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The Coast Artillery Garrisons in Panama

(By an Officer of the Coast Artillery)



CONSIDERATION of the Canal Zone as a coast artillery station must be divided into two parts as there are essential differences in the life in the two coast defenses of the Panama Coast Artillery District. The description of the two coast defenses will therefore be given separately; but first of all some of the main points of difference will be given for purposes of a general comparison. It should be pointed out, however, that it is a happy fact that those living in one coast defense actually prefer their own side of the Canal to the other.

ATLANTIC SIDE, THE COAST DEFENSES OF CRISTOBAL

The defenses are situated in a seaport with all the water and terminal advantages of a port of entry. As the gateway to, and an important distributing point for South America; as the Atlantic entrance to the Canal, and the principal port of the Canal Zone, Cristobal-Colon is a city of about 25,000 inhabitants, its deep water harbor and extensive piers accommodating a varied and large assortment of shipping from all corners of the earth. The Atlantic side has the greater rainfall, more sea-breeze and a smaller diurnal variation in temperature. It is 50 miles distant from Balboa, the Pacific terminus of the Canal, where Department and District Headquarters are situated, as well as the seat of the Canal Zone civil government. The artillery garrison, the size of that of the Coast Defenses of Balboa, is divided into three forts, the Headquarters of the Coast Defenses and the Headquarters Company at Fort de Lessups, and the remainder of the command distributed between Forts Sherman and Randolph. Fort de Lessups is situated on the waterfront facing the harbor, at a central point in the city of Colon. Fort Sherman is across the bay; transportation only by boat. This extensive reservation is situated on the edge of the jungle, and is essentially tropical. Randolph is situated near the Naval station and Army

flying field, 7 miles from the city, and is connected by rail and highway with the twin cities Cristobal-Colon.

PACIFIC SIDE, THE COAST DEFENSES OF BALBOA

Though on the water Balboa does not give one the feeling of being at a seaport. The docks are situated at a remote section of the city. The only shipping to be seen is that which passes in transitting the Canal. The Pacific side has about one half the annual rainfall of the Atlantic side; trade winds and a brisk breeze prevail in the dry season. There is a greater daily range in the temperature. The nights are cooler and the days are probably warmer. The Coast Defenses of Balboa have all the advantages and disadvantages of being near Panama (seat of the republican government); Balboa (the headquarters of the Canal Zone civil government); Quarry Heights, a section of Balboa, and the Headquarters of the Panama Canal Department; and at Fort Amador, the Coast Artillery District Headquarters. The Coast Defenses of Balboa consist of one large post, Fort Amador, connected by causeway, railroad and highway, with the "Fortified Islands." Amador is a large post; has a fine 18 hole golf course; and splendid roads leading to all points on the Pacific Side.

With this introductory comparison of the Atlantic and Pacific sides, the two coast defenses will be described by different officers, each from the view point of one stationed therein, and each presenting what you may some day consider a rather rosy picture.

THE COAST DEFENSES OF CRISTOBAL

Location: The Coast Defenses of Cristobal are situated at the Caribbean (or Atlantic end of the Panama Canal). Due to a configuration of the Isthmus of Panama, the Canal cuts the land in a generally south-easterly direction, hence the Atlantic terminus or origin of the Canal is known as the Northern Entrance, the Pacific the Southern Entrance. The Atlantic Entrance is actually west of the Pacific Entrance.

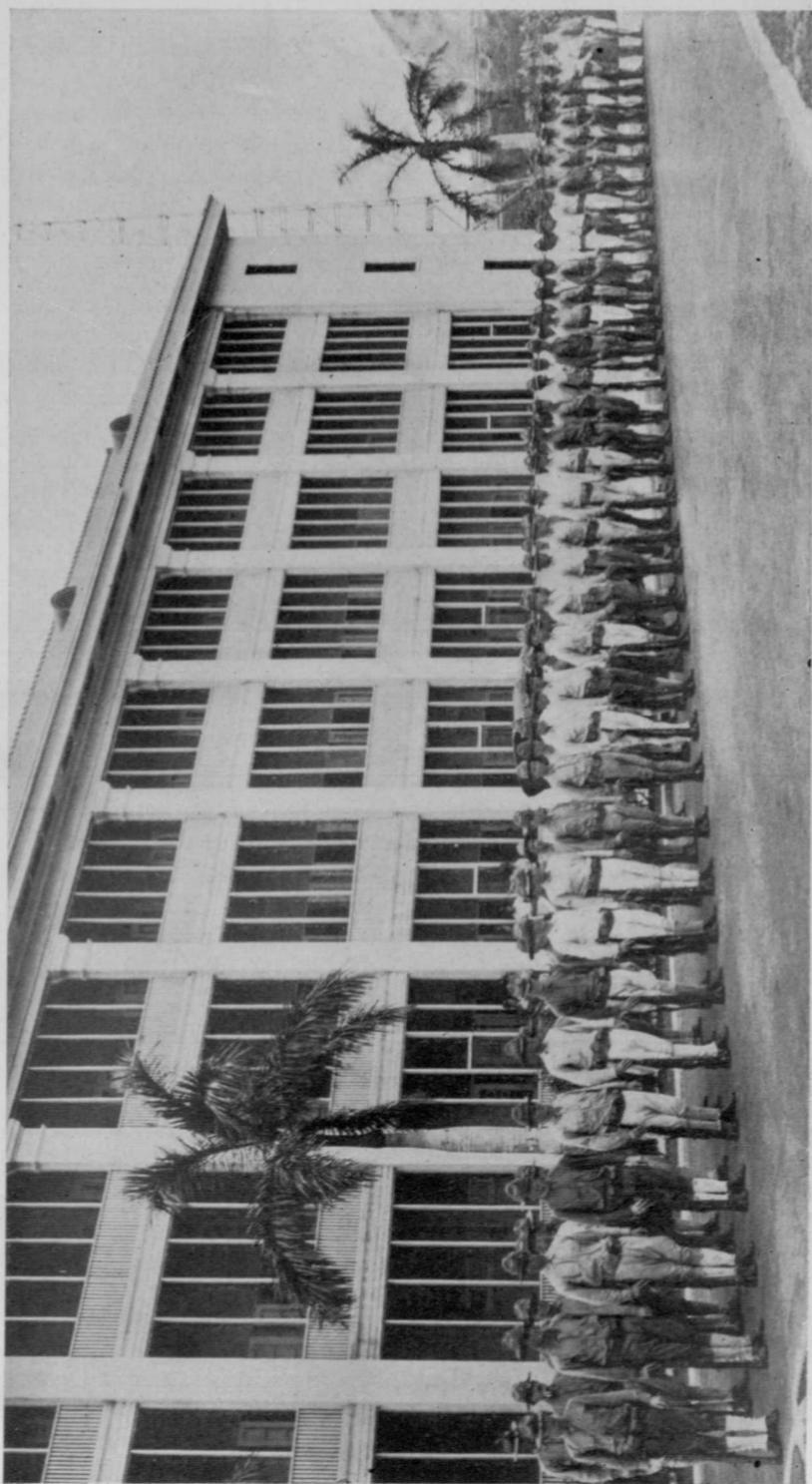
Description: The Coast Defenses of Cristobal comprise three forts: Sherman on the western side of the breakwater enclosing Limon Bay; Randolph at the eastern extremity of the breakwater; and de Lesseps situated on a central point of land inside the breakwater. A number of harbor boats, a mine planter, launches and small craft are attached to the command. Fort Sherman is dependent upon water transportation. Numerous outlying stations and anti-aircraft sites dot the reservations which extend for many miles along the shore line on each side of the Canal. The Coast Defenses of Cristobal form a very extensive command. Fort Sherman is the largest post in the defenses. All elements of Coast Artillery are found in the command.

The city of Cristobal-Colon occupies a large island which has been

linked by fill with the mainland. Cristobal is the American; Colon the native city. Fort de Lesseps is situated in the city, occupying the advanced point facing the mouth of the breakwater, its Battery adjacent to the swimming pool, and next to the Washington Hotel which is said to be one of the finest hostleries in Central or South America. The Colon Hospital, Quarantine and Naval Radio Stations extend north along the shore from Fort de Lesseps in the direction of Fort Randolph, which is separated from Colon by a broad inlet. South from Fort de Lesseps, docks extend for about one-half mile to the "mole," in the direction of the Canal entrance proper, and parallel to the water front and business section of the city of Colon. A great mole or jetty, juts out into the bay from the city of Colon. Five piers extend out from the mole obliquely, and these accommodate the heavy shipping that uses this port. These docks can each accommodate the greatest vessel that floats. A small island opposite the piers, accommodates the local coaling docks. The loading machinery has a capacity which exceeds that of any other plant in the world. On the mainland back of the coaling plant, is the suburb of Mount Hope, where lie a large part of the local and municipal utilities; the railroad yards, the refrigeration and cold storage plant which supplies the whole Zone; the reservoirs and filtration plants, the Cristobal Shops, dry dock and ship yards, the local baseball league grounds, and in the country beyond, the Cattle Industry pastures, dairies, hog ranch and incinerator. The road from Colon to Gatun (the first locks in the Canal system) and the route to Fort Randolph, branch off at Mount Hope. On the way to Randolph which is seven miles from the city, one first passes France Field, the Army Air Service post; then Coco Solo, the Naval Submarine Base and Air Station; finally arriving at Fort Randolph at the end of a fine asphalt highway which extends all the way to Colon.

Transportation: The Army maintains transport service between Army Base, Brooklyn, N. Y., and Cristobal, Canal Zone. The sailings vary between four and six weeks.

Local communications consist of the Panama Railroad and an excellent highway system. There is no highway across the Isthmus. The Panama Railroad connects Colon (Cristobal) and Panama City. The route leads from Colon to Mount Hope; to Fort Davis (station of the 14th Infantry); Gatun (the first locks of the Atlantic Entrance, where the Field Artillery is quartered). Thence the railroad parallels Gatun Lake to Pedro Miguel (lock city); Miraflores (lock city); Corozal (station of Engineers, Q. M. Depots, Ordnance Arsenals and various staff troops); to Fort Clayton (garrisoned by the 33rd Infantry); to Balboa and Panama City, Camp Gaillard, Infantry Brigade Headquarters and home of the 42nd Infantry is across the Canal from Pedro Miguel. Fort Amador three miles from Balboa, is the Headquarters of the Panama Coast Artillery District and of the Panama Canal Division. The headquarters and the garrison of the Coast Defenses of Balboa is also situated



HEADQUARTERS BUILDING, FORT AMAADOR, C. Z.
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there. Quarters of the Panama Canal Division, Quarry Heights, Department Headquarters, are situated a mile up the hillside from the Balboa station.

Returning to the Atlantic side, a branch line railroad from Fort de Lesseps runs over the main Panama Railroad tracks to Mount Hope, thence north to France Field, Coco Solo and Fort Randolph. Seven round trips are run daily. Harbor boat service links Forts de Lesseps and Sherman. Four round trips are made daily; with night trips on holidays, Wednesday, Thursday and Saturday, and Sunday nights. The trip by railroad from town to Randolph, and the boat trip between town and Sherman each require 25 minutes. A military railroad at Fort Sherman leads to the outlying stations on the reservation. This line runs through the heart of the jungle. A mile by trail from the end of the jungle is situated old Fort San Lorenzo, ancient citadel at the estuary of the Chagres River, famed as the shipping port and harbor of Spanish galleons, in the old days of the Spanish Main.

Commercial steamship lines between United States ports and Cristobal, C. Z., operate as follows:

New York { The Pacific Steam Navigation Company.
(Sailings: Monthly.)

New York { The Panama Railroad Company.
(Sailings: Every 10 days.)

San Francisco {
Baltimore { ... The Grace Line.
New Orleans { (Sailings: Approximately every 5 weeks.)

New York { The Grace Line.
(Sailings: Every 3 weeks.)

New York {
Baltimore {
Norfolk { ... The Pacific Mail.
San Francisco { (Sailings: Approximately every 18 days.)
Los Angeles {

New York { The White Star.
—tourist { (Sailings occasionally.)

Boston {
New Orleans { ... The United Fruit Company.
New York { (Sailings: One each week.)

Upon arrival of persons who are to live on the Canal Zone (all posts are on the Zone, as distinguished from the Republic of Panama) the customs inspection is first required. Automobiles and other important articles upon which the Panamanian Government depends for duties, must be entered thru the Canal Zone Government on certified free entry blanks, a more or less formal matter. The Canal Zone is a duty

free port of entry. Returning to the United States, duty is payable on all goods purchased off the Canal Zone unless they have been in purchaser's possession one (1) year, and have thus become household or personal property.

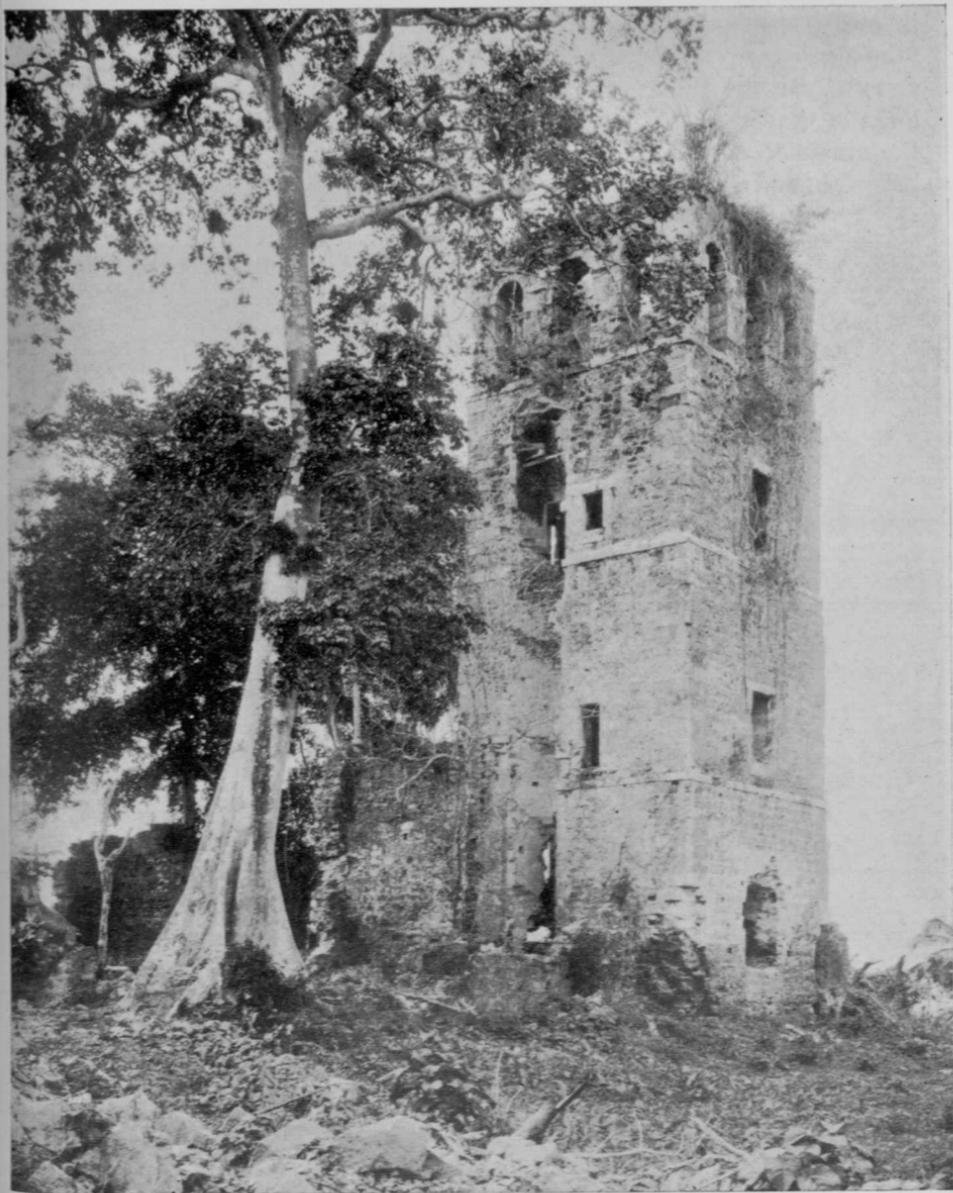
Climate: To keep fit in the tropics one must take frequent and regular exercise. The old tropical idea that one *must* have his afternoon *siesta*, does not hold here. At least office hours with the army are not adjusted to the siesta system. After a few weeks of tropical sojourn, one becomes pretty well acclimated. From December 1st to May 1st, the dry season is on. Trade winds, and bright skies make the place especially attractive. Between May 1st and December 1st, it is a "wet" country, soaked thru and thru, excepting during August, when the "Little Dry Season" breaks in.

The Atlantic side according to records has a lower *average* temperature than the Pacific, due mostly to the prevailing winds from the Caribbean during three-quarters of the year. The continuous breeze is always most acceptable. Our coolest weather comes on over-cast days in July and August. Occasionally, these over-cast and rainy periods become slightly chilly. We may expect to find Panama at its best during the dry season and at its worst during the wet season.

Health: Good health in the tropics depends upon regular and systematic exercise. One must keep out of the jungles in the rainy season, and during this the greater part of the year (dates somewhat uncertain) to be on the guard against colds, which have a wicked tenacity. Men appear on the whole to weather the tropics better than women. With the women it seems generally to be a lack of exercise which leads to a run-down condition. Infants thrive best. Cow's milk and fresh cream can be obtained from the Panama Canal Commissary (30c and 32c per quart). Children over 5 years old do not seem to do so well, generally suffering much from tropical sores and itch. The tropics are enervating to all and plans should be made to take advantage of yearly leave. Costa Rica, a one night run from Cristobal, by a four (4) hour rail trip to the highlands, will carry one to cold weather. Many Isthmians make periodical visits to that country for the good of their health. Trips to Colombia on the south and to Peru and Ecuador along the west coast of South America, are long journeys and must be regarded as foreign tours and not as vacation trips. Summing up the health situation in Panama, it should be constantly remembered that daily exercise and an annual trip to cooler climes are essential to the enjoyment and preservation of good health. After two years, most people are very anxious to get home, for one begins to feel the enervating influence of the tropics.

Sports: A varied and continuous athletic program is available here. The big games are basket-ball and baseball. The Army and Navy have a fine baseball league. Rugby football is popular with the English

colony, but the American game is too warm for this climate. Boxing is popular in the Republic of Panama. Bathing and swimming are also



RUINS OF OLD PANAMA. THE TOWER, SHOWING THE LOCATION OF THE SPIRAL STAIRWAY

popular. At Fort Sherman and along the shores of New Cristobal, excellent beaches exist. The Washington Hotel swimming pool adjacent

to Fort de Lesseps is one of the most popular spots on the zone. This is the scene of famous water carnivals on every holiday in the year. Tennis and golf are also favorite sports. Concrete courts can be found in every post and community. All year round tennis is enjoyed. A 9-hole golf course traverses one of the most beautiful sites on the Zone, situated on the great dam at Gatun, alongside the largest series of locks in the Canal. Nearby is situated the Gatun Tarpon Club. Below the apron of the Gatun spillway; tarpon, jack, snook, bass, red snapper, bony fish, and a variety of other fish can be caught. Rod and reel are used



NATIVE SHACKS IN THE VILLAGE, TABOGA ISLAND

exclusively. Steel fly rods are most popular. Just below these falls on the picturesque Chagres river, over the same waterway that carried the Spanish treasure four hundred years ago, General Pershing on a recent visit, personally caught the greatest tarpon ever captured in this country, as far as is known. The Prince of Wales, who followed General Pershing, on a more recent visit, indorsed the Chagres river as the "Fisherman's Paradise." In the back areas, that border the Canal one turns from rod and reel to rifle and hunting knife, to enjoy the thrills of big game hunting. Trails good for pedestrian and horseman alike catacomb these back areas and lead one to the lairs of wild beasts of every tropical

family, including the canao, wild pig, jaguar, wildcats, tiger cats, tapir, honey bear, possum, turkey, ducks, etc. As the trails invite the horseman, and the fine roads tempt the automobilist, so do colorful inlets and channels offer a variety of journeys and travels to the motor boat enthusiast, both along the shore line and in Gatun lake, through which the Canal system runs from Atlantic to Pacific.

Clothing: Your tropical wardrobe should follow the same rules as obtain in midsummer in the States. Cotton O.D. uniforms and white duck, both dress and mess jackets are required. Sport clothes of summer texture are indispensable for the ladies. Leave your wool clothes be-



GAME BAGGED IN THE CANAL ZONE, THIS IS A TAPIR SHOT BY A PARTY OF COAST ARTILLERYMEN

hind if you want to save a lot of trouble. To anticipate a possible return to the States in the winter, bring them and pack away in a dry closet. Rain coats should be brought from the States. Certainly the ladies and children should so provide themselves, but officers can count on obtaining the usual issue raincoats. White caps should be brought from the States. White shoes of all grades are plentiful. White dress and mess jackets can probably be obtained of better material and at a cheaper price than in the States. Workmanship here is satisfactory. High grade tailoring can be had at one civilian tailoring establishment each in Colon and Panama. This applies to both white and O.D. cotton or O.D. gaberdine uniforms. Civilian suits can be obtained

cheaper than in the United States, of superior English materials and of high grade tailoring. Materials for women's dresses, ranging from gingham to silks can be obtained at reasonable prices. Much dissatisfaction is heard with the grade of women's hats obtainable. Trimmings for evening dresses and for hats, and evening slippers are rarely obtainable.

Servant Problem: This is both a question and a problem. Servants in general are plentiful, but good ones are scarce. Cooks and nurses run from \$16 to \$20 per month, wash-women from \$7 to \$10. Rates are lower in the civilian communities. Very few finished domestics are to be had. Experience proves that it is better to take a candidate and train along your own lines. The servant classes consist entirely of Jamacian negroes, i.e., British trained, if at all. One need not expect to find servants cheap, in Panama. Jamaican labor is expensive in overhead, generally unreliable, endowed with healthy appetites, prone to break up the china and to plunder the pantry, although as a rule generally honest as to your property of greater value. Your servants are paid in U. S. money, The Panamanian money is scarcely ever seen.

Household Effects: In selecting out the things to leave behind in the U. S., bear in mind that: Excessive moisture attacks books, the joints of American (glued) furniture, and leather goods. Pack your pictures well to protect against mold enroute. It appears best to leave such books, pictures and leather goods home as you can conveniently, although many officers have brought everything in the way of household effects without disastrous results. Pianos do not stand up well. Special tropical pianos are generally used in this country. Some extra allowance is given here for electric lights in bookcases and dry closets. But it is not enough. It is undoubtedly best to leave in the U. S. any articles which excessive moisture would damage.

Quarters: At Fort de Lesseps (Coast Defense Headquarters) there are field officer's sets, and double apartment houses; all concrete. These quarters are cool and airy, conveniently arranged, and are said to be among the most attractive quarters in the Army. At both Sherman and Randolph the quarters are entirely of wood, with large wide porches, all of the two story type. All quarters in the command are provided with open basements on the ground floor, containing servants' quarters, washing and storage rooms. The object of this type of construction is to get above the roach and ant level, and to reduce dampness which is the chief cause of danger and damage to man and equipment alike. Rugs and curtains are generally used in all quarters. Shades for windows have to be bought to reduce the glare. Curtains of cheap material (which can be purchased locally) should be used on account of the corrosive action of sun and rain water, well saturated with salt. These react on your copper screening and everything in your house gets the benefit of it. There is no doubt that good rugs should not be used,

and that they should not be brought into this climate. Dry closets are provided in all quarters, but the space is usually found to be inadequate to the needs, especially if you have a liberal wardrobe. Camphor and cedar chests are invaluable. Storage space in quarters is also very limited. Garage space for automobiles can be secured in Colon at \$7.50 per month. At Randolph and de Lesseps a car is desirable. At Sherman, one would have no use for a car, except to keep it in Colon, for use when you come to town.

Schools: The children from the defenses attend school in Cristobal. From Sherman the boat schedule is arranged to meet this requirement. A school train runs from and to Randolph daily. From de Lesseps it is but a short walk to the schools. All schools are operated by the Panama Canal civil government. Classes are conducted in kindergarten, common, grammar and high schools. The standard compares favorably with that obtaining throughout the United States.

General: Life in the tropics is generally pleasant. The surprising thing on the Zone is the cosmopolitan atmosphere. You encounter every nationality on the globe, particularly in the trades-people and passing travelers. The native store is scarce. East Indian and Chinese shops are the rule. American banks are established. The moving pictures are American; the opera is Spanish; the municipal or public utilities are either Panamanian or of the Canal Zone Government. Commissaries are operated by the Panama Canal civil government, by the Army at each post and by the Navy at Coco Solo. Your provisions mostly come from the Panama Canal Commissary. Daily deliveries are arranged for each post. The native market supplies fruit, fresh vegetables and fresh meat, but the Panama Canal Commissary is generally favored for staple groceries, fresh meats, household goods of all kinds, clothing, shoes, trunks, sporting equipment, and in general, emporium at large. Your chinese gardener furnishes the best and cheapest vegetables. States fruits and vegetables can be obtained at rare intervals but command fancy prices. You must expect your living expenses to run States prices plus a good sized percentage; for the Panama Canal Commissaries, which are the chief supply organizations, carry an enormous overhead. Don't expect to save money, for living is extremely high. Entertaining is done on an active but sensible scale. Bridge and dances lead in popularity. The Washington Cotillion Club is the chief social organization. This organization is composed of Army and Navy Officers and leading civilians in the Atlantic Side community. Dinner dances at the Hotel Washington are held twice a month. The Strangers' Club, in Colon is a live organization and the leading social club. This club is famed far and wide for its hospitality. The Gatun Golf Club is a popular institution at the end of a beautiful drive, situated on Gatun Dam. Golfing paraphernalia is limited in the local stores. The golf enthusiast should bring his clubs and an automobile, for the golf club

is a half hour by road from Cristobal and there is no other way to get there. For the automobilist, be prepared to learn driving all over again, for automobiles follow the English rule and drive to the left of the road. The traffic laws are divided between the Zone and Panamanian authorities, and many things are strange and tangled down here, but the English language is the rule, and one catches on rapidly and adjusts one's self to the life with surprising ease. Altogether, a tour of duty on the Canal Zone should be to a fairly resourceful, energetic and reasonable officer and his family, a sojourn of interest, pleasure and profit.

