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TERMS USED  
IN  
DESCRIBING  
FORTIFICATIONS

by

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Sources: Farrow's Military Encyclopedia

Coggins' Arms & Equipment of the Civil War

## BANQUETTE

In fortifications, a device by which men are able to deliver their fire over the parapet. It is made just high enough above the terreplein to allow men of medium stature to fire over the interior crest. The distance of the tread below the crest is taken, for this purpose at four feet six inches; sometimes it is taken three inches less or four feet and a quarter. The width of the tread depends upon the number of ranks expected to occupy it. In the days of the smooth bores and muzzle loading muskets it was made wide enough for two ranks. A width of two feet is sufficient for one rank. It is usually made three feet wide in ordinary field fortifications. The tread is made with a slope to the rear, to allow the water falling on it to drain off. It is connected with the terreplein either by a slope or by steps. The inclination of the former is usually  $\frac{1}{2}$ ; it may be greater if the banquette is low. The ramp or inclined slope is preferred to steps.

The banquette is a step a earth within the parapet sufficiently high to enable the defenders, when standing upon it, to fire over the crest of the parapet with ease.

## BARBETTE

The barbette is a construction by means which a piece can fire over a parapet. It consists of a mound of earth thrown up against the interior slope; the upper surface of which is level, and 2'9" below the interior crest for guns of small caliber, and 4' for heavy guns. If the barbette is raised behind a face, its length should be sufficient to allow  $16\frac{1}{2}'$  to 18' along the interior crest for each gun; and its depth or the perpendicular distance from the foot of the interior slope to the rear should be 24', for the service of the guns. The earth of the barbette at the rear and the sides receives the natural slope. To ascend the barbette, a construction termed a ramp is made; this is an inclined plane of earth, which connects the top of the barbette with the terre-plein. The ramp is 10' wide at the top, and its slope is 6 base to 1 perpendicular. The earth at the sides receives the natural slope. The ramp should be at some convenient point in the rear, and take up as little room as possible.

As barbettes are usually placed in the salients, an arrangement is made for the guns to fire in the direction of the capital. A pan-coupee of eleven feet is first made; from the foot of the interior slope at the pan-coupee, a distance of 24' is set along the capital; at the extremity of this line a perpendicular is drawn to the capital and 5' are set off on this perpendicular on each side of the capital; from each of these points, on the perpendicular, a line is drawn perpendicular to each face respectively, the hexagonal figure thus laid out is the surface of the barbette for one gun. The ramp in this case is made along the capital.

