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THE MOBILE DEFENSE OF ADVANCE BASES BY THE MARINE CORPS.

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THE field service regulations make it mandatory to *estimate the situation.* In estimating the situation, the first thing to be considered is the *mission* of the military force concerned. The study of logic teaches us that the correctness of the conclusion depends primarily upon the soundness of the premises. The most important factor then in this estimate of the situation is the determination of the *true mission* of the Marine Corps in the event of war.

The countries with which the United States may become involved in war may be divided roughly into two classes. First: great naval powers; second: powers weak in naval strength. A war with a nation belonging to the first class means that the military shore forces of the two nations must (unless the territory of the two be contiguous, as in the case of Great Britain and the United States) remain inactive and unused until the two fleets have settled the momentous question of supremacy at sea. The Army can take no active part in the hostilities until the path across the sea has been opened and one nation or the other is able to assume the offensive.

In such a war the Marine Corps, if not assigned to Advance Base work, would in all probability be divided up into small detachments and either assigned to the vessels of the fleet, or held on shore in a state of inactivity as guards to navy yards, naval magazines, etc., while waiting for the war at sea to reach a decision. If, on the contrary, the Marine Corps be utilized as an Advance Base organization, it would have the opportunity to share with the Navy

Lecture delivered to officers of Advance Base School, Philadelphia, in May, 1915. This paper is based very largely on Captain Earl Ellis' lectures on Advance Bases.

the glory always resting on those who strike the first blows at the enemy, and it also would have the satisfaction of feeling that it had an important, semi-independent duty to perform and that on the manner of its performance would largely depend the success or failure of the Fleet.

Surely, this is a mission which is worth while, and one which furnishes a spur to energetic effort and zealous labor in time of peace, so as to attain the true soldier's Elysian state, "preparedness for war."

In the event of a war with a non-naval power, our duties, if organized into regiments and brigades for Advance Base training, would be that of the advance guard of an army. The Marine Corps would be the first to set foot on hostile soil in order to seize, fortify, and hold a port from which, as a base, the Army would prosecute its campaign. Here being again first on the scene, the Corps would perform most valuable service, and would be ready to join the Army in its march against the armies of the enemy.

All, I believe, will agree that our training as an Advance Base organization, both as a mobile and as a fixed defense force, will best fit us for any or all of these roles, and that such training should, therefore, be adopted as our special peace mission.

I think there is some confusion, however, in the mind of the ordinary Marine officer like myself, as to the meaning of the term "Advance Base." As I understand the subject, the meaning of these words is too narrow to represent correctly the mission of this Brigade. Naval bases are classified in several ways. For our purposes the questions as to whether they are permanent or temporary, advance, or on the line of communications, or at home, etc., etc., are not of as much importance as the question as to whether they are defended or undefended. It is my belief that the Marine Corps may be called upon to defend an undefended or partially defended naval base, or other important point on the coast irrespective of whether or not it be, strictly speaking, an advance base.

This view I know is not in accord with the prevailing conception of the duties of an advance base organization; but wars nowadays come with the suddenness of a magazine explosion, and a fully equipped, heavily armed, highly mobile and well trained organization such as is this First Brigade, might unquestionably be called on to defend any important base or harbor from attack.

The question now arises as to what part will the mobile force, as such, take in the carrying out of the Marine Corps mission.

From the standpoint of the Mobile Force, its activities vary but little whether the base be naval or military—permanent or temporary; advance or retired, etc., etc. Its problem is always the same old one, viz: the defense of a particular locality against the attack of a hostile mobile force supported by naval vessels. There is no mystery connected with the solution of this problem. A city, or a coast defense battery, or a harbor filled with shipping, is to be protected from attack. To furnish this protection, the enemy must be prevented from occupying any position from which his artillery may be able to throw its projectiles into the city, the fort or the harbor.

