defense, was developed to a high state of efficiency.

Submarine mine work has since been transferred to the Coast Artillery Corps and the Torpedo Depot (Submarine Mine) is still located at Fort Totten. At this same school experiments were commenced as early as 1872 in the use of searchlights as an aid to coast defense. One small light was secured and the first night drills were held. This practice was developed until it soon became customary to hold at least one night drill a week at all coast defense forts.

In the early 80s the first seacoast mortar battery was designed and constructed at Willets Point. Prior to this date little use had been made of the mortar as a defense against warships, but it proved such a valuable weapon that for some time all Coast Defense Commands have included in their armament several batteries of mortars.

In 1898 the fort at Willets Point was named Fort Totten in honor of Brigadier General Joseph G. Totten, Corps of Engineers. Three years later the Engineer School was moved to Washington Barracks, since which time Fort Totten has been a Coast Artillery post.

During the World War Fort Totten was used, as in the Civil War, as a training camp for troops enroute to the front. Many organizations were organized, trained and sent overseas from this station, including Coast Artillery, Infantry, Engineers, Field Artillery, Medical, Signal Corps, Antiaircraft, and one Belgian party of 340 officers and men.

At present the garrison consists chiefly of the 62nd Artillery Regiment, Antiaircraft. Antiaircraft work is, of course, a development of the World War, and the work is new and interesting to both officers and men. The 62nd is one of the few organized antiaircraft units. The regiment consists of one searchlight battery, two gun batteries, two machine gun batteries, a combat train, headquarters battery and the service battery, all completely motorized. Among its activities are motor transport work with Cadillacs, Dodges, F. W. D's, Liberty trucks, G. M. C.'s and motorcycles, searchlight work, radio, electricity and telephones, machine guns, automatic rifles, pistols, infantry and artillery. In addition to the regiment there is a caretaking detail for the Coast Artillery armament, the Corps Area hospital, the Torpedo Depot and the staff departments.

Fort Totten has always been, and still is, considered one of the most beautiful and desirable posts in the United States. It is equipped with permanent barracks and quarters, containing all modern improvements, and has its own completely furnished gymnasium, Y. M. C. A., athletic field and skating pond. Swimming, fishing, boating, tennis and even golf on a small practice course, are among the sports offered the officers and men serving here. Last, but not least, the post is only 45 minutes from 42nd and Broadway, New York.

Antiaircraft Demonstration Held Not Conclusive

[REPRINTED FROM THE *Army and Navy Journal*.]

The aircraft and antiaircraft demonstration at Langley Field and Fort Monroe is not regarded as conclusive by competent observers. The conditions under which it was made were not Service conditions. Also it is pointed that it must be remembered that the War Department has from the beginning claimed that antiaircraft weapons were a passive defense, the active defense being other aircraft.

Attention was called to the records of the war to show how small the demonstration was by antiaircraft guns at Fort Monroe. According to official record, the French Army, with 75-mm. guns brought down a plane for every 3200 shots. The American record, with 3-inch guns, was a plane for every 605 shots, and the British record was 1500 shots per plane. Only 57 shots were fired by the two A. A. guns which were employed at the Fort Monroe demonstration. The purpose of the affair was to give the members of Congress an opportunity to witness the operations of antiaircraft guns rather than to make a test of their possibilities, officers said.

The targets of the antiaircraft guns were sleeves towed by airplanes which were 15 feet long and 4 feet in diameter. A bombing plane is 40 feet long, 75 feet wide and 15 feet high. Thus, it is stated, the antiaircraft guns started with a handicap and the failure to hit a sleeve, it is insisted, is not an indication that if they had fired at a bombing plane they would not have secured direct hits. According to the accepted estimates of military authorities, the danger-zone of the targets would be 15 feet over 35 feet short, and 50 feet laterally. In the first demonstration, 18 shots were fired at the sleeves while they were being towed against the wind at about 50 miles an hour. Of these shots, three were within the danger-zone, and with explosive shells would have hit a bombing plane.

In the other 39 shots, the planes were flying at about 150 miles an hour with the wind. This was too fast, it was pointed out, for the R. A. corrector which was designed for targets traveling at not over 100 miles an hour. Both the gun and its equipment were of the 1918 model, which were equal to the task of defense against airplanes of that date, according to competent authority. The commander of the guns was deprived of the use of a corrector, as the one with which his guns was quipped ceased to function when the planes traveled at a speed of over 100 miles.

When inquiry was made as to why Fort Monroe was not armed with more modern antiaircraft guns, attention was called to the small appropriations that have been made by Congress for the development of antiaircraft defense. Despite the recommendations of the War Department, only \$180,000 has been appropriated for use in developing antiaircraft artillery during the past five years, as compared with \$453,000,000 for the Air Service. More modern guns have been developed and better ammunition has been tested out, but Congress has not appropriated any money for their purchase. Under the present policy, the Coast Artillery is required to use war surplus guns and ammunition until the supply is exhausted before purchasing new guns and ammunition.

There was nothing remarkable in the aircraft demonstration, spectators insisted. The program started by pursuit planes flying over the area in an attack on the enemy's plane at an altitude of about 5000 feet. Later an attack at a very low altitude was made on the battleship area and smoke screens were laid. The attacks with bombs were made at an altitude of from 100 to 200 feet. When the antiaircraft guns were shooting at the sleeve targets, the planes flew at an altitude of from 4500 to 6000 feet. Even when the machine guns were put in action against sleeve targets, the planes flew at an altitude of from 1200 to 1800 feet. At this altitude the machine gun fire was so effective that it is claimed an airplane would have been destroyed, according to reports.

The searchlights failed to locate any planes. At the same time, no plane dropped its flare within the range of its objective. This contest between the airplanes and the searchlights was a draw, as neither of them reached their objective.

In all probability, the outgrowth of the affair will be a policy under which demonstrations, or rather practice firing against airplanes, will become part of the routine of the antiaircraft guns. The War Department will go to Congress with recommendations for increased allowances for this purpose. It will be insisted that antiaircraft developments should keep pace with those of the Air Service. There is also strong conviction in the War Department that the air force should be trained to cooperate with the Coast Artillery in developing the coast defenses.

MILITARY NOTES

furnished by

THE MILITARY INTELLIGENCE DIVISION, G. S.

Argentina

FLIGHT FROM BUENOS AIRES TO LIMA: Wednesday, December 3, 1924, the Argentinian aviator, Guillermo Hillcoat, arrived in Lima, having flown from Buenos Aires by way of Santiago, and the coast, using a 160-horsepower Curtis Oriole. Hillcoat left Buenos Aires November 26th, arriving in Mendoza the same day. From there he made two unsuccessful attempts to pass the Andes, and finally succeeded on a third attempt. He followed the general route of the Trans-Andine Railway from Mendoza to Santiago.

Captain Alvarillo, of the Peruvian Air Service, who was trained in the Argentine, went out to meet Hillcoat in a "Bristol," but due to motor trouble had to land near Pisco. He has returned to Lima for parts for some necessary repairs.

While the flight along the coast from Santiago to Lima is not difficult, the crossing of the Andes, at any time and under any conditions, may be considered as a feat.

Hillcoat remains in Lima as the special guest of the Peruvian government for the Centennial celebration.

China

CHINESE OFFICERS IN JAPANESE MILITARY SCHOOLS: An official report from Japan states that 21 Chinese Army officers have arrived in Tokyo from Mukden to enter the Japanese military academy. These officers are from Chang Tso-Lin's Manchurian Army.

It is reported that these officers were sent to Japan because Chang Tso-Lin was so well pleased with the showing made by his Japanese trained officers in the recent Mukden-Chihli war.

Czecho-Slovakia

COMMISSIONED PERSONNEL: Commissioned personnel in the Army of Czecho-Slovakia in December, 1924 was as follows:

Generals	111
Colonels	308
Lieutenant Colonels	824
Majors	585
Staff Captains	3,256
Captains	2,692
First Lieutenants	1,625
Lieutenants	1,162
Sub-Lieutenants	123
Total	11,786

Considering the entire number of officers, without regard to rank, each officer receives \$306 a year in pay and allowances. The allowances include quarters, arms and ammunition, subsistence, dependents and high cost of living bonus.

France

SUPERIOR WAR COUNCIL: A French decree of January 6, 1925 publishes the composition of the Superior War Council for the year 1925. The following are members:

Marshals of France—Joffre, Foch, Petain, Lyautey, Franchet d'Esperey, Fayolle.

Major Generals—Gouraud, Berthelot, Guillaumat, Mangin, Debeney, Duport, Degoutte, Weygand.

Marshal Petain has been appointed Vice-President of the Council, which signifies that he would command the French armies in war. He is the permanent inspector of troops, services and military schools and is responsible for the "center of advanced military studies" and the Ecole Superieure de Guerre. He has authority over the Major Generals who are members of the Council and makes all the necessary proposals to the Minister of War concerning them in the matter of the allocation of commands in peace and war. The General Staff of the Army is under the control of the Vice-President of the Council.

The Minister of War is by virtue of his office the President of the Superior War Council.