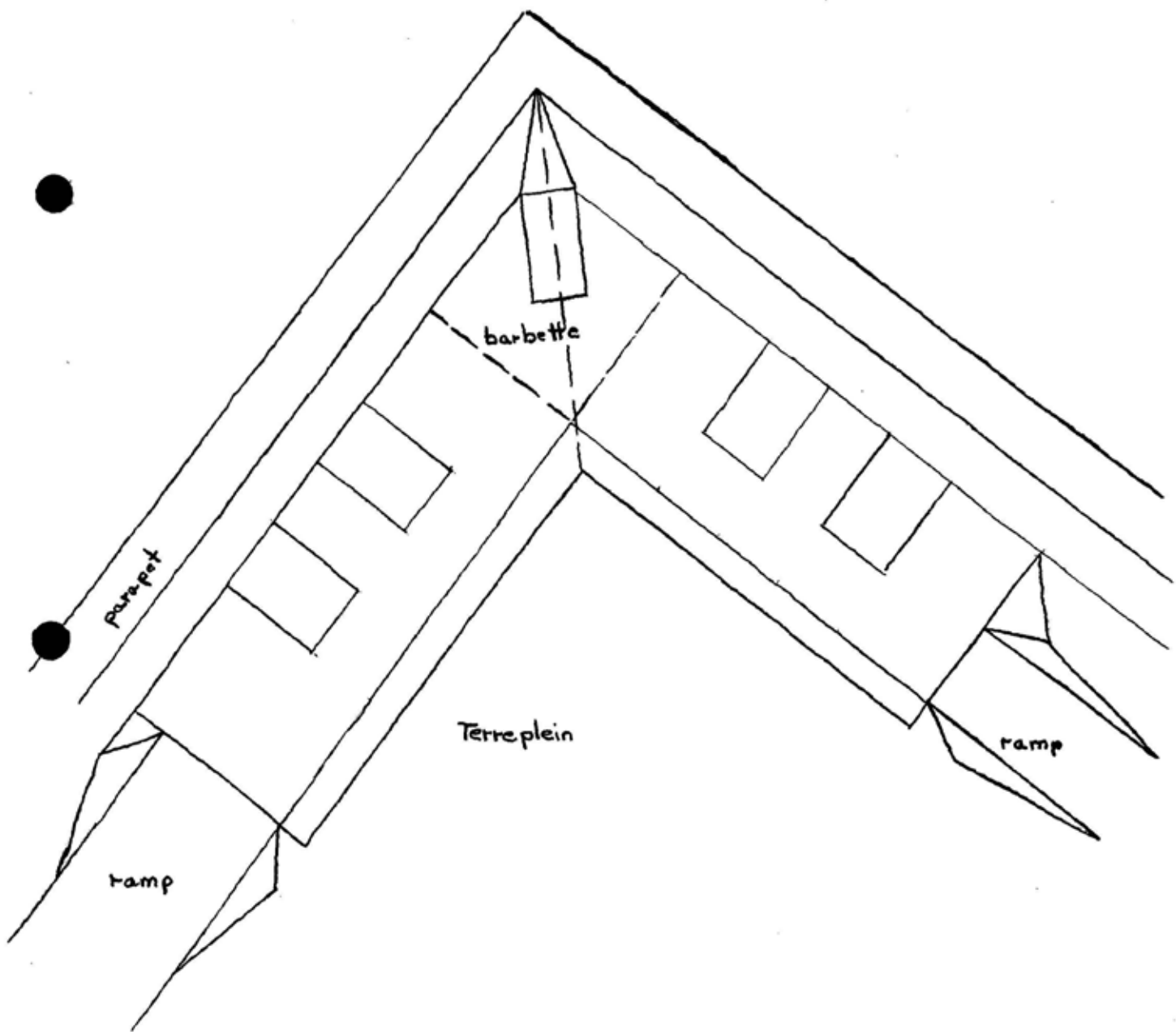
If 3 or more guns are placed in the salient, a pan-coupee is formed as in the last case; and 24' are in like manner set off on the

capital; but instead of proceeding as in the last case a perpendicular is drawn from this point to each face, as shown in the drawing, and the pentagonal space thus enclosed will be taken for the gun in the salient; from the perpendiculars last set off as many times  $16\frac{1}{2}$ ' will be set off on the interior crest of each face, as there are guns required: this will give the length of the barbette along each face; the depth will be made 24', and the two will be united in the salient. One or more ramps may be made as most convenient.

To give temporary cover to guns on a field of battle and enable them to command a wide field of fire, a parapet of just sufficient height to allow the guns to fire over it may be thrown up for the purpose, the earth being taken from the ditch in front. The ground may be roughly leveled off for enough to the rear for the maneuver of the guns. Between each gun a shallow trench may be dug parallel to the wheels, where the gunners can find shelter and when not serving the pieces.

The advantages of the barbette consist in the commanding position given to the guns, and in a very wide field of fire; on these accounts the salients are the best positions for them. Their defects are that they expose the guns and men to enemy fire. Light guns, particular howitzers, are the best for aiming barbettes, because the hollow projectile of the latter is very formidable both to the enemy's columns and to his cavalry, and when his batteries are opened against the salients, the light pieces can be readily withdrawn.