Owing to the greatly increased range and power of modern artillery, the enemy must be held at a greater distance from the goal he seeks than formerly, and our defenses must be of such a nature as to give our troops protection against the enemy's modern and more powerful naval or land batteries. Conversely, the increased power of modern artillery, as well as its greater security by reason of its defiladed positions, makes successful landings and hostile infantry attack much more difficult, and the problem of the defense correspondingly easier.

So far as the mobile force is concerned, the character of the defense of localities or bases may be roughly divided into two classes: insular and continental.

By an insular base, fort, city or other locality, is meant one so situated that the attacking force can be met at the beach, there being no landing places beyond the radius of activity of the defending force. A modified insular position is one located on a small peninsula connected with the mainland by a narrow causeway, making it necessary for the enemy either to land in the face of the defending force or else to cross the narrow causeway under the defender's fire.

By a continental base, etc., is meant one situated on a continent or on such a large island that the enemy may land at a distance from the base without opposition, and the defense of the base, fort, city, or other locality becomes the ordinary one of the preparation and occupation of a defensive position. This position must be strong enough, both as to its characteristics and as to the force occupying it to defend the base against not only a raiding force, but also against a deliberate, powerful and long sustained attack.

The conditions surrounding the two situations manifestly differ in some respects and therefore require different solutions.

The defense of a purely insular locality or base has the following

advantages over the ordinary defensive position: Its field of fire is unlimited; there is no terrain to conceal the movements of hostile troops; its target (boats loaded with men) is the most vulnerable of all targets; the landing can be readily interfered with by means of obstacles, mines, etc.; if the boats succeed in reaching the beach the troops are, necessarily, while disembarking and forming on shore in a state of disorganization; after landing they are unfamiliar with the country, and, finally, a defeat is almost certain to result in the complete destruction or capture of the hostile landing force.

The disadvantages of an insular base are that the defending force is exposed to the fire of the powerful guns carried by the supporting fleet; that the fleet by reason of the swiftness of its movements may threaten any number of points and still concentrate without difficulty at the selected landing places; and that the defenders, owing to the small area of the island, must hold all landing places in force, so as to prevent the seizure of commanding positions from which the enemy may by his artillery fire render the base untenable.

The general scheme for the mobile defense of insular bases involves the following considerations:

(a) A main line;
(b) A second line;
(c) A stronghold or keep;
(d) Artillery;
(e) Sectors of defense;
(f) General Reserve;
(g) Roads;
(h) Wire and visual communications;
(i) Transport and supplies;
(j) Camps, sanitation, etc.;
(k) Working parties, etc.

THE MAIN LINE.

In an insular base fire trenches for infantry and machine guns should be constructed at all landing places. They should be near the beach so that the enemy may be met while still in his boats or while in the act of disembarking; the trenches should be located in low positions so that the fire of the ship's guns against them must cease as the boats approach the beach; so that the defenders may be in the best position to meet night attacks; and so that the best fire effect may be obtained; they must be as nearly invisible as it is possible

to make them, and they must afford protection to the defenders against the tremendous fire of the fleet. Invisibility, however, will be their chief protection, and every precaution to keep the defenders out of sight must be taken; the trenches should be connected with cover trenches or with covered or protected positions in rear by means of concealed communicating trenches; these communicating trenches should, if necessary, be roofed over with sod or brush; lines of trenches in rear for tiers of fire should also be constructed. The water approaches to the landing places should be obstructed with submerged obstacles, such as wire entanglements, spikes, abattis, etc., so as to prevent a landing, or at least to hold the boats under our fire for a considerable time; contact or observation mines should also be planted in all approaches to landing places. Obstacles, land mines, live wires, etc., should be utilized on the beaches so as to impede the formation of the troops after landing. Searchlights, bonfires, etc., should be placed so as to illuminate the sea and with the object of making it impossible for boats to approach the beach at night without being observed, and with the object also of interfering with the navigation of hostile boats; finally, the most careful provision should be made for distribution of fire on the entire target, especially at night.

SECOND LINE.