THE COAST DEFENSES OF BALBOA

Location: The Coast Defenses of Balboa are situated at the Pacific end of the Canal (or the South entrance). It is interesting to note that due to the peculiar configuration of the Isthmus of Panama, as mentioned in the location of the Coast Defenses of Cristobal, one may see the sun rise in the Pacific Ocean.

Description: The Coast Defenses of Balboa consist of one post, Fort Amador, for the headquarters and the entire Coast Artillery garrison of the Coast Defense, and the fortifications situated on a group of four islands extending out into Panama Bay a distance of two or three miles. The Islands, Naos, Perice, Culebra and Flamenco, are connected to each other and to the post by a causeway having on it auto road and a single R. R. track, thus making the transportation problem from the post to the defenses an easy one. Fort Amador is built on a wide strip of made land (taken from the famous Culebra Cut) projecting into Panama Bay with the Canal on one side and a wash filled at high and medium tide on the other. This made land has been transformed by palm trees, beautiful hedges, tropical plants, flowers, and a well kept 18 hole golf course into one of the beauty spots of the Canal Zone. The outlying stations on either side of the Canal are served by the Coast Defense boats. Fort Amador also contains the Panama Coast Artillery District Headquarters and the Panama Canal Division Headquarters. Adjacent to Fort Amador are the Quarantine and Naval Radio Stations of the Pacific side. One mile inland between the two familiar landmarks of the Pacific side, (Sosa Hill and Ancon Hill), we find Balboa, the terminus proper of the Pacific end of the Canal. Balboa contains many of the most important utilities of the Canal,—repair docks, dry docks, a large coaling plant, oil wharf and the main repair shops of the Panama Canal. The repair shops are designed to handle the various classes of work which may be required for the maintenance of the Canal and Railroad and are capable of making the most extensive repairs of any kind on the largest vessels. The dry dock is one of the largest in the world, having a length of 1000 feet and entrance width of 110 feet. This dock will accomodate any vessel that can pass through the Canal. The Headquarters, Panama Canal, and Panama Canal Department,

U. S. Army (Quarry Heights is the name of the Department Headquarters reservation) are located at Balboa Heights on the western side of Ancon Hill. To the north end of Ancon Hill lies Ancon—Ancon like Balboa is an American town and has the location of the large Canal Zone Hospital, the government laundry and the Tivoli Hotel. To the east of Ancon Hill and lying beside Ancon is the city of Panama (native), the Capitol of the Republic of Panama. Panama City stands on a rocky peninsula jutting out into the shallow water of the bay. The ruins of the old fortifications form a very picturesque scene across the wash from Fort Amador. This city is the largest in the Republic of Panama and is the most important one commercially. It is the seat of the government and the center of practically all trade of the Pacific section of the Republic. Along the road from Balboa inland we first come to Corozal, a military reservation containing the Quartermaster and Signal Corps Depots, Engineer Operating Base, and the Panama Ordnance Depot. Next we reach Fort Clayton, the home of the 33rd Infantry. The Miraflores and Pedro Miguel locks are then passed in turn. Camp Gaillard (42nd Infantry) is situated across the Canal and about 5 miles from Pedro Miguel. All points on the Pacific side with the exception of Camp Gaillard are connected by fine asphalt roads.

Transportation: The subject of the railroad and boat transportation has been covered rather fully by the Coast Defenses of Cristobal. Very few of the vessels transiting the Canal make Balboa a port of call. However, the Togo Kisen Kaisha Line, on the Yokohama, Honolulu, San Francisco, Los Angeles and west coast of South America route, and the Mail Steamship Company on the west coast of Mexico and South America route, make Balboa a regular port of call. There are two good auto roads on the Pacific side. One through Balboa, Corozal, Pedro Miguel to Gamboa, a total distance of 16 miles, and the other east via Panama City to the ruins of old Panama. One may reach the Panama Golf Club (the only Golf Club on the Isthmus with a 19th hole) by this road. There are also a few dirt roads into the interior that can be travelled by auto in the dry season. Jitneys and carametas are plentiful and are always within easy reach. The newcomer should become familiar, as soon as possible, with the Zones designated for the purpose of setting a fixed charge for jitney service. Fort Amador is so situated that it is within a short auto ride to Balboa, the Panama Canal Headquarters, Department Headquarters, U. S. Army, and Panama city.

Climate: There are but few differences in the climate of the Pacific side. These differences have been covered in the introduction.

Sports: At Fort Amador, golf is the paramount sport. It is indulged in by all. Many confirmed non-golfers have fallen for the game. However, the other sports, swimming, hunting, tennis, boating, fishing, and horseback riding are not neglected. Swimming and beach parties

at Toboga and Taboguilla Islands, about eight miles from Fort Amador, are very popular. The location of the Hotel Aspinwall at Toboga makes Toboga a pleasant place to spend a week end. Boating is more popular and enjoyable in Panama Bay than on the Atlantic side as the Bay is practically always smooth. Alligator hunts in the tidal rivers along the coast provide a very exciting sport. Hunt clubs are very active and go into the interior once a week. Many fishing parties to the pearl islands are enjoyed. As on the Atlantic side, baseball and basket-ball are the big games. In Panama, boxing and horse racing



COAST ARTILLERYMEN AND THEIR MASCOTS IN THE CANAL ZONE

are the favorite sports. Bull fights are had whenever a troupe of Toreadors may be obtained in their journey from Spain to Chili and Peru. In the interior, cock fighting and a game similar to ten pins are very popular with the native.

Clothing—Servant Problem—Household Effects, as covered by the Coast Defenses of Cristobal apply also to the Coast Defenses of Balboa.

Quarters: The quarters at Fort Amador consist of Field Officers' sets, two set apartments and four set apartments, all concrete. All are of the same type as those described at Fort de Lesseps, and are in excellent condition. A splendid view of Panama Bay and the City of

Panama may be obtained from the front porches. They are so situated that no sun reaches the front porch except for a short time during the morning, making it a nice cool retreat for practically the entire day. The field officers' sets at the end of the officers' line form an arc of a circle,—a concrete band stand has been erected in the center, from which concerts are played once a week. There are a few berths in the Post Exchange garage for automobiles. However, all those who are not fortunate enough to get one of these berths just park their cars in front or rear of their quarters the entire year.

Schools: The school facilities for the children of the defenses are excellent. Instructions in all grades and high school may be had in a very modern school in Balboa. The schools are run by the Canal government and no charge or taxes are made for the instruction given. A bus has been arranged to carry the children from the defenses to the school.

General: Post life is very active,—bridge—dinners and dances being the chief form of entertainment. The bridge club consisting of nearly every family on the post meets in the golf club rooms every Wednesday evening. A dance is held once a month but there are dances every week at either Quarry Heights, Corozal, Fort Clayton or Camp Gaillard. A large open air movie hall is patronized by the great majority of the post. The towns of Ancon, Balboa and Pedro Miguel each have a large club containing bowling alleys, pool and billiard tables, moving picture halls, reading rooms, etc. The clubhouse at Balboa has a large fresh water swimming pool. Activities in Panama are largely confined to the Union and Century Clubs, also the National and Cecilia Theatres. The Union Club is a Panamanian club that extends its privileges to officers without the regular initiation fee. It has a beautiful building located on the old sea wall overlooking Panama Bay. This club is the scene of all large receptions and festivities connected with the Panamanian Government, Diplomatic Corps, Army and Navy, Panama Canal, and is the center of activities for the annual carnival. The Century Club is purely an American club situated near the Tivoli Hotel but is just across the border in Panama. All operas and shows of talent are held in the National Theatre. The Cecilia Theatre is the only first class moving picture theatre in the town. Band concerts are held every Sunday evening at the Santa Anna Plaza. A commissary and a post garden are maintained on the post. All other supplies are obtained at the Panama market or the Balboa Commissary which is a large department store similar to the one at Cristobal. A bus schedule from the post to the Balboa Commissary is maintained daily. Native fruits,—bananas, oranges, alligator pears, papayas and mangoes are abundant. Exercise is the requisite of health in this climate. After a hard days work one is completely rested and refreshed by the cool nights. It may sound strange but a light woolen blanket

is used very frequently at night. Sanitation has progressed to such a degree that disease is almost unknown. The disease and sudden death rate is far lower than that of most of our large cities in the States. Flies and mosquitos are very seldom seen. Malaria is hardly ever contracted except in the jungle or in land that is not under control of the U. S. Sanitary Service. Taking everything into consideration life on the Canal Zone is very pleasant, active and healthful, and not filled with the hardships that one imagines to go with a tropical place.

**IT IS HARD FOR A BILIOUS
CAPTAIN TO BE
ABSOLUTELY SQUARE**

**A GOOD SWEAT UNDERLIES
ALL GOOD ADMINISTRATION**

Suggestions for Training the Anti-Aircraft Gunner

By Captain Aaron Bradshaw, Jr., C. A. C.



ONE of the many problems confronting the Anti-Aircraft Artillerist is the developing of suitable targets for the training of gunners. A great deal of time and thought has been spent by the 1st Anti-Aircraft Battalion at Fort Monroe, and also by the French at their school of fire for anti-aircraft artillery, on this subject. The following ideas are those which have resulted from this work:

1. FIRING AT BURSTS

A burst is placed at a desired point and, as it travels with the wind, firing data is computed and this burst used as a target for subsequent firings. The speed of the wind is of course the speed of the target. For this reason this method does not closely approach service conditions but for preliminary instruction it affords excellent training. Bursts can also be used as targets for night firing. The burst to be used as a target is placed in the intersection of two searchlight beams, or it is fired in space and a searchlight picks it up from its flash. It is then tracked as it travels along and data is computed. Shells filled with brick dust offer better possibilities for this work. The bursts of such shells would be more distinct and would last longer.

2. FIRING AT 6 FOOT BARRAGE BALLOONS

The six foot barrage balloon as furnished by the Air Service offers an excellent target. It is believed that this balloon would offer great possibilities as a target if anchored to a raft towed by a speed boat, for service conditions could thus be simulated. The balloon is secured by means of piano wire which is rolled on a small winch. Care must be exercised in the operation of this winch to prevent kinks in the wire. This balloon can be fired at when free and offers a good target, but it will, under ordinary conditions, pass out of range before reaching a very high altitude.

3. FIRING AT KITES AS DESIGNED FOR METEOROLOGICAL SECTION, DEPARTMENT OF AGRICULTURE, (WEATHER BUREAU)

This kite can be flown to great heights, (5,000 yards), and can be towed at great speed with the wind. It can also be towed at a reasonable rate of speed against the wind, but great care must be exercised to avoid

sudden changes in direction. The dimensions of this kite are approximately 6 ft x $6\frac{3}{4}$ ft x 3 ft. and the kite is fully described in "Kite and Kite Making" by Vincent E. Jakl, a United States Department of Agriculture Publication.

4. FIRING AT AEROPLANES WITH REDUCED ALTITUDE

In order to get the data to cause a burst at a desired definite point in space, it is necessary to solve a Trajectory Chart, using as arguments the Angle of Site to this point and the Altitude, assuming the direction given by the Gun Pointer. If you study a Trajectory Chart you will see that if we decrease the altitude, we cause a burst to occur along the same line of site but below the target, as shown in the following illustration:

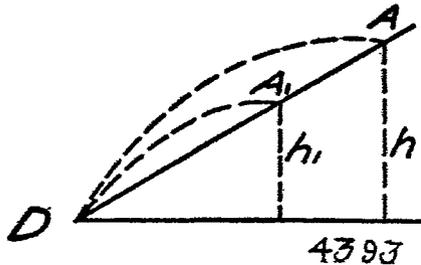


FIG. 1.

This gives us a means of firing at a moving target, (aeroplane), and of observing the effects of our fire. Deflections can be observed directly, and comparisons of the altitude obtained, with those expected from use of the Trajectory Chart, will give us valuable data for determining our relative accuracy. What we are doing in fact is to fire at a fictitious point below the real target, while we are actually tracking the real target. This method will give us practically the same impression as firing upon the real target. The bursts are produced along the same line of site as the aeroplane and it is difficult, except when the observer is located at an angle with the plane of fire to distinguish differences in range accurately. The burst, therefore, when observed along the line of site, will appear close to the target. If the officer in charge of the battery is very careful, and studies the Trajectory Chart, this method is safe, and if the plane flies on a course away from the battery, perpendicular to the front of the battery, the chance for errors is exceptionally small if the battery commander is on the job. The reduced altitude used should be about 1,000 yards below the target fired at.

5. FIRE STAGGERED 180° IN DIRECTION

If an observer at O, (Figure 2) looks through double erecting prisms such as R and S, at a total reflection of a lighted object placed in rear

of him, he will see the image of this object at a point a' in front of the observer. The action of the two prisms will be to stagger the image a' 180° in direction from the object a . This property of the prisms is

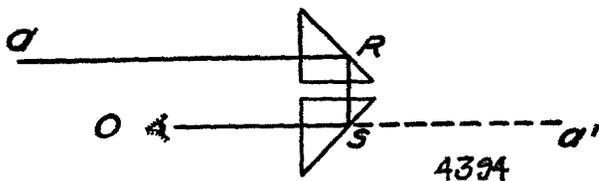


FIG. 2

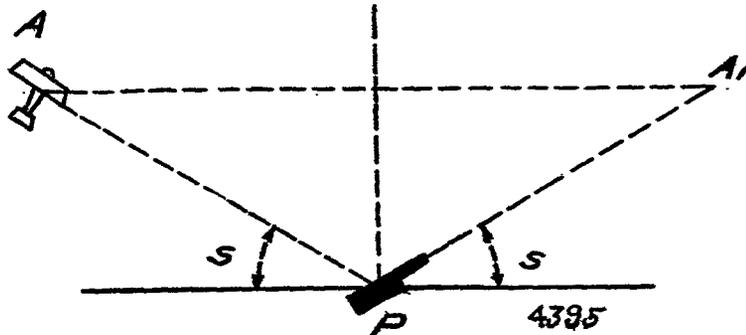


FIG. 3

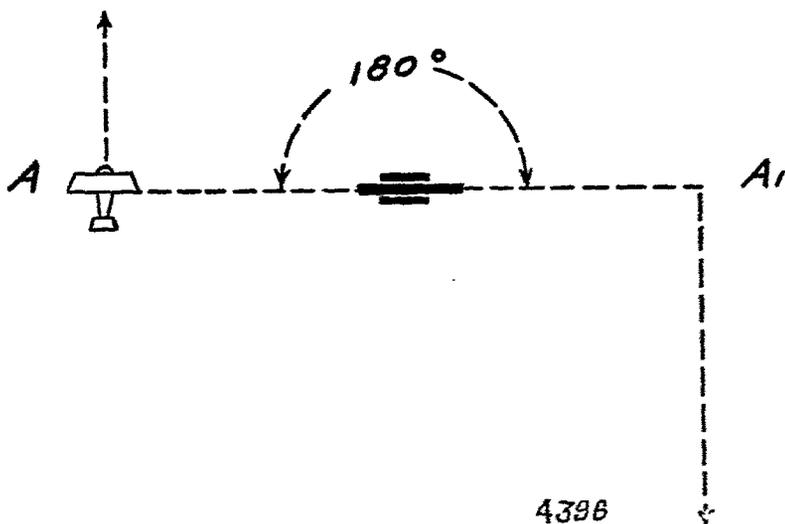


FIG. 4.

utilized in the fifth training method, that of "Fire Staggered 180° in Direction." In this method the sighting apparatus on the gun functions so that the image of the Aeroplane A will be seen at a point A_1 , (Figs.

3 and 4) with the same angle of site and range, but with the azimuth differing by 180° from that of the aeroplane. Figure 3 illustrates this method in elevation, while Figure 4 shows it in plan.

The gun pointer will point his sight on the aeroplane, but the gun will be pointed back on the fictitious point A_1 . The fire will then be executed on a path in front of the gun, parallel to the aeroplane's path, which is described in rear of the gun.

This method of fire offers protection to the pilot. The next question to be considered is how we will be able to observe the effects of this fire. The French, at their School of Fire for Anti-Aircraft Artillery, as described by G. Fontaine in the *Revue de L' Aeronautique Militaire*, have devised an ingenious method for the observation of this fire with respect to direction and angle of site. (See Figure 5.) The apparatus con-

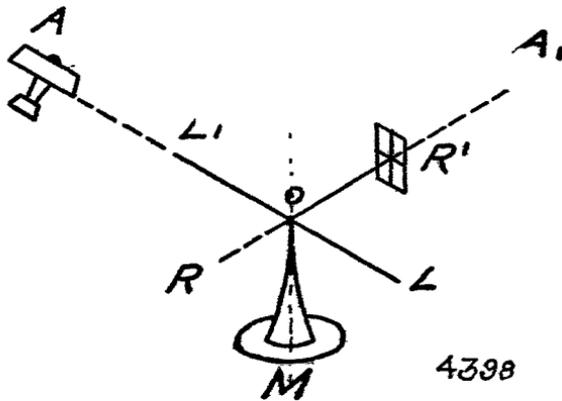


FIG. 5.

sists of a telescope LL_1 , and a sighting ruler with a grid, as shown at R' , which is movable about a horizontal axis at O , and which is able to turn at the same time about a vertical axis OM . The movements of the telescope and the sighting ruler are connected in such a fashion that their axis remains constantly symmetrical with respect to the vertical axis OM . Thus, if the telescope is pointed on the plane as indicated by A (Figure 3), the sighting ruler will automatically be pointed in the direction PA_1 . The observation for site and direction is therefore made in the following fashion. The sighting ruler RR' carries at R an eyepiece and at R' a grid. An observer keeps the telescope LL_1 constantly on the target (aeroplane) and another observer, putting his eye at the eyepiece R , reads the deviation in direction and site as shown on the grid. The altitudes of the bursts are measured by the Altimeter Section and recorded. Referring back to Figure 3, it will be readily seen that if the altitude of the burst is the same as that of the aeroplane,

the range will be good. The range will be short or long according to whether the altitude measured is less or greater than that of the aeroplane.

This method has an advantage over all of the preceding methods since it permits of firing at all altitudes and is very safe for the pilot. The French have devised observing apparatus similar to that just described, which permits of more than one person observing the effects of the fire at the same time.

Objections might be raised against this method, for the effects of the wind will be different than if we were firing at the target directly, as the angle the wind makes with the vertical plane containing the line of sight from gun to target is not the same as the angle the wind makes with the vertical plane containing the line from gun to the fictitious point A_1 . It is believed, however, that this difference would not be appreciable, except when the wind is blowing parallel to the plane of fire, or nearly so. In any case, if this method was used for target practice, this difference could be accounted for or taken care of in the computation of errors, or else could be taken care of in the computation of data.

6. FIRING UPON TOWED TARGETS

A target towed by an aeroplane offers the greatest of opportunities for training, for service conditions can actually be reproduced. The relative efficiency of an organization can be determined readily and the accuracy of each shot is apparent. Deviations can be measured and accurate analysis of the practice made.

For a target towed by an aeroplane, it is believed that an open sleeve, such as used by the Meteorological Sections for determination of wind data, is the most satisfactory type of target. Experiments have been made by the Air Service and a target of this type is to be towed at Fort Monroe for the practice to be held there during the month of September. The following is the preliminary outline of this program.

"Target to be of the open sleeve type, approximate dimensions, 6ft in diameter, 12ft. long. To be towed by an aeroplane, length of towline, 1,000 yards. The towing plane should be of the Martin Bomber type of comparatively slow speed, so as to facilitate safety. The plane will fly courses at altitudes of 4,500, 8,000 and 12,000 feet. The limits of the courses will be marked by well defined objects, visible both from the ground and from the air. . . Fire will be delivered only when the target is within the area bounded by the lines making 20° with the perpendicular from the firing point to the course of the target. The aeroplane will be in communication with the battery by radio telephone.

"Record of observations of all shots will be kept by ground observers, stationed at both altimeter stations and at the battery commander's station. An observer in the towing plane will observe the bursts and

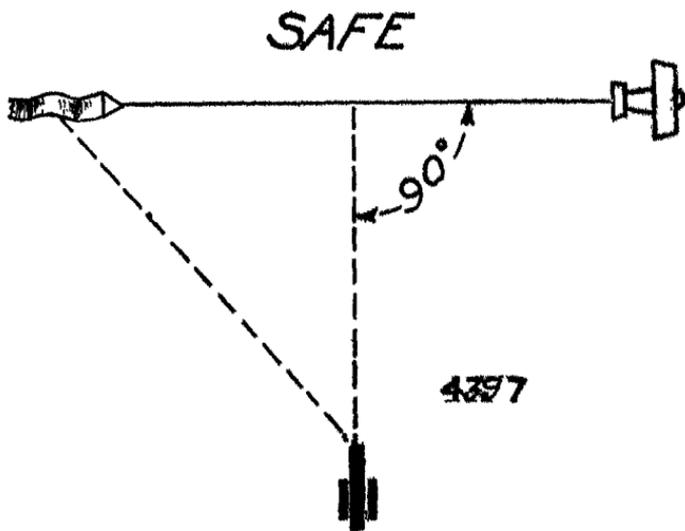


FIG. 6.

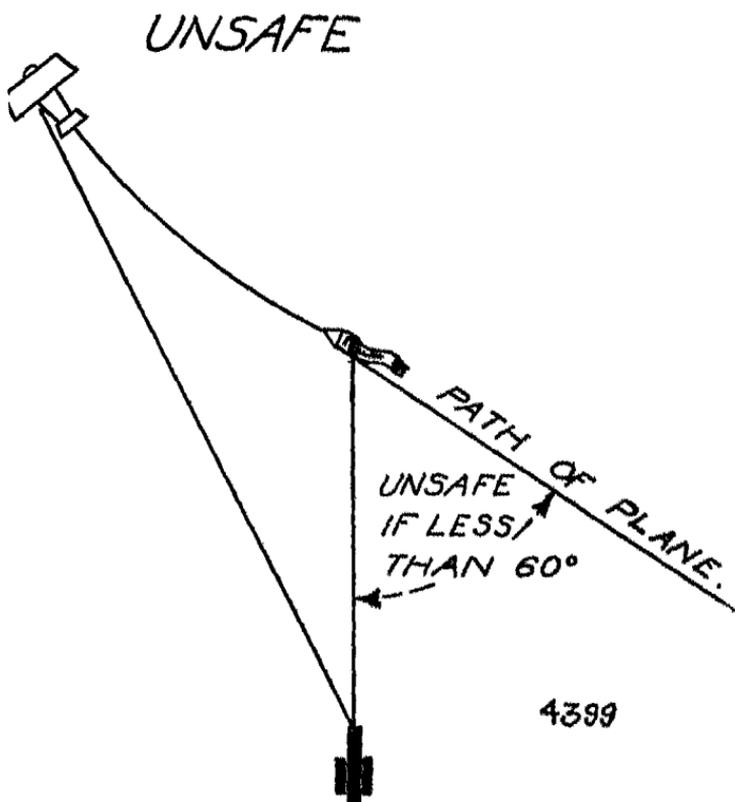


FIG. 7.

keep a record as far as practicable showing the relative positions of the bursts, as to range (over or short) and to altitude (high or low)."

Firing at a towed target is absolutely safe if attention is paid to the following safety precautions. The towline should be approximately 1,000 yards long. Fire should not be conducted at a plane which is flying perpendicular to the Battery Front, or nearly so. It is extremely dangerous to fire under these conditions, for an error in the computation of data will cause great trouble. Figures 6 and 7 indicate the safe and unsafe conditions, respectively, for the execution of this kind of fire.

A thoroughly competent and reliable man, if possible an officer, should check the alignment of each gun at the instant before firing to see that the gun points behind the plane; if this is the case, the fire will be safe. See figure 8.

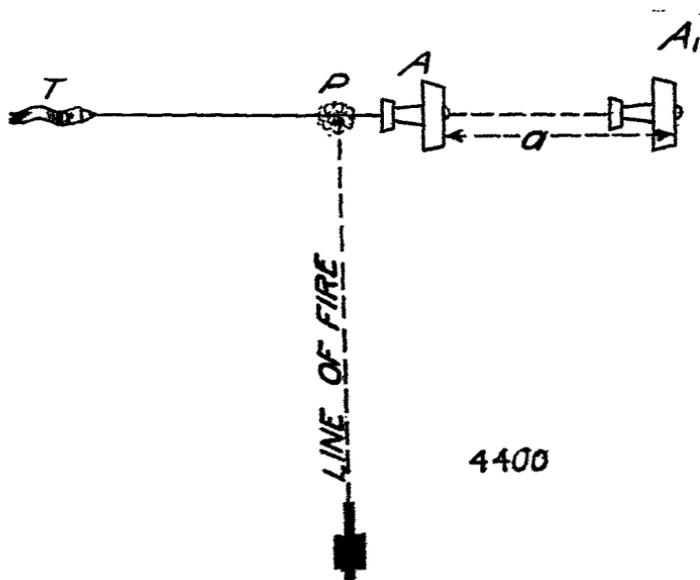


FIG. 8.

The methods for training as outlined briefly above were taken up in a progressive order. It is planned that the gunners be first trained in their duties, and that sufficient standing gun drill be had to acquaint them thoroughly with these duties and instill in them the highest essentials of discipline. The first firings should be at bursts, as outlined above, or at fixed or free balloons, followed by practices with towed balloons or a towed kite. When sufficient training has been had to indicate that the sections have acquired the necessary qualities for following rapidly moving targets, the firings should then begin to be made upon aeroplanes with reduced altitude, upon aeroplanes with fire staggered 180° in direction and upon targets towed by aeroplanes.