Thus; guns are said to be in barbette when they are elevated by raising the earth behind the parapet, or by placing them on a high carriage, so that, instead of firing through embrasures, they can be fired over the crest of the parapet. In this position, the guns have a wide range, instead of being limited, as in firing through embrasures. (See figure a)



A work consisting of 2 faces and 2 flanks, all the angles being salient. Two bastions are connected by means of a CURTAIN, which is screened by the angle made by the prolongation of the corresponding faces of 2 bastions, and flanked by the line of defense. Bastions contain, sheltered by their parapets, marksmen artillery, platforms, guards. They are protected by galleries of mines and by demi-lunes and lunettes outside the ditch, and by palisades, if the ditch is inundated. Bastions should be large, and contain five or six hundred infantry, with the necessary artillery. The bayoux of the besiegers are directed towards the CAPITAL of the bastion. The FACES of the bastion are the parts exposed to being enfiladed by ricochet batteries, and also to being battered in breach.

Bastion (Demi) -- is that which has only one face and one flank, cut off by the capital -- the extremities of horn and crown works are similar.

Bastion (Empty) When the mass of rampart and parapet follows the winding of the faces and flanks, leaving an interior space in the center of the bastion, on the level of the ground, it is called a hollow or empty bastion. In standing in a bastion, and looking towards the country, the face and flank on the right hand are called the right face and flank; and on the left hand, the left face and flank.

Bastion (Flat) When the demi-gorges and gorge are in the same line, and the former is half of the latter, the work is called a flat bastion.

Bastion (Fort) are the most perfect of closed field works,

with reference to flanking defenses, as each side or front consists of two faces, two flanks and a curtain.

Bastion (Full) When the interior space is filled up to the level of the terreplein of the rampart, the construction is called a full bastion.

## CASEMATE

Various modes have, from time to time, been proposed for arranging defensive casemates for the exterior defense of land fronts. The difficulty in covering the masonry from the batteries of the assailant has been the chief objection to these structures, and is the more prominent as the fire of artillery becomes more accurate, as such casemates would soon be ruined or rendered untenable by embrasure shots. The structure for this purpose which has been most applied within late years (1880's) is what is termed the HAXO casemate; the details having been first proposed by General Haxo, one of the first authorities of the French school of engineers. These casemates consist of a series of arched bombproof chambers closed in front by a thin mask wall which, except around the embrasures through it, is covered from the assailants artillery fire by the parapet. To present but a small surface of masonry to fire, the arches, which are horizontal and perpendicular to the mask wall for the greater portion of their length, descend toward the front, leaving where they join the mask wall just sufficient height within for service of the gun. To effect this anterior portion of the arch must be canoidal in shape. The piers of the arches are pierced with wide arched openings, which serve the double purpose of a communication between casemates and to give the gun a wider traverse for firing. Embrasures are peirced in the parapet in prolongation of those of the mask wall, and it is proposed to cover the small portion of the masonry necessarily exposed by this arrangement by placing several thicknesses as of heavy timber in front of it to receive the shot, or to case it with wrought iron. When the casemates serve simply for the cover of the cannon, the arches are covered with 4 to 6' thickness of earth, and are left open to the rear



for the more prompt escape of the smoke, and a ditch is sometimes made just in rear of the casemates to catch bombs and limit the effects of their explosion. When the arches are made longer than for the service of the guns alone, the earthen covering is sometimes arranged with a parapet to cover cannon in the barbette or for small arms.

In the casemated batteries for sea coast and harbor defenses, the scarp or mask walls of the chambers for the guns, being exposed to the fire of the ships alone, are not covered, as on land fronts, by an earthen mask; these walls being built of sufficient thickness and strength to withstand the fire of the heaviest guns within the range that ships can venture to attack, and being far less vulnerable than the wooden or iron sides of vessels thus far brought into general use. These batteries in our own and European works consist of a series of arched bombproofs chambers which serve for the service of the guns alone; or else they receive such dimensions that the portions of the chambers immediately in the rear of the mask wall are appropriated to the service of the battery and the rear portions are converted into quarters, store rooms, and other necessary purposes for the garrison. In the earlier sea-coast casemated defenses constructed in our service, the gun chambers have received dimensions to admit of two guns in each chamber. The chambers are usually formed of segmented brick arches of  $120^{\circ}$ , which rest upon stone piers built back perpendicular to the mask wall. When the casemates serve also as quarters for the garrison, the rear, towards the parade, is closed by a brick or stone parade wall, which forms the front wall of the quarters. A brick partition wall separates the quarters from the gun-gallery.