A second line should be constructed in rear of the first to be held in case the first line be penetrated. This line, if practicable, should be sufficiently advanced to prevent the hostile batteries from taking positions from which they could attack the fleet or the station. Communicating trenches or protected roads from the first to the second line should be provided so as to permit a safe withdrawal from the first line and occupation of the second line. Similarly the reserves must be able to reach the second line without being exposed to the hostile fire. This line must be held to the uttermost as the safety of the train and therefore the efficiency of the fleet will depend on this defense. Should the defenders be so weak as not to be able to hold a line sufficiently far in advance to afford this protection, advance posts may be fortified and held with a view to delaying the destruction of the base by the enemy.

STRONGHOLD OR KEEP.

Not only is it important to protect the base from hostile attack

so as to preserve it for our own use, but, likewise, it may be important and perhaps vital to deny to the enemy the use of the base. For this purpose a stronghold or keep should be constructed and heavily fortified. Heavy guns should be lavishly used in its defense, and the garrison should be well provided with food, water, ammunition, etc.

ARTILLERY.

Artillery will be a tremendous factor in the defense of insular bases. By reason of its use of indirect laying, it may be placed in secure positions which the ships' batteries cannot reach and from which every approach to every landing place may be swept by its fire. Owing to the rapidity of movement of the enemy's fleet, there will be but little time to shift the batteries; each landing place and its approaches must therefore be continuously covered not only by infantry fire but by artillery as well. It is of great importance also that the transports should be forced to keep far from shore, thereby exposing the comparatively slow moving boats laden with men to a long continued attack with shell or shrapnel. Heavy artillery is essential for this purpose and even the armored ship may be held at arm's length if heavy howitzers or mortars be utilized by the defenders. The terrain of many islands like that of Culebra is of such nature that a rim of steep hills runs parallel to the beach, making a gun of short range and high angled fire necessary if the beaches are to be swept by any but direct artillery fire. It would be suicidal to use direct fire, during the daylight hours, as the field pieces would be smothered or destroyed by the tremendous volume of fire from the fleet. The mountain battery is admirably fitted for this role of covering the beaches with indirect fire. It is light, easily transported, and can be adapted for high angle fire to such an extent as to bring it into the same class as a mortar. I believe that with ample artillery of all classes placed in defiladed positions so as to cover all beaches and the approaches thereto, this arm alone would be able during daylight attacks to destroy all flotillas conveying landing forces before they could reach the beach. At night, owing to the curtain of darkness which even efficient searchlights will only partially lift, and owing to the difficulties attending accurate indirect laying, infantry and machine guns must become the chief reliance of the defenders. The powerful backing of artillery fire must not be discarded, however, and positions for direct laying close to the beach should be

selected and a part of the guns placed in them after nightfall and withdrawn before daylight. The remaining batteries in retired positions should be assigned so as to cover all sectors, and a most diligent watch kept so that immediately upon the hostile flotilla being picked up by the rays of the searchlights, a tremendous volume of fire may be brought to bear on it.

SECTORS OF DEFENSE.

An insular base, by reason of having its entire perimeter placed in a state of defense, corresponds very closely to the closed works of a fortress. Like a fortress, it is probable that it will prove to be too extensive for all troops to be directly supervised by one man. It should therefore be subdivided into several sectors, each sector being independent of the others, but subject, of course, to the orders of the Brigade Commander. The fact that an advance base brigade consists not only of infantry, mobile artillery, and the necessary auxiliary troops, but also of troops which in their military functions approximate closely to the coast artillery, causes the division of the defenses into suitable sectors to be somewhat difficult. If the coast defense batteries happen to be located in close proximity to each other and occupy a distinct portion of the defensive perimeter as was the case at Culebra in the maneuvers of 1914, the division in question might be made by assigning the fixed defense regiment to the sector occupied by its batteries, and by dividing the remainder of the perimeter between the infantry regiments. This, however, I do not believe to be the best disposition even under the special circumstances mentioned above. The special mission of the fixed defense regiment, of the batteries manned by it, and of the mines planted and controlled by it, is to prevent damage from being inflicted by the hostile fleet, on our train while at anchor at the base; and to use every means at its disposal to destroy the enemy's fleet. In brief, all of its efforts should be directed against the enemy's ships. On the other hand the special mission of the mobile forces is to prevent the hostile landing forces from seizing the base itself or from occupying a position from which its artillery may render the base an unsafe refuge for our fleet.