MARSHALS AND GENERAL OFFICERS: The active list of general officers of the French Army is as follows:

6 Marshals of France,

3 Major Generals (Castlenau, Sarrail, and Guillaumat) who remain on the active list for life,

1 Major General (Berthelot) who is held on the active list until reaching the age of 65 years,

1 Major General (Peltier) detached,

117 Major Generals, of whom 15 are with colonial troops,

233 Brigadier Generals, of whom 32 are with colonial troops.

The senior general officer is General Gouraud, followed by Generals Mangin and Debeney, in order.

Germany

ARMY ORGANIZATION: The German army organization is unique in that each division has an infantry leader with a staff composed of two general staff officers, a staff officer and 30 noncommissioned officers and men as his assistants. In time of peace, the infantry leader is charged, under the division commander, with all matters concerning the infantry of the division. This is, perhaps, more necessary in the German organization as the division commanders are also area or district commanders with the many additional duties the latter position demands. Another factor which may have influenced the establishment of an infantry leader and staff in the division is that there are only three regiments of infantry in the division instead of four as in our service. This condition prevents the organization of two infantry brigades with their commanders.

In examining a translation of recent tactical problems of the German Army, it is disclosed that the infantry leader also issues combat orders to the infantry and attached arms. In the problems in question, the division was arriving by rail at hourly intervals. The enemy was advancing toward the detraining area. The infantry leader was notified by the division commander, already in the detraining area, of the sector assigned, the troops already available, and was given the mission of covering the detraining of the rest of the division and opposing the enemy's crossing the frontier. In carrying out his mission, the infantry leader issued the necessary orders and maneuvered his troops between 5:20 p. m., October 2nd, when he received the division order, until 8:00 a. m. October 3rd, when a new division order was issued. During this time

the front line was twice attacked and the infantry leader maneuvered his covering troops without reference to the division commander whose headquarters were about 15 miles to the rear in the detraining area.

In general, the problems show the simplicity insisted upon in issuing orders and the wide latitude and initiative afforded subordinates.

The location of the tactical problems is of interest. The area selected is that just southwest of Hanover covering the line between the Ruhr, now occupied by the Allies, and the large commercial coast cities of Bremen and Hamburg. This may have some significance, as it was rumored that the Allies, in their plans for taking additional sanctions under the Versailles Treaty (before the Dawes Plan), contemplated an advance toward these two cities.

Another new feature in the organization of a German division (theoretical) is the presence of a Reconnaissance Detachment consisting of a headquarters, two squadrons of cavalry, a bicycle company and an armored auto train. A fixed organization of this kind offers the advantage of special unified training in reconnaissance and the best conditions for insuring efficient information work. It should possess a decided advantage over units temporarily banded together to perform this function.

Italy

COURTS OF HONOR: The following article on Courts of Honor, which regulates "affairs of honor" arising in the Italian Army is of interest:

The fighting of duels is forbidden in the Italian Army, but officers, and even under-officers and other ranks are none the less bound to fight them if a Court of Honor declares that it will take no steps to prevent a contest.

In the event of an "affair of honor" arising between two Army officers, they each appoint two seconds who are obliged in the first instance to do their best to arrange an amicable settlement. If this is not possible, the seconds must refer the case to a Court of Honor, constituted as described below. Failure to refer constitutes a breach of discipline.

The four seconds draw up and sign a report on the facts that have caused the dispute, and request the Court of Honor to give its decision. In the event of the seconds not agreeing on any points connected with the dispute, the representatives of each party draw up and sign separate reports. If, in very serious cases, the two opponents do not wish details of their quarrel to be reported, this fact must be recorded in the report made by the seconds.

The report, or reports, are enclosed in a sealed envelope on the outside of which are shown the names and rank of the opponents and of their seconds.

In the event of a dispute between two General officers, the report must be forwarded to the Army Corps Commander of the area to which the challenging General Officer belongs.

The authority to whom the envelope is addressed, without reading the contents, orders the immediate formation of a Court of Honor, composed of a president and two members who are chosen from army officers on the active list and senior in rank or in length of service to the opponents. The envelopé is then sent to the President with instructions as to when and where the Court of Honor is to assemble.

The court, after considering the report and, if necessary, interviewing the opponents and their seconds, gives its decision. If the opponents desire to interview the Court, their request must be granted.

A Court of Honor must make one of the three following declarations:

- (a) That no cause for a duel exists;
- (b) That a reconciliation must be effected;
- (c) That it "declines to intervene in the dispute," which means that the duel will take place.

The above rules also apply in principle to quarrels between military officers and those of either of the other fighting services. The authority who convenes

the Court of Honor and appoints the President must be a supporter of the challenging officer; the same authority appoints one of the members. The other member is appointed by a superior of the challenged officer.

Officers "in congedo," even when not doing military duty, are morally obliged to have recourse to a Court of Honor for the decision of disputes.

Disputes between officers and civilians may also be referred to Courts of Honor if the civilians so desire.

In time of war duels must be postponed till after peace has been signed.

The challenged party has always the choice of weapons.

Mexico

REPORTED REDUCTION OF ARMY: With the economies planned by the new administration in Mexico under President Calles, the War Department budget is said to have been reduced from 115,000,000 to 80,000,000 pesos, or approximately \$17,500,000. It is said that a plan is being worked out whereby the reduction of the Army can be made from the present strength of 68,000 men to 50,000 by the end of August. In this connection, the press of Mexico City on January 31st announced that orders had been issued by the War Department for the discharge of 595 officers of all ranks, including 60 general officers.

Japan

THE JAPANESE SPECIAL GRAND MANEUVERS, NOVEMBER 1 to 6, 1924 (with map): It should be made plain that the Japanese Special Grand Maneuvers are never a true reflection of the Japanese army in action. While they give considerable experience in marching, the issuance of orders, communications, etc., the campaign is no doubt closely worked out in detail before it is started and some of the engagements at least are anticipated and carefully planned in advance. There is therefore very little to be learned of Japanese strategy or tactics. These maneuvers serve a special patriotic purpose. They are held in a different section of the country each year and usually three to six divisions participate. All the populace within reach, turn out to observe the more important battles and frequently crowd the fields and restrict the action and movement of the troops. Several Imperial Princes and either the Emperor or Prince Regent, graciously attend and to these great respect is paid by the troops and the populace.

The Special Grand Maneuvers are usually held each autumn. Those of 1924 were the first since 1922, owing to the earthquake of September 1, 1923. They were held on a minor scale both as to number of troops engaged and cost (about \$1,500,000). A war organization was outlined, but full war personnel and equipment was not supplied.

Japan was assumed to be divided into three countries: "A", or blue—the territory south and east of an approximate line connecting Tsuruga on the Sea of Japan, and Ise Bay; "B", or red—the territory north and east of the approximate position of 137° 30' longitude; "C"—an unarmed country between "A" and "B". This is a zone 40 to 60 miles wide.

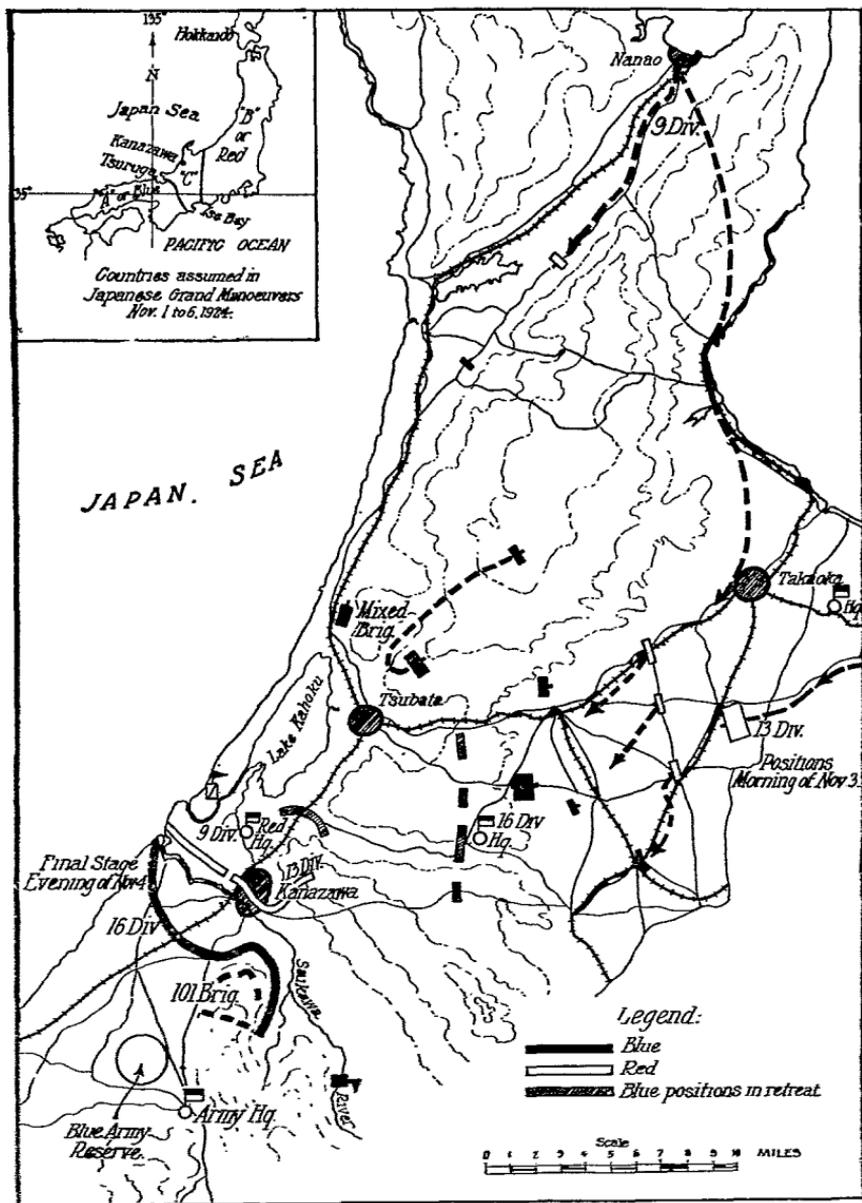
The Blue and Red navies were considered weak and maneuvering in the Pacific Ocean. The entire campaign was carried on in "C" country. The actual theater under consideration was in and about Kanazawa on the shores of the Sea of Japan. Along these shores are low level rice lands extending back for two to six miles where the hills are reached. The rice had been cut and was in many cases in the shock. The fields were soggy and movements were usually confined to the roads.