Arched recesses and flues are made in the piers for chimneys, and the parade wall, the sides of the pier, and the saffit of the arch are suitably

finished to give a dry and well-ventilated dwelling. In most of our earlier casemated work there is but one tier of casemated guns, this tier being surmounted by a barbette battery covered either by an earthen or stone parapet on the water fronts. Casemated adapted to two guns in each room present a more vulnerable work in the portion of the mask wall between the piers, expose more men to danger from embrasure shots; present a greater opening in the rear to the assailant's fire when not closed by a parade-wall; offer less resistance to the shock of shells; and are more difficult to construct without settling than rooms for single guns. These advantages in favor of casemates for single guns are the marked where, for the purpose of obtaining a heavy fire in some fixed position or direction, it's desirable to resort to a castellated structure consisting of several tiers of casemates.

In other words, a casemate is a vaulted chamber with embrasures for guns. It is necessary that they should be bombproof and distributed along the faces and flanks of the bastion, to serve as quarters and hospitals to the garrison in war; but such subterranean barrack are for the most part quite undesirable as places to effect residence.

## COUNTER-SCARP

The side of the ditch opposite to the parapet. The slopes of the scarp and counter scarp will depend on the nature of the soil, and the action on it of frost and rain. The scarp is less steep than the counter-scarp, because it has to sustain the weight of the parapet. It is usual to give the slope of the scarp a base equal to  $\frac{2}{3}$ 's of the base of the natural slope of a mound of fresh earth whose altitude is equal to the depth of the ditch; the base of the counter-scarp-slope is made to equal  $\frac{1}{2}$  the same base.

To determine the exact dimensions of the ditch for a given parapet requires a mathematical calculation. On the field a result may be obtained approximately sufficiently near the truth for practice by assuming the depth of the ditch and dividing the surface of the profile of the parapet by it to obtain the width. In excavating the ditch it will be found that more earth will be furnished at the salients than is required there for the parapet; that the reenterings will not always furnish enough. On this account the width of the ditch should not be uniform, but narrower at the salients than at the reenterings.

The counter-scarp is the outer boundary of the ditch---revetted with masonry in permanent fortification to make the ditch as steep as possible.

## COUPURES

Coupures are short retrenchments made across the face of any work having a terre-plein. The ditch of the coupure is carried quite across the terre-plein, and through the parapet of the work in which it is formed, but not through the revetment.

## CROTCHETS

Crotchets are openings cut into the glacis at the heads of traverses, to enable the defenders to circulate round them. These passages are closed by a gate when necessary.

## CURTAIN

The curtain is that part of the rampart of the body of the place, which lies between the two bastions, and which joins their two flanks together.

## DEMI-LUNE

The object of this work is to secure the gates of the place from a surprise; to mask from the enemy's batteries the flanks and curtain of the enceinte; to give crossfires on the salients of the bastions; and to favor sorties. The fire from the demi-lune is very effective on the enemy's works along the bastion's capitals. Finally it is a work of which the enemy can only obtain possession after great labor and loss of time; and when carried, it is with great difficulty that he can render it tenable, as it is exposed to the fire of the enceinte, within a short range. Engineers since Cormontaigne, finding that the demi-lune still admitted of being enlarged with advantage, have accordingly so determined its dimensions that it may be thrown so far to the front as will still place the breach which an enemy may make in its face within the range of the musketry of the bastion-face. In large fronts, like Noizet's the demi-lune may be thus made to cover about 30 yards of the bastion faces from the shoulder angle, and thus secure retrenchments resting against this part from being turned by a breach made near the shoulder angle. These considerations limit the salient angle of the demi-lune to  $60^{\circ}$  degrees, and place the salient at not more than 210 yards from the bastion face, as this distance will bring the breach at about 180 yards from this face, or within effective range of musketry. The demi-lune thus arranged places the bastions, in all cases, in strong reenterings; but when the angles of the polygon are very obtuse, the faces of the bastions prolonged also fall within the salients of the demi-lunes, and are therefore not easily enfiladed. The demi-lune, with numerous advantages, is not without defects. Its faces, from their position, are exposed to an enfilading fire; it deprives the curtain of all action on the exterior ground; and it is only when the