Upon the completion of each intensive training period, a complete practice should be held, using a towed target, as outlined under method 6 above. This practice should be followed by an analysis, which in completeness would rival the analysis now required by existing orders for the fixed guns of the Coast Artillery. Of course this would necessitate a number of observers and recorders and a great deal of time, but it is thought that the results obtained, by being able to fix responsibility and trace the source of errors, would justify the effort.

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Coast Forts in Colonial Maine

By Major Robert Arthur, C. A. C.



DURING the Colonial period, the territory lying within the geographical limits of the present state of Maine constituted the northeastern frontier of the American colonies. To the north and east lay New France with a French claim to all territory southward as far as the fortieth degree of north latitude. The British claims extended northward to the forty-fourth parallel of latitude. The French looked upon the Penobscot River as the proper boundary line between New France and New England, while the English contented themselves with an active claim to the St. Croix River as a satisfactory dividing line between the two countries. The English settlements did not, however, extend to the St. Croix River, or even to the Penobscot, and but few colonists ventured beyond the Kennebec. Taking advantage of this fact, the French established themselves at the mouth of the Penobscot, and retained control for the greater portion of the time. Thus, for many years, Pemaquid, in the Sagadahoc Province, east of the Kennebec River, formed the most eastern stronghold of the English; while Penobscot, or Castine, formed the western stronghold of the French.

In the interior, living among the almost impenetrable forests of that territory, dwelt many tribes of Indians, savage and warlike, who allied themselves sometimes with the one, sometimes with the other, and often with neither, but who delighted in war and who seemed to be driven by an insensate desire to exterminate the white settlers. Five Indian wars and numerous minor incursions during the seventeenth and eighteenth centuries devastated the Provinces of Sagadahoc and Maine, and depopulated large portions of the country. Punitive expeditions against the Indians exterminated some of the tribes but, until after the Revolutionary War, the colonies were unable to push far inland except along the banks of the more important rivers.

Notwithstanding the rigors of the climate, notwithstanding the distance from the seat of government, notwithstanding the dangers which threatened on every hand, colonization projects were undertaken repeatedly, for the country was rich in its natural products, hunting and trapping was profitable, the soil was rich, and land was easily obtained. Under a steady influx of settlers, all the southern coast of Maine was gradually colonized and placed under cultivation.

As a general rule, the colonists received no aid from the government, but were forced to look to themselves for their protection. In

a few cases, the larger companies were able to obtain the assistance of soldiers from New York or Boston, and, occasionally, a locality, such as Pemaquid, was considered of such strategical importance that the government undertook such defensive projects as were considered necessary. Consequently we find three distinct types of fortifications scattered through the Provinces.

The first and most numerous class of defense took the form of a fortified habitation or blockhouse, usually of timber, erected by a single family or by a small group of closely associated settlers. These were usually designed for defence against attack by the Indians and their location immediately upon the sea shore or the banks of streams was merely incidental to the fact that the water constituted the main lines of communication. A few so located were built so as to withstand attack from the seaward. In case of threatened attack, the surrounding settlers manned the fort, into which they moved their families and their more portable possessions.

In the second class falls the forts erected by plantation or colonization companies. A company being formed, grants of land were obtained from the government, and the contract frequently contained the proviso that the proprietors would erect a substantial fort if the authorities of the Colony would provide the soldiers with which to man it. Sometimes in wood, sometimes in stone, these forts are found along the sea shore and the river banks at the more important commercial or agricultural points. Usually situated on tide-water, they were designed for protection against attack from the landward or from the seaward, and their guns were so mounted as to cover both approaches.

The third class of fortification includes a small number of more elaborate works erected by the Colonial government, with or without aid from Great Britain, and manned by soldiers sent there from Boston. A few of the earlier forts were of timber, but the more important works were built of stone. These were considered to be the outposts of the American colonies and were designed to combat the claims of the French.

Of the history of these forts, much remains buried in the past. Unlike most of the more southern colonies, Maine lacked chroniclers and annalists. Extracts from personal correspondence and from undestroyed town records form much of our present information concerning these localities. We find references to forts of which no trace remains, and we find traces of forts of which no record may be found. Even the sites of many of the early forts are in dispute, and in case of one of the more important forts of its day we find claims for as many as four locations. It is therefore doubly difficult to write with clearness on the history of these works or even to be reasonably certain of our chronology. It is fair to assume that all the forts built near navigable water were erected so as to command the channels of approach, but, without speculation,

it is not possible to bridge the many gaps which exist in the records of Maine during its colonial years.

The first fort of which we find any record was erected by the French. On November 18, 1603, Pierre de Gaust (or Gast), Sieur de Monts, obtained from Henry IV. of France a patent to all the American territory between the fortieth and the forty-sixth degrees of northern latitude. During the winter months he made ready his expedition, and, on March 7, 1604, he set sail for his new territory. Arriving at Cape de la Heve on the sixth of May, he began his explorations. While in the Bay of Fundy he ascended the Schoodic River to a small island which was selected by Champlain for his settlement and fortification. This island, containing twelve or fifteen acres, they called St. Croix (later Neutral) Island because, a few miles up the river, there were two streams which entered "crosswise, to fall within this large branch of the sea."

Winter approaching before he had concluded his explorations, de Monts decided to locate temporarily on St. Croix Island. Fearing attack by the Indians, he erected, on the northern end of the island, a fort which effectively commanded the river, and within which he set up the cannon from his ships.

The winter was unusually severe and the garrison suffered a great deal from scurvy. The approach of spring, however, brought back the health of the party and, about the middle of May, de Monts set out in his pinnace in search of a more suitable site for his colony. Finding nothing which pleased him, he returned to St. Croix Island and, after a short stay, removed everything to Port Royal. The patent to Acadia he surrendered in 1606 to Madame de Guercheville.

In the meantime, an association of Englishmen had been formed for the purpose of colonizing America and of civilizing and converting the "infidel savages." This association was, on April 10, 1606, incorporated by King James I. into two Companies under one General Council of Government. The first company, consisting of Gates, Wingfield, Somers, Hackluyt, and others of London, was called the First Colony of Virginia or the London Company. The second, consisting of Sir John (Chief Justice) Popham, Sir Fernando Gorges, Thomas Hanham, Raleigh Gilbert, George Popham, William Parker, and others of Plymouth or "elsewhere, who might associate," was called the Second Colony of Virginia or the Plymouth Company.

The charters to the two companies included all the territory between the thirty-fourth and the forty-fourth parallels of northern latitude and between the Atlantic and the Pacific Oceans. This vast expanse was divided into North and South Virginia, the London Company receiving South Virginia and the Plymouth Company North Virginia.

Enterprises were matured by both companies at about the same time, and, on May 31, 1607, an expedition of two ships of the Plymouth

Company set out from Plymouth. This tiny fleet, containing a hundred men under Captain Raleigh Gilbert as Admiral, arrived safely off the coast of Maine early in August. On Sunday, August 9, 1607, the greater part of the company landed on an island which they called St. George's Island, probably Monhegan. After some time spent in exploration, they chose a "demi-island" on the west bank of the Sagadahoc (Kennebec) River for their new home. This point of land near the mouth of the river called was "Sabino" by the Indians, "being almost an island of good bigness." "On the following day, the 19th of August, we all went to the shore where we made choice for our plantation" and organized the community with Captain George Popham as President and Captain James Davis, whom we met in Virginia, as Captain of the Fort. The company then proceeded to fortify; "each man did his best endeavor for the building of the fort" until, on about the sixth of October, it was fully finished, trenched, and fortified with twelve "demi-culverins of nine pounds, or sakers of six pounds." Strachey says: "They fully finished the fort, trencht and fortifyed yt with 12 pieces of ordnance, and built 50 houses therein, besides a church and a storehouse," but, considering the size of the company, he is undoubtedly in error concerning the number of houses. The fort they named St. George.

About four months after their arrival, that is, about the middle of December, Robert Davies was dispatched to England in the *Mary and John*, and more than half of the company went with him. Forty-five were left in the fort to endure the hardships of the next few months. The winter was very severe and they suffered much from the cold. At some time during the winter, "a quarrel fell out between the colonists and the natives" wherein one of the former was killed and the remainder driven from the fort. They left behind them their provisions, arms, and powder, and the Indians, unfamiliar with the peculiar properties of gun-powder, opened the casks and managed to blow to pieces most of the contents of the fort, including several of the Indians themselves.

On February 5, 1608, Captain George Popham died and was buried within the walls of the fort.

The death, in England, of Sir John Gilbert made it necessary for Captain Raleigh Gilbert, his heir, to return to England, so when Captain Davies revisited the colony in the late spring, the colonists, discouraged by the loss of their leaders, "resolved to stay no longer in the country, 'wherefore they all embarked in this new arrived ship, and in the new pinnace, the "Virginia,"* and set sail for England. And this was the end of that northern colony upon the River Sagadehoc.' "

The next fort in Maine was built by two Jesuits, Biard and Masse,

* The *Virginia* had been built by Captain James Davis during the winter and was the first ship to be built by Englishmen in America. It was later taken by Captain Davis to the waters of Chesapeake Bay.

who had accompanied Poutrincourt to Port Royal in 1608, but had found themselves unwelcome there and had moved to Mount Desert in the Spring of 1609. Here they constructed and fortified a habitation, planted a garden, and dwelt five years.

Madame de Guercheville, who had obtained the Patent of de Monts to Acadia, was a zealous Catholic and wished to convert the Indians to that faith. She sent out from France an agent, Suassaye, with twenty-five colonists. This company landed on Mount Desert on May 16, 1613, and built a fort and their habitations. This settlement they named St. Saveur.

The French now occupied Port Royal, St. Croix, Mount Desert, and probably the mouth of the Penobscot River. Captain Argall, while on a fishing trip to New England waters, learned of the activities of the French and reported them to the authorities at Jamestown. Disturbed by the disposition of the French to move westward into the Virginia territory, the Jamestown colonists equipped Captain Argall with an expedition of eleven fishing vessels carrying sixty soldiers and fourteen guns, and sent him to dislodge the French. His first approach completely surprised the colonists at Mount Desert, but, with a ship and a bark in the harbor and the small fort on shore, they made some show of resistance. Their cannon were not in a situation to be used effectively and most of the men were absent from the fort, so when Captain Argall landed, the greater part of the garrison escaped to the woods. Destroying the Jesuit cross, Argall erected another inscribed with the name of the British king, and then proceeded to attack in succession the forts at St. Croix and at Port Royal. Destroying these, he removed the captured ships, ordnance, cattle, and provisions to Jamestown.

The next coast fort was built at Pemaquid in about 1624. In the long struggle between England and France for the possession of North America, Pemaquid was repeatedly fortified as the most eastern stronghold of the English as Castine was the most western outpost of the French. We are informed that this first fort at Pemaquid stood until King Philip's War in 1676. The size and construction are unknown, but it was probably a simple block-house of timber strengthened by earth or stone and palisaded and used as a public storehouse. Its site is also unknown but is assigned to the point at the western side of the mouth of the river. It seems rather to have been intended for a protection against the pirates that were beginning to infest the American coast. One of the notorious characters of that period, the pirate Dixie Bull, seems not to have encountered much resistance here. With but sixteen men, he came to Pemaquid in 1632 and soon plundered the fort and most of the neighboring plantations.

In the spring of 1633, the New Plymouth colonists established at Machias a new trading-house which they furnished with a variety of

commodities and put under a guard of five or six well-armed men. Situated on the west bank of the river above Cross Island, nothing but the traces of the ancient fort remain to us.

By the following year, New Plymouth had established, pursuant to its right to exclusive trade, two trading-stations on the Kennebec river, one at Fort Popham and one at Cushnoc (Augusta).

Charles de Menou, known as D'Aulnay de Charnisay (variously spelled), located himself about a hundred and fifty miles to the west of Charles Etienne de la Tour, who was situated at the mouth of St. John River. D'Aulnay's choice was the peninsula, on the eastern side of Penobscot Bay, at Major-biguyduce Point in Castine (called by the French Pentagoet), where there was a good harbor and from which ships might ascend the river for forty miles. He considered himself entitled to the paramount government of the whole Acadian country as far westward as the French dominions extended, and built for his protection a small well-planned fort mounting eight guns. In the summer of 1635 he captured the Plymouth fort on the Penobscot and claimed the territory as far as Pemaquid in the name of the King of France.

La Tour, however, disputed the claims of D'Aulnay, and the controversy between them, covering a period of years, forms one of the most romantic and interesting episodes in the history of Maine. Obtaining assistance from Boston, La Tour prepared a squadron which sailed for the Penobscot on July 14, 1643, and commenced an attack on D'Aulnay immediately upon arrival. The onset was so unexpected and furious that D'Aulnay was compelled to evacuate. Pursued as far as Penobscot, he grounded his two ships and a small vessel so as to fortify himself as expeditiously as possible, and turned upon his pursuers. In the ensuing engagement La Tour was repulsed and d'Aulnay returned to his fort. In 1659 the fort was captured by Sedgwick, a Massachusetts officer who reduced all the French forts in Acadia.

In 1658, Major Thomas Clark and Captain Thomas Lake, merchants from Boston, purchased Arrowsic Island and erected a fort overlooking the water. The fort mounted at least two great guns and was manned by soldiers detailed for that purpose.

In 1670 the French flag again appeared in Castine. To preserve Acadia from the incursions of invaders, the French had re-established the forts at Port Royal, Chedabucto, St. John's La Heve, and Penobscot. After the treaty between England and Holland, the Dutch, in 1674, being still at war with France, dispatched an armed ship to seize the fort at Castine. One account says the attack was made by buccanniers from San Domingo. Chambly, the commander, was carried off, but the success was not pursued and the possession of the fort was not long retained.

With a view to retaining possession of the country, the Dutch again,

in 1676, sent a war vessel to the Penobscot and captured the French fortifications there. As this was a part of New England, two or three vessels were sent there from Boston and drove the Dutch from the peninsula. The English did not remain in possession here, but the events drew the attention of Governor Andros to the eastern provinces. In 1677 he took formal possession of the Sagadahoc Province and ordered the construction of a fort at Pemaquid.

Richard Hammond had already (1675) erected a trading-house and fort on the Sagadahoc a short distance from the fort of Clark and Lake. Hammond's fort has been variously located by different writers. A party of Indians attacked the fort in August, 1676, and Hammond was killed and his possessions destroyed.

Following the attack upon Hammond's fort, the Indians visited the fort at Arrowsic and secured entrance by stealth. Lake was killed and Davis wounded, and the fort was abandoned. The inhabitants of Sheepscot retreated to the fort at Cape-newagen. The people of Pemaquid fled to one of the Damariscove islands and erected a fort which they soon abandoned and withdrew to Monhegan.

The first defensive work erected in Portland Harbor was the fortified house of Christopher Levett who settled upon one of the islands of Casco Bay. The first fort was Fort Loyal, a bastioned stockaded fort which stood in Portland on a rocky bluff at an elevation of about thirty feet above high water. Captain Hawthorn, in September, 1676, began its construction pursuant to an order of the General Court of Massachusetts. The log barracks, guard house, and shops were surrounded by palisades, while wooden towers on the interior served as observation posts. The whole was loop-holed and had emplacements for eight guns. Outlying works supplemented Fort Loyal in providing defense against the Indians.

The first notable use of Fort Loyal was as a prison for some twenty Indians, including the celebrated Hopgood, chief of the Norridgewocks, who had been seized at Saco and sent to Portland for safekeeping. They were subsequently released by Governor Andros and became known as relentless foes of the white settlers.

In Saco there were two forts, one at Winter Harbor built in 1676, repaired or rebuilt in 1700, and called Fort Mary. The other was located below the lowest falls, on the west bank of the river, and was known as the Stone Fort. In 1708, the forces and stores were removed by the government from the latter to the former.

In the summer of 1677, Governor Andros sent Lieutenant Anthony Brockholst, with four sloops loaded with material, to erect the second fort at Pemaquid. This fort, which was named Fort Charles, was "a wooden Redoutt with two gunns aloft, & an aoutworke with two Bastions in each of w^{ch} two greatt guns, and one att ye Gate." Captain Anthony Brockholst and Ensign Caesar Knapton were placed in command with

fifty soldiers. Thomas Sharp was assigned to command in December, 1680; Francis Skinner in August, 1681; Nicholas Manning in March, 1687; Fones Andros in August, 1687; and Lieutenant James Weems in November, 1687.

Mr. Skinner was evidently not a disciplinarian. Captain Brockholst, in a letter dated New York, May 10, 1683, says to him: "I am sorry the loosness and carelessness of your command gives oppertunity for strangers to take notice of your extraviganyes and Debaucheryes and that complaints must come to me thereoff being what your Office and Place ought to prevent and punish. Expect a better observance and comorte for the future and that Swearing, Drinking and profaneness to much practised and Suffered with you will be wholly Suppressed and that you have Regard to all former Orders and Regulations.

"Your Affectionate friend,

"A. B."

When Colonel Thomas Dongan was appointed Governor of New York, Sir Edmond Andros was made Governor of New England, and Governor Dongan was notified by the king in 1686: "Whereas wee have thought fitt to direct that our ffort & Country of Pemaquid in regard of its distance from New Yorke bee for the future annexed to & Continued under the Governm^t of our territory & dominion of New England our will & pleasure is that you forthwith Deliver or cause to be delivered our said ffort & Country of Pemaquid with the Greate Gunns, ammunicon & stores of warr together with all other utensills & appurtennces belonging to the said ffort into the hands of our trusty and welbeloved S^r Edmund Andross Kinght our Captaine Generall & Governour in chiefe there for the time being or to such person or persons as they shall Impower to receive the same and for soe doing this shall be your warr."

After the purchase of Maine by Massachusetts, a provincial government was established under the presidency of Thomas Danforth in 1680-1, and Fort Loyal, commanded by Captain Edward Tyng, became a public garrison and was furnished with ordnance and equipment. A commission consisting of President Danforth, Mr. Nowel, and Mr. Nathaniel Saltonstall visited Fort Loyal in 1680. Their report on the expediency of maintaining a garrison at Fort Loyal, which was referred, at the January, 1681, session of the General Court, to a committee of seven members, recommended that a well-equipped garrison would be an asylum and safeguard for the people in case of any sudden incursion by the Indians, and would also greatly encourage settlers "to replant themselves in this town and the vicinity" which had been depopulated by Indian strife, and that it ought to be maintained and continued at the expense of Massachusetts, provided the inhabitants of Maine would furnish and pay six soldiers to man it.

Governor Andros, determined upon the enlargement of his jurisdiction, the unlimited exercise of power, and the accumulation of wealth, resolved to seize upon Penobscot, where the Baron de Castine had located in 1685. In March or April, 1688, the Governor joined Captain George, commander of the frigate *Rose*, at Pemaquid, and sailed for Castine. As soon as the frigate was anchored in the harbor near the old fort, he sent word to Castine that he was on board and ready for an interview if one was desired. The baron, however, unwilling to be made a prisoner, had already retired, with his dusky family, to the woods, abandoning the fort to the unexpected and unwelcome visitors.

The governor had brought with him labor and material for the repair of the fortification but, as it had been originally constructed principally of earth and stones, it had fallen so much into decay that he decided to spare the expense and to abandon the undertaking.

He then returned to Pemaquid where he found that the fort, built by his order eleven years before, had fallen practically into ruin, and he ordered it to be thoroughly repaired.

Hostilities with the Indians were commenced in August, 1688, and immediately every fort between the Piscataqua and the Penobscot was repaired and manned. In September, soldiers were enlisted or detached for an eastern expedition. At first Governor Andros was unwilling to give his approval to the undertaking, but, perceiving that war was inevitable, he established eleven well supplied garrisons in the eastern country: (1) at Pemaquid, he stationed thirty-six regulars and two new companies of sixty men each, under Captain Tyng and Captain Minot, and gave the command of the garrison to Captain Brockholst and Lieutenant Weems; (2) At New Dartmouth Fort (Newcastle), he assigned twenty-four regulars under Lieutenant John Jordan and one new company of sixty men under Captain Withington; (3) A small fort on the eastern side of the Sheepscot (Damariscotta?) was to be relieved weekly by a detail from the garrison at New Dartmouth; (4) At Sagadahoc, (5) at Newton, on Arrowsic Island, (6) at Fort Anne (on the peninsula of the ancient Popham fort?), and (7) at Pejepscot, he distributed forty regulars and two militia companies of sixty men each, and gave the command to Lieutenant Colonel Gregory, Major Thomas Savage, and Captain Manning; (8) At Falmouth, Fort Loyal was manned by a company of sixty men under Captain George Lockhart; (9) At Saco, Andros stationed one company under Captain Lloyd, and a detachment of twenty-eight men from the troops under the command of Major Henschman and Captain Bull; (10) A fort at Kennebunk, commanded by Captain Puddington, was to be relieved from Saco; (11) A fort at Wells was to be relieved in the same manner.

Distributed among these forts, five hundred and sixty six men were continued in service throughout the winter. The Governor had several of the forts repaired, notably those at New Dartmouth and at Pejepscot

(Brunswick Lower Falls), and he put in commission three government vessels, the sloop *Mary*, the sloop *Speedwell*, and the brigantine *Samuel*.

The outbreak of the Indians caused the inhabitants of North Yarmouth to withdraw to Jewel's Island where they hoped to make themselves secure by repairing the old fort there, but they were pursued by their enemies and were barely able to defend themselves successfully against attack. A vessel shortly afterwards took them off and carried them to Boston.

1. Fort Charles at Pemaquid was attacked on August 3, 1689, by about a hundred Indians. The surprise of the community was complete when the attack began by a furious rush of the Indians upon the fort and the village. The fort commander immediately opened upon the attackers with his heavy guns, but failed to prevent the Indians from taking possession of ten or twelve stone houses on the street leading to the fort. The siege continued throughout the day and the night. Shortly after dawn a proposition to capitulate came from the fort, one of the stipulations being that the members of the garrison were to be permitted to return to Boston. The terms being agreed upon, Lieutenant Weems marched out at the head of fourteen men, all that remained of the original garrison. The Indians destroyed everything about the fort and the settlement and killed many of the prisoners, but Lieutenant Weems was permitted to return to Boston.

2. The Indians attacked the fort at New Dartmouth on September 5th and 6th and were repulsed. However, a mutiny among the men later in the year resulted in the abandonment of this fort.

3. The fort on the eastern bank of the Sheepscot River was destroyed at about this time and the settlement was entirely broken up.

4, 5, 6, 7. With the loss of Fort Charles at Pemaquid, the eastern forts were abandoned and a wide country was depopulated and left to the savages. Fort Anne was abandoned was early as May 12, 1689.

8. On the night of September 20-21, Major Church of Massachusetts arrived at Fort Loyal by sea from Boston with several companies of whites, negroes, and friendly Indians from Cape Cod. He found the town besieged by about four hundred French and Indians, and his timely arrival saved the inhabitants.

The enterprising Frontenac had returned to America, in October, 1689, as Governor of New France, with instructions to institute a campaign against New York and Boston, operating with his land forces from Montreal and with his naval forces from Quebec. The Provinces of Maine and New Hampshire were totally unprepared for attack. Indifference on the part of Massachusetts to the military necessities of the frontier, inefficiency among the commissioned officers, insubordination and ignorance among the enlisted men, and withdrawal of troops from the garrisons weakened these Provinces to an extent which made effective resistance impossible.

In the spring of 1690, three expeditions were sent against the English settlements. The center column, consisting of twenty-four French soldiers and twenty-five Indians, under the command of Francois Hertel, after partially destroying Salmon Falls, New Hampshire, proceeded to the Kennebec to join the left column of Count de Portneuf, who was on his way to attack Fort Loyal. This command of Portneuf's, which consisted of fifty French soldiers and fifty Abnaki Indians from the Mission of St. Francois in the Province of Quebec, was also joined by the Baron de Castine, bringing the total French and Indian force to about four hundred. The fighting strength of the garrison at Fort Loyal had been reduced by the withdrawal of Simon Willard and his company to about seventy men.

Portneuf landed, on the night of the fifteenth of May, on the north end of the peninsula in Indian Cove at the foot of Munjoy's Hill. The following night all the inhabitants who resided in the four outer houses retreated to the fort. Following a siege of four days, the garrison surrendered on the twentieth, one of the conditions of the surrender being the safe conduct of all the members of the garrison to the nearest English town. Disregarding the agreed terms, the Indians slaughtered practically all of the defenders regardless of age or sex. About five of the garrison, including Captain Davis and two daughters of Lieutenant Clark, were spared and were ultimately exchanged at Quebec. The French story of the siege says that "the fort was fired, the guns spiked, the stores burned and all the inmates made prisoners. The Indians retained a majority of them." The armament of Fort Loyal was left in the ruins of the place when the French and Indians withdrew.

With the loss of Fort Charles at Pemaquid, the forts eastward, together with a wide country lately occupied by settlements, were abandoned. Later, however, troops were obtained from Massachusetts, the garrisons supplied with troops and munitions of war, and the territory regained.

The third fort erected at Pemaquid was designed to maintain the claim of the English to the eastern territory and to restrain the Indians from encroaching upon the western settlements. When Governor Phips arrived at Boston, May 14, 1692, with the new charter and with his commission as governor, he "proceeded to erect a strong fort at Pemaquid such as had never before been seen in all the region." A bill was passed by the legislative assembly appropriating thirty thousand pounds for general purposes. Nearly twenty thousand pounds of that amount were expended in the construction of the fort.

Having engaged some four hundred and fifty men and collected such tools and equipment as were necessary, the Governor sailed from Boston in August with Colonel Benjamin Church, commander of the forces of the Province. Arriving at Pemaquid Harbor, a site for the new fort was selected, covering the same locality as Fort Charles but ex-

tending further westward so as to include the great rock which the Indians had used for protection when they captured the fort three years before.