In order to secure the best results I believe it to be mandatory that each organization should concentrate its attention and its activities on its own special mission; and that neither should infringe upon nor interfere with the prerogatives or duties of the other.

Therefore the officers attached to the mobile forces should not exercise command over the batteries or the submarine mining operations, and conversely the officers of the fixed defense regiment should not exercise command over the mobile forces. Accepting this conclusion as correct, the question of the division of the defensive position into sectors and the assignment of tactical units thereto is greatly simplified. The entire perimeter would, under these conditions, be divided so as to give to each infantry regiment its own independent sector for the security of which against attacks by landing forces its commander would be held responsible. The commanding officer of each sector would himself make the assignment of his troops to the first line, and to the local supports and reserves. The proportion of troops to be assigned to the several echelons would depend on the defensive strength of the first line trenches and the security of the means of communication with them from the rear. As a general principle no more troops should be kept in the fire trenches than the needs of the military situation make mandatory, as exposure to the terrific fire of the fleet will be most trying and even demoralizing to the best of troops. At night, however, the first line should be strongly manned.

The sectors will ordinarily be subdivided into parts which one battalion can defend, each battalion furnishing the details for its own fire trenches and its own supports.

The headquarters of the sector should be located at the post of the reserve. It should be on the main road to the front.

GENERAL RESERVE.

In addition to the reserves of the various sectors, the defense of an insular base or of a fortress requires that a general reserve be held out of the trenches under the direct control of the brigade commander. This reserve is *his* instrument to be used in accordance with *his* plans, and at the time and place which he may decide to be the most critical. Were all the troops assigned to sectors, there would be none available to throw in at the crucial moment, as the commander of each sector would be convinced that the greatest danger was on his front and would hold on to his own men like grim death. The general reserve, ordinarily, would as a whole be centrally located at the junction of the radial roads to the front, but the conditions may be such as to require it to be divided, and the location of the fractions in rear of the most vulnerable parts of the de-

fensive perimeter. The general reserve should consist entirely of infantry and machine guns. No part of the mobile artillery should be held in reserve.

ROADS.

One of the most important features of a fortified base is the means of interior communication. The roads necessary to provide for such communications should be among the very first defensive works undertaken. In general, the following roads should be constructed:

(1) Radial roads from brigade headquarters or main supply depot to the headquarters of each sector.

(2) Roads from the headquarters of each sector to the position of each of its supports.

(3) Roads or communicating trenches from each support to the fire trenches.

(4) A circumferential road in rear of the defensive works.

(5) Cross roads connecting the various radial roads.

(6) If the tactical situation requires the general reserve to be located at any place other than at brigade headquarters, or off the road system, roads connecting its post with the main road system must also be constructed.

In locating and constructing these roads not only must the rapidity of moving reinforcements, etc., be considered, but questions affecting their security and invisibility are of great importance. Troops marching on these roads should be invisible from the sea and not exposed to hostile fire. This should especially be considered in the case of the roads connecting the first line trenches with the second line; and not only should these roads be unexposed to the fire of the hostile fleet, but these roads should be exposed to the fire of our troops when occupying the second line.

WIRE AND VISUAL COMMUNICATIONS.

Rapidity and accuracy in transmitting orders to the front and information to the rear are the most marked characteristics of modern warfare. To accomplish this most important and necessary task requires a complete battle system of wire communications supplemented by visual communications for use in case the wires be cut or the system be thrown in disorder by artillery fire, or by other

means. The wire communications may be subdivided into two systems:

(a) The administrative system,
(b) The battle system.