angles of the bastion are very open that the reenterings formed by the demi-lunes became of a formidable character. The glacis of the demi-lune covered way forms a ridge, which is serviceable to the enemy by masking his works on one side of the ridge from the fire of the collateral works on the other. Various devices have been proposed by engineers to remedy this defect of exposure to enfilading fire. Some have proposed raising a very high bonnet at the salient, to act as a traverse and limit the effect of a plunging enfilade. Others have proposed a curved pan-coupee in the salient, of sufficient size to mount several guns to fire in the direction of the capital. Others suggest breaking the faces into several crochets, like the covered way, and with like purpose. Others proposed to draw the salient of the parapet so far inwards that the faces prolonged will fall without the limits of the assailants enfilading positions/. Others propose to occupy the salient with a high casemated traverse, to cover from enfilade and to give a strong fire from the casemates on the assailant's approaches in advance of the salients of the adjacent works.

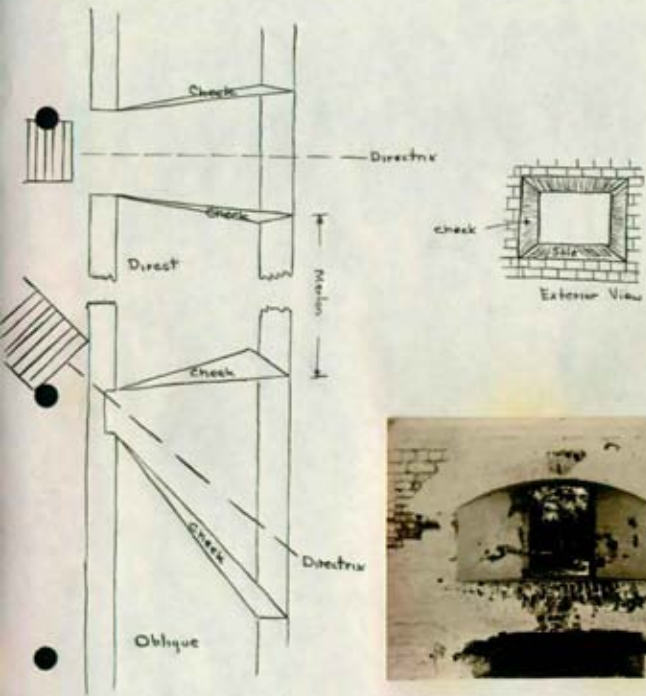


## EMBRASURE

The embrasure is an opening made in the parapet for a gun to fire through. The bottom of the embrasure, termed the *SOLE*, is 2'9", or from 4' to 6' above the ground, on which the wheels of the carriage rest, according to the size of the gun and the kind of carriage. It usually slopes outward to allow the gun to be fired at a depression. The base of this slope should never be less than 6 times the altitude. In most cases it may be horizontal, or even a slight slope to the rear. The interior opening, termed the *mouth*, is from 18" to 36" wide according to the caliber of the gun, and is of rectangular or trapezoidal form. The line which bisects the sole in the direction of the line of fire is called the *DIRECTRIX*. The sides of the embrasure are termed the *CHEEKS*; these widen out towards the exterior, which widening is termed the *SPLAY*, the inclination upon each side from the directrix being one upon ten. They furthermore have an inclination outwards from the vertical; this inclination, at the line of the exterior crest, is three upon one. When the directrix is perpendicular to the interior crest, the embrasure is termed *DIRECT*; when oblique, the embrasure is termed *OBLIQUE*.