The erection of the fort was commenced by Captains Wing and Bancroft, and was completed by Captain March, two companies being retained to do the work. The walls, constructed of stone, formed a quadrangle with an exterior compass of about seven hundred and thirty-seven feet and an interior court or square one hundred and eight feet on a side. The south walls, facing the sea, were twenty-two feet in height; the west walls, eighteen feet; the north walls, ten feet; the east walls, twelve feet; and the round tower at the south-west corner was twenty-nine feet in height. Eight feet from the ground there was a row of twenty-eight embrasures in which fourteen to eighteen guns were mounted. This new fort, called Fort William Henry, was finished within a few months and was manned by sixty men.

By 1696 Fort William Henry had become a noted public garrison. The French thought that it dominated western Acadia and resolved to reduce it. Consequently, Iberville was sent from Quebec with two warships and two companies of soldiers to make the attack. At St. John or at Port Royal he was joined by Villebon, Governor of Nova Scotia, and a company of fifty Mickmack Indians, and also by Castine and his Indians at Penobscot. Proceeding to Pemaquid, the force invested the garrison on the 18th of July, and Iberville sent to Captain Chubb, commanding the fort, a summons to surrender. With fifteen guns well mounted and with ninety-five men well armed, Chubb felt that he could withstand a long siege against a much superior force, so he promptly and somewhat dramatically replied: "I shall not give up the fort though the sea be covered with French vessels and the land with wild Indians."

By morning the French had landed their artillery, and by the middle of the afternoon they had so far emplaced their guns that they were able to throw five or six mortar shells into the fort. Mortars being new to the garrison, consternation reigned within the walls of the defense, and in the midst of the confusion, Castine found means to send a letter to Chubb telling him that "if he delayed a surrender till an assault was made, he would have to deal with Savages, and must expect no quarter, for Iberville according to the king's order, was to give none." This threat, added to the effect of the mortars, decided the issue, and the garrison capitulated. By the terms of the capitulation, the garrison was to be transported to Boston, there to be exchanged for an equal number of French and Indians, and, until their removal, they were to be protected from the Indians. However, when the gates were opened, the Indians found one of their own people in irons and were so exasperated by his story of his sufferings and of Chubb's treatment of other Indians that they at once killed several of the English. To

protect the rest, Iberville removed them to an island and placed over them a strong guard.

The French supposed that the garrison compelled Chubb to capitulate against his will, but he was himself censured by the English and afterwards placed under arrest, tried, and cashiered.

The French considered the capture of Fort William Henry a great achievement. This fort, which had cost Massachusetts an immense sum of money to build and to garrison for four years, was now plundered and largely demolished, and, on the 18th of July, the French returned to the Penobscot.

Following the treaty of Ryswick, September 11, 1697, France and Massachusetts both claimed the Sagadahoc Province, or country between the Kennebec and St. Croix Rivers. The Lords of Trade and Plantations stated that they should always insist "on the English right as far as the river St. Croix;" and strongly urged the government of Massachusetts "to rebuild the fort at Pemaquid," a work, they said, "which ought long before to have been done."

On January 10, 1700, four years after the loss and destruction of Fort William Henry, the Board of Trade, by order of the King, made a report of the condition of the several fortifications in His Majesty's plantations. With respect to Pemaquid, they advised that, for the security of that port and all the country round, the fort should be rebuilt. The authorities, both in England and at Boston, recognized the need for a strong fort at this place, but neither wished to incur the expense of rebuilding, and so, for thirty-three years, the walls of Fort William Henry lay piled in ruin.

Turning our attention again to Portland, we find that, in 1700, at a point about three miles north-east of the old location of Fort Loyal and four miles north of Spring Point, a fort, known as New Casco Fort, was constructed under the direction of Colonel Romer, a provincial military engineer of considerable renown. This work was square, each side being fifty feet in length. Bastions, with faces thirty feet long, were located in the north-east and south-west corners, and high sentry-boxes overlooking the surrounding country were placed in the north-west and south-east corners. About one hundred feet south-east of the fort was the well on which the garrison depended for water, and a line of stockades was built so as to secure the approach to it. The area included by the work, exclusive of the bastions, was two thousand five hundred square feet.

This little fort justified its construction in Queen Anne's War in 1703, when it was the easternmost post of the English. Five hundred French and Indians, under command of the Sieur de Beaubassin, laid siege to it in August. Major March, with an effective force of thirty-six men, repulsed all assaults, and the French commander was forced to begin regular approaches. These were, however, interrupted and

the siege raised by the timely arrival from Boston of Captain Cyprian Southack in an English warship in the service of Massachusetts.

Governor Dudley visited the works in 1704 and directed the construction of a new fort, which was erected in 1705 by Colonel Rednap, an engineer officer of the Provincial forces. The stockades of the new defenses entirely surrounded those of the old works. The new fort was quadrilateral, with regular bastions at all its corners. Exclusive of the bastions, it was two hundred and fifty-eight feet long and one hundred and ninety feet wide. In each side a sally-port was provided, the one on the east having a small stockaded redan in front. The bastioned front was two hundred and fifty-eight feet long on the north and south sides and three hundred and forty-six feet long on the east and west sides. Its interior area, exclusive of the bastions, was a little more than an acre.

From the south sally-port, a sheltered way to the shore of the bay was built, with the water ends flared outwardly and extended into the water so as to give a protected mooring to the boats of the garrison. Major March commanded until 1707 when he was relieved by Major Samuel Moody who remained in charge until 1713.

New Casco Fort continued to be the defence of Falmouth until 1716, when its garrison was withdrawn, its armament and stores removed, and the work demolished by orders from the colonial government.

In 1703, a body of five hundred Indians, mostly under French leaders, fell upon the eastern frontiers. Dividing into several parties, they attacked Wells, Cape-Porpoise, Saco, Scarborough, Spurwink, Purpooduck, and Casco. All were captured or destroyed except Scarborough and Casco, where the garrisons, after long sieges, were relieved by reinforcements.

In 1704, Colonel Church, who had commanded the garrison at Saco in the preceding year, learned that two French officers, Gourdon and Sharkee, had begun to build a fort at Passamaquoddy, whereupon he proceeded against them and killed or captured all the French in the area.

Throughout the period 1702 to 1705, Governor Dudley had been urging the General Court to rebuild the fort at Pemaquid, but the House held Pemaquid to be "out of the usual route traversed by the Indians: and being an hundred miles distant from any English plantation, it was merely a place of occasional anchorage for coasters or fishing boats, and could be of no great benefit—no 'bridle to the enemy—no barrier to our frontier.'"

Fort George, at Brunswick, was established in 1715, and was twice greatly damaged by fire. Brunswick was burned in 1722 and repopulated in 1727.

At Cushenoc (Augusta) on the banks of the Kennebec River near

the head of tide water, Dr. Noyes, one of the Plymouth proprietors, built, in 1716, a stone fort which was said to have been one of the best forts in the eastern country. Built in diamond form, about fifty feet on a side, it had flankers of the same shape, about twelve feet on a side, projecting from the eastern and western corners. Here, for a time, a garrison was maintained at public expense. So great was the encouragement given to settlers by the establishment of the fort that "several towns, as Brunswick, Topsham, Georgetown and Cushenoc began to be settled; a great many fine buildings with saw mills were erected; husbandry began to thrive; and great stocks of cattle were raised." After the death of Noyes, in 1722, the fort was neglected, and in Loverell's War, when the inhabitants withdrew, the Indians destroyed it.

Governor Shute arrived October 4, 1716, and shortly afterwards ordered the repair of the fort and the re-establishment of the garrison at Pemaquid.

Fort Richmond, located above Swan Island in the mouth of the Kennebec River, was built in 1719 or 1720 by private parties for business ends and for accomodating soldiers furnished by the government for the protection of the settlers of the area. The Governor, in his address to the November, 1722, session of the General Court, recommended that Fort Richmond be enlarged, and this was done. Captain Joseph Heath prepared the plans, making the fort seventy feet square of hewed timber twelve inches thick, with bastions in the usual form to mount ten pieces. He remained in command until June 13, 1734, when he was relieved by Captain Jabez Bradbury, who made extensive repairs in 1740. Captain John Minot was the next in command and turned the garrison over to Captain Joseph Bane in 1742. Captain Bane was succeeded by William Lithgow, who remained in command until Fort Halifax was completed in 1754, when Fort Richmond was dismantled.

Another fort built in 1719 or 1720 was known as St. George's Fort, being located in Thomaston, on the east bank of St. George's River. John Leverett and other proprietors of the Waldo patent erected a fortified house and, a short distance away, a small blockhouse, the whole being inclosed by palisades, and large enough to contain two hundred and fifty men. In 1722, the Indians endeavored to surprise the fort but failed to force a surrender. In July of the same year, a larger body from Penobscot undertook a siege which they continued for twelve days. They made considerable progress in undermining one side of the defenses, when heavy rains caused the banks of the trenches to cave in upon them and put an end to the enterprise. Leverett then proposed to make the fort a public garrison and was supplied with a detachment of forty-five men under Colonel Thomas Westbrook.

The General Court, meeting August 8, 1722, pronounced the declaration of War against the Indians expedient, and promised "all neces-

sary and timely assistance." It was decided to employ two more armed vessels and a large additional number of whale boats, and to maintain a force of about a thousand troops. The rates of pay were: Captain, seven pounds per month; Lieutenant, four pounds; Sergeant, two pounds eighteen shillings; Corporal, two pounds five shillings; and Private, two pounds. In distributing these men, one hundred were sent to York, thirty to Falmouth, twenty to North Yarmouth, ten to Maquoit, twenty-five to Arrowsic, and twenty-five to Fort Richmond.

Four or five hundred Indians fell upon Arrowsic (Georgetown) on September 10, 1722, and burned a part of the settlement, but failed to force a surrender.

The last attack of the Indians in 1723 was made on the twenty-fifth of December upon the fort on St. George's River. Learning from two prisoners the weakened condition of the fort, about sixty Indians prosecuted the siege for thirty days, but Captain Kennedy, the commanding officer, held out until Colonel Westbrook arrived with reinforcements and drove the enemy off.

Fort Mary, at Saco, had fallen into decay, and the General Court, in 1727-8, ordered it renewed eight or nine miles above the old stone fort, on the west side of the Saco River. A building, fifty-five feet long by twenty-seven feet wide by nine feet high, was erected of squared pine timber nine inches thick, and a Sergeant and ten men were stationed there.

In the spring of 1729, David Dunbar, a reduced Colonel of the British service, arrived at Pemaquid with a royal patent to the entire Province of Sagadahoc. He immediately repaired the fortifications at Pemaquid, and changed the name from Fort William Henry to Fort Frederick, in honor of the Prince of Wales. The commission given him was revoked by a Royal Instruction of August 10, 1732, whereupon the Governor recommended to the General Court that the fort at Pemaquid be put in a defensible condition. So Fort Mary, at Winter Harbor (built originally in 1708-10), was dismantled and the garrison, ordnance and stores removed to Fort Frederick, where a garrison was maintained for about four years.

In 1731 the town of Portland applied to the General Court of Massachusetts for the construction of a fort for the public defense, and a work was begun on the site of the former Fort Loyal but it was apparently not completed.

Restlessness and discontent becoming apparent among the Indians in 1736, preparations were made for repairing the public fortifications, and for replenishing the public arsenals. The trouble was, however, smoothed over, the tribes became so tranquil that, early the following year, Fort George at Brunswick and Fort Frederick at Pemaquid were dismantled; and the troops at St. George's Fort and Richmond Fort were reduced to one officer and ten men at each place.

In 1740, the Governor reported to the General Court rumors of the presence of Spanish privateers upon the coasts, and obtained an appropriation of three thousand pounds to be applied to the repair of Forts Frederick, St. George's, Richmond, and Mary at Saco. A vessel, the *Snow*, was also built for the protection of the coastwise shipping, and a fort was raised or enlarged at Falmouth, eight or ten 12-pounders being mounted here.

In August, the Governor, attended by members from both legislative houses, visited the eastern country, and made a careful inspection of all the eastern forts. Upon his return, he reported to the the Legislature and obtained an appropriation of seven hundred pounds with which to complete the works at Fort Frederick, St. George's, and Saco, and to provide a chaplain for Fort Frederick.

In 1743, war between Great Britain and France seemed imminent. The eastern Provinces of Maine and Sagadahoc being most exposed, the Legislature appropriated about one thousand two hundred and eighty pounds to be expended on the defenses of the eastern settlements. Fort George, at Brunswick, was again made a public garrison, the other eastern forts received additional supplies, and the colonial forces were increased by about one hundred and fourteen men.

As soon as it was known in the colonies that France had declared war in the spring of 1744, the French colonists and their Indian allies began to plan attacks upon the English. The first attacks occurred on July 19, 1745, at St. George's and Damariscotta (Newcastle). Savages from Cape Sable, St. John, and St. Francois united in an attack upon the fort at St. George's, upon which, however, they made no impression. Another party from Penobscot and Norridgewock prepared to assault Fort Frederick, but the garrison received timely warning and was prepared to receive the assault.

A company of about one hundred next made their appearance in the Sagadahoc country and, on May 26, 1747, commenced an attack upon the fort at Pemaquid. They were repulsed, but in September, another mixed party numbering about sixty furiously assaulted the garrison of Fort Frederick for about two hours. They also were repulsed.

This latter party, or another of like size, next besieged the fort at St. George's. They attempted to undermine the fort from the river bank, but when they had advanced half way to the fort, the earth, as in the attack in 1722, gave way and killed or buried a number of Indians. Another attempt was then made a few yards away, but the trench was advanced for only about twenty feet.

Upon the conclusion of peace, the garrison at Fort Richmond was reduced to fourteen men, that at Pemaquid to six men, at St. George's to fifteen men, at Fort George to four men, and at Saco to eight men; and all were poorly prepared to withstand an assault. A body of Indians from the north fell upon Fort Richmond on September 11, 1750,

but the garrison had received warning of the attack from an Indian. Learning that the fort had received reinforcements during the night, the assailants withdrew.

In 1752, Fort St. George's in Thomaston was enlarged. Constructed of hewn timber, twenty inches square, with walls about sixteen feet high, its form was quadrangular, each side being about a hundred feet long. Inside were barracks built of timber for the dwellings of the people. In the center was a well of good water, and from the southern wall a covered way built of logs extended to a large timber blockhouse at the water's edge, about two hundred feet distant. The fort becoming overcrowded, the inhabitants built blockhouses in two rows about a hundred rods west of the fort, and surrounded them by a palisade of ten-foot posts driven into the ground.

In 1754, war with the French and Indians again appearing imminent and Fort Richmond being in decay, the House desired the Governor to order the erection of a new fort as far above Fort Richmond as he might deem advisable and, upon its completion, to transfer to it the garrison, ordnance, and stores of the old fort. In the summer the Governor ordered the construction of a fort at Teconnet, thirty-seven miles from Fort Richmond. Quadrangular in form, about one hundred feet by forty feet, the new fort was constructed of hewn pine timber and raised about twenty feet in height, with bastions and blockhouses. The walls were thick enough to resist musket bullets and the fort was sufficiently commodious to contain four hundred men. There was also a strong redoubt constructed on the landward side and armed with two small cannon and a swivel. In the main fort were mounted several small cannon, and a garrison of one hundred men was assigned. When completed on the 3rd of September, the place received the name of Fort Halifax, and the ruined works at Fort Richmond were demolished.

Encouraged by this enterprise, the proprietors of the Plymouth patent built two forts the same season, both on the eastern bank of the Kennebec River. One called Fort Western was situated at the head of sloop navigation near the water's edge just below Augusta at the place called Cushnoc. The fort was a large building, one hundred feet by thirty-two feet, constructed of hewn timber like Fort Halifax. Near it was a blockhouse, twenty-four feet square. Here four cannon were mounted and a garrison of twenty men established.

The other fort, called Fort Shirley, was located in Frankfort (Dresden) about a mile above Swan Island, and hence sometimes called Fort Frankfort. A parade ground, two hundred feet square and surrounded by pickets, extended to the water's edge. Within were two blockhouses, the projecting stories being twenty-four feet square. The walls, ten inches thick, were built of pine and hemlock timber, and the blockhouses were located respectively in the northern and southern corners of the parade ground. The fort was, for a time, under the command of Samuel Goodwin.

By October 17, 1754, the troops were all discharged except the few men retained to garrison the forts. Shortly afterward the General Court appropriated money for the supplies at Fort Halifax, for building a small fort at the second or ten-mile falls in the Androscoggin River, and for repairing Fort George at Brunswick.

The fort at St. George's River was attacked in August, 1758, by about four hundred French and Indians, but the garrison was well prepared to receive the assailants and succeeded in repulsing them.

On March 23, 1759, the General Court resolved to employ four hundred men under the supervision of the Governor to take possession of the Penobscot country and there erect a fort which, when finished, should be garrisoned by one hundred men from the forts at Pemaquid and St. George's, which were to be dismantled. Having examined sundry places and taken formal possession of the country, the Governor selected a site in Prospect on the western side of the Penobscot River, about three miles below Orphan Island. The fort was laid out square with the points of the compass, the east side facing the water, and at each corner were flankers. Each side was ninety feet long on the inner side of the work, and the walls, ten feet in height, were entirely surrounded by a moat eight feet deep, fifteen feet wide at the top, and five feet wide at the bottom. Along the center of the ditch were palisades extending entirely around the fort except at the portcullis on the east side, where a drawbridge crossed the moat. Within the walls was a blockhouse fifty-four feet square and twenty-two feet high, constructed of squared timber dovetailed at the corners and trenailed. The roof of the blockhouse was hipped, and had a sentry-box on top. Several coehorns were mounted on the roof of the blockhouse and three or four cannon were mounted in the twenty-foot area between the blockhouse and the walls of the fort. The upper story of the blockhouse projected about three feet beyond the lower, and the platform was covered with easily removable planks. Ten or twelve small cannon were mounted in the upper story.

This fort, which cost about five thousand pounds, was completed on July 28, 1759, and was called Fort Pownal. It was the most regular and strongest fort in the Province, and the authorities in England were so satisfied with its erection that Parliament reimbursed the Colony for the expenditures on its construction. The place more recently became known as "Old Fort Point." Brigadier General Jedediah Preble, with a force of eighty-four men, was at first stationed there. On his resignation in 1763, Colonel Thomas Goldthwaite assumed command and remained there until 1770, when John Preble of Falmouth, son of General Preble, succeeded him. In the following year, Goldthwaite was reassigned to command by Governor Hutchinson. In 1775, Mowatt, with a British war vessel, captured and dismantled the fort, and removed all the guns and ammunition. In July of the same year, Colonel Cargill of New

Castle, fearing that the works would be occupied by the enemy, burned the blockhouse and all the wooden portion of the fort.

To protect the frontiers during the winter of 1759, one hundred and sixty men were enlisted, eighty-four being assigned to Fort Pownal, forty-one to Fort Halifax, thirteen to St. George's, and nine to Saco. Fort Frederick, at Pemaquid, had been dismantled in the preceding year, the usefulness of the fort having ended when the fall of Quebec closed the French and Indian War. After a few years of peace, the large guns of this place were removed and, in 1762, transported to Boston, and Fort Frederick was left to the ravages of time.

Fort Shirley was demolished in 1760 or 1761.

For the protection of the vicinity of Portland, ten pieces, ranging from six-pounders to thirty-two-pounders, were sent to Falmouth in May, 1776. One fort was constructed on Munjoy's Hill and named Great Fort or Fort Allen. Another, located on Free Street, was known as the Upper Battery. Magazine Battery stood in Monument Square and mounted five guns. Lower Battery was located on the old site of Fort Loyal. Fort Hancock was constructed on the site of Fort Preble and was garrisoned by a company of artillery; and a small battery was built on Portland Head, where a detachment was stationed for the purpose of signaling the approach of hostile vessels. Such were the preparations for the defense of Portland during the Revolutionary War.

In 1779, the British authorities decided to carry the war into the northern colonies. Accordingly, Brigadier General Francis McLean was sent from Halifax with nine hundred men to seize and fortify the peninsula of Castine. He landed on the 12th of June and proceeded energetically with the erection of defensive works.

It was not long before the news of this expedition reached the authorities at Boston, who resolved to drive McLean from his position. A large land and naval force was raised with Solomon Lovell in command of the army and with Captain Saltonstall of the thirty-two-gun frigate, the *Warren*, in command of the fleet. Peleg Wadsworth was second in command under Lovell, and Paul Revere was in command of the artillery. The land forces numbered about one thousand five hundred men, to which could be added three hundred marines from the fleet. A number of guns of large caliber was carried on the expedition.

This force appeared off Castine on July 25, 1779, and found the fort unfinished and unprepared for defense. McLean sent to Halifax for reinforcements, and kept on with the construction of his fort. Two bastions had not been begun, while the other two and the walls had not been raised more than four or five feet.

The Americans landed on the third day and secured a position on the heights. Instead, however, of making an immediate assault upon the unfinished works, they held conferences and decided upon a regular

siege. Two weeks passed with no particular activity, and finally Sir George Collier arrived with a British fleet. Thereupon the Americans withdrew to their ships and were defeated in the naval action which followed.

Apprehensive of a second attack, General McLean labored unceasingly, after the siege was raised, to complete his fort which he named Fort George (Castine), a name given it in honor of King George III. The works were essentially complete by December, but were not again molested. Castine was evacuated by the British in January, 1784.

At the close of the Revolution the forts of Maine were largely non-existent. Fort George (Castine), in the hands of the British, and the works around Portland were in a fair state of repair, but most of the others had been demolished or had deteriorated to such an extent that they had to be rebuilt or abandoned. Confronted, as were the other colonies, with rebuilding their government, with reestablishing their trade, with re-creating their credit and staving off bankruptcy, the northern colonies had no time to devote thought to the state of their coast defenses. The forts were therefore abandoned. They had served their purpose and had passed. The great sums of money and the great amount of time which had been expended in their erection and maintenance brought no heritage to the newly formed United States of America and no forts in Maine were transferred to the central government. Maine had no forts.

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A FIGHTER IS JUDGED BY WHAT HE CAN
TAKE AS WELL AS BY WHAT HE CAN GIVE.

A Universal Plotting Board for Stationary Targets

By Lieut. Colonel James Prentice, C. A. C.



THE need for some form of plotting board on which the range and azimuth of any point on a map or chart from any other point on the same map or chart can be found with little delay and to within five hundredths of a degree without the use of a logarithm table, has long been felt. A board that fulfills these requirements can be easily made from ordinary boards and scrap iron with the help of a few simple tools.

The principle on which this board operates is as follows: Assume that a circular board has been constructed, having a curved slide which can be rotated with little or no play around the board's periphery. (See Fig. 1.) On this slide at the point A and B, two suitable studs are welded on which couplers of equal length are pivoted for the purpose of keeping the "straight edge" CD constantly parallel to the chord AB, so that if the rotated parts are reasonably rigid, the azimuth of the "straight edge" will always be equal to the azimuth of the chord AB.

On account of the shortness of the arc AB it is best to offset the azimuth pointer P, 90° . If it is desired to know the azimuth of the point N from the point M we read the scale nearest the periphery which indicates in this case, 90° .

Assume that a chart is supplied on which there is a grid and that on this chart it is desired to find the azimuth and range of the point Y from the point X. The procedure would be to move the slide AB so that the pointer indicates 90° . Place the grid map on the board and adjust it in any convenient part of the board so that the grid north and south line will be perpendicular to the "straight edge" CD and the east and west line will be parallel to the "straight edge" CD. Secure the chart so that it cannot move during adjustments of the "straight edge." Move the slide AB with the attached couplers and straight edge around to the position A_2B_2 . Put a targ or a pin at X and bring the straight edge CD gently up to it. When the movable parts are rotated and adjusted so that the straight edge CD passes through X and Y, the azimuth of Y from X can be read directly at the pointer P.

A great many expedients can be resorted to in the use of couplers of various lengths. Couplers can be made of two pieces with length scales and clamping devices. Long couplers with holes at frequent intervals can be used, but the best practice is to use an articulated coupler with a

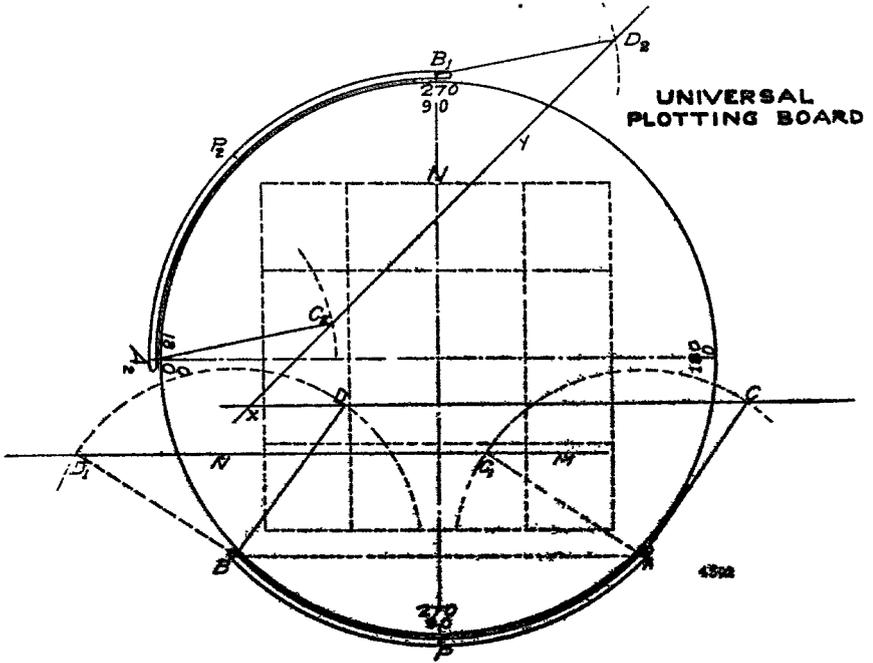


Fig. 1.