This paper will not touch upon the administrative system. By means of the battle system the brigade commander would be connected with each regimental or sector commander, with the commander of the mobile artillery, with the headquarters of aviation detachment, and with the more important observation stations. Each sector commander would also be connected with the artillery commander, with the commanders of the other sectors, with the commander of the fixed defenses, and with each of his own groups or supports. Each group or support would be further connected with the fire trenches in its front. The interior communications of the mobile artillery are provided ordinarily by that arm. The visual signal system should not only be available for use as a substitute for wire communications, but should also supplement it. It may be the only means of communication between headquarters and isolated observation stations or garrisons on an islet or located at great distances from the main body. The field wireless, too, would be of much value under such conditions whenever practicable to transport it, and there would also appear to be a wide field of usefulness for the homing pigeon reared and trained at the base.

TRANSPORT AND SUPPLIES.

These questions are of the most vital importance. Troops must be fed, they must have water, and they must be supplied with ammunition. None of these problems have been solved by us. We depend on Providence, and hope that God will supply animals, wagons, etc., like manna from the sky at the place to be defended. It is difficult to see any satisfactory solution of this problem. The system of transport on board naval vessels precludes a large number of animals, etc., from accompanying the brigade, not to speak of the necessity of rapid mobilization and embarkation. We can carry with us, however, a certain number of motor trucks, which have now been so developed for military purposes as to be suitable for use over bad roads or even over a rough country without roads. I believe that these motor trucks supplemented by the transportation which can be obtained in the vicinity of the base must be our ultimate solution of the problem. The water supply problem is

likely to offer many obstacles to the defense of naval bases. In this case likewise it is difficult to provide a standard solution of the problem which would fit all cases. Water for the fractions quartered near the anchorage of the train or near any landings protected from attack can readily be provided by the vessels of the train. Heretofore barrels have been used for this purpose; they are, however, very unsatisfactory, wasteful and insanitary. For drinking water, galvanized iron tanks of suitable capacity should, I believe, be furnished. These should be placed at such points as depots, headquarters, reserves, stronghold, second line, and supports. These tanks should be kept filled either from the local supply or the ships. They should be rigidly guarded and every possible measure taken to prevent waste and contamination. In addition concrete cisterns should be built, and a reserve supply stored. All food supplies in the vicinity should be purchased, especially cattle and other live stock, and only a quantity sufficient for the actual needs of the native population should be sold or issued to them. These precautions may be essential, as the fortunes of war may perhaps separate the brigade from the entire fleet including the train, under which circumstances it would be placed solely on its own resources and possibly have to stand a siege.

CAMPS, SANITATION, LANDING, ETC.

Landings of necessary troops, stores, etc., should be made near the landing places to be defended if it is practicable to do so. By so doing, infinite labor and much time in preparing for defense may be saved. Similarly the water route for keeping these detachments supplied should be utilized just so long as the enemy allows it to be done, thereby giving our forces time for opening roads and improvising transportation facilities to supplement the auto trucks carried with the expedition. In selecting camp sites, sanitary as well as military considerations should be given great weight. Heretofore, in tropical wars, disease has been much more fatal than bullets. Low places infested with mosquitoes should not be chosen, invisibility from the sea if beyond effective range of the hostile guns is not important. Ordinarily, however, military considerations would be paramount as to the general location of the reserves, while sanitary considerations would be given greater weight in regard to the exact location of their camps. The permanent camp for the forces occupying each sector should, as previously stated, be near the sta-

tion of its reserve; every possible comfort and facility should be provided at these camps, for it is there that the troops will come for rest and recreation when relieved from the arduous duty in the trenches themselves unless the supports can be placed in covered positions when shelter tents may be used.

WORKING PARTIES.