The armies employed were as follows:

Blue Army—Commander: Full General K. Machida (a member of the Military Council.

Army Headquarters, 16th Division—A wireless telegraph section for aircraft is attached.

Two infantry brigades, each of two infantry regiments. Each regiment consists of three battalions and one infantry gun detachment (two 37-mm. guns or two trench mortars). Each battalion consists of four rifle companies and one



machine gun company (the machine gun company has two sections each with one 1905 model and one 1914 model heavy machine gun fitted for blank cartridges). Each rifle company has six light machine guns (of these three are dummies).

One cavalry regiment, 2 squads each, about 140 strong.

One field artillery regiment, three battalions (three batteries per battalion), each battery with two field guns (one gun per section).

One engineer battalion, two companies.

16th Division Transportation Corps—Draft horse organization.

101st Infantry Brigade—Two infantry regiments organized similarly to infantry brigades of 16th Division. Most of the men were reservists called out for their annual period of training.

One independent heavy field artillery battalion, three batteries, each battery having two 15-cm. horse-drawn howitzers.

One independent mountain artillery battalion, three batteries, each battery having two mountain guns.

One independent air squadron, manning six "B" 1 type reconnaissance planes.

Blue Army Telephone Corps—One company, and two wireless receiving sections with telephone, buzzer and wireless receiving equipment.

Total war strength of Blue Army assumed 24,000 men; actually much less.

Guns (war) field artillery 75s—Assumed 24, actually 18; mountain 75s, assumed 12, actually 6; 15 cm. howitzers, assumed 12, actually 6.

Red Army—Commander: Full General G. Tanaka (former Minister of War and now member of the Military Council).

Army Headquarters, 9th Division—A wireless telegraph section for aircraft is attached. Organized similarly to the 16th Division, substituting "one mountain artillery regiment" for "one field artillery regiment", and "pack horse organization" for "draft horse organization."

13th Division—Organized similarly to the 16th Division.

One independent heavy field artillery battalion, two batteries, each battery having two 15-cm. horse-drawn howitzers.

One independent air squadron, manning six "B" 1 type reconnaissance planes.

Red Army Telephone Corps, two companies with telephone, buzzer and sound apparatus.

Red Army Wireless Corps, three companies with wireless "A" 2 type equipment.

Total war strength of Red Army, assumed 33,000 men; actually much less.

Guns (war) field artillery 75s—Assumed 24, actually 18; mountain 75s, assumed 24, actually 18; 15-cm. howitzers, assumed 12, actually 6.

The following blank ammunition was carried:

Infantry, 15 rounds per rifle; Engineers, 5 rounds per rifle; Cavalry, 10 rounds per carbine; Infantry 73-mm. gun (or trench mortar), 20 rounds per gun; Field and Mountain Artillery (75s), 40 rounds per gun; Heavy Field Artillery (15-cm.), 20 rounds per gun; machine guns, 1500 rounds per gun; light machine guns, 750 rounds per gun.

In the situation on November 2nd, the Blue Army, which had detrained earlier near Kanazawa, advanced north through this city. Its cavalry is well to the east on the right flank. The 16th Division advances to the north and east and a mixed brigade to the north. Headquarters are near Kanazawa.

A division or more of the Red Army has detrained at a point on the Japan Sea, about 70 miles east by northeast of Kanazawa and is rapidly advancing. At noon of November 1st, the 9th Division began landing at Nanao, a point about 30 miles north by northeast of Kanazawa. By the evening of November 2nd, patrols of both forces were in contact at numerous points about 25 miles north and east of Kanazawa.

In the situation November 3rd, the Blue Army planned a general attack, hoping to crush the Red Army in detail. At the same time the Red Army advanced with the intention of dividing the Blue forces. In the forenoon the Blue mixed brigade was pressed back and at 3:00 P. M., the commander of the Blue Army decided to avoid a decisive action and at sunset to retreat to a position south of Kanazawa and attack from there. Rear guard delaying actions were ordered.

During the night of November 3rd-4th, the Blue Army retired toward a position about two miles south of Kanazawa with the left flank on the sea and the

right in the hills, covering a front of about eight miles. Rear guard actions continued and particular advantage was taken of the Sai-Kawa River through Kanazawa as a covering position before retreating to the final position. A portion of the Blue artillery was specifically distributed in the zones between the covering and main positions to check the enemy's advance at the river and facilitate the retreat of the covering troops to their positions. In case the Red force, after penetrating the covering position presented an opportunity, the Blue forces were to assume the offensive and crush his right flank, throwing him back onto the sea and a lake four miles north of Kanazawa. By the evening of the 4th the Red Army had arrived at the Saikawa line and the final action took place. The results are not known as the maneuvers were here called off. A grand review by the Prince Regent followed.

The following comments on these maneuvers are of interest.

The weather was very good and one infantry brigade is reported to have marched 55 miles in 24 hours. The men did not carry full field equipment, however (at least blankets and gas masks were not carried). Reservists had had but two weeks with the colors just prior to maneuvers.

There were no antiaircraft guns, no tractor-drawn artillery and no tanks. Automatic rifles were seen for the first time at Imperial Maneuvers and were assigned six per company and six men were assigned to each automatic rifle.

Salmson reconnaissance planes (usually radio equipped) only were used, but they simulated bomb dropping and firing on front line trenches. Owing to the fine weather they were up very early in the morning and flew until late at night. The air reconnaissance reports show that they kept the army headquarters well in touch with the principal movements of the enemy.

The men of one army wore white cap bands, the other the ordinary red bands. Camouflage by means of rice straw was used considerably by individual soldiers. Guns were usually camouflaged by means of painted canvas or nets and brush.

In the final engagement, no Blue artillery was used as army artillery, but all was attached to the 16th Division and 101st Infantry Brigade. The number of rounds to be expended in this battle were, if necessary, to total 1500 rounds for each field artillery or mountain gun, and 850 rounds for each 155-cm. howitzer.

For the final defense, the Blue Army requisitioned iron plates, barbed and smooth wire, dynamite, black powder, sulphur and motor boats owned by the civil population of Kanazawa.

Wireless was set up promptly following the movement of the forces to new positions. The telegraph corps connected army headquarters with each division, separate brigade, air headquarters or unit directly under army headquarters, but did not establish communications between these units.

Orders supplemented by sketch maps were issued promptly from each higher headquarters. In general, representatives of all units requiring orders were assembled, and printed orders issued to each.

Switzerland

ARMY ORGANIZATION: Owing to the fact that Switzerland has no permanent army, but only a militia force conscripted on lines which have been urged for adoption in the United States from time to time, the following brief description of the Swiss Army is of interest.

With the exception of 200 permanent instructors the army has no regular or professional soldiers. It is composed solely of Swiss citizens from private up to the highest grade. When the Swiss Confederation requires troops it calls into active service the number of recruits required.

The 200 regular or professional soldiers above referred to are more military functionaries than army officers for while they are charged with the training of the recruits and the teaching in the different military schools they exercise no command of troops.

Commissions in the Swiss Army are given the men rising from the ranks who are specially recommended by the chief of their arm to take the course at the Polytechnique of Zurich. A course at this school consists of three half-years (not consecutive) and covers the following subjects: Tactics, military history, mountain warfare, ballistics, musketry, fortification.

On graduation, the aspirant becomes a lieutenant-instructor and is in line for promotion by seniority to include the grade of colonel.

The Swiss citizen is available for military service for a period of 28 years commencing in his 21st year. Active service or service in the Elite lasts for 12 years (10 years in the cavalry) divided as follows: First year, 65 to 90 days; second and remaining years, he is subject to call for Cours de Repetition of about two weeks' duration. On completion of service in the Elite he serves eight years in the Landwehr (10 years in the cavalry) in which he performs one repetition course lasting 11 days. The remainder of the 28 years' period of service is spent in the Landsturm, during which he does no active service, but he can be called out for special exercises lasting three days.

While the Swiss Army is a "militia army," it differs from the armies of all other highly civilized countries in which militia troops form a recognized part, owing to the fact that service is compulsory and the instruction given is as intensive as that prescribed in our training camps during 1917 and 1918. The Swiss officer of all grades is thoroughly equipped provisionally to perform the duties required of him and the great majority of the people of Switzerland are passionately fond of their army whose roots penetrate into every family.