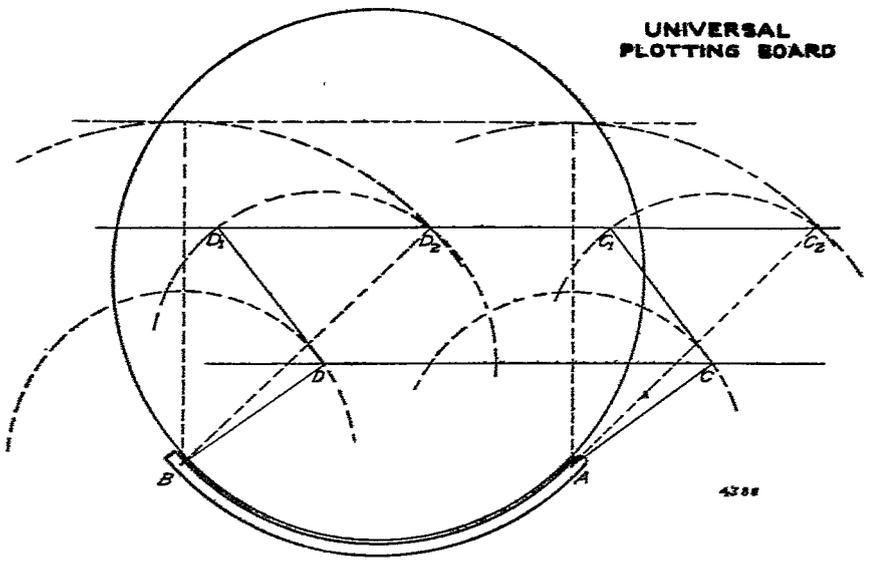


Fig. 2.

supplemental straight edge (see Fig. 2). In this case the two sections of the articulated coupler are equal to the single long couplers AC_2 and BD_2 . The advantage of this is apparent when the long coupler is swung sideways in order to reach the points X and Y. Long couplers cause too much overhang of straight edges and couplers over the edge of the board.

A plotting board of this type is especially suitable for use in flash ranging and in general coordination of artillery activities. A single board would cover a whole division sector on a scale of 1/20,000, having a diameter of about six feet. On a scale of 1/62,500 (one inch to the mile) the greater part of an army area could be covered, while a five foot board would be suitable for regimental work.

UNIVERSAL PLOTTING BOARD

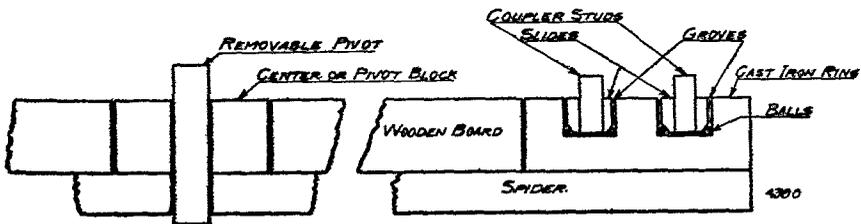


FIG. 3.

UNIVERSAL PLOTTING BOARD

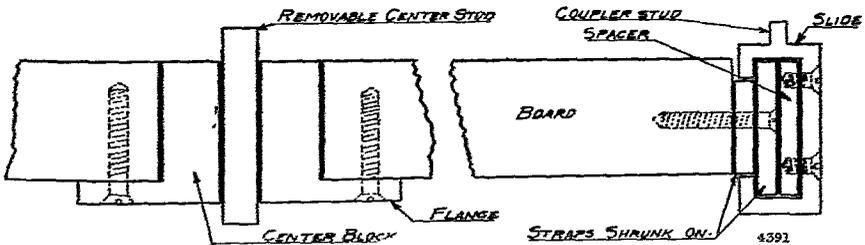


FIG. 4.

There need be no arms pivoted at the center, and for this reason any chart that can be inscribed in the circle can be used on the board. The board is independent of scale, since independent measuring tapes or straight edges can be used in measuring any given line. The permanent straight edges are not scaled as they are for use in determining azimuths only.

It should not be inferred from the above that a grid map or chart is needed on this board, as such is not the case. If the azimuth of any line

on a map is known and the straight edge is set to read that azimuth, then the map or chart can be properly oriented. Even a blank piece of paper with only two known points or with one point and a known line of direction from that point will be sufficient to start operations.

This board was primarily devised for use in flash ranging but since it can be used in triangulation it appears to the writer that it would be valuable for all round fire in the Coast Defenses especially in fire against stationary objects or in interdiction fire.

The great detrimental feature in the 360° plotting boards thus far furnished by the Ordnance Department has been the use of a fixed pivot in the center. This fault has kept down the ranges at which a scale of 300 yards to the inch can be used to about one-half the diameter of the plotting board. On this board the full diameter of the board can be used thus doubling the ranges for plotting. Furthermore an infinite number of base lines can be used with this board with no further preparation than indicating their position on the oriented map. A means of constructing the intricate parts of a board such as is described above is shown in the figures 3 and 4.

A SMILE

IS SOMETIMES OUT OF PLACE.

**BUT MORE OFTEN ARE DISCIPLINE AND
EFFICIENCY INJURED BY THE UNNECESSARY**

FROWN.

Notes on Scottish Artillery in the 16th Century

By Col. Sir Bruce Seton, Bt. C. B.

(Written for the COAST ARTILLERY JOURNAL)

EARLY in 1584 the young King James VI succeeded in obtaining possession of the Royal Castle of Stirling after a short siege. Having hanged the Captain for his resistance, he proceeded to take possession and appointed one John Bruce of Airth to take over command and to prepare an "inventare" of the contents of the Castle as they stood on 6th May 1584.

From the lists drawn up by Bruce it is possible to get an idea of the armament of what was one of the most important fortresses in Scotland at the time.

The document gives lists of furniture, guns, ammunition and the Royal Wardrobe as they stood when the Castle surrendered. The guns numbered fifteen, and are described as "greit ordinance;" they varied from the heavy 60 pounder "bombart" to the small "falcon" firing a one or two pound projectile.

The list shows that the original armament of the castle was made up as follows:—

- 2 iron "bombartis" which were found "liard on thair syde"
- a "gros culverin"
- a "dymmie" (demi) culverin
- 3 "myanes" or serpentines
- 2 "sakaris"
- 4 "doubill falconis"
- a "singill falcon garnesit for ane schip"
- a "battart"
- and 6 hagbuttis, which can not be classed as artillery.

In the second list of ordnance etc., brought from Edinburgh only six guns are mentioned, and these are small weapons of the type which normally accompanied troops in the field. They consisted of 2 "moyanes," 2 double and 2 single falcons. With them were a couple of barrels of "cannoun" and one of "morsing" powder, carried in a "clois cart" or ammunition waggon; also a remarkably limited supply of "bullattis," i.e., 72 of iron and 15 of lead for the moyanes and double falcons, and 22 of lead, for the single falcons.

As might have been expected there was an abundant provision of pioneers tools, ropes for hauling the guns, harness and materials for repairing gun carriages.

Roughly speaking, the "bumbart" or bombard and the culvarin were heavy guns, which were not normally taken into the field unless siege operations were contemplated. As there were practically no roads in the modern sense this is not surprising. A very fine specimen of the "bumbart," the celebrated Mons Meg, is still in existence, mounted in Edinburgh Castle. It is probably the largest gun of its type ever used in Scotland. This remarkable weapon, affectionally described in the Lord Treasurer's accounts as "the greit iron murderer Muckle Meg" weighs $8\frac{1}{2}$ tons and was, almost certainly, constructed in Scotland about the middle of the 15th century. It has a calibre at the muzzle of $19\frac{1}{2}$ inches, but at the breech the chamber is only about 9 inches. Casting a gun of this size was impossible at the time Mons Meg was made, and we find that the built up gun preceded the cast gun. "Meg" burst in 1680 when firing a salute and, at the injured spot, it is possible to see that the chase is composed of an outer jacket of hoops over an inner layer of longitudinal bars. There may have been a liner as well. This gun fired stone shot as well as iron ones, up to the middle of the 16th century; but the use of the stone "bullatt" had ceased by 1550.

The Stirling bumbarts, which were probably of similar type, were mounted in "flancours" that is to say in fortifications projecting from the walls of the castle and enfilading them.

The "gros culvering of found" was a cast iron gun, from 10 feet to 13 feet in length, of calibre from 5 in. to $5\frac{1}{2}$ in. and firing a projectile of 16 to 20 pounds weight. It was mounted on a two-wheeled carriage with a detachable third wheel at the end of the trail.

It is difficult to identify the smaller kinds of ordnance. Each variety had several alternative names which were used quite indiscriminately by contemporary writers and confusion results when, in the same document, two or three such names are used for the same type of gun. In this respect the Stirling list is open to criticism, for it shows separately the "dymmie culvering" and the "myanes"—which are probably the same gun. There was little serious attempt at standardizing dimensions of guns or their projectiles in those days; and a large specimen of one gun might easily be confused with, and fire the same projectile as a small specimen of the gun of the class next above it. The small falcons used by the insurgent army at Langside varied in length, calibre, and size of projectile, and their ammunition supply must have been a most complicated matter.

The "culvering myane" of Stirling Castle was a cast iron 10 pounder; the "sakar" weighed 2850 pounds and fired a 5 pound shot; and the falcons were small light weapons firing shot of one to two and a half pounds.

Our knowledge of the construction of the 15-in. and 16-in. guns in

Scotland is rather fragmentary, and but little can be obtained from the only available sources, viz, contemporary historians and the Lord Treasurer's accounts. It is quite certain, as stated above in reference to "Mons Meg," that the early guns of large calibre, and possibly medium guns as well were forged, not cast. The technical difficulties in connection with large castings probably accounted for this.

Not only was a King of Scotland killed by the bursting of one of his own guns, but references in the Treasurer's accounts to compensation paid to residents in the neighborhood of the gun factories for damage to their property show that gun trials were a hazardous operation liable to lead to unexpected results. Even when guns were cast there appears to have been difficulty in dealing with the problem of length. The consequence was they were cast in two parts, viz, the chase and a "chalmer" or breech chamber, which were then screwed together. In 1471 the Scottish Parliament enacted that certain small guns were to be constructed each of which was to have "twa chalmeris." Whether the security of the piece depended on this screw joint is not known. If it did the military career of the "gunnar" who combined the functions of laying and firing must have been a speculative one. The existence of these breech "chambers" does not of course justify the statement made in the introduction to the Treasurer's accounts to the effect that guns at that time were mostly breech loaders.

Whether forged or cast, guns in the 15th and 16th centuries were largely made at the Royal Works in Edinburgh and Leith; and also, curiously enough in the Abbey workshops at Holyrood. In 1473 a "Francheman" called Rounald was paid £5.5 for making a gun; and in the following year he was succeeded by a "goldsmyth" called William, who was paid £2. In neither case is the size of the gun stated.

PROJECTILES.

As a general rule the projectiles in use were solid shot made of iron or lead, or, in the first quarter of the 16th century, of stone. Stone shot formed the most important part of the big gun ammunition supply of the Scots army at Flodden. The cutting of "gun stanis" was carried out in quarries near Edinburgh and elsewhere, and the Treasurer's accounts refer to payments in 1496 to a "quareour, for correkking of gunstonis." Mons Meg fired them as well as iron shot, and a pile lies beside her as she stands today in Edinburgh Castle.

There are no references to stone projectiles at the battle of Langside in 1568 or in the Stirling lists where "bullattis" of lead and iron, and "chanzeit bullattis" (chain shot) are mentioned. At Stirling there were apparently no shells, though shells were used at Langside and specimens still exist. They were of cast iron, with walls $\frac{4}{10}$ -in. thick, a diameter of about $3\frac{1}{10}$ -in. and weighed, when empty about 2lb. 6 oz.

They have a fuzehole about $\frac{1}{2}$ -in. in diameter, which, in some, has a screw thread.

Fuzes of iron or copper were in use before Langside, some of them screwed. They appear to have contained a match of slow burning powder which was lighted by the gunner immediately before the gun was fired. Devices for regulating the length of time of burning came in at the end of the century; but Stirling was evidently rather behind the time as regards both shells and fuzes. Lead and iron "bullattis" were mostly made in Edinburgh; but there are indications that local manufacture was also employed to some extent, as, for the falcons at Stirling, there were "cammis" or moulds of stone for casting projectiles. The "bullattis" so cast has a well marked ridge which corresponded to the line of junction of the two halves of the mould.

GUN POWDER

Although some of the powder used for artillery and small arms was imported there were certainly powder factories in Edinburgh and Leith in 1456. In that year the Exchequer Rolls refer to payments of £49·14 for 1,988 lbs. of saltpetre, £14·6·8 for brimstone from Flanders and 25/- for charcoal. At the same time they mention the importation of 2 barrels of "Hamburg" powder for bombards at a cost of £13·1·4.

Other entries refer to the purchase of canvas "to dry the pudir on," to washing of the said canvas, and for making of barrels. In the Stirling lists three kinds of powder are referred to, viz, cannon powder "paris fyne" (which probably indicates that it was imported from France, or was of French standard), "culvering powder" and "morsing powder." The latter was probably used for priming, and perhaps also for shell fuzes.

TRANSPORT

Although the tactical employment of artillery was in its infancy, guns, large or small or of both kinds, generally accompanied armies in the field; and a good deal of interesting information is available in the Treasurer's accounts as to the transport employed.

"Weir" (war) carts were, apparently, generally employed for the carriage of small guns such as falcons at the time of Flodden; but the reference in the Stirling lists to "lymmaris" (shafts) for these guns appears to show that they were, at the close of the 16th century, sometimes horse drawn. For larger guns the normal means of transport consisted of teams of oxen.

When James IV set out on the expedition which terminated at Flodden his "gros culveringes" were supplied with teams of 32 to 36 oxen, with gangs of pioneers numbering 20 men to each gun to make the roads passable, and large parties standing by with drag ropes. With roads in the condition they were then in, accidents were frequent, and the gun

occasionally took charge in spite of the men on the drag ropes. This necessitated the employment of the travelling "cran" (crane) drawn by oxen, to pick up overturned guns and to remove damaged transport oxen from the way. The "cran" mentioned in the Stirling lists was probably of this type.

PERSONNEL

Unlike the rest of the army, which was of the militia type, the artillery was, in the 16th century, a Regular arm; and even in the rare intervals of peace there was a nucleus of gunners. On the outbreak of hostilities large numbers of artificers and pioneers were engaged, as pointed out above, to accompany the "artailzeri"; and their engagement was, nominally, by the week.

In 1497 pioneers, equipped with spades, mattocks and shovels got six shillings a week; and drivers got a shilling a day for themselves and the same for forage for each beast in their charge. Smiths, wrights and similar mechanics were paid sixteen pence a day. Of gunners proper—or, as they are quaintly described in the Acts of the Scottish Parliament "cunning men to schute"—there were comparatively few, and many of them were foreigners. In peace there was always a nucleus of trained men employed in construction of guns and powder; and they assumed command of the guns in the field. Their pay showed a tendency to rise as they got more "cunning"—an agreeable feature of old time soldiering which is regrettably absent in the Service today. Thus in 1512 Master Robert Borthwick, "gunnar, master meltar of the Kingis gunnis" got £5·10 Scots monthly and his five assistants or "machinadores" were paid £3·15. In 1516 Borthwick got £10 and the others £4. On mobilisation additional gunners and assistant gunners were engaged; their pay varied from 9/4 to 13/4 a week.

THE TACTICAL EMPLOYMENT OF GUNS

This is a subject of which perhaps nothing will ever be certainly known. That artillery had come to be a recognised arm by the beginning of the 16th century is evident; and that considerable moral support was afforded to the infantry by the noise of its discharge is repeatedly stated by individual Scottish historians. Whether it was seriously hoped to stop the advance of troops to the attack is doubtful—though, at Flodden, the master gunner Master Borthwick was rebuked by the King for his importunity when he begged leave to open fire on a bridge which the English had to cross. He, poor man, never came into action at all. The English guns opened fire and he was one of the first casualties.

The ranges at which artillery operated must have been very short, having regard to the fact that in 1745 the Castle guns in Edinburgh only carried part of the way down the High Street, and were notoriously inaccurate. Some 300 years before this a bombard—perhaps Mon Meg

herself—took part in the attack on Abercorn Castle. The gunner in charge was a Frenchman, of whom contemporary dispatches relate that he “Schot richt weill and falsit (missed) na schot within a fathom from where it was chargit him to hit.”

Crude as artillery may have been however in 1500 to 1600 it must always be borne in mind that it practically revolutionised warfare from the moment of its appearance.

At Flodden at least the artillery was regarded as “Army” not Corps Troops. The gunner in command was independent of the Corps Commanders, and it was only by threats of personal violence at the hands of the King that ‘Master’ Borthwick was prevented from putting into operation his intention, viz, opening fire on the bridge the English army had to cross. Had he been permitted to do so, what was perhaps the worst military defeat sustained by any country during the middle ages might have been averted.

NOTE. The “Stirling Inventare” of 30-11-1585 will be found in the “Report on the muniments belonging to the Rt. Hon. Lord Elphinstone at Carberry Tower” by the late Sir William Fraser K.C.B. dated 14-3-1882.

Reference is also invited to the accounts of the Lord High Treasurer (of Scotland) the Exchequer Rolls and the acts of the Scottish Parliaments.



The War of Stagnated Fronts

(A study of the pernicious effect of Trench Warfare upon the morale of troops, by a German participant in the World War, from No. 32, of February 4, 1922, Militar-Wochenblatt. Translated from the German by Colonel George Ruhlen, U. S. A., Retired.)

ENERAL von Falkenhayn lays stress upon the statement that in its time trench warfare was selected and carried on only as the lesser of evils under the heavy pressure of imperative necessity, words that give expression to the profound feeling of every soldier at the front. Even though the disadvantages of a system of warfare that had become torpid in fixed fortified positions were generally admitted, making prominent mention of some specially important factors *can serve only to emphasize the correctness of those of our regulations having for their purpose the exercise of the highest spirit of the offensive.*

The Manchurian campaign 1905-06, permitted the system of entrenched positions to reach an exaggerated importance and thus brought about delay of the ultimate decision; it was then a correct estimate of the quality of passive but irresistibly stubborn defense, inherent in the Russian, that had previously asserted itself in former Russian campaigns by the active development of trench work, (Borodino, Crimea, and Balkan wars).

But by this system one sacrifices voluntarily the superiority of the leadership of armies, the advantage of carefully arranged methods of attack, and the possibility of profiting to the utmost by the enemy's weak points and errors. An excessive portion of the combatant forces is held at local defensive positions and the possibility of rapid, forceful decision is greatly lessened.

While this last feature may, for a certain period of time be desirable, it can never be favorable in a prolonged progress of the war, especially when confronted with the possibility of an unlimited extension of the enemy's defensive resources. Victory can in the end be found only in the destruction of the enemy's fighting strength; wearing him away and gaining ground are at best only incidental side issues. Tannenburg was and remained the lightning illuminated model of battles, such as Count Schlieffen, in his review of Cannae, sets forth as worthy of striving for.

In the struggle for existence great things can be achieved only by putting up our greatest efforts. Schiller's words: "when life is not at stake life is never won" are justified not only for the individual but for

nations. If one asks: in what way does trench warfare exert an influence upon Clausewitz's principal potentials of success in war? We have: First, That the superiority of talent in leadership cannot be adequately exploited, especially those of the brilliantly sustained independence of action of subordinate leaders which became so prominent in our former wars, (Spicheren, Woerth, Metz, etc.,). We were witnesses, during the world war, that combats in one's immediate vicinity often became stagnant; that the impulses to active participation, to stubborn endurance and exertion of the greatest effort of the individual fighter were frequently put aside.

Second, the warlike virtues of the army, founded on the training of the individual soldier will be weakened rather than strengthened. The single individual who was taught and upon whom was impressed the precept: "forward, at the enemy, cost what it may" had to relearn. The training toward disregard of himself, to be venturesome and accustom himself to the extreme of bodily exertion, was for a time replaced by passive efforts for the preservation of his individual self, thus giving unmeasured influence to one of the mightiest attributes of human nature—self preservation, in contrast to the requirement of sacrifice of self.

The unbiased observer must have noticed how the desire for safety of the person restrained, in average natures, the better impulses; how the want of active exertion during many long hours of passive idleness gave opportunity for the frivolous babbler, intent only on his personal safety, to exert undesirable influence upon stronger natures.

The officer, as an example to his men, was at all times their nearest helper and participated in their grievances and privations. But those educators of warlike virtues began to disappear more and more rapidly and were replaced in part by elements less fitted for this heavy task and who did not possess the qualifications and strength to stand up under the monotony of many long days of exigency and danger and did not, even in their own person, maintain their spirit of resistance to these destructive influences. Thus the value of their example was lost. Next followed the decline of superiority in leadership of the non-commissioned officer over his subordinates. The daily uninterrupted living together brought it about that the true value of the individual became more and more apparent; the replacements of numerous men who in civil life had positions of prominence and were from an economical and social point of view more advantageously placed than the modest non-commissioned officer, succeeded in creating the impression, outside of strictly service lines, of superiority to their non-commissioned officers in ways which the latter were unable to resent. These instances had a contagious effect, so that in the end military bearing and conduct suffered under the continuing close and forced propinquity. Many weak superiors yielded to these influences without taking proper means of asserting themselves.

As far as the continuous activities of the enemy permitted, the officers were a unit in combatting these well appreciated dangers of the vexatious passive existence of trench warfare, wholly devoid of opportunities of experience of the soul stirring incidents and emotions of a continuously changing war of movement. As a further consequence of trench warfare there came about a continually increasing use, from day to day, of auxiliary technical and mechanical means of defense, with the enemy, thanks to his unlimited resources, greater than with us. But the number of technical auxiliary weapons has at all times been in inverse ratio to the warlike conditions of the nations making use of them.

In the golden age of Rome the legionary achieved his hard fought victory with the lance and sword. But later on, in the times of the emperors, the disintegration of manly virtues gave rise to an increased introduction of technical auxiliaries and machines of war. In the year 1777 the great king writes, with a certain bitterness of expression: "formerly victory was won by the bravery and strength of the troops but now the artillery decides everything and the test of the skill of a general consists in being able to bring his troops in contact with the enemy in such manner that they may not be annihilated before the beginning of the actual attack." A truth that is also current to-day.

But only one generation later, under the inspiration and leadership of men burning with ardor for the relief of their fatherland, victory was achieved under conditions of an even more effective system of technical auxiliary appliances of war than those referred to by King Frederic. And so it will always be under like conditions.

"We have begun to estimate the *art* of war higher than military virtues; this was the ruin of nations in all times; bravery, self sacrifice, endurance, are the foundation stones of the independence of nations; when our hearts are no longer responsive to these we are lost, even in the midst of our greatest victories," says Scharnhorst, having in view conditions in 1806. To him who is in earnest search of all the causes of our downfall the truth of these words must be a revelation of the subversion of the warlike virtue of our people after three years of defensive trench warfare. The war of movement steels with power and self confidence; it gives opportunities for self sacrifice and the development of manly virtues. Enduring trench warfare is, on the other hand, their grave. It encourages the drift toward self preservation and blunts all manly spirit and tendency to higher aims. It is not, however, intended to emphasize the assumption that this theoretical review should in any manner attach itself to the individual soldier in trench warfare. Only he who has lived through it can appreciate the enduring daily self sacrifice that was demanded of the earnest defender of his fatherland; but human flesh is weak and that must be taken into consideration by him who is charged with responsibility.

But much may also be said in regard to the third principal potential, but it must be left to an abler pen to discuss the extent of the influence of the prolonged trench warfare upon the self sacrificing spirit of the people themselves, in connection with its contributing causes of slackness and want of definiteness of political aims and leadership. We soldiers had our own peculiar individual ideas of the singular justice that permitted the "home fighters" to live without risk and in the enjoyment of their accustomed comforts under conditions of earning abnormally high wages and even with prospects of acquiring an assured competence for the future, while the fighter at the front, in daily contest with privations and death, was lucky if he came out of it alive.

Our homes were, almost without exception, saved from the contact of an enemy. Relinquishment of the entrenched front positions would necessarily have caused changes in this phase of the situation. Did the people at home requite the sacrifices made by the armies in the front by individually and unselfishly contributing to their utmost possibility, toward the burdens of war? Does not now an unmerciful enemy to whom power was given by our voluntary surrender of our arms, squeeze the last attainable substance out of our people? Is death due to exhaustion in despair or to sickness caused by undernourishment of less significance than it would have been on the battle field? These are questions each one must answer in silence to himself.

"You must know that it is not necessary for me to remain alive, but I must do my duty and fight for my country, to save it if it be still possible" was once written by a king of lofty spirit to an intimate friend in an hour of trial.



The National Significance and Importance of the Reserve Officers Training Corps

*By C. Y. Thomason, Coast Artillery Unit, R. O. T. C.
2nd Year, Advanced Course, Coast Artillery Unit, R. O. T. C.
1st Prize, \$50.00, Georgia Tech. R. O. T. C. Essay Competition*



ABOUT 1914, prior to the outbreak of the World War, the Army of the United States consisted of about one hundred and seventy thousand men, with some eight thousand officers. With the advent of this nation into the struggle, came the demand for four million men to successfully bear our share in carrying on the conflict. In order to make this force effective, trained officers were necessary—thousands of men with good educations, ability to lead, and most important of all—thorough military training.

With the passage of the Draft Bill, it was a comparatively simple matter to muster the required force of untrained men, but the training of competent officers was a matter which required more time and care. Officers Training Camps turned out officers by the thousands—most of them with practically no previous military experience. This took time, and the products of these camps were by no means the finished and competent officers really needed by the young but lusty Army.

