Draw EG parallel to AB, three feet from F to G, and the line FG will be the breadth of the banquette. On the point G raiſe the perpendicular GH, upon the line FG, four feet and a half. Draw from the point H, HK, paral­lel to AB. Make HK ſeven feet and a half, HI a foot and a half, draw GI, which will be the inside of the parapet of circumvallation.

From the point K, let fall on the line AB the perpen­dicular KM; take KL a foot and a half, and draw IL, which will be the upper part of the parapet of the line of circumvallation. Take MN five feet, and from the point N draw the perpendicular NO, and set off ſeven feet and a half from N to O. Draw OR parallel to AB, making the distance three fathoms or 18 feet from O to R; draw the line LN and produce it to P, and LP will be the ſcarp, or the outside of the parapet of the line of circumvallation. From the point R raiſe RS, perpendicular to OR, or paral­lel to ON. Make QR equal to OP, and draw QS, which produce beyond S three feet to V ; then take SX six feet, and draw VX, and the profile of the circumvallation will be completed.

This kind of glacis, VX, will ſerve to raiſe the enemy, and to expoſe them more to the fire of the line, ſhould they attempt to make themselves masters of it, and to cover the parapet of the circumvallation, in the same manner almost as the glacis of a place covers the top of the rampart.

The dimensions above given may vary a little without in­convenience ; but it would be to no manner of uſe to make the lines ſtronger ; only you may reduce the ditch to ten or twelve feet in breadth at the top, and five or six feet in depth. A ditch of leſs breadth and depth, besides its not allowing ground enough to form a good parapet, would have the inconvenience of being too eaſy to paſs over by the enemy. The lines may be fraiſed (see Fraise) ; which is done when they are to last for ſome time, and the neigh­bouring country furniſhes wood enough for the purpoſe.

Sometimes a fore-ditch is dug before the lines, 12 or 15 feet in breadth at the top, and six or ſeven feet deep ; it is made about 12 or 15 fathoms from the ditch of the line. The design of it is to stop the enemy when they attempt to attack the lines, and to make them loſe both time and men in passing over it. As it is expoſed to the fire of the lines, the time the enemy must necessarily ſpend in crossing will of courſe occasion their losing a great many men ; and besides, the passage itſelf may throw them into ſuch disorder, as ſhall prevent their attacking ſo advantageouſly as they would otherwiſe do, were it not for this obstruction. Between this fore ditch and the ditch of circumvallation, at the siege of Fhilipſburg, in order to strengthen the defence of the cir­cumvallation, there were likewiſe dug wells, which were ran­ged chequerwiſe, of about nine feet diameter at the mouth, and six or ſeven feet deep. They were situated near to each other, to prevent the enemy from passing easily through the intervening ſpaces. The Spaniards practised ſomething of this kind at the siege of Arras in 1654. Before the circumvallation, they dug a number of holes two feet diame­ter, and a foot and a half deep ; in which they fastened stakes that were capable of greatly obstructing the passage of the cavalry. See Plate DXXIX.

A line of circumvallation requires a ſtrong army to de­fend it. We have found the circumference of the line which we have been now tracing, namely, of 94 sides, each of 120 fathoms, to be 11,280 fathoms ; out of this number the gorges of the redans are to be deducted, but then their faces are to be added. The gorges have 30 fathoms ; and the two faces which have 50, give an overplus of 20 fa­thoms on each redan ; that is, to the number above men­tioned of 11,280 fathoms, add as many times 20 as there are redans, in order to have the entire circumference of the circumvallation. This circumference has 95 redans ; there­fore we must add 94 times 20, or 1880, which will make 13,160 fathoms for the whole circumference. This num­ber being divided by 2282 (which is the number of fathoms contained in a French league) gives about five leagues and a half. Now it is clear, that ſo great an extent of ground requires a very numerous army to guard it. We may make a calculation pretty near, by ſupposing that every ſoldier drawn up in a line occupies a ſpace of three feet, that is, half a fathom ; that the ſoldiers are four deep ; and that the army is drawn up in two lines, which will give eight ranks of ſoldiers. Each rank containing 26,320 ſoldiers, the circumference of the circumvallation being 13,160 fa­thoms, the eight ranks will therefore make 210,560 men.

To these we ſhould likewiſe add about 12,000 or 15,000 men for the works of the attack, which would form an army of about 225,000 men. And as it is not customary, at least in Europe, to send ſuch ſtrong armies into the field, from thence it follows, that the circumvallations, and the lines in general, when they are of a very great extent, are extreme­ly difficult to guard. And indeed the most celebrated ge­nerals have been divided in their opinions upon this ſubject. They all agree that there are certain cases in which they may be of ſome advantage, eſpecially when they are of a narrower compaſs, and the design of them is to stop up the entrance of a country of a ſmall extent ; but if they are very large, it is extremely difficult to defend them when attacked by a ſkilful enemy.

It was heretofore the cuſtom to add great outworks to the lines, ſuch as horn and crown works, tenailles, &c. All the circumvallations of the towns that were besieged during the wars between Spain and Holland, under the princes of Orange, were remarkable for this sort of works. Theſe have been since laid aside, becauſe we find that even a line, with its simple redans, is very difficult to guard ; and ſuch a number of outworks does but increaſe its circumference. The modern lines have only a few small half-moons A, be­fore the gates of the circumvallation, placed, like thoſe of the towns, against the middle of the curtains ; the entrance is ſhut up by wooden barriers, and ſometimes by chevaux- de-frize, and other contrivances, which will hinder the paſſage from being easily forced.

The lines having very little elevation, stand in no need of bastions to be flanked in all their parts, like thoſe in the cir­cuit of a town. Redans, which are of more simple and ex­peditious construction, are ſufficient. The angle they make with the curtain is always very obtuſe, to the end that the ſoldier being placed on the face of the redan, may be the better able to defend its approach. It is customary indeed to make battions in thoſe parts where the lines form ſuch angles as could not be sufficiently defended by redans. Yet, whenever it may be judged neceſſary, the line of circumvallation may be fortified with battions. The greatest part of the lines at the siege of Philipsburg was flanked in this man­ner, as may be ſeen in Plate DXXIX. The bastions increaſe the circumference of the circumvallation ; and probably the reaſon why they were uſed at the siege of Philipſburg, was becauſe the circumvallation was of a very ſmall extent.

At the point of the redans, batteries are erected to fire the cannon a barbette over the parapet ; and the same is practised wherever the cannon are placed on the line of circumvallation.

Hitherto we have ſuppoſed that the circumvallation was regular; but even were it irregular, the construction of it would differ very little from that which we have just now given.

A general ought to posseſs himſelf of all places from