Another definition may be stated as an embrasure is an opening cut through the parapet to enable the artillery to command a certain extent of the surrounding country. The space between every two of these openings is called the *MERLON*, is from 15' to 18' in length. The opening of the embrasure at the interior is 2', while towards the country is usually made equal to  $\frac{1}{2}$  the thickness of the parapet. The interior elevation of the parapet, which remains after cutting the embrasure is called the *GENOUILLERE*, and covers the lower part of the gun carriage. The *PLONGEE*, or slope given to the sole, is generally less than the inclination given to the superior slope of the parapet, in order that the fire from the

embrasure may meet that of the masonry from the parapet at a point within a few feet from the top of the counter-scarp.



In order that the part of the embrasure which is next to the muzzle of the gun may be nearly of the same width in both the direct and oblique embrasures, the mouth of the latter is wider in proportion to the obliquity. Embrasures are revetted with the same material and in the same manner as the interior slope.

The advantages of embrasures is that the men and guns are less exposed than in a barbette battery. Their principle defects are: they have a very limited field of fire; they weaken the parapet, and present openings through which the enemy may penetrate in an assault. Owing to thier limited field of fire, they are generally used for the protection of particular points, as to flank a ditch, protect a salient, enfilade a road, etc. The most suitable position for them in a work is on the flanks.

The best mode of arranging the elements of a defense requires that the work should be so planned that every point exterior to the defenses within cannon range should be thoroughly swept by their fire. Owing to the form and height of the parapet, its fire can take effect only at some distance beyond it. The enemy having reached the ditch will not be exposed to fire unless some arrangement has been made to sweep the ditch. Any place where he can find shelter, where the missiles of the defense pass so high above him as to inflict no injury, is called a DEAD-ANGLE or DEAD-SPACE. To remove this defect, the main work may be so arranged as to sweep by its fire every point exterior to it, or auxilliary works termed caponiers, scarp and counter-scarp galleries, etc. may be used. In the former case parts of the work must be thrown forward towards the enemy and other portions retired. These advanced parts are called FACES; the retired parts FLANKS; and the parts connecting the flanks, CURTAINS. The outline of such a plan must be angular. The angular points toward the enemy are called SALIENTS. The angle formed by two retired points, a REENTERING ANGLE. The line bisecting a salient angle is called the CAPITAL. In firing over a parapet, a soldier usually aims directly to the front, so that the line of fire and the parapet make nearly a right angle with each other. There is then an angular space in front of the salient (equal to the supplement of the salient angle) which receives no protection by direct fire from it. This space is termed a SECTOR WITHOUT FIRE. The continuous line of fortification inclosing a position is called the enceinte, the BODY OF THE PLACE or the MAIN INCLOSURE. The general outline of the enceinte may be CURVILINEAR, or POLYGONAL FIGURE of any character. Whatever system may be adopted for the enceinte, there are some con-

ditions which it must satisfy to render it effective:

1: It should have a steep revetted scarp; unbroken on all sides except for the necessary openings for communications, thoroughly flanked throughout by cannon and small-arms; and of sufficient height to prevent all ordinary attempts at escalade.

2: The scarp should be so covered by earthen or other masks that it cannot be reached by the projectiles of an assailant from any position exterior to these masks.

3: The parapet and interior covered shelters should be proof against solid and hollow loaded projectiles.

4: The parapet should command all the site and outworks exterior to the enceinte and within range of its guns, and sweep them with flank and cross fires.

5: As far as practicable, the principle lines of the parapet should receive such directions that the assailant cannot take up positions to enfilade them. If the position thus inclosed be an inhabited one, as a city, town, etc., or an important point that requires the presence of other persons than those necessary for its defence, it receives the name of FORTRESS or FORTIFIED PLACE. If it is to receive no other inhabitants but the troops for its defence, it is called a FORT; and the defenders are termed the GARRISON.

## EXTERIOR SLOPE

The exterior slope is a slope given to the outside of the parapet. It is found by experience that earth of common quality will naturally acquire a slope of  $45^{\circ}$ , even when battered by cannon. This inclination is therefore given to the slope.