The lessons taught by the World War took root in the minds of our Country's Legislators, with the result that the Reserve Officers Training Corps, previously a practically dormant and inactive organization, became an important force, both in our Colleges and in the military world. Generous appropriations contributed the stimulus toward making it an active and well-planned organization, which immediately took its rightful place in College work.

Despite the aversion for all things of a military nature, created by the years of warfare, the courses of military instruction were made so attractive that students were glad to take them. Uniforms, commutation of rations, and summer camps were features which appealed to the average College man. The courses, instead of being confined to close-order drill and tiresome ceremonies, were broadened to include lectures and practical work on subjects which were not only of vital importance to an officer, but interesting to the student. These things have contributed toward making Military one of the most popular courses in the modern College.

Now let us turn to the value of the R. O. T. C.—both from the standpoint of the Government, and of the student.

The R. O. T. C. does not hope to turn out trained and finished officers—men who could immediately assume a position of command and responsibility. The courses as presented in the Colleges are intended to give them the basis upon which may be added the finishing touches necessary to make good officers. These men, placed in reserve, could be called forth in time of war, given a short intensive training suited to the needs of their branch of the Service, and made ready in a short time for active and useful duty. Thus the United States has in reserve at all times a large force of basically trained men, ready at short notice to be transformed into competent officers.

Aside from the military value of this force of Reserve Officers, the civic value of the training received under the R. O. T. C. is immense. The courses of study offered in the military departments of our Colleges may be very favorably compared in educational value with the regular college courses. A good variety of subjects is taken up and the practical work offered is of great value in civil life. For example, it has been said that a man who wins his commission in the Artillery has sufficient training to be a good Civil Engineer. The same thing might be said in connection with the Signal Corps and Electrical Engineers. The Motor Transport Corps offers a course in Auto Mechanics hard to beat in any Technical School.

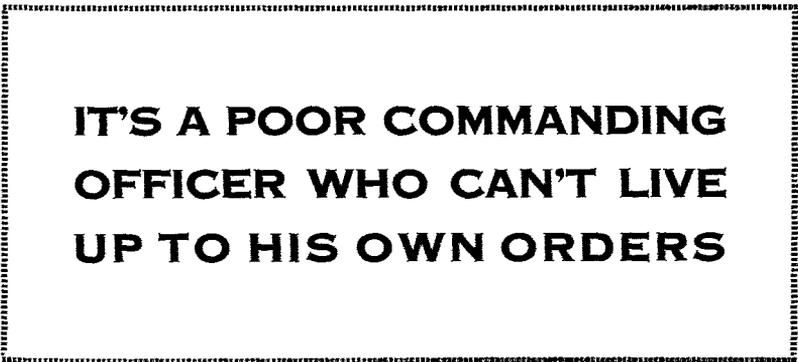
Thus we see that these R. O. T. C. courses have a practical value to every man, which makes it to his advantage to get the most he can from them.

The discipline and obedience to authority as exemplified in the old-fashioned military regimes, are not entirely dispensed with in the modern course. Enough close-order drill and Infantry manoeuvres are assigned the student to give him a thorough idea of the value of discipline and the poise which is the making of a good officer. This work is given in the earlier part of the course, while the last two years are devoted more to the theory and specialized study of the subjects directly pertaining to the branch of Service entered.

The question is asked—if we have no other war, what good then will be this extensive training, with its consequent expenditure of the Nation's money?

If we are never afflicted with another war—a state which all of us devoutly hope will come to pass—the training received by the young College man, under the R. O. T. C., will be of incalculable value in civil life. Aside from the practical importance of some of the manual and technical courses offered—the discipline, physical training, and military poise obtained, are easily worth the money expended by the Government, and the time given by the student.

The R. O. T. C. is an organization for real American Manhood, embodying in its work and scope the best ideals of Americanism as expressed in work, study, and patriotism. Its national significance and importance is incalculable, covering so many details of military and civil value, that its work may best be summed up in these words—"the making of Men."



**IT'S A POOR COMMANDING
OFFICER WHO CAN'T LIVE
UP TO HIS OWN ORDERS**



EDITORIAL

A Coast Artillery Fable

LEON Smithers was the only child of a devoted couple in rural Virginia. Smithers, Senior, and his wife were not world beaters, but were typical good citizens who lived to maintain the good name of Smithers, and who entertained an inordinate and uncritical pride in young Leon, so named in the fond hope that the stimulus of this suggestive handle might react to develop in him all the lion-hearted qualities of courage and nobility which lay close to the hearts of his devoted parents. As time went on and Leon graduated successively from kilts to knickerbockers and then to long pants, the neighbors impartially sized up Leon as being a good boy but not a whiz. However, due to the misfortune that Leon was an only child and grew up in the fond cloister of parental pride and devotion, he was secluded from the practical tests of boyish initiative and mental competition so that neither he nor the two elder Smithers realized that Leon exhibited but little promise of capitalizing on paternal prediction.

Now it so happened that during the post war period of industrial depression, Leon's father shared in the widespread economic embarrassment by having his already meagre wages cut to the bone. So just at the time that all the family realized the financial necessity of having Leon leave school and go to work, the fates interposed in Leon's path a Coast Artillery Recruiting Sergeant who set forth in glowing terms the educational opportunities and physical and material advantages which would accrue to young Leon if he should join the Coast Artillery. After a serious conference between the Recruiting Sergeant and Leon's parents the upshot of the matter was that it was decided that the best thing Leon could do at the time was to enlist in the Coast Artillery.

After arriving at the Coast Artillery fort to which he was assigned, Leon soon overcame his first homesickness and in consonance with his original purpose, enrolled in the Post School. In his school work as well as in the performance of his duties it soon became apparent to his officers and non-commissioned officers that Smithers was a good steady boy but slow and dull as an old hoe. However, Private Smithers was

well satisfied with his own progress, took a decent pride in the fit of his uniforms and the condition of his equipment, conjuring up for himself as he polished away on his rifle stock, many a picture of himself with a corporal's chevrons and even with the stripes and lozenge of a first sergeant. However, while his bunkies grouched and growled about the beans, fatigue, and the fewness of "nights in," Smithers was well content and in an inarticulate fashion his spirit responded to the military traditions of the historic spot which was now his home, and unfailingly his heart pounded a little harder as he stood rigidly in ranks and listened to the strains of The Star Spangled Banner and watched *his* flag come fluttering down through the soft afternoon light.

As the bracing air of spring gave way before the torrid heat of summer, all the companies of the regular garrison completed their own target practices in order that, as Leon read on the Company Bulletin Board and heard his Company Commander explain to the men, the regular troops might be free to share in the most important work of helping in the military instruction of their brothers-in-arms, the National Guard and the members of the Civilian Military Training Camps, who were to come at different times during the summer to learn as much as possible, in a short time taken from their civilian pursuits, of the Coast Artillery game. In an unexpected fashion the significance of this big idea percolated through Leon's consciousness and he swelled with pride as he wrote home to the folks of his coming responsibility as an instructor during the summer camps.

Presently the first contingent of National Guard arrived and moved into the camp which had been prepared for them by the regular garrison. One of the National Guard companies was assigned for training and instruction to the battery which was manned by Smithers's company. Now it so happened that during the first few days of this National Guard training period, Private Smithers fell heir to a succession of duties—room orderly, guard, fatigue, and kitchen police—which kept him away from the Battery. On the day the National Guard company was to fire service practice Smithers fell in with his company, marching out for the men to assume their assigned places as coaches alongside the corresponding details in the National Guard outfit. When the company got to the Battery the first sergeant discovered that the regular man for the data-phone at No. 2 Gun was A.W.O.L. Looking over the reserve section he scrutinized with a hopeless air the material available for this assignment and finally fixed his eye on the unfortunate Smithers, and detailed him to this phone. Perhaps the first sergeant failed to remember that in his short service, Private Smithers had never had any instruction in the use of the telephone. Anyhow, Smithers realized the fact and his heart sank. Overcome with a sense of responsibility and with a hopeless bewilderment as to what was expected of him, Smithers mounted to the loading platform, opened the box and put on the head-set.

The next half hour swept by in a tremulous haze, finally interrupted by the harsh voice of his own Captain, bellowing from the B.C. station "What in hell's the matter with you, Smithers? That deflection was Two-Point-Seven-Six, not Three-Point-Seven-Six. Now wake up and get it straight." Whereupon poor Smithers, feeling that the eye of every National Guardsman in the world was shooting him in the back, mustered with all his effort his remaining mental energy, and concentrating all his attention on that devilish far away sound coming to him through the earpiece, satisfied himself that what he heard agreed with the last thing the Captain said so that he lifted his head and shouted in a voice of assumed confidence "Three-Point-Seven-Six!" The gun was in battery and Smithers braced himself for the forthcoming concussion when through a raucous megaphone he again heard the Captain's voice "Cease firing. Smithers, you — — fool, what in the very devil is the matter with you. Haven't you any sense at all? I have just got through telling you that deflection is Two-Point-Seven-Six and not Three-Point-Seven-Six, and yet here you are trying to throw away this whole practice." Then Smithers heard the megaphone turn away and shout in another direction, "First sergeant, take that leather-headed Smithers off that phone and put somebody on who is not a damn fool."

With his heart pounding and little black and red splashes darting before his eyes, Smithers yielded the headset and shrank from the loading platform. In one short moment his whole world had gone black and turned upside down before his eyes. He was disgraced forever—before his bunkies, before all the National Guard there was, and in his overwrought conception, before the people of all the United States and worst of all, before his far away mother and father. His picture of Leon Smithers as a fine soldier, as a corporal, as a sergeant, was crumpled like a piece of waste paper crushed in the hand.

Is this a long story to be concluded with so unimportant and so undramatic an incident? Perhaps, and to a bystander it might have been easy to see that Smithers was inexpressibly wooden and that the Captain was irritated beyond composure by this culminating incident in a series of petty annoyances, and yet the Captain was functioning by a Training Memorandum which he had studied thoroughly and which included among other precepts this dictum, "harsh criticisms of subordinates, nagging, unduly severe correction and other tyrannical or capricious conduct is destructive of self-respect. Unrestrained indulgences in such practices mark an officer or an enlisted man as unfit for the instruction and command of men."

Now this hypothetical story of Leon Smithers points to a wholesome moral which every Coast Artilleryman would do well to keep close to his heart. The Army, alike with the world, is full of Leon Smithers. The work of the Coast Artillery like the work of the world, can best be done when every member of the team shares in a spirit of pride and

confidence. The pride of no willing Smithers can be shattered without wrecking the solidarity of the team. The Coast Artillery team like all others consists of two classes—the Smithers and all the rest. From among “all the rest” are chosen the leaders of the team, not only because they may have more between the ears than the Smithers, but also because they have more aptitude for control than the Smithers. The fatal fact always confronting the military leader is that the surrender of his self control for even a moment may be enough to destroy a Smithers.

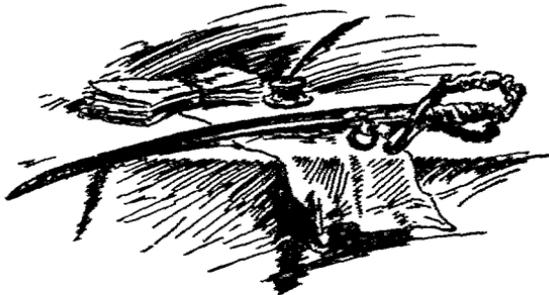
A Question

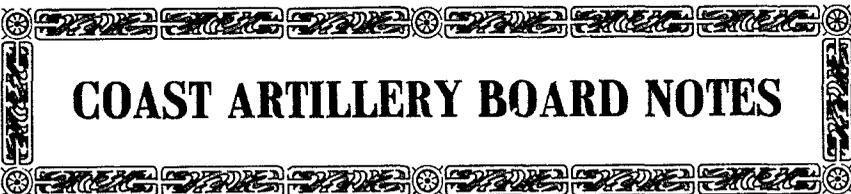
Conceiving Coast Artillery Tactics as the foundation of common sense which should relate every feature of training to some reasonable expectation of what could occur in war, what is the greatest tactical need in Coast Artillery training today?

This is an important question, deserving the earnest consideration of every Coast Artillery officer. If we can agree on the *greatest* tactical need in training, and then proceed to find a practical means to meet that need, we will have laid a sure foundation for improvement in efficiency.

The question is too important to admit of any slap-dash, ill considered answer. But in order to bring the question to a focus admitting of attack, it will now be hazarded that *the greatest tactical need in Coast Artillery training today is a target for service practice which will travel twenty-five knots an hour.*

Is this true or untrue? Either way, it is a head raised inviting the shillelah. Take a crack at it.





COAST ARTILLERY BOARD NOTES

Work of Board for Month of July, 1922



THE following officers were members of the Coast Artillery Board on August 1, 1922.

Col. H. J. Hatch, C. A. C., President.
Maj. F. H. Smith, C. A. C.
Maj. J. S. Pratt, C. A. C.
Maj. A. Norton, C. A. C.
Maj. W. B. Hardigg, Ord. Dept.
Capt. G. W. Morris, Sig. Corps.
Capt. L. W. Jefferson, C. A. C., Secretary.
1st Lieut. J. J. Johnson, C. A. C., Computer.

The preparation of Training Regulations continued to be the principal work of the Board during July and August. Of the twelve separate pamphlets to be published under this head, the following have been completed but have not yet been approved by higher authority.

1. The Fire Command.
2. The Mine Command.
3. The Fort Command.
4. Emplacement and tactical employment of artillery.
5. Schlooming film scale.
6. The Coast Defense Command.
7. Definitions.
8. Intelligence Service, C. A. C.

The following pamphlets are nearing completion:

1. The Battery Command.
2. Meteorological Service.

The following pamphlets have been ordered written but no progress has been made on them to date:

1. Service of the Piece (Gun drills).
2. Minimum Specifications for C. A. Troops.
3. Gunnery for Heavy Artillery.
4. Field Service Regulations.

In connection with the preparation of Training Regulations, the Board has received many valuable suggestions from officers throughout the service. These suggestions are appreciated and valued highly, coming as they do from officers who are actually engaged in the training of troops and the handling of armament under actual present conditions.

It is sometimes the case that while certain of the suggestions submitted by officers are extremely valuable and warrant the consideration of the service generally, they are too much in detail to warrant publication in Training Regulations. It is felt that as these Regulations will be mandatory it will be advisable to limit their scope to general principles and to leave as much detail as possible to the initiative of Coast Defense, Fort, Fire and Battery commanders. The Board will endeavor to secure the publication of the most valuable of these suggestions through other publications, especially through the Coast Artillery Journal.

Following is a resumé of projects of general interest to the Service recently received for consideration by the Board:

1. The Hall Ellis Spotting Device.

To be considered in connection with other similar devices.

2. A Traction Device for motor trucks and tractors submitted by Private 1st Class Ira G. Renalds, Finance Department, Fort Monroe, Virginia. An adjustable auxiliary attachment for application to the rear wheels of a truck to enable it to function as a tractor as well as to run on the four wheels originally provided. Recommended for reference to Motor Transport Division, Q. M. C., and to the Ordnance Department.

3. Portable searchlight apparatus (Strauss) submitted through the Chief of Engineers by Joseph B. Strauss, Consulting Engineer, 225 Michigan Avenue, Chicago, Illinois. A searchlight mounted on trailer in many respects similar to Cadillac Unit now in use by Coast Artillery. Not considered to possess sufficient advantages over Cadillac type to warrant additional cost of construction.

4. Antiaircraft Mounts for Caliber .30 automatic arms.

To be tested. Matériel just received.

5. The Bull-Tucker Sound Ranging Plotting Board. The Artillery Board has under consideration several suggestions and improvements applicable to Sound Ranging apparatus, which it is believed will assist materially in the interpretation of data and extended use of present equipment.

6. "Make-your-own" Dry Batteries. The sedry batteries are of commercial make intended for use in the ordinary 2 cell hand flash light. The construction of each cell, however, represents a radical departure from the usual practice in dry battery construction. Each cell consists of five component parts that are carried separate until such time as it is desired to place cell in service. The component parts are then mixed in accordance with the manufacturers instructions and the battery is ready for use. This type of dry battery is being given a series of tests to determine its value for service use.

7. Comparative tests of T. I. Bells. Two time interval bells of commercial design have been recently received by the Artillery Board for a service test in comparison with the present type of T. I. Bells.

The object of this trial is the determination of the service value of the new bells as a satisfactory substitute for those now in use. Should the results prove satisfactory, it is believed the adoption of the new type will go far towards a standardization of parts in bell construction, affecting economies incident to a ready interchange of parts and ease of procurement.

8. (a) Test of shrapnel subcaliber ammunition for 12-in. mortars. 497 rounds of 2.95-in. shrapnel assembled with powder charges estimated to give a muzzle velocity of 810 f. s. when fired from the 2.95-in. subcaliber guns have been received by the Coast Artillery Board for test. The purpose of the test is to determine whether or not the water impacts of this ammunition can be observed more readily than the impacts of the service mortar sub-caliber ammunition.

(b) Proving Ground tests have indicated that shrapnel fired from the sub-

caliber tube with fuses set "safe" for burst on impact with the water produce bursts which render the observation of the impacts less difficult than those of service subcaliber ammunition.

(c) Most of this ammunition will be fired under different weather conditions, when the water is smooth and when it is rough. Service subcaliber ammunition will be fired at the same time to form a basis of comparison in facility of observation of the two types.

(d) It is now planned to do the firing at Fort Monroe some time in September. The results of the test will be made known when completed.

9. The Modified Galitzka Panel.

(a) The object of this panel is to provide a ground signaling device for communication from ground to an airplane in flight. The device was proposed by Corporal Galitzka, Signal Corps, in 1919. This panel consists of two white duck cloth strips, in the shape of a "V," making an interior angle of approximately 120°. Equally spaced on both of the straight sides are flaps that may be turned back, exposing a white section or block. The entire figure is fastened to a black background of the same material. The over-all dimensions are approximately 8 by 10 feet. Signaling is accomplished by exposing one or more of the white strips, of which there are seven in all.

(b) In the original test of this panel held December 20, 1921 at Langley Field several important defects in its design were apparent.

(1) Only satisfactory with altitude 2000 feet or less.

(2) Observer had to be directly over the panel. Confusion resulted when panel was read at an angle.

(3) Chances for errors increased rapidly with increasing height.

(c) At the conclusion of this test the Board recommended two Model Panels of different design be made for comparative test with the Modified Galitzka Panel.

(d) The following is a description of two Model panels received recently and tested by the Coast Artillery Board in cooperation with Air forces at Langley Field, Virginia. For the purpose of this report they will be denoted as Model "A" Panel and Model "B" Panel.

Model "A" Panel: This Panel consists of a circular center piece of duck cloth diameter 12 feet and 7 inches, one side being white, the opposite of an orange color. Included with the center piece are 10 strips of cloth of the same material as the center piece, the same color combination being used, i.e., white on one side and orange color on the reverse side. The dimensions of each strip are 7 feet, 8 inches in length and 1 foot, 5 inches wide.

Model "B" Panel: This panel is identical with Model "A" Panel with the exception that the center piece is modified to the following extent. (A) One side of the center piece is provided with a white center surrounded by an orange border 2 feet wide. (The over all diameter is 12 feet, 7 inches). (B) The opposite side of center piece has the reverse color combination, i.e., orange center and white border of the same dimensions.

(e) *Method of Signaling With Model Panels:* The panel arrangement is essentially that of the familiar clock diagram with a reference line corresponding to the position of 12-o'clock. The reference line is made by placing several strips end to end and pointing in any desired direction. Separate signal strips are then laid out radially from the center piece at 45°—90°—135°—180°—225°—270°—315° respectively.

All signals are read in a clockwise direction from the reference line. Each radial strip being assigned a number relative to the reference line, thus permitting a display of single or multi-figure combinations upon the ground. Obviously by referring the number displayed to its corresponding position in a predetermined code list accurate transmission of information can be carried out.

With the angular displacement of signals as stated above relative to clockwise reading it is possible to obtain the following single and multifigure combinations.

Single letter.....	7
2 letter.....	21
3 letter.....	35
4 letter.....	35
5 letter.....	18
6 letter.....	7
7 letter.....	1

TOTAL, 124

(f) *Discussion and Plan of Test:* Preliminary trials demonstrated that the model panels could be read by an aerial observer up to elevations of 10,000 feet and at an appreciable angle (45° Approx). It was also noted that it was possible to read the multi-figure combinations as easily as the single letter figure. With this information at hand, the following test was carried out.

The Model Panels including the modified Galitzka Panel were displayed simultaneously on the ground, being observed and photographed at elevations of 2000—4000—6000—8000—10,000 feet.

(g) Both from the photographs and from the report of the observer in the airplane it was very apparent that:

(1) The Model "A" Panel used with the orange colored side exposed on a dark background was nearly invisible at all elevations above 2000 feet, and when exposed on a light background the panels stood out clearer but at best were not satisfactory, especially at high altitudes. With the white side exposed on a dark background the signals stood clearly at all altitudes, especially when the panels radiating from the center were doubled in length.

(2) The Model "B" Panel with the dark center and white border made the signals stand out more clearly than the solid color used in the Model "A" Panel.

(3) Both Model "A" (white side) and Model "B" Panels were more satisfactory than the modified Galitzka Panel, which had the sole advantage of clearness at low altitudes due to the white strips being placed on a black background.

(h) *Conclusions:*

(1) It is believed that it is unnecessary to have a system of ground to airplane signaling panels for use at elevations in excess of 10,000 feet for the following reasons:—(A) The visibility at such elevations is dependent upon practically ideal atmospheric conditions. (B) It becomes increasingly difficult to sense shots excepting those from the largest caliber guns, due to the great height. (C) In the case of the large caliber guns the distance from the gun to target precludes the use of panels except as an auxiliary short range means of signaling.

(2) The result of tests indicate that accurate signaling from the ground to an aerial observer can be carried out with panels of the models A and B type up to 10,000 feet, this of course depending largely upon atmospheric conditions as affecting visibility. However a certain amount of difficulty was experienced by the observer in reading the panel at the higher elevations by reasons of its apparent decrease in size at the extreme elevations.

(3) At no time during the conduct of these trials was it evident that there was any advantage in the use of the orange color arrangement. Both visual and photographic observation showed the tendency for the orange color to merge into the background indicating a lack of sufficient definition.

(4) In the case of the all orange colored panel placed on a white background (concrete road), the same difficulty was experienced, namely a merging of the orange color into the background.

It should be noted that the contrast is most pronounced on the Galitzka panel, it being a combination of black and white. It appears quite evident that the best contrast can be obtained with white against a black or by the reverse arrangement.

(5) It is believed that the Modified Galitzka Panel is impractical for use as a means of signaling in the conduct of Heavy Artillery Fire.

(6) The most satisfactory combination was had by the use of the Model "B" Panel. This shows clearly that the center piece having a dark center and white border is of decided advantage over a center piece having a white center and dark border. At elevations above 6000 feet, difficulty was experienced in reading the panel; this was due to the fact that the strips were of insufficient length. Increasing the length of Reference line from 3 to 5 lengths and each signal strip to 2 lengths permitted the observer to read signals quite readily at elevations of 10,000 feet.

(7) It is the opinion of the Coast Artillery Board that the panel denoted as Model "A," long white panels and white center piece permits of accurate signaling up to elevations of 10,000 feet; however, in order to relieve an observer of undue eyestrain in reading at the higher altitudes it is believed its dimensions should be increased and its center piece substituted by the center piece with the black center and white border.

(8) After a careful consideration of these tests, the Board recommends:

(I) That black be substituted for the orange color.

(II) That the dimensions of each strip be increased to width 3 feet, length 10 feet.

(III) That 19 strips be supplied in order to provide for multi-figure combinations.

(IV) That the over-all diameter of center piece be made 20 feet.

(V) That one side of the center piece be provided with a black center, diameter 12 feet, and a white border 4 feet wide.

(VI) That the reverse black and white arrangement of (V) above, be used on the opposite side of center piece.

(VII) That the new panel be resubmitted for further test.

(i) A final test will be made as soon as a model panel of the desired specifications can be made.

(j) The advantages of the new design of panels for Coast Artillery work has been made clearly apparent by the tests already conducted, especially over the Modified Galitzka and similar types.

10. Application of Duplexed Radio Telephony in Coast Defenses.

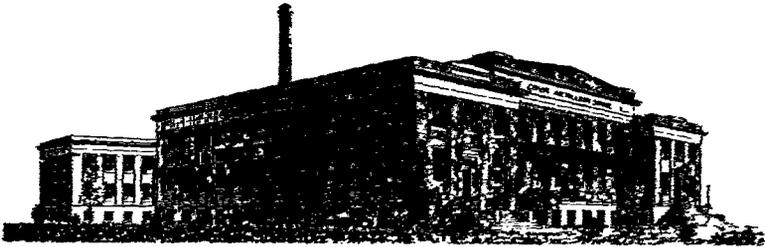
No further experiments in this line have been conducted, previous tests have demonstrated the practical use at Coast Defenses of a method for readily interconnecting the Radio telephone and wire telephone systems, permitting direct telephone communication from any Coast Defense telephone to a harbor boat or Airplane in flight. Further tests are suspended pending receipt of new telephone sets.

11. Test of light ray filters (Navy flash). The test involves using a large assortment of different colored glass filters in connection with observing instruments; the purpose being to select those filters best suited to eliminate glare and cut haze under various light conditions. The test is an extensive one and will be conducted in connection with observations with new range finders for aircraft, telescopes, and coincidence range finders.

12. Tactical employment of Sound and Flash Ranging Equipment. Involves a test of the Aberdeen Chronograph which will be held at a later date.

13. Test of Airplane flares. Flares to be dropped from airplanes to illuminate targets at night. Preliminary tests have been held under unsatisfactory conditions. Further tests to be made later. Action suspended pending development of matériel to eliminate defects that developed in initial tests.