The army consists of six infantry divisions, four brigades of cavalry, 72 batteries of field artillery, eight mountain batteries, 12 batteries of 12-cm. howitzers, and certain foot artillery units. The aviation units consist of five squadrons with about 60 airplanes of various types.

The army possesses two eminent qualities—real discipline in all grades and a genuine sentiment of devotion to the country.

Maneuvers on a small scale were held toward the end of September, 1924. The available strength of infantry companies was from 110 to 120 men; batteries, 80 men; squadrons of cavalry, 80 men. The total of troops taking part was about 14,000 men. The utilization of the ground by small infantry units was distinctly good, this being one of the strong points of the Swiss Army.

The maneuvers consisted of the operations of two unequal forces, the larger about double in strength that of the former. The smaller force, however, was supplied with some 40 automobile trucks for rapid changes in position which gave them a mobility not possessed by their opponents and in part made up for the former's numerical superiority. Although it rained constantly during the maneuvers, the men seemed in good humor and stood the fatigue with remarkable cheerfulness, sanitary conditions were good and the sick report small. The equipment was good in every respect and well taken care of. The grey-green cloth of the Swiss Army makes an excellent field uniform. The men were supplied with a new field helmet, very practical in shape and martial in appearance which, though heavy, seemed to be popular with the men. All the leather equipment of the cavalry was exceptional in quality and cleanliness, well adjusted and made of splendid leather.

The Swiss Government does not contemplate being soon in a position to give its army modern improvements such as tanks, chemical warfare service, heavy artillery, railway artillery, bombing and pursuit aviation, but believes that a wise utilization of the mountainous terrain of the Alps can help to make up for these deficiencies and enable the Swiss Army to hold its own without too great a handicap against better equipped troops.

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, Colonel, C. A. C., President Coast Artillery Board.

Projects Initiated During January and February

Project No. 317, Sound Ranging Switchboard and Microphone.—

In 1923 the Signal Corps developed a new type of switchboard which was sent to Fort Eustis, Va., for test. The board was tested with a new type of carbon button microphone developed by the Bureau of Standards. The tests developed defects in the switchboard and microphones which called for remodeling the board and the advisability of developing a new type of carbon button microphone. The switchboard was returned to the Signal Corps Laboratory, where the changes were made and four new microphones were designed and built by the Signal Corps. The switchboard and microphones were returned to Fort Eustis in September, 1924, where tests were conducted under the supervision of a Signal Corps engineer. A preliminary report was submitted by the Coast Artillery Board, in which the Board stated that it believed further tests would show the new system of sound ranging to be far superior to the Bull-Tucker system, but that definite conclusions could not be drawn without further tests with all calibers and under all conditions reasonably to be expected in service. The Board recommended that (a) the switchboard be modified by changing the sensitivity and line rheostats as indicated in paragraph 11 of its report; (b) the Signal Corps complete the manufacture of seven 5½-inch "pull" type microphones now in progress and ship them to Fort Eustis at the earliest practicable date, (c) tests be conducted to determine the suitability of the new system with all calibers from 105-mm. upward, and under all service conditions, and (d) tests and development of the new system be continued with the idea of replacing the Bull-Tucker system when it has been conclusively shown that the system developed is practical and suitable for use with Coast Artillery Sound Ranging units. The Chief of Coast Artillery approved recommendations (a) and (b) and approved (c) and (d) only so far as they did not involve special expenditures of ammunition. Further tests on this materiel will be conducted commencing about April 1, 1925.

Project No. 318, Test of Tracer Ammunition, Experimental, Cal. .50.

—Three lots of tracer ammunition, Cal. .50 experimental, 900 rounds in each lot, were received by the Coast Artillery Board in December, 1924. The Chief of Coast Artillery directed that this ammunition be tested and a report submitted as to the most suitable type for further tests. This tracer ammunition was furnished in three colors—red, yellow, and green. The tests of tracers were conducted by day and night firings. Firings were also conducted on a towed water target at an unknown range to see if the gunner using the trace of the tracer

bullet could place the service rounds on the target, the tracers being inserted in the belts of ammunition in the ratio of 1 in 5. From observations made on the tug towing the target it appeared that the gunners were able to adjust their centers of impact satisfactorily. The red tracer gave the best all around color for a tracer compound. The Board recommended (a) that the red tracer be adopted for issue to the service for further tests; (b) that the Ordnance Department be requested to study the apparent failure to function of a larger number of red tracers as compared to green tracers; (c) that a study be made by the Ordnance Department as to the relation of the trajectory of the tracer bullets at about 1000, 2000 and 2500 yards with respect to the trajectory of the service bullet. In forwarding the report of the Board to the Chief of Ordnance, the Chief of Coast Artillery concurred in these recommendations.

Project No. 319, Protection of Harbor Defenses Against Toxic Chemicals.—This project resulted from a letter from the Chief, Chemical Warfare Service, addressed to the Chief of Coast Artillery with reference to the general subject of protection of harbor forts against toxic gases. By 3d Indorsement on this letter the Coast Artillery Board outlined certain views indicating modifications of the line of development proposed in that correspondence. As a result of that correspondence, a formal conference was held between representatives of the Chemical Warfare Service and the Coast Artillery Board, and an outline of the development policy that should be pursued with reference to protection of harbor defenses against toxic chemicals was adopted. This outline has been submitted by the Board to the Chief of Coast Artillery.

Project No. 320, Plan for Mounting 75-mm. Gun, M-1916, on 16-inch Barbette Carriage, M-1919, for Subcaliber Use.—The Chief of Coast Artillery, by letter dated December 23, 1924, transmitted to the Board sketches showing a plan for mounting the 75-mm. gun, model 1916 for subcaliber use on the 16-inch Barbette Carriage, Model 1919, and requested comment and recommendation by the Board. The Board suggested certain modifications.

Project No. 321, Firing Tables for 8-inch S. C. Gun, Models of 1888, 1888 MI, 1888 MII, Firing H. E. Shell, Mark 1.—These firing tables were prepared by the Chief of Ordnance and were submitted to the Board for statement as to whether they were in satisfactory form for printing. The Board reported they were in satisfactory form for printing.

Project No. 322, Allowance of Cleaning and Preserving Material.—The following instructions were contained in a letter from the Chief of Coast Artillery: "It is desired that a study be made of the present allowances of cleaning and preserving materials as given in Circular 58, War Department, 1923, with a view to the determination of the minimum allowances that are absolutely necessary to prevent deterioration of armament under existing conditions. It is believed that a reduction in the total amount authorized can be made, due to the fact that a large percentage of the armament is now out of service." This study was to be based on a detailed consideration of the needs of a 12-inch battery and of a 6-inch battery, in service and out of service, in the continental United States and in the tropical foreign possessions. A study was made and report submitted to the Chief of Coast Artillery.

Project No. 323, Indication and Identification of an Airplane in Flight Formation by Observers at End of Altimetric Base Lines.—The Chief of Coast Artillery, in a letter to the Coast Artillery Board, expressed a desire that a study and the necessary tests be made to determine the possibilities as to indication to, and identification by, the observers at the ends of an altimetric base line of an airplane which is a unit of flight formation. This project is now under study.

Project No. 324, Mount for Cal. .50 A. A. Machine Gun.—This is a study of a suitable mount for the Cal. .50 Water Cooled Antiaircraft Machine Gun. After conference between members of the Board and representatives of the Office, Chief of Ordnance, specifications of suitable mount were submitted for approval.

Project No. 325, Chelsea Mechanical Time Fuzes.—The Chief of Coast Artillery requested comment by the Coast Artillery Board as to objections, if any, to reducing the time train rings of the Chelsea Mechanical Time Fuzes from 75 seconds to 37.5 seconds. It was the belief of the Coast Artillery Board that a mechanical time fuze of 37.5 seconds total time was sufficient for all antiaircraft artillery for any type of materiel, and recommended that the 37.5-second time fuze be considered satisfactory for manufacture.

Project No. 326, Cowan Universal Deflection Board for 155-mm. Guns.—The Board received a letter from 1st Lieut. Edward G. Cowen, Coast Artillery Corps, together with a description of a deflection device for 155-mm. guns. Upon receipt of a working model of the device, which is to be furnished the Board, a study of this device will be made and report submitted thereon.

Project No. 327, Conditions of Fire at High Speed Targets.—This study originated with the Coast Artillery Board, and is an endeavor to calculate, so far as may be practicable, the effect of the approximate assumptions and methods used in position finding upon the accuracy of the firing data when applied to targets moving at 25 and 30 knots.

Project No. 328, Test of Cal. .45 Tracer Ammunition.—The Coast Artillery Board was directed by the Chief of Coast Artillery to test and submit a report on the suitability of the Caliber .45 Automatic Pistol, using tracer ammunition, consideration being given during the test to the possibility of replacing the Very pistol for signaling purposes. Report of the Board will be published in an early issue of the JOURNAL.

Project No. 329, Experimental Antiaircraft Machine Gun Sight.—The 61st Coast Artillery (A. A.) reported that the present type of sight used with the Caliber .30 Antiaircraft Machine Gun is not satisfactory. An experimental sight has been designed and is the subject of this project.