## FOSSE

In fortifications, the ditch or moat either with or without water, the excavation of which has contributed material for the walls of the fort it is designed to protect. The fosse is immediately without the wall, and offers a serious obstacle to ~~escalading~~ the defenses.

GENOUILLERE

From the French GENOU, knee. It is that part of the parapet of a battery which remains above the platform and under the gun, after the opening of the embrasure.



In fortifications, the slope of earth, commonly turfed, which inclines from the covered way towards the country. Its object is to bring assailants, as they approach, into a conspicuous line of fire from the parapet of the fortress, and also to mask the general works of the place.

In the fortifications like Naizet's, one principle is chiefly to be attended to in dispersing the different planes of the glacis. They should all be swept by the artillery fire of the works immediately in their rear, and by musketry fire at least of the bastion-face. The glacis of the reentering place of arms should be swept by the fire from its redoubt. The glacis of the demi-lune offers more difficulty in its arrangement, owing to the cremaillere form of the interior crests. The best method seems the following:

Planes are passed through each long branch, so as to be swept by the artillery fire of a portion of the face of the demi-lune; these are connected by another series of planes, which are passed through the salient point of each crochet, and below the plane of musketry fire of at least  $\frac{1}{2}$  of the bastion face, and that of artillery fire of a part of the demi-lune face. It will be readily seen, from the nature of this problem, that it admits of many solutions. In selecting amongst them, the following considerations may serve as guides:

1: When the planes of the glacis have a very gentle slope, they are better seen by the works in the rear, but the construction is more expensive, on account of the greater quantity of embankment.

2: When the slope is more steep, the enemy's works on the glacis are better exposed to the reverse views of the collateral works, although not so well seen by those directly in rear of the glacis; but the quantity of embankment is smaller.

In fortification, the opening on that side of the work corresponding to the body of the place, or the sides whence comes the defense. In isolated works the gorge is sometimes intrenched. The gorges of works not attached to a fortress, but which are its dependencies, are in general, open, or without parapets, in order that the enemy may not cover himself from the fire of the place if he should seize such detached works. If the works are liable to surprise, and the gorges cannot be shut, a row of palisades are planted there and mines are prepared so as to overthrow the enemy if he should seize the work and attempt to construct a lodgement there. The gorge of a bastion is usually open space between the extremities of the flanks of the bastion. The larger this gorgéois, the better is the defense; for when the ruined bastion is about to fall by siege into the hands of the enemy, the defenders can construct defensive works or dig small ditches in the gorge of the abandoned bastion. Such resistance sometimes drives the besiegers to the necessity of battering in breach the curtain.

A stockade is the best inclosure for the gorge of a work. The outline or plan of the gorge should be a small bastion front, or tenaille, for the purpose of obtaining a flank defense. The trunks for the stockaded should be 10" to 12" in diameter and 11' in length. It will be best to square them on two sides, so that they may have about 4" of surface in contact. The top of the stockade should be at least 8' above the ground. To arrange for a defense, a banquette is thrown up against it on the interior; the height of the banquette 1'9". A strip about 2' in length should be cut from the top of 2 adjacent trunks with a saw, so that when they are placed side by side there shall be an opening at top, between them, 8" wide on the interior and  $2\frac{1}{2}$ " in the exterior; this opening, through which the muzzle of the musket is run out in firing, is

termed a LOOP HOLE. The distance between loop holes should be 3'. In this arrangement the bottom of the loopholes will be 6' above the ground on the exterior, to prevent the enemy from closing on them to stop them up or use them in the attack. About 4' in front of the stockade a ditch is made, 12' wide and 3' deep. The earth from the ditch is thrown up against the stockade, in a slope, to the level of the bottom of the loop-hole; the enemy prevented from attempting to cut down the stockade by this soil.

The gorge of a fortification or gorge of a work is the opening on that side of the work corresponding to the body of the place, or the side whence comes the defense. In isolated works the gorge is sometimes intrenched.