14. The board has before it in addition to the above, extensive projects concerning the development and test of self contained Range finders for anti-aircraft artillery. These are of the coincidence and stereoscopic types. Numerous spotting devices and deflection computers have been submitted, and range finding apparatus for long range batteries. New ideas in the construction of range rules and range correction boards have been received. These will all be thoroughly studied and tested when time and circumstances permit.





Employment of Heavy Artillery—Problem No. 2

A SOLUTION

1st Requirement:

(a) 1st Section: Btry A, Bn Hq, Sec Serv Btry and Med Det (less 4 enlisted men)—13 officers 230 enlisted men.

2nd Section: Btry B, Ord Det and 4 enlisted men, Med Det—7 officers, 188 enlisted men.

	2 Bat- teries	Bn Hq	Sect Serv Btry	Att. Med	Att. Ord	Total in Bn	Assigned 1st Section	Assigned 2nd Section
Motorcycles.....	4	2	0	1	1	8	5	3
Trucks, $\frac{3}{4}$ -T.....	4	2	0	1	0	7	5	2
Trucks, FWD.....	0	4	1	0	1	6	5	1
Trucks, radio.....	0	1	0	0	0	1	1	0
Car, motor.....	0	1	0	0	0	1	1	0
Car, recon.....	0	1	0	0	0	1	1	0
Ambulance.....	0	0	0	1	0	1	1	0
Officers.....	10	6	1	1	2	20	13	7
Enlisted men....	314	51	16	10	27	418	230	188

Note: Two men ride on each gun, flat or gondola car.

(b) No. of passengers.

When cars are desired, where to be spotted, and arrangement of cars on siding.

Destination, route and hour of departure.

Hour train will be ready for inspection by Ry officials.

Note:—Clearance diagram of the mortar carriages, and diagrams showing total weight, weights on and distances between trucks, weights on and distances between axles, would probably be furnished previously to determine practicability of the move.

(c) Inspection of armament train immediately after receipt of order for the move to allow time for any necessary repairs. At this inspection he determines

the general condition of cars including journal boxes, air brakes, and car wheels. Inspection would also be made of the cars delivered by the railroad immediately after their arrival at the camp to see if they are in condition for use (Bn RRO would probably accompany RTO on this inspection). A final inspection to determine whether cars are properly loaded and secured.

2nd Requirement:

(a) *Composition and Arrangement:*

<i>Serial No. in section</i>	<i>1st Section</i>	<i>2nd Section</i>
1	Locomotive (switch)	Mortar
2	Mortar	Amm.
3	Amm.	Mortar
4	Mortar	Amm.
5	Amm.	Mortar
6	Mortar	Amm.
7	Amm.	Mortar
8	Mortar	Amm.
9	Amm.	Amm.
10	Amm.	Amm.
11	Amm.	Amm.
12	Amm.	Amm.
13	Amm.	Amm.
14	Store	Amm.
15	Store	Amm.
16	Store	Amm.
17	Store	Amm.
18	FC	Amm.
19	FC	Amm.
20	Power Plant	Amm.
21	Tank	Store
22	Gondola	Store
23	Box (baggage)	Store
24	Box	FC
25	Box	Tank
26	Box	Gondola
27	Box	Ord. repair
28	Box	Ord. supply
29	Box	Box (baggage)
30	Box	Box
31	Box	Box
32	Box	Box
33	Gondola	Box
34	Flat	Box
35	Flat	Box
36	Flat	Box
37	Flat	Box
38	Flat	Flat
39	Flat	Flat
40	Flat	

- (b) Stops desired enroute for supplies such as water or hot coffee.
Car numbers, initials, weights, nature of contents of each car.

3rd Requirement:

FIELD ORDERS)
 No.....)

1st Bn 901st Art
 CAMP EUSTIS VA
 24 March 22 - 10:00 AM

Maps: Special, Camp Eustis Va.
 Gettysburg 3-in. (or 12-inch reduced to 1-in.)

1. Our 1st and 2nd Armies are in contact with the enemy southeast of GETTYSBURG.
2. This battalion has been attached to the 1st Army and will proceed tomorrow via: the CHESAPEAKE AND OHIO; RICHMOND, FREDERICKSBURG, AND POTOMAC; PENNSYLVANIA; and WESTERN MARYLAND RAILROADS to NEW OXFORD, PA.
3. (a) Trains will be spotted at 1:00 PM 25 March as follows:
 - 1st Section at Siding No. 1* For personnel and equipment of Btry A, (less 4 ammunition cars), Bn Hq Sec Serv Btry and Med Det (less 4 enlisted men).
 - 2nd Section at Siding No. 2* For personnel and equipment of Btry B Ordnance (CO Btry B in charge) Det, 4 enlisted men of Med Det and 4 ammunition cars.
- (x) Battery Commanders will supervise the loading of their respective sections. Entraining will be completed by 6:00 PM 25 March. Two men will be placed in charge of each flat and gondola car. The gun commander and one man will ride at all times with each mortar. A guard will be placed at doors of each box car occupied by troops.
4. Auto trucks will be loaded and all gasoline and water tanks will be filled to capacity before entraining. Barrels filled with water will be placed in each box car and refilled enroute when necessary. All ammunition cars will be loaded to capacity before departure. Two days cooked rations will be carried in addition to those prescribed by FSR.
5. Bn CP will be with 1st Section.

A
 Major.

Distribution:

CO Camp Eustis	CO Med Det
CO 901st Art	CO Ord Det
CO Btry A	Staff
CO Btry B	Files
Serv Btry	Diary
RTO	

COMMENTS ON PROBLEM NO. 2

1. The solution of this problem is necessarily based partially upon theory since it is only as a result of actual service with this matériel that an exact statement of transportation required may be obtained. Officers of experience have been freely consulted however, and the solution is believed reasonable and practicable. It should be the aim of every commander of a railway artillery unit actually to drill at entraining and detraining in order that the best location of every article of equipment on the armament train, and of every unit of motor transportation may be determined. As a result the battery commander can decide accurately what additional railway equipment is necessary for any movement. Every bit of equipment and baggage, and every man in the organization will have a certain specified place.

2. In deciding upon the troops to accompany each section, the following points should be considered:

- (a) Equalization of the loads of the two sections.
- (b) Order of importance of the personnel at the destination.
- (c) Personnel should not, in general, be separated from their matériel.

After considering the above it is evident that one battery should be in each section. It is assumed that the first section will arrive at destination before the second. As the batteries cannot be emplaced until the Bn Commander has made his reconnaissance, the Bn Hq and Hq Det should be in the 1st Section.

The service battery is included because its locomotive may be needed immediately for switching or for some other work upon arrival at the destination.

The Ord Det will not be needed at once, so may be placed in the 2nd Section.

Part of the Med Det will be needed in each section so it should be divided between them proportionately. The medical officer might go in the 1st section so as to be present to accompany the Bn Commander if desirable. The senior N.C.O. should then go with the 2nd section.

3. The arrangement of cars in each section is more or less subject to variation. In general the railway officials will vary the normal arrangement to suit specific conditions. The following considerations may be said to govern the normal arrangement:

(a) In order to save switching at the destination and to expedite the withdrawal of the commercial cars, it may be advisable to have the armament train complete at the head of each section. Par. 18, Service Regs. for Railway Artillery states: (b) "When making up trains in which there are heavy guns they should be placed immediately after the engine with at least one car between guns." * * * "The heavy weights should cross bridges before the bridge gets a swing." Carrying this idea still farther, the cars might be arranged from front to rear in order of weight.

(c) Ordinarily in a movement of this kind, the service section locomotive will be carried as dead load. Being heavy, it should be toward the front and possibly immediately in rear of the commercial engine when, if necessity calls for it it may be used as a helper. The normal position of a helping engine varies according to the nature of its use and to the road upon which employed.

(d) All flat cars carrying motor transportation should normally be placed together to facilitate loading and unloading.

(e) Ammunition cars, loaded, are probably the heaviest after the mortars, and should therefore, be placed well to the front with the mortars. As an ammunition car normally accompanies each mortar into position, it is preferable to separate the mortars by one or more ammunition cars rather than any other cars. Those not with mortars should follow immediately thereafter.

4. If a partial equalization of the number of cars in each section is to be made, it can possibly be done best by moving a limited number of ammunition cars from one section to the other. Ammunition will not, in all probability, be of the first importance when the 1st section arrives and by the time there is any possibility of its being needed, the 2d section should be on hand.

5. The designation "901st Artillery" indicates GHQ Reserve Artillery in accordance with conventions adopted at the School of the Line.

Employment of Heavy Artillery—Problem No. 3

References:

Maps: Gettysburg 3-inch Bonneauville and Gettysburg Sheets and 1-inch reduced from 12-inch War Game Map.

Plate: Conventional Signs Artillery Units.

Extracts from C. A. S. Mimeograph covering Reconnaissance, Selection and Occupation of Positions.

General Situation:

The Blue Ridge Mountains and the Maryland-Pennsylvania line eastward form the boundary line between two hostile states; Reds to the West and north Blues to the east and south.

War was declared 15 February 1922. Since 15 March 1922 the 1st and 2nd Blue Armies have been in contact with the enemy along the general line (338-738)—FAIRPLAY—WILLOW GROVE SH—WHITE RUN—GRANITE HILL—HUNTERSTOWN—NEWCHESTER—(364-765). Both sides have been improving their lines.

Special Situation: (Blue):

The 1st Bn 701st Arty detrained near BASHORE MILL on the night of 25-26 March and moved to cover of woods north of SCHILD FARM (362.9-744.0).

At 8:00 A.M. 26 March Maj A commanding the Bn reported to the CG 301st FA Brig at WHITEHALL SH (362.0-744.2) and was given the following instructions:

"The 3d Corps, (7th, 8th and 9th divisions from right to left), holds the WHITE HALL SECTOR. Line of contact is along WHITE RUN. This Brig supports the 3d Corps. Enemy aviation and counter-battery are very active. Your Bn will be emplaced during the night 26-27 and 27-28 March in the vicinity of (359-744) near MEYER; you will move via WHITEHALL SH—CR 595—RJ 587W—CR 621 to your position; no movement of trains will take place between 4:50 AM and 7:20 PM. The center line of your field of fire will pass through WOLF HILL (352.8-748.3). Be prepared to open fire at 8:00 AM 28 March. Maps and data for geodetic points will be given you at (B2) Brigade Intelligence Office. Information concerning ammunition and other supplies will be furnished from (B4) Brigade Supply Office. A Camouflage Officer of 10th Eng will accompany you on your reconnaissance. You will send a liaison officer to Art Brig CP, of 8th Div at W SACHS (357.0-744.5)."

Maj A receives from B2 the following:

5 copies of 1/20,000 maps of areas to be covered by fire of his batteries. These show enemy organizations so far as known and position of BLUE first line elements.

3 copies of 1/62,500 maps showing scheme of road circulation.

3 copies of 1/62,500 maps showing system of signal communication now installed.

3 copies of such A.I.S. bulletins previously published as contain information of interest to his Bn as to Enemy targets.

1 copy of all traverses and data concerning orienting points near his position.

3 copies of Generals Orders of 301st Brig.

3 copies of 1/62,500 maps showing areas visible from hostile OP's.

3 copies of 1/62,500 maps showing areas visible from OP's of observation battalion established in the sector.

3 copies of telephone code.

1 copy of radio code.

1 copy of Plan of Signal Communications.

Maj A then returns to his Bn at 4:85 AM and assembles his officers. He gives them an outline of the information received from CG 301st Brig and warns them particularly concerning movement of trains in the day time. He gives the Supply Officer the information concerning the position of the railhead and has him report there for instructions as to the issue of rations and gasoline. He gives the Comdg Officer of the Comb Tn the information as to the position of the ammunition dump and directs him to get in touch with the Commander and to be ready to start at dark and to have one day of fire at the battery positions

by 8:00 AM 28 March. He sends a Liaison Officer to Art Brig CP of 8th Div as ordered. He then at 9:00 AM starts upon his reconnaissance.

Required:

1. As Maj A, a description of your movements and the use made of your Bn Hqrs and other personnel between 9:00 AM and 3:30 PM 26 March.
2. Sketch to scale 3-in. equals 1 mile showing the location of both batteries, rear echelon all CP's and OP's and all wire connections using Conventional Signs furnished herewith.
3. Enumerate the transportation that should be kept at the forward echelon.
4. As Capt E sketch to scale 1-in. equals 50 yards showing the locations of all elements of your battery position, all ammunition, and all wire connections, using Conventional Signs furnished herewith.

Conventional Signs Artillery Units

ARTILLERY

Position Command Obsn
Post. Sta.

<i>Basic</i>			
<i>Single Piece</i>			
<i>Platoon</i>			
<i>Battery</i>			
<i>Battalion</i>			
<i>Regiment</i>			
<i>Brigade</i>			
<i>Balloon</i>			
<i>Battalion Radio Station</i>			
<i>Regimental Radio Station</i>			
<i>Wire in general (or on Ground)</i>			

Extracts from "The Reconnaissance for and the Selection and Occupation of Battery Positions for Heavy Artillery," Coast Artillery School

RECONNAISSANCE

1. Terrestrial reconnaissance should be made by the commanders of all artillery units. The objects are:

(a) The selection of the positions for the artillery and for its various units of information, observation and command, together with the routes of approach.

(b) The organization and distribution of the work of installation. On the care and skill with which the reconnaissance is made depends in a large measure the rapidity and success of the actual occupation of the position. A complete and timely reconnaissance always saves considerable labor for the personnel in construction and often prevents losses. It is, therefore, very necessary to push forward a reconnaissance as soon as instructions are received looking toward the engagement of the artillery.

2. Every reconnaissance should begin with a study on the map of the area to be reconnoitered. This study coordinates work and saves time. The reconnaissance personnel should in every way possible get in touch with the commanders of units which have occupied or are occupying the region itself or its vicinity as the experience of these officers can be utilized to advantage. These preliminary steps, however, do not obviate the necessity for artillery commanders going over the ground themselves and personally supervising the units under their command.

3. The duty of locating the enemy and of securing information concerning him devolves in general upon troops of other arms. It is most essential that the information thus secured should be promptly transmitted to the artillery. The artillery must, however, obtain for itself such special information as is needed to insure the proper posting and the effective employment of the guns to carry out the tasks assigned it. The reconnaissance made by the artillery commander and his staff must be sufficiently thorough to secure this information.

4. It is essential that the officer commanding the artillery should be in close touch with the officer commanding the unit to which the artillery is assigned or attached. The artillery commander should be kept constantly informed as to the tactical situation and the plan of action and should receive early instructions as to the special tasks to be performed by the artillery. At the earliest opportunity the artillery commander should reconnoiter and select the positions for the artillery in accordance with the instructions which he has received and with the tactical requirements of the situation. He should cause his immediate subordinates to accompany him or should inform them when and where they are to report to receive their instructions and to undertake their own reconnaissance.

5. In undertaking a reconnaissance, an artillery commander should have a clear idea in his mind of the general plan of action and of the task to be accomplished by the force under his command. Unembarrassed by details, he should study the tactical situation and the lay of the ground, select the position with a view of carrying out his special mission and arrange for the necessary preparatory dispositions.

6. Reconnaissances are made by higher artillery commanders to fix the general conditions of the entry into action of the large artillery units. Army and Corps artillery commanders must be perfectly informed as to the nature and condition of the ground, the communications and the defile, in order to be able themselves to direct the march, deployment, entry into action and supply of their respective units. The reconnaissance of the terrain as a whole, of the objectives and of the observing sectors are made by the artillery commanders, with the assistance of

their staffs, immediately upon the receipt of information as to the function of their units.

THE REGIMENT

7. The regimental commander should receive from the commander of the unit to which the regiment is assigned or attached, information and instructions covering the following:

- (a) The general situation.
- (b) The mission of the larger unit and the plan of action.
- (c) The special mission of the artillery regiment.
- (d) Special conditions affecting the employment of the regiment.
 1. Sector to be occupied.
 2. Time of opening fire.
 3. Means of observation available.
 4. Routes of access authorized and routes reserved.
 5. Lines of information required.

(e) Information showing the location of the command posts of the larger unit and of neighboring artillery and the location of ammunition depots, repair parks, engineer dumps, air squadrons and balloon companies.

8. Based upon the instructions and information which he receives and upon the result of his study of the map and his reconnaissance of the terrain, the regimental commander determines upon:

- (a) The assignment of missions to his battalions and the zone of action of each battalion.
- (b) Positions to be occupied by each battalion and the routes of access.
- (c) The regimental post of command and the necessary observation posts.
- (d) The general plan for the regimental lines of information.
- (e) Orders and instructions to be issued to carry out his plans.

THE BATTALION

9. Each battalion commander should receive from his regimental commander information and instructions covering:

- (a) The general situation.
- (b) The general plan of action and the artillery mission.
- (c) The special mission of the battalion.
- (d) Conditions affecting the employment of the battalion.
 1. Sector to be occupied and zone of action.
 2. Time when positions must be occupied and time of opening fire.
 3. Routes of access, routes reserved and standing orders in regard to circulation.
 4. Lines of information required.
 5. Battalion observation post and sector to be covered.
- (e) The location of various artillery command posts, of ammunition dumps, supply points and repair facilities.

10. The reconnaissance made by the battalion commander must determine the battery positions and the routes of access to them, the location of the battalion post of command and observation post, the plan for the lines of information and the location of the echelon. In making this reconnaissance, the battalion commander should divide his detail into three parties as follows:

- 1st party—Battalion Commander, Orientation Officer, Signal Officer, Scouts and Battery Agents, Instrument Non-Commissioned Officer.
- 2nd Party Battery Commanders and battery details.
- 3rd Party Radio Officer, Surgeon, Battalion and Battery telephone details and matériel.

11. As soon as he has received his instructions from the regimental commander, the battalion commander starts on his reconnaissance with the first party. Before starting he gives the necessary instructions for:

- (a) The disposition and timely arrival of the second and third parties.
- (b) The continuation of the march of the battalion, its route, the limit of its advance, the precautions to be taken and the disposition of the trains.

12. Upon his arrival in the sector, the battalion commander goes to the regimental post of command to receive all available information and to secure a guide if necessary. He then proceeds to the zone assigned to his battalion. Upon arrival in the vicinity of the position, the battalion commander halts his party and proceeds with his reconnaissance, with only the personnel absolutely necessary. On this reconnaissance, the battalion commander:

- (a) Selects the battery positions.
- (b) Studies the routes of access, their defilade and the work necessary to be done on them.
- (c) Selects his observation post and if practicable, reconnoiters the objectives.
- (d) Selects the battalion post of command.

Upon the completion of this reconnaissance, the battalion commander directs the second and third parties to report to him and issues any additional orders that may be necessary for the advance of the battalion. These orders having been given, the battalion commander issues instruction for the necessary reconnaissance to determine:

- (a) The position for the echelons.
- (b) The location of the different depots and supply points.
- (c) The plan for the battalion lines of information.
- (d) The site for the first aid station.

13. The orientation officer accompanies the battalion commander upon his reconnaissance. He makes the necessary determinations in regard to the battery positions, the observation post and the battalion post of command, and locates all of these positions on the map. He determines a reference line for the observation post and identifies a certain number of known points and plots these on a rough sketch. He then determines for the battalion, or for each battery, an orienting line and the coordinates of marks which will assist in the prompt location of the base pieces. Before the batteries go into positions, the orientation officer furnishes each battery commander such information as is immediately necessary, particularly for the establishment of the base piece.

14. The signal officer prepares the plan for the lines of information of the battalion and reconnoiters the routes for the telephone lines. Upon the arrival of the equipment he supervises the installation of the telephone system and arranges for the establishment of all lines of information in accordance with his approved plan.

THE BATTERY

15. Each battery commander should receive from his battalion commander information and instructions covering:—

- (a) The general situation.
- (b) The heavy artillery plan and the battalion mission.
- (c) The special mission of the battery.
- (d) Conditions affecting the employment of the battery.
 1. The battery position, its field of action and its base point.
 2. The routes of access, routes reserved and standing orders regarding circulation.

3. The time when the battery should be in position and the time for opening fire.

4. The lines of information to be established.

(e) The location of the various artillery command posts and information posts and of supply points and repair facilities.

(f) The location of the echelons.

(g) The distribution between the batteries of the construction work pertaining to the battalion which can not be performed by the battalion detail.

16. As soon as he has received his instructions from his battalion commander, the battery commander proceeds with the reconnaissance. On this reconnaissance, he definitely locates the positions for the pieces, carefully reconnoiters the routes of access to these positions, locates his post of command, and if practicable, selects a position for an observation post. Upon the completion of his reconnaissance, the battery commander sends instructions to the battery executive officer covering:

(a) The dispatch at the proper time of the personnel, tools and matériel necessary for the construction and organization of the position.

(b) The time of departure of the battery, the order of pieces in the column, the route of access and the method to be used in emplacing the guns.

(c) The location of the echelon.

(d) The dispatch of trucks for ammunition, camouflage and other material.

The battery commander then arranges for shelter for his personnel, for the installation of the lines of information pertaining to the battery and takes the necessary steps to insure the supply of his battery.

17. The preceding summary gives the standard distribution of all operations that must be performed for the reconnaissance of a battery position. There will be many cases, however, when the circumstances and local conditions will necessitate changes in the sequence and distribution of the work. In some cases, it will be necessary to curtail these operations to those which are absolutely essential for the immediate opening of fire, leaving the others to be performed later. The accomplishment of the mission must be placed above all other considerations.

SELECTION OF POSITIONS

22. The area within which the artillery must take position is determined by the tactical situation and the plan of action decided upon by the commander of the troops. The artillery is not free, therefore, to choose its own position, but must make the best use of the terrain within the limits thus imposed.

23. The commander of the troops designates the areas or places near which the artillery is to take up its positions and influences the distribution of the units by a general indication of the tasks to be performed. The artillery commander distributes the area to be occupied among the regiments or battalions of his command and assigns duties to those units. Regimental commanders amplify the orders of the senior artillery commander as may be necessary, particularly with reference to ammunition and other supplies and the lines of information. Battalion commanders assign their batteries to positions or to areas in which to take position, and assign targets or zones of action. Since the proposed plan of action influences the choice of position, it is important that all of the above commanders transmit to their subordinates all available information as to the plan of action and the part to be taken by their respective units.

24. The position selected for a battery of heavy artillery must satisfy certain conditions. The more important of these are:

- (a) Tactical conditions.
- (b) Conditions affecting the installation.
- (c) Conditions affecting the protection of the battery.
- (d) Conditions affecting the ease of command.
- (e) Conditions of accessibility.

Positions satisfying all of these conditions are seldom, if ever found. The relative weight to be attached to these conditions depends upon the tactical situation.

25. The prime consideration in the selection of a position for a battery is that the position must be one which will enable the battery to fulfill its tactical mission. The battery must be able to cover with its fire the whole terrain which is allotted to it as its zone of objectives or be able to deliver an effective fire on all targets assigned to it. It follows that the only invariable rule in the choice of a position is so to post the guns that they will be able to carry out effectively the tasks assigned to them. Compliance with this rule necessitates careful study of the following point in connection with every position under consideration:

- (a) Maximum and minimum ranges possible with the ammunition available under most unfavorable atmospheric conditions.
- (b) Obstruction of the field of fire by natural or artificial obstacles and the possibility of removing such obstacles.
- (c) Dead spaces remaining in the zone of action. Some of these dead spaces may be covered by neighboring batteries.

26. Consideration must be given to the nature of the ground in order that a firm foundation may be secured for the gun platforms and that it may be possible to do the necessary digging to secure the protection desired for the personnel. If an excessive amount of work is required in the installation of the battery the personnel of the battery will be tired out and not in the best condition to render effective service.

27. The best protection from hostile fire is concealment. The principal means of concealment are the defilade of the guns from all points within the enemy's position and the use of camouflage matériel. The security of the battery generally increases with the amount of defilade, but this amount is limited by conditions depending on the tactical mission. The calculation of this limit and the measurement of the defilade should be included in the study of each position considered. Moreover, the battery must be concealed as much as possible, by natural or artificial means, from the view of enemy airplanes or balloons. The availability of natural means of concealment and the practicability of installing artificial camouflage should be considered. The amount and character of the protection to be provided for the personnel of the battery depends upon the tactical situation. The feasibility of providing the necessary protection should be considered in the selection of the battery position.

28. The accomplishment of its mission by an artillery unit will be very difficult, if not impossible, unless means for the transmission of orders, information and data are provided and maintained between all units of the command. In the selection of the position and of the location of the various stations of the unit consideration should be given to the practicability of establishing and maintaining the requisite lines of information. Simplification of the system results in greater ease of command and insures more effective employment of the unit.

29. The routes of access to a position should be very carefully studied. A position which can easily be reached has many advantages resulting from this accessibility,—the more important are:

- (a) Rapidity and ease with which the guns may be placed in position and taken out of position.
- (b) The simplification of ammunition supply.

- (c) Easier transportation of supplies and matériel.
- (d) Reduction in the labor required of the personnel.

Since tactical considerations will normally prevent the emplacement of batteries on the main highways, particular attention should be given to the routes of access after leaving the roads. Every effort should be made to secure positions which will permit good access routes without requiring an undue amount of work in preparing these routes.

30. The method which should be followed in determining upon the position to be selected has been outlined under the subject of reconnaissance of position. This consists of a study of the map followed by a reconnaissance of the terrain. The study of the map will give very useful information providing it is in reality a study and not merely an examination of the map. One should not be satisfied with estimating or simply glancing at the accidents of the ground, the slopes, ridges and valleys, but the contours should be carefully studied, their numbering read, their intervals known and the direction and numerical values of the slopes considered. In doubtful cases a vertical cross section should be made. On this preliminary study the targets or the zone of action should be located on the map. This study of the map will then permit the determination of maximum and minimum ranges, dead areas, and obstructions for each position. From this information it will be possible to limit the choice of positions and thus reduce the labor involved in the reconnaissance of the terrain.