Project No. 330, Deflection Corrections, Computation of.—Question as to whether map or corrected range shall be used. This project is of Coast Artillery Board origin and is now under study.

Completed Projects

Project No. 290, Test of Perrin Telesitemeter.

I—HISTORY OF THE PROJECT.

1. The Perrin Telesitemeter, a French sound locator of aircraft, reconditioned by the Ordnance Department at Frankford Arsenal, was received for test at Fort Monroe, Va., October 4, 1924.

2. The instrument was unpacked, assembled and emplaced October 15, 1924, and nine men were selected for training. This training was continued for a month, at the end of which time all but the four best operators were eliminated.

3. A working test of the instrument was then conducted and after an additional period of training extending over two more weeks a final test was made.

II—DISCUSSION.

4. The Perrin Telesitemeter is entirely unsuited for use with mobile units, due to its size and weight, and the excessive time required for emplacement,

assembly and adjustment. These are disadvantages which could be remedied with great difficulty, if at all.

5. There are four necessary adjustments, two of which are objectionably difficult. A separate sound source is necessary at a high point and the two dif-

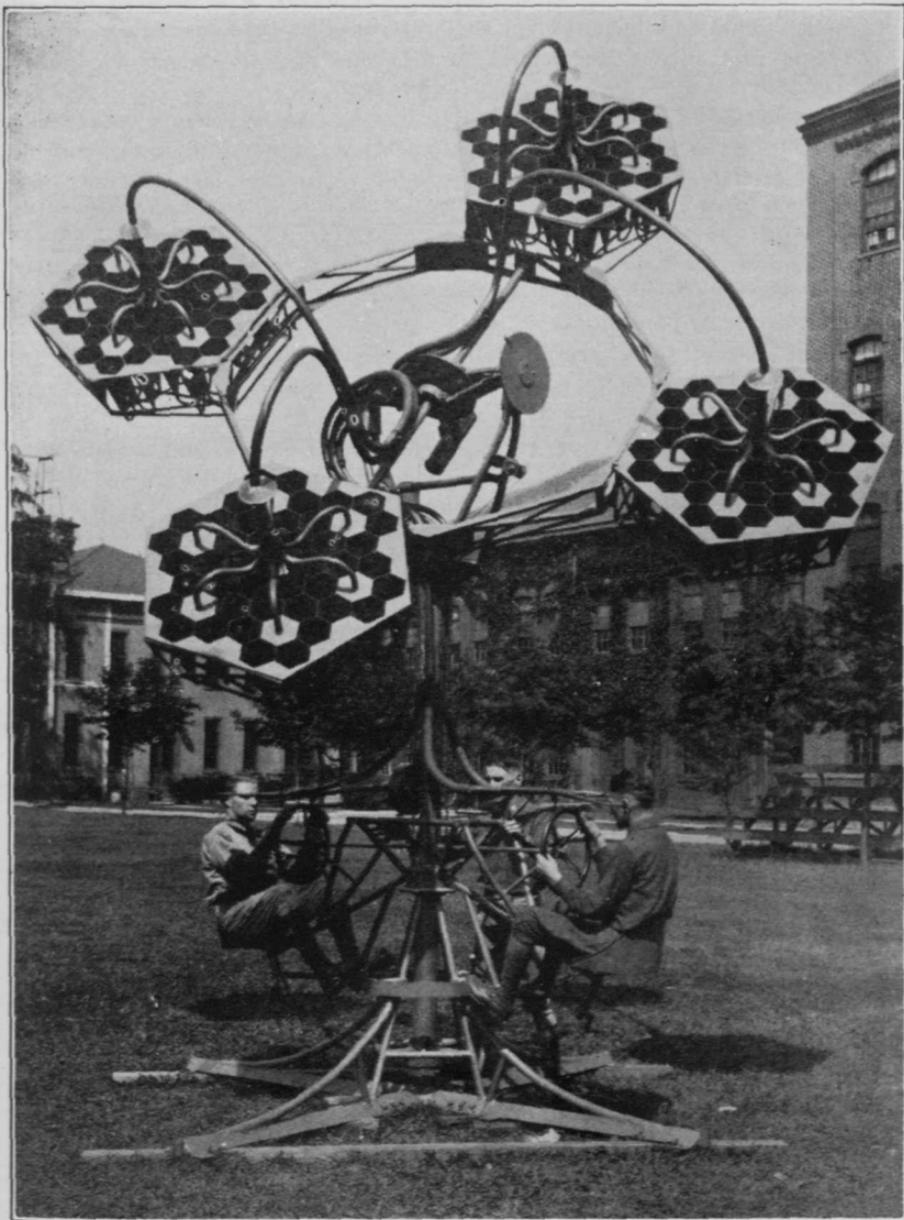


FIG. 1

ficult adjustments must be made before each period of use. The time required under the most favorable circumstances is about 20 minutes. This disadvantage might be eliminated by redesigning the instrument and mounting it upon another system of axes.

6. There are three scales to be read, two constantly and the third occasionally. The necessity for the use of three scales rather than two results from the system of geometrical axes used.

7. During the period the telesitemeter has been under test it was out of order more often than it functioned properly. However, it is believed that all such troubles could be eliminated by modifications other than complete redesign.

8. More protection from weather is necessary than is permissible under service conditions.

9. The stethoscopes are irritating and less satisfactory in every way than listening helmets. Such helmets could be substituted for the stethoscopes without difficulty.

10. When in proper working order the mechanical control of the apparatus was satisfactory.

11. The Perrin system of axes seems to have no advantage over the angular height-azimuth system and to have the following disadvantages:

a. Requires three scales instead of two.

b. More difficult adjustments requiring more time.

c. Requires that searchlights be mounted on the same system of axes or the data converted.

d. Requires slower and more complicated plotting method and special plotting paper.

e. Has large and very serious dead angles.

f. Except when target approaches directly and flies almost overhead, requires change of orientation which breaks the track and makes a reorientation of instrument and plot necessary.

12. The telesitemeter is very sensitive to wind noises which reduce its efficiency and render it inoperative in winds not too strong for bombing raids. This is due to the large number of cutting edges on the receivers.

13. The instrument has a high and satisfactory degree of accuracy on a fixed sound source.

14. The range at which a target may be followed is insufficient. This range appears to be little more than that of the ear and is given by the French as from four to six miles, under most favorable conditions. There is no known way of increasing the range of this type of instrument.

15. Tests of accuracy with a moving sound source gave disappointing results. The average errors reduced to azimuth and elevation were approximately 7 and $3\frac{1}{2}$ degrees respectively. Nevertheless, it is believed that the accuracy would have been sufficient to permit finding the target with the beam of a searchlight mounted upon the Perrin system of axes.

III—CONCLUSIONS.

16. It is believed that the Perrin Telesitemeter cannot be made suitable for use under present conditions even in connection with comparatively fixed anti-aircraft defense of localities.

IV—RECOMMENDATIONS.

17. The Coast Artillery Board recommends that:

a. The Perrin Telesitemeter be not adopted as a standard type of listening apparatus for the Coast Artillery Corps.

b. The Perrin Telesitemeter be transferred to the 61st Coast Artillery (A. A.) for continued use with the searchlight battery until required for competitive tests with such type of device as may be developed.

c. Development work continue in the effort to produce sound locating devices to meet the following requirements, for all sound locating devices:

(1) To have simple system of axes (elevation-azimuth).

- (2) To be operable in wind up to 20 m.p.h.
- (3) To have azimuth and elevation scales reading to the nearest $\frac{1}{4}$ degree.
- (4) To be so arranged as not to require reversal of instrument or