It is now axiomatic that the troops which are to garrison any defensive position should prepare it for defense. The commanding officer of each sector then would select and be responsible for the location of the lines, trenches, roads, etc., in his sector, and his troops with the assistance of hired civilians would actually construct the works. This duty is a most arduous one, and the men should not be overtaxed in the heat of the day. The greater part of the work should be done in the early hours of the morning and in the late hours of the afternoon. Plenty of good, wholesome fresh food, pure drinking water, salt water bathing, cleanliness in camp, and protection from mosquitoes will keep the men in good health notwithstanding the most arduous work by day and by night. On the other hand idleness, booze, and lewd women will produce the most rapid deterioration not only in their physical condition, but also in their morale, their esprit and even in their courage. Men who lead a clean life will, I feel certain, give better service to their country when the great test comes, than the drunkard or the debauchee.

CONTINENTAL BASES.

The defense of a continental base differs in some respects from the defense of an insular base, as stated in the first part of this paper. The first or main line of defense of a continental base does not possess the advantages of the similar line in the defense of an insular base. The defenders in the case of the continental base, do not possess the unlimited field of fire, the vulnerable target, the advantage of the enemy being disorganized upon landing, or the security of the defender's artillery by being defiladed from hostile artillery fire. The features, other than the main line of the defense of a continental base, however, are practically the same as those of an insular base and as such have already been fully discussed. We are all familiar with the requirements of the defensive position and with everything in regard thereto which is laid down in detail in the many text books which we have read and studied in preparation

for examinations for promotion. I will not therefore, take up your time in discussing these questions but will read an extract from a pamphlet entitled "Defensive Position in Face of Superior Attacking Force." This extract is based on the lessons taught by the present war and is the latest information available in regard to such matters.

DEFENSIVE POSITION IN FACE OF SUPERIOR ATTACKING FORCE.

SELECTION OF SITE.

We have been taught that "strategy selects, tactics occupies and fortification strengthens the position." "Strategy is the province of higher commanders, tactics and fortifications are the province of subalterns." It is unnecessary to discuss in these pages the various considerations which influence the commander in the selection of a defensive position, viz: security of flanks, extent of frontage for available troops, etc., as these points are familiar to those of us who have read the various text books and manuals of instruction on Tactics and Military Engineering. The following brief notes and sketches will, however, serve to show the lessons which have been learned, and the changes which it has been found necessary to make in the previously accepted standard methods of Military Engineering Construction and points which should prove of value to those who may be placed in charge of various Field Works.

SITING OF TRENCHES.

Trenches should be sited so that they are not under artillery observation, whenever possible, also with regard to *possible observation* stations on ground occupied by the enemy. This point is regarded as of great importance, and not subsidiary to extensive field of fire.

A field of fire of 100 yards is regarded as satisfactory, if it cannot be increased without loss of concealment from the enemy's observation stations. The concealment of obstacles to check the enemy's advance, such as barbed wire entanglements, etc., is of importance, as said obstacles aid the observer in locating and ranging on trenches in rear.

The skilful siting of trenches back of a slight rise, behind a second hedge with obstacles hidden in the same way, or entangled in the hedge in front, has been found to afford the most satisfactory concealment in the earlier stages of an attack.

It has been found along the Western line now held by the British and French that the shell fire is awful and unceasing, the accuracy of ranging phenomenal, and the strain on officers and men enormous. Consequently the target must be reduced to the smallest possible dimensions. This object has been attained by abandoning the types of trenches shown in all previous manuals of Military Engineering and adopting a plan and type which can be best explained by reference to accompanying plan and section. The advance by either side is now considered by yards instead of miles, and is somewhat similar to the methods of attack and defense of fortress. The following brief notes which should be remembered and which must be considered when constructing field defenses are:

1st. Protection from shrapnel.

2nd. Protection from high explosive shell.

3rd. Protection from observation of shell fire by the enemy.