## RAMPART

A structure forming the substratum of every permanent fortification. It constitutes the enceinte, and is constructed immediately within the main ditch by throwing up the soil excavated from it. On the front of the rampart the parapet is raised, and width should be left behind it to allow of guns, wagons, and troops passing freely on the top of the rampart. The height of the rampart is dependent on the relief (height) of the buildings to be defended, and on the positions in the neighborhood which an enemy might assume.

## RAVELIN

In fortification, a triangular work of less elevation than the main defenses, situated with its salient angle to the front before the curtain, which with the shoulders of the adjoining bastions it serves to protect. It is open at the rear, so as to be commanded by the curtain, if taken, and is separated from the work by the main ditch while in its own front the ditch of the ravelin intervenes between itself and the covered way. The guns of the ravelin sweep the glacis and perform a very important function in commanding the space immediately before the salient angles of the two next bastions, ground which the guns of the bastions themselves cannot cover. The bastions, on the other hand, flank the ravelin. The original name of the ravelin was RIVELLINO, which indicates a derivation from VEGLIARE, to watch, the ravelin having probably been at first a watch-tower.

## REVETMENT

The interior slopes of the parapets of permanent and field works, as well as in some cases the sides of the ditches of the latter, require revetments to enable them to stand at that slope which is necessary, and to endure the action of the weather. The materials made use of in the construction of field revetments are: fascines, gabions, hurdles, sod, sand-bags, and timber. In siege operations, and in fact in all operations in active warfare vast quantities of these materials are required, and are daily consumed, in the construction of the breastworks, parapets, batteries, magazines, and a variety of miscellaneous purposes. Large quantities then, must be prepared or manufactured by the ordinary troops of the line, superintended by their own officers, who should be acquainted with all the details necessary for their production.

In permanent fortifications, the revetments are retaining walls of masonry built for the purpose of holding back the earth of which the works are composed. The most ordinary position of such revetments is for the escarp and the counterscarp of the ditch. The more important of those two is the escarp, which has to hold back the great mass of earth represented by the rampart, parapet, banquette, etc. It is usually of solid brick work or stone, 5 feet thick at the top, and sloping outward as it descends (on the ditch side only) to the extent of 1 to 6. Prior to Vauban's time, the escarp revetment was commonly raised to the top of the parapet: but as in the case the artillery of a besieger played on the top of the wall, and ruined it soon after the siege commenced, that engineer adopted the principle ---thence fourth followed--- of raising it no higher than the crest of the glacis, or about 7 feet above the natural ground,

leaving the parapet above the/of sloped earth only. When the main ditch is 24 feet deep, the scarp revetment will be about 30 feet high. Additional strength is imported to the revetment wall by massive buttresses of every 15 feet called COUNTERFORTS, and these again, are sometimes connected and strengthened by masonry arches outside the revetment. The revetment forms a terrible barrier to an assaulting party.

## SALLY-PORT

A gate or passage by which the garrison of a fortress may make a sally or sudden attack on the besiegers. The name is applied to the postern leading from under the rampart into the ditch; but its more modern application is to a cutting through the glacis, by which a sally may be made from the covered-way. When not employed sally-ports are closed by massive gates of timber and iron/.



## SCARP

The side of the ditch adjacent to the parapet. When the ditch of a fortress is dry, the scarp is usually faced with mason-work, to render it difficult of ascent; and behind this facing there are often passages or casemates for a defense. In temporary fortifications, the revetment is sometimes of wood, while in field works, palisades at the foot, or fraises on the berme or edge of the ditch are held sufficient. The scarp is always made at as large an angle as the nature of the soil will allow; the design being to offer the greatest possible obstacle to an assailant.

## TERRE-PLEIN

In fortification the flat surface of the rampart, on the front portion of which the parapet and banquette are formed, and of which the rear slopes down to the general level of the inclosure.

The word terre-plein is used to designate the surface on which the men stand in readiness to defend the parapet, and at the same time are screened from the enemy's view. The terre-plein may be the natural surface of the ground, it may be above the surface, or it may be below it, as the bottom of a trench. In ordinary field fortifications the terre-plein is the natural surface of the ground, the latter is termed the parade.