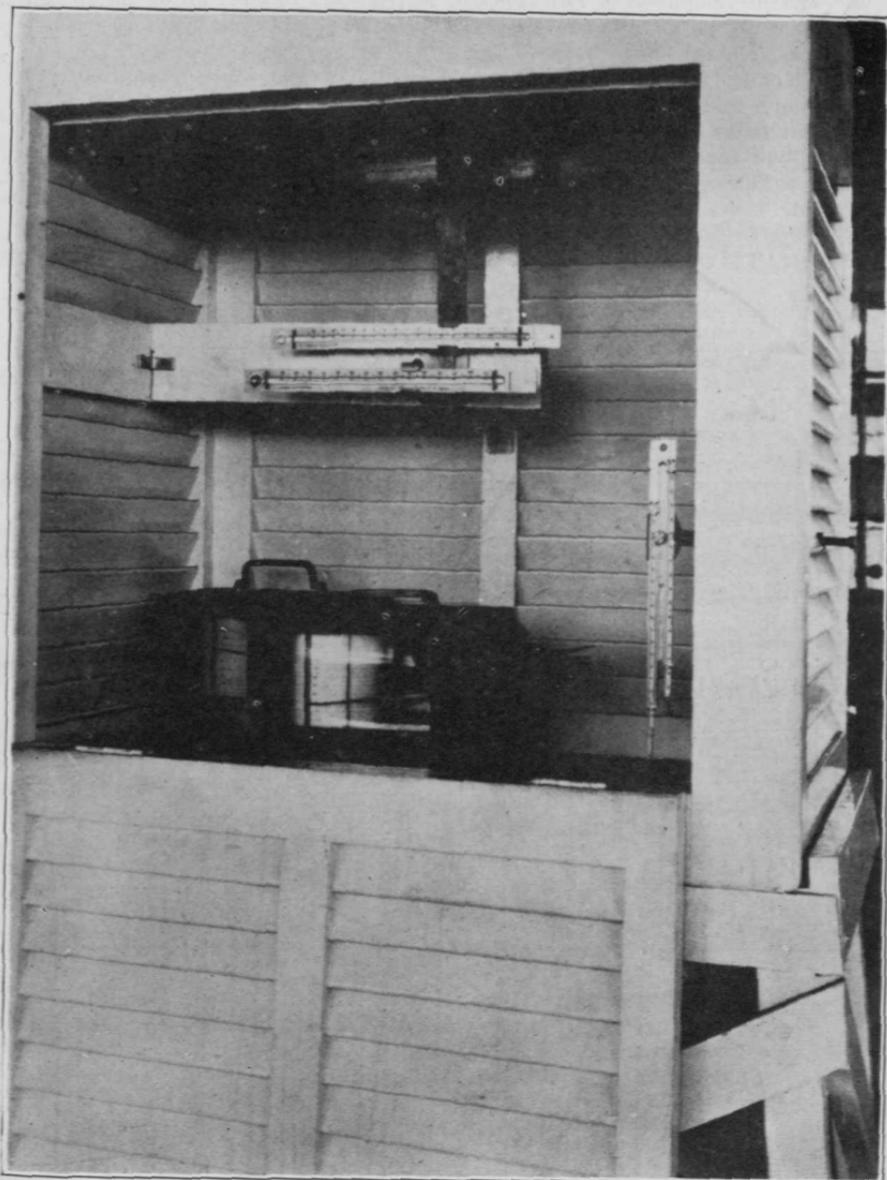


FIG. 2

reorientation when target passes nearest to zenith.

- (5) To be provided with open sight or other means of visual orientation.
- (6) To permit accuracy of observation by trained observers to within .4 degree, on a fixed sound source.
- (7) To have range of 8 miles at night.

- (8) To reproduce sound of aerial target with minimum of distortion.
 (9) To be capable of reproducing sounding frequencies as low as 100.
 (10) To permit minimum elevation of minus 3 degrees for training purposes and to pass freely through the zenith.

d. That development of two types of instruments to meet all of the foregoing requirements be undertaken, the characteristics of the two types to be substantially as follows:

(1) Mobile type readily transportable within weight limits permitted with mobile troops and easily emplaceable within 30 minutes. Separate truck or trailer permissible if necessary.

(2) Type for use in semi-permanent mounting for defense of localities with greatest possible accuracy and without limitations as to time of emplacement and weight.

COMPARATIVE TEST OF ROTOR AND SLING PSYCHROMETER
 AT METEOROLOGICAL STATION
 FORT MONROE, VA.

Time	Date	Relative Humidity		Time	Date	Relative Humidity	
		By sling %	By Rotor %			By sling %	By Rotor %
9 AM	10/13/21	74	71	9 AM	10/21/24	71	76
11 AM	"	69	69	11 AM	"	56	60
1 PM	"	61	56	1 PM	"	67	67
3 PM	"	55	51	3 PM	"	58	58
9 AM	10/11/21	77	77	9 AM	10/21/24	64	64
11 AM	"	53	53	11 AM	"	61	61
1 PM	"	48	44	1 PM	"	43	43
3 PM	"	45	42	3 PM	"	58	58
9 AM	10/15/24	73	3	9 AM	10/22/24	67	67
11 AM	"	70	70	11 AM	"	57	57
1 PM	"	57	57	1 PM	"	53	53
3 PM	"	51	44	3 PM	"	58	58
9 AM	10/16/24	69	74	9 AM	10/23/24	73	67
11 AM	"	75	75	11 AM	"	62	62
1 PM	"	61	61	1 PM	"	63	63
3 PM	"	80	80	3 PM	"	65	65
9 AM	10/17/24	79	89	9 AM	10/24/24	75	68
11 AM	"	80	80	11 AM	"	51	54
1 PM	"	74	69	1 PM	"	51	51
3 PM	"	69	65	3 PM	"	60	55

FIG. 3

e. That development of the following additional devices be undertaken by the Ordnance Department:

(1) Simple plotting devices of sufficient accuracy to permit pointing searchlights at moving aerial targets.

(2) Methods and formulae for correction for wind, refraction, and sound lag.

(3) Plotting devices to furnish data for pointing guns by sound on targets not illuminated by searchlights.

(4) Simple sound source for training listeners when aerial targets are not available.

f. That consideration be given to development and mounting on the searchlight of a device similar to the British Ring Sight which will permit the operator of a light, pointed approximately by sound, to search in the neighborhood of the direction at which the beam is pointed.

V—ACTION OF THE CHIEF OF COAST ARTILLERY.

First Indorsement.

War Department, O. C. C. A., December 27, 1924—To Chief of Ordnance:

The recommendations of the Coast Artillery Board contained in paragraph 17 of Coast Artillery Board Project No. 290 are concurred in.

Project No. 289, Rotor for Psychrometer.

I—HISTORY OF THE PROJECT.

1. A rotor for whirling the psychrometer has been designed to replace the sling. The Coast Artillery Board has been asked to test the device.

II—PROCEDURE.

2. The rotor was set up at the Meteorological Station at Fort Monroe and tested. The method of mounting is shown in Fig. 2.

III—DISCUSSION.

3. Fig. 3 is a table of results of simultaneous measurements of the relative humidity made by the sling and rotor psychrometers. The mean values of all measurements made by each of the two methods differ from each other by less than 1 per cent, a difference which is negligible.

4. The rotor type was found to be better than the sling type for inexperienced observers. Readings were made easily and little chance for breakage existed when the rotor psychrometer was used. In order to prevent unauthorized persons from turning the rotor unnecessarily by means of the handle which projects outside of the instrument shelter, it is believed that the crank of the rotor should be made detachable.

IV—RECOMMENDATIONS.

5. It is recommended:

- a. That the rotor for psychrometer be adopted and issued to the service.
- b. That consideration be given to making crank of the rotor detachable.

V—ACTION OF THE CHIEF OF COAST ARTILLERY.

Third Indorsement.

War Department, O. C. C. A., November 14, 1924—To Chief Signal Officer:

The recommendations contained in paragraph 5 of Coast Artillery Board Project No. 289 are concurred in.

BOOK REVIEWS

The World Crisis of 1915. By the Rt. Hon. Winston S. Churchill, First Lord of the Admiralty, 1911 to 1915. 578 pp. Charles Scribner's Sons. Price, \$6.50.

Mr. Churchill sees in 1915 the year of lost opportunities, the year of mistakes that prevented confining the conflagration to enormous but not uncontrolled limits. With the beginning of 1915 we find the trenches running from the Alps to the sea, with no possibility of maneuver. The British Grand Fleet had yet to discover a way to entice the German High Seas Fleet from its fortified harbors. But if a deadlock existed in the west, events were transpiring in the east that were eventually to place the Russian armies in a precarious position.

The cost in lives and munitions of a frontal attack being prohibitive, how best could Britain employ the Fleet in supporting actively a flanking operation? Two plans offered themselves, one an amphibious offensive in the Baltic with the object of turning the enemy's right flank, and the other a similar offensive against Turkey, an ally who had not yet profited to any large extent by its contact with German efficiency for organization. Both plans were based on the conviction that the western front would undergo no decisive change for some time to come; both aimed at turning a hostile flank; both aimed at succoring Russia. The southern operation would be far less hazardous, it could be broken off at any time the Channel Fleet was needed elsewhere, it would if successful eliminate Turkey, improve Allied prestige in the Balkans, and open communications between the western allies and Russia.

The final choice of the southern flank as a means of reaching a decision resulted in the costly efforts in the Dardanelles and on the Gallipoli peninsula. Originally conceived as a purely naval operation with the utilization of a fleet the greater part of which was due for scrapping, vacillation, half-heartedness, governmental inefficiency, insufficient staff work finally developed this enterprise into a colossal expenditure of man-power in a dismal failure. The complexity of forces acting for and against its success are analyzed with a clarity of perception and expression of which only Mr. Churchill is capable.

The author's treatment of the Dogger Bank engagement of January 24th is accomplished in truly dramatic style. How a 12-inch shell striking a vital spot in Beatty's flagship and saving the German battle cruisers from almost certain destruction is narrated in delightful style. In a ratio of 4 to 5 the Germans preferred to retire behind their torpedo areas. Mr. Churchill uses the Dogger Bank engagement as an argument for his choice of the Firth of Forth as a base for the Grand Fleet rather than Scapa, and as a vindication of certain of his policies in the Admiralty.

The author's treatment of the bombardment of the forts in the Dardanelles is particularly attractive to an artilleryman and the lessons derived from the operation are extremely well analyzed. Herein is written one of the latest chapters of the history of land-sea artillery duels. In spite of the allied losses of March 18th, the combined fleets were disposed to continue the engagement, but upon learning that the land forces would not be in a position to support the fleet's advance for almost a month, Admiral de Robeck saw his communications in danger once the Fleet entered the Marmora. By this time strategic surprise was lost forever and

General von Sanders had four whole weeks of allied inactivity in which to organize the defenses of the peninsula. The account of the Gallipoli campaign is developed broadly and is carried throughout its decline and abandonment in the winter of 1915. The treatment of the submarine operations in the Dardanelles is particularly attractive.