31. The possible battery positions having been determined from the map and the preliminary study of the map having been completed, all data obtained therefrom are verified and made accurate by reconnaissance upon the terrain.

OCCUPATION OF POSITION

32. The second object of the reconnaissance of a position is the preparation of the plan for the organization and distribution of the work connected with the installation of the battery. The work of installation includes a number of tasks, some tactical and some administrative, several of which must be done simultaneously and others that may be done as time permits according to the circumstances of the particular case. The scheme outlined herein can be completely carried out only when there is a sufficient extent of time and material. But, in any case, even in open warfare situations, this system can be partially applied by making the most of the time and means in each particular case.

33. Based upon the instructions of his battalion commander and as a result of his own reconnaissance, the battery commander decides upon the positions for the various elements of his command, including; the gun positions, the post of command, the observation post, the echelon, the supply depot and the shelters for the battery personnel. He also decides upon the arrangement of camouflage for concealment of all positions, upon the lines of information and upon the regulation of traffic within the battery.

34. Having decided upon his plan for the position the battery commander issues the necessary instructions for the carrying out of this plan. These instructions should include:

- (a) A sketch of the entire battery position with approximate dimensions.
- (b) General instructions on the construction of different features of the position with indications as to the order of the work.
- (c) Steps to be taken immediately for the camouflage of the work and of the routes of access.
- (d) The authorized routes for passenger and vehicle traffic, with regulations governing this traffic.
- (e) Information relative to the supply of ammunition, equipment and food.

35. The indication on the ground of the outline of the various positions and stations should follow immediately after the reconnaissance of the battery commander and should include:

- (a) Staking out the center of each of the terrepleins.
- (b) Laying out the direction of fire of each gun.
- (c) Staking out the terrepleins, shelters, and stations to be constructed.
- (d) Staking out and inclosing the traffic routes and footpaths within the position.

36. The laying out of the battery position being completed, the battery commander has a statement prepared showing the materials necessary for the construction of the position and makes arrangements for securing the tools and material needed in addition to the battery equipment. He then arranges for the proper organization of the working squads and of the special details.

37. The camouflage of the battery should be undertaken as soon as the main features of the battery have been outlined. Use is made of regular camouflage materials carried by the battery and brought up during reconnaissance and of material found on the position or near by. The battalion commander should get in touch with the nearest camouflage officer of the Engineer Corps and if possible should secure the services of an expert camoufleur to assist in the camouflage of the position. Additional camouflage material needed should be secured from the nearest Engineer camouflage depot.

38. In general the work should be organized so as to:

- (a) Permit the most rapid opening of fire possible.
- (b) Assure from the beginning protection for the personnel and material sufficient to permit them to accomplish their mission.
- (c) Render possible a progressive and uninterrupted improvement of the position.

The actual priority in the work will depend upon local conditions and no general rule for such priority can be laid down. Any plan which accomplishes the requirements outlined above should prove satisfactory.

There are many details in connection with the occupation of a position which the battery commander must personally supervise or for which he must provide proper supervision by officers or non-commissioned officers. Some of these have been mentioned before but in addition to these, the plan for the occupation of the position should also include provisions for:

- (a) Guiding the battery to the position and the detached details to their places of duty.
- (b) Necessary repairs to all roads and bridges.
- (c) Securing the required orientation data for the battery.
- (d) Installation of the lines of information.
- (e) Arrangements for gas defense.
- (f) Preparation for local defense of the position.
- (g) Details for work away from battery as at regimental and battalion headquarters.
- (h) Drawing of rations, fuel, lubricants and supplies.
- (i) Special arrangements for night firing.
- (j) Care and repair of transportation equipment, putting it in condition for the next move.
- (k) Sanitary measures, including latrines and water supply.
- (l) Preparation for moving promptly upon receipt of orders.
- (m) Rendition of the required reports.

THE BULLETIN BOARD

The Coast Artillery Reserve Association New York District, 2nd Corps Area

By Major Wm. R. McCleary, C. A. C.

The last report of the activities of the Association was published in October, 1921. This report covers the period since date of last report to July 31st, 1922. It is contemplated that, in future, our members and others interested in the Association shall be kept informed of what is being done to justify our existence by means of a monthly letter to the JOURNAL, which was selected as our official organ at the time the Association was organized.

CHANGES IN OFFICERS

On May 12, 1922, Major Wm. R. McCleary, C. A. C., was, at the request of the Association, designated by the Corps Area Commander as Recorder to fill the vacancy caused by the resignation of Major R. I. McKenny, C. A. C.

PROGRESS OF RESERVE ORGANIZATION

Since the last report there has been a considerable increase in the number of Coast Artillery Reserve officers in the 2nd Corps Area, particularly in the vicinity of New York; also considerable progress in the development of the Reserve organization.

The following Coast Artillery organizations have been allotted to the 2nd Corps Area:

90 Companies Coast Artillery
(621st to 721st)

{ Harbor defense troops assigned to
the various Coast Defense Commands;
i.e., Sandy Hook, Eastern New York,
Southern New York and Delaware.

Six Regiments Anti-Aircraft
Artillery (502nd, 533rd, 521st,
522nd, 530th and 539th.)

{ Corps and Army troops; assigned:
502nd to XII Army Corps,
533rd to I Army Corps,
521st to IV Army Corps,
522nd to IV Army Corps,
530th to G. H. Q.
539th to G. H. Q.

The Harbor Defense troops have been placed directly under the Commanding General, 2nd Coast Artillery District, Fort Totten, N. Y., for organization and training. A branch office of District Headquarters has been established in the Army Building, at 39 Whitehall Street, New York City, from which are administered all matters pertaining to those officers and organizations of the Coast Artillery

Organized Reserve assigned to harbor defenses. This was done in order to facilitate administration by insuring closer contact with the large number of Coast Artillery Reserve officers residing in the vicinity of New York. Moreover, better opportunity is thus afforded for co-ordination and co-operation with Corps and G. H. Q., which exercises general supervision of all matters incident to Reserve organization and training.

Lt. Colonel J. L. Long, C. A. C., is in charge of this office, with Major Wm. R. McCleary, C. A. C., as Executive Officer.

Major C. L. Williams, C. A. C., is directly in charge of the organization of those companies allocated to southern New Jersey and the State of Delaware. His office is at Room 179, Municipal Building, Wilmington, Delaware.

Lt. Colonel Allen D. Raymond, C. A. C., is at Montclair, New Jersey, with Headquarters of the 521st Anti-Aircraft Regiment; Major A. W. Lyon, C. A. C., at Buffalo, New York, with the 522nd Anti-Aircraft Regiment; and Lt. Colonel Granville Sevier is at 39 Whitehall Street, New York City, in charge of the organization of the other four Anti-Aircraft regiments.

There are at present 434 Coast Artillery Reserve officers in the Corps Area and the roster is growing, slowly, but surely.

An energetic campaign will be conducted this summer and fall to get every one of these officers in the Association and to make them a unit back of the principles for which it stands. That this will be a "large order" under the circumstances is thoroughly realized, for there is no question but that the illogical and short sighted policy of the present Congress, in failing to provide adequately for the organization and training of our citizen army in this, the critical period of its existence, has dampened the ardor of a large proportion of the reserve officers and has placed a severe handicap upon those charged with the work of organization.

The fact that only twenty-five per cent of those who volunteered to take the 15 days annual training this year were able to do so, the remainder being prevented by lack of funds, has caused a great deal of dissatisfaction and unfavorable comment on the part of these officers.

ASSOCIATION ACTIVITIES TO DATE

It will be one of the missions of this Association to get together from time to time and, by means of full and free discussion, to arrive at ways and means to "carry on" in spite of handicaps; to impress upon its members that military preparedness for any probable emergency is vital to our continued existence as a nation and a world power; that this preparedness can be best secured by adherence to the policy laid down in the Act of June 4, 1920, and the carrying of same to its logical conclusion; i. e., the enrollment and organization of a volunteer citizen reserve of officers and specially qualified enlisted men, who, in time of national necessity, will form the nucleus and training force for the National Army without breaking up and demoralizing the Regular Army and National Guard organizations, our first line of defense.

The first of these "get together" meetings for 1922 was held at the Army and Navy Club in New York City on May 20th and consisted of a luncheon followed by a conference and business meeting of the Association. This meeting was the subject of an article which appeared on the front page of the New York Times on Sunday, May 21st. Lt. Colonel H. C. Wilson, C. A. R., Chairman of the Association, presided. Amongst the officers of the permanent establishment present were:

Brig. Gen. A. W. Brewster, Comdg 2nd Coast Artillery District,
Colonel Willoughby Walke, C. A. C., Comdg. C. D. of Eastern New York,
Lt. Colonel Samuel G. Shartle, General Staff, Asst. C. of S., G-3,
2nd Corps Area,

Colonel E. B. Martindale, C. A. C., Chief of Staff, XII Army Corps,
Lt. Colonel R. F. Woods, C. A. C., Comdg. Coast Defenses of Sandy Hook,
Lt. Colonel Granville Sevier, C. A. C.,
Lt. Colonel J. L. Long, C. A. C.,
Major C. B. Ross, C. A. C., Asst. C. of S., G-2, XII Army Corps,
Major Wm. R. McCleary, C. A. C.

The meeting was addressed by General Brewster, Colonel Walke, Colonel Shartle, Colonel Martindale, Colonel Sevier and Colonel Long; also by Colonels W. I. Taylor and Sidney Grant of the New York National Guard, who are also Coast Artillery Reserve officers and members of the Association.

A general discussion followed in which criticism and dissatisfaction were freely voiced at the failure of Congress to provide adequately for the national defense. Those present were unanimous in condemning its action in practically nullifying the provisions of the National Defense Act of 1920 by cutting the appropriation for training of the National Guard and Organized Reserves to a ridiculously inadequate amount, and reducing the strength of the Regular Army below the minimum required to perform its functions under that Act.

A resolution was passed as follows:—"That the chairman is directed to appoint a committee on publicity consisting of seven members, whose scope and functions will be: to present to Congress through every available channel the imperative need of providing sufficient appropriations to carry on the education and training requisite to establish and maintain the military policy of the United States as provided in the National Defense Act of 1920, including the retention of commissioned and enlisted personnel as recommended by the War Department; to furnish to the public, through newspapers and magazines, information that will educate them in the needs of the country for National defense; and especially to present the Coast Artillery Service in all its phases to the youth of the country who are possible candidates for its future personnel."

The following were appointed on the committee: Major Azel Ames; Major Robt. H. Hazeltine; Major Edw. T. Harris; Major Wm. R. McCleary; Captain A. Z. M. Azoy, Jr, and 1st Lt. M. J. Shai.

Mr. A. L. Smith of the New York Times, a former officer of the World War, was asked to assist the Committee and has kindly agreed to help in every way possible.

Two additional vice-chairmen were elected; viz: Major Azel Ames and Major Robert S. Allyn. Also six additional members of the Executive Board; viz: Majors Monell, Perry, Coons, Stockwell, Oglesby and Hazeltine.

Arrangements were completed for a trip to Sandy Hook on Saturday, June 3rd. This was made possible through the courtesy of Colonel Walke, who tendered the use of the Mine Planter "General Ord." This proved a very successful undertaking. It was circularized to all Coast Artillery Reserve officers and former Coast Artillery officers in the 2nd Corps Area and was participated in by over 60 Reserve officers and former officers, and by several of the permanent establishment, including General Brewster and Colonels Hero and Raymond. Only the highest praise is due the Coast Defense Commander at Fort Hancock, Lt. Colonel R. F. Woods, and his officers, for their enthusiastic co-operation in making a success of this contribution toward the practical education of the Reserve members of our officer personnel. Ample transportation facilities were afforded by means of all available Government and private owned autos at the post. A very interesting inspection was made of every element of the Defenses, including batteries, fire control, searchlights, mine defense, and railroad and anti-aircraft artillery. An excellent luncheon was furnished at the "Brick House Mess." All the visitors left expressing themselves as having been greatly pleased and benefited by the trip.

Many officers expressed surprise that no provision has been made for a landing field for aeroplanes at Sandy Hook. There is no question but that a field is very much needed in connection especially with the fire control of the two long range twelve inch batteries whose efficiency as elements of the defense of New York Harbor will be greatly limited unless provision is made for adequate aerial observation. This can be accomplished most efficiently by means of an observation squadron stationed at Sandy Hook. An excellent opportunity is afforded for the construction of such a field by the clearing, filling and leveling of the flat marshes extending through the center of the reservation, south of the Artillery barracks. The Association desires to place itself on record as being behind this project, which is considered essential to the proper defense of the harbor.

TRAINING

During the month of June, (13th to 27th), a special period of training was held at Fort Hancock, which was participated in by seven officers. It consisted in a brief course in Infantry training, administration, machine guns, automatic rifles, artillery materiel, and gunnery, followed by practical firing problems, using sub-caliber and 3-inch service ammunition. Majors E. K. Smith and W. R. Nichols were in charge of the instruction, which, notwithstanding the fact that there was only a very short time available to prepare for the reception of the student officers at the post, and that the course of instruction had to be hastily improvised, was very successful in every way and very beneficial to the officers concerned. The latter were very enthusiastic in their praise and appreciation of the course.

The regular annual training camp, now under way, is being attended by sixteen Reserve officers from all parts of the Corps Area, including two field officers. Lt. Colonel R. F. Woods is Commandant of the camp, and Lt. Colonel J. L. Long, C. A. C., the Senior Instructor, is being assisted by an able staff of instructors, including officers from the Coast Artillery School and from the Infantry School at Fort Benning. As has been stated, this camp, which was originally planned for at least 85 officers (including those from the anti-aircraft regiments, a camp for whom was to have been held at Fort Totten) has, on account of lack of funds appropriated, dwindled to 16 officers.

In like manner, the Correspondence School, which was very ably conducted by Major L. B. Weeks, C. A. C., originally enrolled about 135 officers. After three months there were only forty active names on the list and before the term closed several of these had fallen by the wayside. Had there been a sufficient number of Regular Army officers assigned, with sufficient funds for travel to enable a closer personal contact with these student officers, in the form of quiz classes on the lessons, it is believed that interest could have been maintained and the course made a success.

The Association desires to go on record in favor of these classes, in fact it is not believed that the courses conducted on a 100% correspondence basis will succeed. It is believed, however, that the papers making up the course should be sent to all Reserve officers, for their information, whether they enroll or not.

PLANS FOR THE FUTURE

In order to stimulate the interest of Reserve officers, attract the attention of the public, particularly of former Artillery officers who have not yet accepted Reserve commissions, and to offset in part the effect of the ultra-economical policy of Congress toward the military establishment, plans are being made for a demonstration of heavy mobile artillery, under war conditions, in conjunction with aerial observation. It is planned that the 6th Field Artillery, now at Camp Welsh, Montauk Point, on duty at the Reserve Officers Training Camp and the Citizens Military Training Camp and due to leave there sometime in September, enroute,

by marching, to their permanent station, shall make a halt of about two weeks at Mitchel Field and go into prepared positions under camouflage. Arrangements are being made that will permit groups of Reserve Artillery officers to visit Mitchel Field during this period, inspect these battery positions and view them from the air in the capacity of aerial observers. The cooperation of the Commanding Officer at Mitchel Field, Major W. R. Weaver, has been assured, and it is believed that this can be made a highly successful and profitable undertaking. It is expected that the Anti-Aircraft Battalion at Fort Totten will also participate in the demonstration.

Major Robt. T. Rasmussen, a former officer of the Regular Service, now in the Officers' Reserve Corps, will be asked to organize and command a battalion of anti-aircraft artillery in Nassau County, utilizing the materiel of the Regular Anti-Aircraft unit at Fort Totten. It is planned to make this a completely organized unit as to personnel, the first in the United States. Major Rasmussen's P. C. will be in Freeport, Long Island.

The above mentioned undertakings are but a part of the Association's programme for the upbuilding of the Coast Artillery Reserve in the 2nd Corps Area.

It is planned to leave nothing undone that will help to build up an efficient organization and to keep up the interest of the officers in the development of artillery and the progress of artillery methods.

It is considered highly desirable in this connection that steps be taken to secure a Reserve Brigadier General—as soon as one exists and is available—to become the Reserve assistant to the Commanding General, 2nd Coast Artillery District. This officer should have Coast Artillery experience, and his functions should include co-ordination of the several Reserve Coast Defense Commands and Reserve Coast Artillery units, and the standardizing of the study and quiz procedure under the Coast Artillery correspondence course; also to maintain the necessary liaison between the Reserve and the Regular establishment.



Doings of the Coast Artillery Rifle Team

The Squad of Coast Artillerymen who have been working faithfully all summer at the Rifle Range, Wakefield, Massachusetts, left for Camp Perry and the National Matches under the leadership of Major W. S. Fulton, Team Captain, on September 2.

During the summer the members of the Squad in training at Wakefield participated in the Rifle and Pistol Matches held under the United Services of New England, ending on August 18. In these matches Coast Artillerymen made a good showing, winning two out of nine matches. Briefly summarized, the results from a Coast Artillery standpoint were as follows:

The Coast Artillery won the McKenzie Match, 600 yards slow fire in which there were 105 entries. The high man was Captain C. A. Chesledon, with a score of 50 plus 5 extra bull's eyes. The next three places in this Match were won by members of the U. S. Marine Corps, while the 5th, 6th, and 7th places were won respectively by Lieutenant L. H. Lemnitzer, C. A. C., Captain J. T. Campbell, C. A. C., and Captain G. deL. Carrington, C. A. C.

Captain H. C. Barnes, Jr., C. A. C., won the 200 yards Snipers Match, by a score of 10+10. The 2nd, 3rd, and 4th places were won by the Marines, while the 5th and 9th places were won respectively by Sergeant O. R. Ping, C. A. C., and Captain E. W. King, C. A. C. In this Match there were 60 entries.

In all the other seven Matches, Coast Artillerymen were represented among the first ten. In the Phelan Match, 300 yards rapid fire with 90 entries, Sergeant

Otto Bentz, C. A. C. won 3rd place, Sergeant E. B. Porter, C. A. C. 8th place, and Major S. W. Stanley, C. A. C. 10th place.

In the Cummings Match, 500 yards rapid fire with 91 entries, Major W. S. Fulton, C. A. C., won 5th place, and Captain J. T. Campbell, C. A. C., landed in the 10th position.

In the Lynch Match, 1000 yards slow fire, with 100 entries, the Coast Artillery took away 4th, 6th and 7th places by Lieutenant G. W. Trichel, C. A. C., Captain J. A. Ryan, C. A. C., and Lieutenant H. I. Borden, C. A. C., respectively.

The Hayden All-American Team Match had 9 teams entered and consisted of 200 yards standing 10 shots, 200 yards rapid fire 10 shots, 300 yards rapid fire 10 shots, 600 yards slow fire 10 shots, 1000 yards slow fire 20 shots. The results of this match were as follows:

<i>Place</i>	<i>Team</i>	<i>Score</i>
1	Marines No. 1	2809
2	Marines No. 2	2792
3	Coast Artillery No. 1	2795
4	Marines No. 3	2755
5	Coast Artillery No. 3	2749
6	Coast Artillery No. 2	2738
7	Massachusetts No. 1	2665
8	Navy Submarine Base	2548
9	Massachusetts No. 2	2341

In the Easterbrook Individual Pistol Match with 35 entries, Major W. D. Fraser nosed into 3rd place with a score of 254, the winner, Captain R. E. Vermette, 5th Infantry, having a score of 258.

The Bridgeham Team Pistol Match, with 10 teams entered, was won by the Marines No. 1 Team with a score of 1256 out of a possible 1500, the Coast Artillery winning 3rd place with a score of 1155.

In the Pfaff Match (Team Snipers) the Coast Artillery Team of San Francisco won 4th place, the first three places being taken by three teams from the Marine Corps.

In addition to the work at Wakefield Captain H. C. Barnes, Jr., C. A. C., and Lieutenant G. W. Trichel, C. A. C., represented the Coast Artillery in the "tryouts" for the American International Rifle Team to enter the International Rifle Matches to be held at Milan, Italy about September 10 to 12, 1922. These "tryouts" were held at Quantico, Virginia, August 10, 11, and 12, competitors having been selected from the country at large and the seven high men being selected to represent the United States. The Team members selected in the order of their scores were as follows: Lt. Comdr. C. T. Osburn, U. S. N.; Mr. L. N. Neusslein, Civilian; Major J. K. Boles, Field Artillery; Sergeant M. Fisher, U. S. M. C.; Lt. Comdr. A. D. Denny, U. S. N.; Gunner C. A. Lloyd, U. S. M. C.; Captain J. Jackson, U. S. M. C. The two Coast Artillery representatives stood high in the score, Captain H. C. Barnes, Jr. winning 8th place and thus just missing the Team, while Lieutenant G. W. Trichel took 11th place.

The results of the year's training of our Coast Artillery representatives for the National Matches above enumerated indicate that the Team is on its toes, and is doing its utmost to merit the confidence and support of the Coast Artillery. However, these figures do not tell the whole story. The spirit and the team work of the Squad are all that we could wish them to be and justify the feeling of confidence and determination with which the team is about to enter on the final struggle to put the Coast Artillery high on this roll of honor.

An Appreciation

IT HAS BEEN DECREED by our Federal Government that its purposes will be best served through the withdrawal of the Coast Artillery from the shores of Portland and another branch of the service installed.

The City of Portland, its various organizations, and its citizenry, as a whole, feel obligated to extend to the Coast Artillery such appreciation as only those who have enjoyed the years of association can express—an association between the military, civic and social life that has been without a blemish or misunderstanding.

We can but hope that every branch of the service that comes to us will conduct itself in the same courteous and co-operative spirit as has the Coast Artillery and this appreciation extends alike to commanding officers, other officers and the men of the line, and it is therefore

RESOLVED: That this appreciation be forwarded to the Adjutant General of the U. S. Army, the Commanding Officer of the First Area Corps, the Commanding Officer of the retiring Coast Artillery and that it shall also be suitably framed and hung in a prominent place on the walls of the Chamber of Commerce, and in the City Building.

(Signed) Albert E. Anderson
 Frank B. W. Welsh
 Hilda L. Ives
 Mary L. Thompson
 W. Wright Beck

Done at Portland, Maine, April 19, 1922. Under authorization of General Committee appointed to welcome 5th Infantry supplanting Coast Artillery.



BOOK REVIEWS

Mathematical Philosophy. By Cassius J. Keyser, Ph. D., L. L. D. E. P. Dutton and Co. New York. 1922. 5¾" x 8½". 466 pp. Price \$4.70.

In this collection of twenty-one lectures, Dr. Keyser has "endeavored to present in the language current among educated men and women some of the maturer fruits" of the study of "the nature of mathematics, upon its significance in thought, and upon its bearing on human life."

These lectures are designed primarily for students of thought, but the author hopes that they "may not be ungrateful to a much wider circle of readers and scholars" among whom he instances "all readers who desire to acquire a fair understanding of such genuinely great mathematical ideas as are accessible to all educated laymen and to come into touch with the universal spirit of the science which Plato called divine."

What mathematical training is necessary for a proper appreciation of these lectures? "So much knowledge of algebra, geometry and trigonometry as a capable student can acquire in one collegiate year."

In propounding the question, "how much mathematical discipline is essential to the appropriate education of men and women as human beings?" The author clearly and forcibly states the "evident tokens and the cardinal constituents of that which in human beings is human," and which they possess in some recognizable measure: a sense for language, for expression in speech—the literary faculty; a sense for the past, for the value of experience—the historical faculty; a sense for the future, for prediction, for natural law—the scientific faculty; a sense for fellowship, cooperation and justice—the political faculty; a sense for the beautiful—the artistic faculty; a sense for logic, for vigorous thinking—the mathematical faculty; a sense for wisdom, for world harmony, for cosmic understanding

—the philosophical faculty; and a sense for the mystery of divinity—the religious faculty.

The aim of mathematics, says the author, is “to think vigorously whatever is vigorously thinkable, or whatever may become vigorously thinkable, in course of the upward striving and refining evolution of ideas.” And thinking he defines as the “handling of ideas as ideas—the formation of concepts, the combination of concepts into higher and higher ones, discernment of the relations subsisting among them, embodiment of these relations in the forms of judgments or propositions, the ordering and use of these in the construction of doctrine regarding life and the world.”

The author begins his work with a study of the “great concept denoted by the familiar term—Postulate System.” He considers the system devised by Professor Hilbert (see Hilbert’s *Foundations of Geometry*) for initial study rather than Euclid’s system for the reason “though Euclid’s system was good enough to withstand more than two thousand years of criticism, it is now known to have some grave imperfections—most of them sins of omission.”

The author very thoughtfully warns the reader that the study of the Postulate System “is not as entertaining as a movie, that it will quickly weary such as are content with a little phraseological facility in matters they do not understand, but not those whose curiosity is deep and genuine, for they will be sustained by the dignity of the task and the joy of the game.”

Supply and Demand. By H. D. Henderson, Fellow of Clare College, Cambridge, England. Harcourt, Brace and Co. New York. 1922, 5' x 7½". 181 pp. Cloth. Price \$1.50.

This is the first volume in the series of *Cambridge Economic Handbooks*, of which J. M. Keynes is the general editor. While the book under consideration, like others in the series, does not purport to do more than set forth well-established if not orthodox principles, yet the reader cannot fail to note in this discussion of *Supply and Demand* a marked advance in outlook from the traditional stand of the Cambridge school, and the evidence of a conscious revaluation of concepts as a result of the impact of theories such as those of Marx and John Stuart Mill. In particular the chapters on *Land, Risk Bearing and Enterprise, Capital, and Labor* show evidence of the most careful reexamination of economic theory in face of the latter day exposition of the economic theory of discontent. The result is a sane and logical statement of the inescapable force of the *marginal* factors in demand, supply, cost, and utility, and of the real distinction between cost, total utility and wealth.

It is to be remarked that this is a book whose reading becomes increasingly more interesting the farther one proceeds.