The objects can be best obtained by constructing the trenches *as narrow as possible, as deep as possible* (from 3 feet for fire trenches to 16 feet for cover trenches—(which are excavated at a distance of 40 yards in rear of fire trenches, and parallel to them)—to which men may retire during bombardment, the fire trenches being held with as few men as possible). *As much frontal fire as possible,* as it has been found that during an attack by the enemy, which usually occurs at frequent intervals during the night, and is generally universal along the whole line, each section can give but small assistance by flank fire to the section on either side. Eighteen to twenty-four inches is considered sufficient width for trenches. No stretcher carrying can be done, but a trench of similar width parallel to the firing line, and about 15 yards in rear (see sketch) is constructed to permit of communication with the different sections of the firing trench. This cover trench is linked up to the firing trench A at each traverse by a passage 15 B cut to same depth and in similar manner.

The fire trench should be of the recessed and traversed type, as described in the Manual of Field Engineering, whenever time permits. The height of parapet should be almost nil. The surplus earth from excavation should be spread or sodded depending on the nature of the ground in which the trench is constructed.

Earth not required for the parapet should be placed behind and close to the trenches to afford protection against the back blast of high explosive shells, provided the trenches are not rendered con-

spicuous thereby. The earth in the parados must also be sodded or treated in a similar manner to the earth in the parapet. The excavated material can be used to construct dummy trenches to draw the enemy's fire.

All elbow rests should be dispensed with or made as narrow as possible. Most men, however, prefer making their own niches for the forearm to rest against. A simple device to ensure the men's rifles being aimed in the right direction and elevation is useful in case of night attacks and in the absence of searchlights or flares.

All recesses under parapets must be shored up. If plankng or similar material is available, considerable time and the annoyance of earth caving in during construction of recesses can be overcome by laying said planking on the ground at front line of excavation with a good bearing at each end, then excavating the recess under said planking and throwing a portion of the earth on top of the planks. This excavated earth will form a parapet and protect the occupants of the recess from shrapnel bullets.

Headcover and overhead cover, as shown in Manual of Field Engineering, is impossible, except at certain points which are to be used as observation stations, and which must be carefully concealed.

Where headcover can be constructed to advantage, a continuous loophole is considered the best form.

The question of cover from fire for the reserve depends upon the distance in rear of firing line or the ability of the enemy's artillery in searching the ground on which reserves may be stationed. In any case, the possibility of being observed by aerial reconnaissance must be considered.

Point d'appui is unpopular, being most subject to attack. Straight trenches are preferred, as flanking fire is not to be relied upon.

In the event of the flank or flanks of a defensive line having to be drawn back, the trenches should be constructed in echelon. Curved trenches are subject to enfilade fire, especially by heavy artillery at long range.

The cover trenches, previously mentioned and marked "D" in attached plan, are usually constructed about 40 yards in rear of fire trench. They should be as narrow and as deep as the surrounding ground will permit. Recessed in these cover trenches, dressing stations and latrines should be provided.

Drainage is one of the considerations which should be borne in mind by officers whose duty it is to select the site and lay out the work. If possible, a trench should be cut to the lowest point in the surrounding ground such as a ditch, sunken road, or convenient hollow. If such does not exist, soak pits should be dug at convenient intervals and water pumped or bailed out.

Machine gun emplacements should be on the flanks of the position and under cover as much as possible. Avoid unmasking too soon so as not to expose to premature destruction by artillery.

Hold a wood in an advanced position or close in front with strong overhead cover to protect the defenders from injury by falling trees.

Obstacles must be provided to break up or check the enemy's attempts to rush the trenches. Barbed wire is undoubtedly the most effective for this purpose, especially if well concealed. The advantage of concealment, in addition to preventing ranging of the trenches in the rear, is also that working parties are enabled to repair nightly the damage or partial demolition of said obstacles. This repair work, which is carried out by the R. E., is considered the most nerve racking of all, as the enemy's trenches are frequently not more than 100 yards or even 50 yards away.