Mr. Churchill by his attractive style has made the volume highly readable and by his accuracy of fact and impartial statement of the case has made the work an authority of high value.

Tactics and Technique of the Separate Branches. The General Service Schools, Fort Leavenworth, Kansas. 1923. Two volumes. Paper. 6"x 9". Approximately 225 pages to each volume. Price 50c per volume.

These volumes are compiled primarily for use as textbooks by officers taking the Command and General Staff Correspondence Course (Combined Arms, Course D)—a correspondence course for the instruction of senior officers of the National Guard and the Organized Reserves.

The purpose of Volume I is to furnish commanders and staff officers with a general knowledge of the powers, limitations, and tactics of the branches (arms) organically a part of, or frequently attached to, a division and an accurate knowledge of such details of the organization, equipment, and technique of these branches as affect a commander's decisions and orders.

Volume II is published in order that staff officers of units larger than a division, and other officers in general, may be similarly informed with respect to the auxiliary units of special types which form parts of corps and armies or are frequently attached to these units or to divisions. This volume discusses the materiel and equipment, the organization and command, and the technical functions and general tactical employment of corps troops, army troops, and the units in the General Headquarters Reserve.

Foibles and Fallacies of Science. By Daniel W. Hering, C. E., Ph.D., I. L. D. D. Van Nostrand Company, New York. 5½"x 8". Illustrated. 294 pp. Price, \$2.50.

This is an extraordinarily interesting and readable account of vagaries, theories and hoaxes that once thrilled the scientific mind, but which are now practically all discarded. Future discoveries, however, may prove that transmutation of metals is not a fallacy, while the generally accepted Einstein Theory is. The chapter on Divination is particularly good, and the one on Geographic Mania contains an interesting account of the Cook-Pearry alteration. The appendices present ample proof that this is the same old world where "all of the people like to be fooled some of the time."

Archangel—The American War With Russia. By A. Chronicer. A. C. McClurg and Company, Chicago. 6"x 9". 216 pp. Price, \$2.00.

This book is a welcome addition to the small amount of literature dealing with the North Russian Expedition. It is not an adequate presentation of the subject, but to read it will give one a pretty fair, though elementary, conception of American activities in Northern Russia in 1918-'19.

Three chapters deal with the historical events leading up the Russian Revolution and the reasons for and the plans of the allied campaign. Six chapters are devoted to the "six principal American battlefronts. . . . Each of these in the war of North Russia formed a distinct episode quite apart from the others." This isolation of the various units was no doubt one of the prime sources of much suffering and discontent among the American soldiers.

One value of the book lies in the accuracy with which the author portrays the thoughts and feelings of the American soldier in Northern Russia. However, he misinterprets him with reference to the withdrawal. He says the soldiers sensed the "disgrace" of it. On the contrary, the soldiers were, as Roosevelt would say, "delighted" with thoughts of leaving Russia.

The author brings out time and again that the men did not know what they were fighting for and that the officers could not enlighten them. There was, he says, "the want of a definite moral purpose."

The *Chronicler* is often quite tart in speaking of the British. But he writes in glowing terms of Major General Sir William E. Ironside, commander-in-chief, referring to him as "this fighting man, whose fighting stuff had been welded among the Northwest Mounted Police of the Canadian frontier."

What effect did the Armistice have on the American soldier in northern Russia? "He heard of the cessation of blood-letting in France and Belgium, but for many desolate, despairing months, he stood to his guns, witnessing his comrades killed and mutilated, the wounded lying in crude, dirty huts, makeshifts of dressing stations, then in sledges, dragged many excruciating miles over the snow to the rear."

The author gives a beautiful picture of Russian hospitality. "Under their humble roofs, the patient people revealed a hospitality that was moving in its utter absence of guile. The cherished samovar would be brought forth to kindle the uninvited guests with steaming tea, and in the evening all the villagers would troop to the crowded huts to doff their hats, and gaze with never wearying gaze at the strangers from the far fabled land of miracle and hope."

The *Chronicler* closes his book with a long look into the future. "Years from now moujik grandmothers will group rapt children around the oven stoves to tell them of the strange Americanskis who once came so many miles in the dread winter cold to help afflicted Russia."

Modern Military Map Reading and Sketching. By Captain Frank J. Pearson. The Infantry School, 1924. 6"x 9¼". 288 pp. Price, \$2.50.

A complete, comprehensive, practical, generously illustrated, up-to-the-minute treatise, based on the map reading and sketching course at The Infantry School. Not a compilation of Training Regulations or extracts from other manuals, but an entirely new, simplified treatment of the subjects, with more than a hundred original illustrations by the author. Technical terms are avoided. Prepared for the student in language he can understand. Confusing subjects, usually difficult to grasp and understand, are made easy. Includes a thorough treatment of the coordinate system now used on the fire control maps, aerial photography and sand table. Problems embodying the instruction follow each chapter. A special part for instructors prescribes schedules and equipment and outlines points to stress as well as those to avoid. Appendix contains conversion tables and valuable information. Thoroughly indexed.

The Art of Public Speaking. By Albert J. Beveridge. Houghton, Mifflin Co., Boston. 1924. 4¾"x 7¾". 67 pp. Price, \$1.00.

A concise and interesting article on a subject of interest to everyone. In his work Senator Beveridge had something to say, believed it to be true, prepared it thoroughly, stuck to his subject, and was clear, fair, and brief. All concerned, both audience and speaker, should thank the author for each speech prepared and delivered as recommended. Would that more speakers knew the contents of these sixty-seven pages.

Napoleon—An Outline. By Brigadier General Colin R. Ballard, C. B., C. M. G. D. Appleton and Company, New York. 1924. 6"x 9". 325 pp. 26 sketch maps. Price, \$5.00.

This work is published to meet the demand for a complete and concise appreciation of the military genius of Napoleon. It presents the history and strategy of his campaigns in such a way as to be easily understood by the general reader. The author has a clear and pleasing literary style which is added to by a dry humor which permeates the book. It is especially easy to read. Much is written on the character of the man himself, whom the author has stripped of all the

glamour that usually surrounds Napoleon. The reader is inclined to remember in this connection that General Ballard, the author, is an Englishman—not a Frenchman. The author himself was Professor of Military History at the British Army Staff College before the World War, and it is very evident, is a deep student of Napoleonic literature.

The first five chapters deal with Napoleon, the Adventurer; these include his Egyptian campaign. The next eleven chapters deal with Napoleon, the Man of Destiny; these include his career to embrace the Battle of Wagram. The next eight chapters deal with Napoleon, the Man Against Destiny; these continue his life until the time of his death. The five concluding chapters of the book deal with *Dramatis Personae*, including such persons as Josephine, Napoleon's brothers and sisters and some of his marshals.

Although more lines of print have been devoted to Napoleon Bonaparte than to any other man who ever lived, and the events of his life make fascinating reading, yet most people fail to reap the full benefit of such readings because of the confusion that usually exists in their minds as to the sequence of his campaigns and other leading events of his life. The book has for its avowed object the presentation of the chapters of Napoleon's life in concise sequence, and in this the author has succeeded uncommonly well. On the whole the reader is apt to be rather shocked at the author's opinion of Napoleon's character and in some cases of his military ability, but in retrospect the reader has to admit that the author probably has been eminently fair. It is a book worthy of a place in the library of every army officer.

The Depths of the Universe. By George Ellery Hale. Charles Scribner's Sons, New York. 1924. 5"x 8". 98 pp. Price, \$1.50.

From an interesting resume of early astronomical progress the author proceeds to his story of recent discoveries at Mount Wilson, discoveries which have vastly expanded our conception of the scale of the stellar universe and throw new light on the evolution of the stars. In an admirable fashion the author describes and illustrates Dr. Adams' spectroscopic method of determining the distances to stars removed from the earth by thousands of light-years. Other contents of the book include Shapley's illuminating studies of remote globular star clusters, Barnard's recognition of cosmic dust in the dark nebulae, and the discovery by the author and his associates of the curious laws of solar storms.

Written in a direct style and handsomely illustrated throughout, the book can hardly fail to be appreciated by anyone interested in either astronomy or photography.

The First Time in History. By Anna Louise Strong, Ph.D. With a preface by L. Trotsky. Boni and Liverwright, New York. 5½"x 7¾". 249 pp. \$2.00.

All students of sociology and political reform will read Anna Louise Strong's book with interest. All advocates of Communism and Soviet government will hail it with delight and the average reader will find it interesting and instructive reading. To the reviewer it seems that Russia as depicted in its pages is almost "too good to be true." Chapters on the marvelous strides they have made in government by the people as a whole—of their advancement in educational methods—in farming—reconstructing their social life and practically obliterating all racial and religious friction. We of this country have been led to believe the Russian peasant to be the most illiterate, superstitious and animal-like of all peasants in the world. Yet here in the brief space of two years we are shown an ideal state, working for the common good of the fatherland and for the ideals of a soviet government.

