get under the gallery of the besieged, in order to prevent the mischief they may do by their great number of mines.

In the neighbourhood of ſome places there are a sort of ſmall half-moons, called *redoubts.* When they are distant from the place, the enemy cannot maintain themſelves there without exposing their troops to be taken priſoners of war; but when they are covered and defended as they ought to be, and judiciouſly situated, they are an object worth at­tention. Endeavours ought to be uſed to cut off the com­munication between them and the place, and to oblige the enemy to abandon them by throwing in ſhells ; it may even be proper to assault them and drive them out ſword in hand, provided they are not ſo near the place as to receive power­ful ſuccours, and be able to withstand the attack. It is a matter of conſequence to get rid of theſe ſmall outworks as ſoon as poſſible, becauſe they may be of great hinderance to the progreſs of the attacks, by having a view of the trenches from the flanks, and enfilading them, &c.

In ſome fieses, when the garriſon are obstinate in their defence, ſmall outworks are made at the foot of the ſaliant and re-entering angles of the glacis ; theſe consist only of a parapet raised at the foot of the glacis upon theſe angles, each side of which has about 10 or 12 fathoms. Theſe ſmall works are called *arrows.* They may be ſeen in A, A, A, Plate DXXXVI. fig. 2. They communicate with the covert way by a passage pierced on the ridge of the glacis, and palliſaded on both sides. At the entrance of this passage is constructed a traverse B, generally called the *tambour,* which hinders the besiegers from being masters of the arrow, or diſcovering the inside of the place of arms be­longing to the covert way.

To prevent the effect of theſe arrows, the best method is to ply them well with ricochet batteries, and with ſhells thrown in alſo a *ricochet.* Stone mortars may likewiſe be made uſe of, to annoy the enemy in their arrows ; for as theſe works are but ſmall, the stone mortars produce a very good effect. We have already taken notice of almost all the works the besiegers may meet with beyond the covert way ; there remains, therefore, only to see the manner of conducting the attacks of the other outworks most commonly uſed in fortified towns.

**18.** *Attach of a Horn-work.*

*A* HORN-work is nothing more than the front of a forti­fication, which projects into the field, and is joined to the place by two long sides. It is placed oppoſite to the cur­tains, and ſometimes alſo to the bastions. The besiegers ſhould endeavour, as much as poſſible, to avoid attacking the side covered by theſe works, becauſe they are very dif­ficult to take, and of courſe will greatly lengthen out the siege. But supposing there is an abſolute necessity for at­tacking the place on the side covered by a horn-work oppo­ſite the bastion, and that this horn work has an half-moon oppoſite to its curtain : The trenches and parallels are to be made in the uſual manner ; the same method is to be uſed in regard to the ricochet batteries, which will alſo enfilade the branches of the horn-work. The taking of the covert­way of the half-moon, and of the half bastions of the horn­work, is carried on in the same manner as the attack of the half-moon, and the two bastions of the body of the place. There remains, therefore, only to ſhow how the lodgments are to be made in this work. We will ſuppoſe that there are two retrenchments withinside, as in Plate DXXXV. fig. 5.

When the lodgments towards the point of the half ba­stions are finiſhed, ſome guns are to be planted there, in or­der to batter the face of the oppoſite bastion ; and they are to be placed over-against the lodgments of the flanked angles of the half bastions. Theſe lodgments are to be extended on both sides towards the curtain, along which saps are carried on ; as alſo towards the orillon of the half bastions, if they are made with orillons: this will form a kind of ſmall parallel, the fire of which will help to cover the lodgments in front, in case the enemy ſhould make any ſallies to destroy them. In large fortifications, ſuch as horn and crown works, the lodge­ments ought to be carried on with the greatest circumſpection, in order to be able to ſupport them against every attack of the enemy.

As all theſe lodgments are commanded by the bastion, it will be requisite to dig the saps ſufficiently deep, ſo as to be ſecure against their fire ; and likewiſe to make traverſes near enough to each other for the same effect.

If the bastion can be battered in breach from the rampart of the half bastions of the horn-work, the besiegers will for this purpoſe make uſe of batteries erected on theſe half-ba­stions ; and for the same end they will alſo plant a battery of six or eight guns towards the middle of the curtain.— Should it be impossible to sink ſufficiently into theſe, ſo are to batter the lower part of the revetement of the bastion,still they might be uſefully employed in playing against the enemy’s defences, and driving them out of their retrenchments. When the lodgments are well ſecured withinside,it will be extremely difficult for the enemy to continue in the retrenchments, without running the risk of being made priſoners of war ; becauſe the communication between them and the place will become too difficult. They might in­deed, by means of a bridge level with the water, retire into the collateral half-moons : but at the same time that the be­siegers endeavour to make themſelves masters of the horn­work, they will alſo strive to get possession of theſe half­moons ; the taking of which must inevitably follow that of this work.

As ſoon as the enemy are entirely driven out of the horn-work, the besiegers must posseſs themſelves of it by carrying on lodgments which ſhall occupy its whole ex­tent; and if there be any occasion to erect batteries within, in order to batter the bastion in breach, they are to be erec­ted along its counterſcarp, as may be ſeen in z *(ibid).*

Sometimes it ſhall happen, that the ground of the inside of the horn-work will not permit lodgments to be extended there, as they are ranged in this figure, becauſe it may be too wet and marſhy, or else of too narrow a circumference. In that case there is no carrying on the lodgments but along the parapet of the front of this work, and along its branches, if the breadth of the platform of the rampart of theſe branches will permit. It must be made to defile by fre­quent zig-zags or turnings ; but if it be too narrow, the only way for the besiegers is to sink very deep, in order to defile from the fire of the place, and to cover themſelves by traverſes made very near one another.

Explanation of Plate DXXXV. fig. 5.

*a,* Cavaliers of the trenches, *b,* Batteries of stone mor­tars. *c,* Batteries to breach the half-moon before the horn­work. *d,* Batteries against the defence of this half-moon. *e,* Passages over the ditch before this half moon. *f,* Lodge­ments in it, *g,* Batteries against the flanks of the horn­work. *h,* Batteries to breach the half bastions of the horn­work. *i,* Batteries against its curtain. l, Lodgments in the half bastions and in the horn-work, *m,* Passages over the ditch before the retrenchments in the horn-work. n, Lodgments in theſe retrenchments. o, Batteries aginst the defences of the collateral half-moons. p, Batteries to breach theſe half-moons. *q,* Passages over the ditch before theſe works. r, Lodgments in the same. s, Batteries to breach the reduits of the half-moons. *t,* Passages over the