The method of constructing high wire entanglements, as shown in Manual of Field Engineering, with its posts set 3 feet 6 inches or 4 feet above the ground, and the barbed wire strung thereto, has been abandoned, owing to the fact that first, the posts are altogether too conspicuous and make excellent range marks for the enemy; second, as all repair work has to be carried out at night within close range of the enemy's trenches, absolute silence must be maintained, consequently hammering or driving posts are out of the question.

Various substitutes for posts have been tried with more or less success. Three sided triangles constructed with strong limbs of trees, firmly lashed together, have been prepared in rear of trenches and carried out and set in front of the firing line at night, at intervals of about 15 feet. These are fastened to an anchorage placed in the ground and the barbed wire well laced between and all over them.

Also limbs of trees about 8 or 9 feet long, crossed at the center and similar to the spokes of a wheel, have been constructed and erected in the same manner.

Any light, portable and strong support for barbed wire obstacle and of value.

The construction of simple flare lights of long life, shielded on the defender's side, should be practiced.

A few notes obtained from airmen should be of assistance to those engaged in Field Engineering Construction:

A. A long line of trenches is more visible than those arranged in groups.

B. Straight trenches are conspicuous.

C. Trenches across ploughed fields are bad and easily distinguished.

D. Straw spread at bottom of trenches conspicuous.

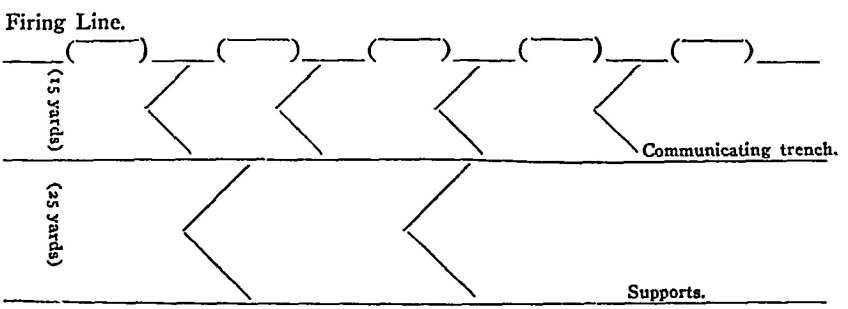
E. Trenches against hedges are invisible.

F. Very difficult to tell whether trenches are occupied or not. This also apples to gun emplacements.

G. Tracks to gun emplacements are very visible. Tracks should be made to all dummy entrenchments.

H. Cover trenches with brushwood to hide deep shadows at bottom.

STANDARD FIELD TRENCH.



The Firing Trench is only 18 inches wide, with no head cover, as owing to the proximity of the enemy's trenches, headcover prevents sufficiently quick resistance to bayonet charges. The Firing Trench is recessed every five rifles, and is located on the reverse slope of a hill, if possible.

The Communicating Trenches contain the latrines.

The Trench for Supports is 16 feet deep by 2 feet wide, or as near as may be, and has recessed dressing stations and kitchens.

In conclusion, I deem it appropriate to dwell on the fact that the entire Marine Corps is primarily an infantry organization. In other words, in discussing the mission of the mobile forces in time

of war, I am discussing what may be the mission of the whole Marine Corps or of any part of it. I mention this because, in my opinion, the infantry of any military organization is not only the backbone of that organization, but possesses in a superlative degree, the very highest military qualities.

Discipline is the foundation of military success, and the only military organization which has possessed discipline in its highest form in the past, and I believe the only one which now so possesses it, is the infantry. Its mode of training has a tendency to produce discipline, while the mode of training of the artillery or of the auxiliary troops does not possess that tendency in anything like the same degree.

Let us not forget that we are, first of all, infantrymen, and have inherited the glorious traditions of that arm of the service. Modern infantry is the direct descendent of the Greek Phalanx with which Alexander swept victoriously over the whole of Asia, of the invincible Roman legions of Julius Caesar, and of the marvelous battalions of Napoleon Bonaparte which even after the terrible retreat from Moscow turned defiantly and held at bay the pursuing Russian masses while the remnants of the Grand Army crossed the Beresina River into comparative safety.