Can a people who for centuries have not only been held down as serfs, but have also been denied the simplest forms of education, divided by a multitude of dialects and racial differences, suddenly amalgamate themselves to the extent of making their country a Utopian dream come true? And all in the space of two short years?

If all Miss Strong claims for Russia is indeed an accomplished fact, and not merely propaganda for communism, then all nations can profit by watching Russia. However, until more evidence of the success has been brought forward, one cannot help being sceptical. Propaganda for the Reds takes many forms, and it is not always easy to detect, but somehow, as I said before, it all sounds *too good*; the lady doth protest too much.

However, it is a book to be read and read carefully. For it shows the plans and hopes of a nation which in future years will be a power with which all the world must reckon. Rich beyond dreams in mineral and agricultural resources which will be developed on the most modern and scientific lines, as they have the benefit of all modern inventions and instruction at the very beginning of their country's freedom. No wonder that Russia and Russian Oil in particular, is a bone of contention among the nations of Europe, and small wonder that the Soviet government wishes to keep it Russian.

War: Its Nature, Cause and Cure. By G. Lawes Dickerson. The MacMillan Co., New York. 5¼" x 7¾". 155 pp. Price, \$1.50.

This book is an impassioned appeal to stop War. In style it is oratorical, easy to read. The author sets forth his views with driving force. It was written by an Englishman primarily for Englishmen, but its appeal is not restricted. It is of interest to thinking men of any nationality. The author assumes, and not without reason, that another World War will be a World Catastrophe—perhaps the end of civilization—certainly a calamity from which not only the participants, but all the inhabitants of the earth will suffer greatly and from which recovery will be slow, painful, and perhaps not even completely possible.

The nature of war he describes with fervor—stripped of all glamour, and the picture is not attractive, and neither is it overdone—for we will agree with the author's statement that War is the greatest of all evils.

The cause of War he ascribes to the desire of all states to hold what they have and to take what belongs to others, and next, the armaments produced by that situation. Few wars are fought only for Right, Peace and Civilization—these motives serve as camouflage for the deeper more real motives which are the desire for power or self-aggrandisement, the desire for territory and markets. He analyzes carefully and in detail the causes of the World War to show that the deeper motives were these desires, and that the nobler appeal of fighting for Peace, Right and Civilization served only as a cloak. The call for fighting men meets with enthusiastic response when based on high moral grounds.

He admits the disinterestedness of the United States in our participation in the World Struggle and that this country was actuated by noble rather than selfish motives, but that does not affect the fact that the underlying cause of the great struggle were desires for power, territory and markets on the part of European nations. He credits America, too, and especially President Wilson, with pointing the way toward World Peace. This, he contends, can only come if all men, realizing the horror and evil of war, and the base motives that cause war, join in insisting that such a conflict shall never occur again. The cure, he points out as being through a League of Nations, including all states, and having real power to determine all issues between its members. Settlement by agreement must be substituted for settlement by force and nations must abandon what has heretofore been the sole motive of their policy, the extension or the maintenance of their territory and their power.

The author is very forceful, and carries his readers along with a sweep, but he is not always quite convincing, especially after careful analysis of some of his arguments. Taken as a whole, though, this little work is an earnestly conceived endeavor to promote peace in the world and to eliminate War. The author is not unreasonable or radical in his thoughts or in his remedy as is evidenced by the progress the world is making in the establishment of a League of Nations and a World Court which may eventually develop into the powerful agencies for World Peace their founders conceived they might become.

A History of the Foreign Policy of the United States. By Randolph Greenfield Adams, Ph.D. The MacMillan Co., New York. 1924. 6" x 9". 490 pp. Price, \$3.50.

"The aim of this volume," writes Dr. Adams, "is to introduce the reader to the elements of American foreign policy," and he has not failed to make good his aim.

Internal political development is portrayed step by step with the development of foreign policy and due consideration is given to the effect of changing industrial and economic conditions.

The study is in the main judicial and non-partisan, but the author has very definite views, and maintains a consistent attitude. That attitude may best be shown by the following:

These were European made wars. But in every case from 1689 to 1815 there was not a single great European War (and there were seven of them) in which American lives were not lost, American property was not destroyed, and in which American soldiers and sailors were not involved. George Washington's farewell address may have been a pious hope that America could steer clear of European quarrels, but it certainly was not a statement of that as a fact. * * * This old world diplomacy had far-reaching consequences, and the idea that America can stay out of European affairs has no basis in fact, for America has never done so from the time to the Spanish Armada to the treaty of Versailles in 1919.

Beginning with "America as a Pawn of European Diplomacy," following our foreign relations during the Revolution, and under the articles of Confederation, and taking a "fresh start" under the Constitution, the diplomacy the infant republic is shown as following its "Manifest Destiny" to the Pacific and the Rio Grande, with the War of 1812 as a "useless digression." Then our special policy in the American hemisphere is taken up and the reader brought to the Monroe Doctrine and the beginning of Pan-Americanism. From this point the chapter headings furnish a clear outline:

- X. A Century of Misunderstanding with Mexico.
- XI. One Hundred Years Successful Diplomacy with Great Britain.
- XII. Another White Man and His Burden.
- XIII. Creeping Down the Caribbean.
- XIV. Opening and Shutting the Door to China.
- XV. Rivalry with Japan for the Pacific.

From Chapter XVI, Dr. Adams deals with the events leading up to and following the Great War. Here the author has been extraordinarily successful in avoiding the display of partisanship.

As may be seen, the arrangement of the work is not strictly chronological, but logical sequence is maintained and the reader's attention never wearied. The literary style does not perhaps conform to critical standards, but is eminently readable, and is shot through with flashes of true wit.

Dr. Adams' unusual ability to summarize a complicated situation in a pithy paragraph or sentence has led him into a few very positive statements of doubtful accuracy or unquestionable inaccuracy. For example:

The Monroe Doctrine thus embodies the principles of American Diplomacy which John Quincy Adams had been so carefully building up for five years and it is to him that the real authorship of the Doctrine ought to be attributed.—(Page 178.)

This is by no means confirmed in the "Memoirs" of John Quincy Adams. Again:

Although the orators from the Southern States had insisted that each state was "sovereign and independent," this position had always been unsound under international law. * * * The only other position in which the southerners could be regarded was as traitors or rebels against authority.

It is hardly necessary to point out that a bloody war was fought to prove that the southern states in giving up their independence had not retained the right to regain it, i. e., to secede. It is but fair to point out that the outworn sectional intolerance displayed here is exceptional.

Here is an example of the exaggeration of which a non-military and non-naval student of the work of Admiral Mahan is so frequently guilty:

"Sea power," Admiral Mahan tells us, "is the *dominant* and *decisive* factor in warfare." (Reviewer's italics.)

Only a few of the many pictures and quotable passages can be given here:

Mexican statesmen seem to have inherited the Spaniard's love of logic and quibbling, and in negotiations seem more interested in scoring an intellectual victory than in getting something done. The Anglo-Saxon has learned that it is possible to be logically right and actually wrong.—Page 189.)

* * * But the agreement was amended and talked to death in the United States Senate, where it seems there can always be found some members who actually do not want our relations with England to become too cordial.—(Page 245.)

It is a mistake to leave out of the story the influence and effect of the daring and audacious men whose motives are neither gain nor glory, but sheer excitement. * * * Such were the men who joined Sir Francis Drake. * * * Such men explored North and South America. * * * Today we find the same breed of men fighting football battles in the college coliseum, for the semi-professional, migratory college athlete of today is of the stuff of which were made the filibusters of the past.

Two paths lie before the people of the United States. One is indicated by such men as William Randolph Hearst, who attacked President Coolidge's mild recommendation on the World Court by saying that "the people of the United States are most determined * * * to keep entirely free from any further European complications." The other path is pointed by such men as Walter H. Page, who drily commented, "I see little hope of doing anything so long as we choose to be ruled by an obsolete remark made by George Washington."

The present military policy of our country is such that almost every army officer from time to time is called upon to make public addresses or lectures on the subject of military preparedness. There can be no clear understanding of our military policy without knowledge of our foreign policy past and present, and the army officer who is not well informed on the history of our foreign relations, is not really competent to discuss intelligently our military policy. In short, a work like the present one (and a better would be hard to find) may be said to be indispensable to the technical education of the American Army Officer.

Swimming Soldiers. By Captain Elbridge Colby, Washington, D. C. The Quartermaster Association, 1924. 129 pp. Price, \$1.25.

The desirability and importance of soldiers knowing how to swim has been demonstrated time and again. Swimming is a military necessity. The occasions when the soldier who swims will survive and the one who does not will perish are inevitable. The mobility of troops is no less important than shooting, and exigencies arise when soldiers must know how to swim if they are to gain their objective. In his *Swimming Soldiers*, Captain Colby, who was formerly instructor in swimming at the Infantry School and manager of the Columbia University swimming team, gives the reader a new appreciation of the importance of having swimming soldiers. His interesting publication shows how to teach soldiers swimming, and indicates methods of promoting and regulating swimming in a command. It points out means of utilizing swimming for military purposes. Over a hundred drawings illustrate in detail all the strokes, most of the dives, and life saving approaches, breaks, and carries.