of the first sapper. The third sapper widens the ditch of the two first likewiſe half a foot, and he deepens it in the same proportion.

At length the fourth enlarges it alſo in the same propor­tion, in breadth and depth ; and then the trench is three feet wide, and the same in depth, which is as much as it ought to be. The earth dug up on this occasion is sufficient, not only to fill the gabions placed by the sappers, but likewiſe to make a parapet of the rest, which is thrown up, and is strong enough to resist musket ſhot. The third and fourth sapper lay the faſcines over the gabions, with their hooks, or otherwiſe ; then they press them down, ſo that the stakes of the gabions ſhall keep them firm. As the sappers are ranged by brigades of eight each, while the first four are working at the sap, in the manner above described, the other four furniſh them with gabions, faſcines, and whatever other things they want. But when the first four are tired, the four last take their places, and work in the same manner ; after which they are relieved by the first, and ſo alternately, till each has performed his part at the head of the sap.

When the first gabions are placed, and the sap is not as yet perfected, the part in which the gabions touch one ano­ther being leſs sold than the rest, their joints are filled up by ſand-bags, which are taken away when the work is com­pleted, or thoſe interstices are filled up with ſmall faſcines called *ſap-faggots.*

This is the nature of the sap ; a work ſo much the more considerable, as it is performed by day as well as night. Several laps are carried on at the same time ; and there is one to both sides of each of the attacks for the second and third parallel. There are likewiſe saps to each of the ad­vanced parts, and to the half-places of arms or parallels.

We have suppoſed that the first sapper covered himſelf with a mantlet ; this was the custom formerly, and an excel­lent custom ; but now it is more uſual to have a stuffed ga­bion. He rolls this gabion before him, and uſes it in the same manner as he would the mantlet. Though care be taken to give a stuffed gabion to the directors of the saps, yet it happens sometimes that the ſappers will not make use of them : for as the weight of this gabion renders it ſome- times troublesome to roll, they chooſe to do without it; and are satisfied with rolling several gabions before them, near one another, and with working behind them. Theſe ga­bions are indeed of little defence, but are ſufficient to con­ceal them from the enemy, who cannot tell the gabion be­hind which the first sapper is. But as the preſervation of theſe men is of great importance, they ought to be obliged to work behind the stuffed gabion : for the same reaſon, the first sappers ſhould have a cuirass, and even a head-piece, musket-proof.

There are three sorts of sap ; the simple, viz. that which we have been deſcribing, the double, and the flying sap.

I. The simple sap, or the sap without any other appella­tion, is made on one side, or, which is the same thing, has only one parapet. 2. The double sap has a parapet on each side, and is carried on wherever its two sides are seen from the place. 3. The flying sap is that in which they do not give themſelves the trouble of filling the gabions with earth ; it is made where the workmen are not much expoſed, and in order to accelerate the approaches.

As soon as the men have brought the sap to its proper perfection, the pioneers are ordered forward, and theſe make it of the same width as the other parts of the trenches; upon which it changes its name of Tap to that of trench. It is called *trench,* if it serves as a way to the town; and a place of arms, if it be parallel to it, and designed to lodge troops. See Plate DXXXI. fig. 7, 8. DΧΧΧIΙ. fig. r. 2. See alſo the upper compartment of Plate DXXVIII. for figures of the different instruments uſed in this and other operations of a siege.

9. Of *Batteries.*

Cannon is made use of at a siege for two different purpoſes ; the first to drive away the enemy from their defences, and the second to diſmount their guns.

To produce theſe two effects, the batteries ſhould not be above the mean reach of cannon shot from the place ; that is, above 300 fathoms. Therefore there is no possibility of constructing them till the first parallel is formed; and as the distance of this first parallel from the place is generally 300 fathoms, the batteries must be on this line, or beyond it, nearer the town. They must always be placed, when the ground will permit, on the produced faces of the works at­tacked, as we have mentioned in the maxims of attack.

Let Z be the centre of the place attacked, and the trenches, as well as the parallels, completed. To find a proper position for erecting batteries, produce the faces AD, AC, BE, BF of the two bastions attacked, till their prolongation cuts the first parallel. Produce alſo the two faces OM and OL of the hair moon MOL of the front at­tacked, and the faces HG and IK of the two collateral half-moons 1 and 2, to the first parallel, and erect batteries on these produced faces, as you see in P, Q, R, S, T, U, X, and Y.

They are advanced beyond the first parallel 40 or 50 fa­thoms ; and are parted from the trenches, to the end that they may be uſed with greater eaſe and convenience, and leſs trouble to the workmen.

10. *Of Sallies.*

That we might not interrupt the making of the trench­es, we conducted them to the foot of the glacis, without taking notice of sallies ; that is, attacks which the gsrriſon may make againſt the trenches, with a view of ruining or retarding the works. As it is not to be preſumed that the enemy will ſuffer themſelves to be straitened in the town without using ſome endeavours to prolong the siege, and as sallies seem to be one of the principal means they can em­ploy, it is proper to point out the conduit to be oblerved, not only for preventing their effects, but likewiſe for render­ing them diſadvantageous to the enemy.

Sallies can be attended with no ſucceſs, unleſs they are made at a time when unexpected. When the workmen are ſuddenly fallen upon, they are scattered, and obliged to fly; which must occasion confusion and disorder among the troops that are to support them ; and it requires some time before they can be brought again to order, and made to charge the enemy. In the meanwhile the latter avail themſelves of the opportunity to fill up the trenches, and to do all the miſchief poſſible : but when the troops are upon their guard against every design of the enemy, if the latter stir out of the place, they are ſuffered to advance; and care is taken to cut off their retreat, by means of the cavalry and the picquet, in case they ſhould advance too far into the field : otherwiſe they are fired at from the places of arms, and other works within reach ; and then they are briſkly at­tacked by the grenadiers and the troops upon duty in the trenches. Care, however, must be taken not to purſue them too far, for fear of the fire of the place, which never fails to be extremely sharp when the enemy have got back to the covert-way.

In proportion as the works advance towards the town, sallies become more dangerous to the besiegers, because the enemy may fall upon the trenches more readily ; for which