which the lines may be commanded, when it is poſſible to do it without carrying the circumvallation to too great a distance. He ſhould likewise take all advantages arising from the nature of the ground, as precipices, eminences, ri­vers, brooks, morasses, and, generally speaking, whatever is capable of rendering the camp of difficult acceſs. If there are any woods or buſhes within its incloſure, it will be right to cover it in thoſe parts by felling the trees, and therewith making a proper fence.

The tracing of the lines is a matter of no difficulty, if you have a good map of the adjacent country ; since you have only to bring the ſeveral parts of the line nearly within l800 fathoms of the centre of the place, and to take care that there ſhall be about 120 fathoms from the point of one redan to another.

Nor is there any difficulty in transferring this line to the around ; the operation is too eaſy to thoſe who know a little of practical geometry, to loſe any time in explaining it here.

When the garriſon is numerous enough to disturb the besieging army, another line is traced in the rear of the camp, called the *line of countervallation.* As it is intended to oppoſe a far leſs considerable body of troops, it is never made ſo strong as the line of circumvallation ; but it is conſtructed on the very same principles, as the figure will sufficiently show.

4. *Of the Park of Artillery.*

The park of artillery is the place which contains the cannon, bombs, powder, and in general all military imple­ments and machines that have any relation to the artillery. This park ſhould be placed where there is least danger of being inſulted by the enemy. It ought to be without the reach of cannon-ſhot, and incloſed within a particular ſpot, which ſhould be fortified alſo by a line, consisting of a ditch and a parapet, flanked with redans in the same manner as the circumvallation. Nothing ſhould be neglected that is capable of ſecuring it either from the attacks of the enemy, or from any other poſſible damage.

5. *Of the Trenches and Parallels.*

While the line of circumvallation is finiſhing, all the materials neceſſary for the construction of the trenches are got ready, and the engineer, who has the direction of the siege, examines on the ſpot the most proper place for the attacks, and the figure they ought to have ; and of theſe he makes a particular plan.

We have ſuppofed that the place is regularly fortified, and on level ground ; ſo that here it is indifferent on which side the attack is begun. It is sufficient to explain the rules that are to be there obſerved ; and afterwards to apply them to irregular towns, and to uneven grounds. Let C (fig. 2.) be the place besieged, and A and B the bastions attacked. Begin with indefinitely producing towards the field the capitals of these two bastions ; in like manner pro­duce the capital of the half-moon oppoſite the curtain between theſe two bastions ; let off 800 fathoms from the ſaliant angles D and E of the covert way to F and G. This done, take DH, and EI of 300 fathoms ; and from the centre C, with the radius CH or CI, deſcribe an arc, which produce beyond the points H and I ; and on this arc HI construct the first parallel. Then on the same lines, DF, EG, take the points M and N 140 fathoms distant from the points H and I ; and through theſe points deſcribe from the centre C another arc, on which the second parallel is constructed. This second arc will cut the produced ca­pital of the half moon in the point L, which is to be ob­served, in order to begin from hence a trench, which ſhall extend to the ſaliant angle of the covert-way before this half-moon. Lastly, through the points O and P, the di­stance of 20 or 25 fathoms from the angles D and E, de­ſcribe from the centre C a third arc, on which the third pa­rallel is constructed.

Terminate the first parallel by producing the faces *a b, a b* of the half-moons 1 and 2, collateral to the bastions A and B ; but extend the parallel 15 or 20 fathoms beyond the intersection of this prolongation. The second parallel will be leſs extended than the first, by about 30 fathoms on each side ; and the third alſo leſs extended than the second, by about 30 fathoms on each side.

This being done, you have a ſketch of the trenches and the places of arms. The busineſs now is to trace the trenches, or approaches, without being ſeen or enfiladed.

Take a long ruler, and lay it on the point G, ſo that it ſhall make, with the produced capital EG of the bastion B, an angle EGS, whoſe side GS being produced, ſhall meet no part of the covert-way, and ſhall be distant about 10 or 12 fathoms from the angles to which it approaches nearest. Take GS of an arbitrary extent, as of 200 or 220 fathoms, and put the ruler on the point S, ſo that it ſhall make with GS such an angle GST, as that the side ST produced ſhall not fall on any part of the covert-way, but be 10 or 12 fathoms distant from the most ſaliant parts. Terminate this side in T, and there make alſo a new angle STI, whoſe side TI ſhould terminate at the point T, where it meets the first parallel. Perform the like operation on FH, and it will give you the outline of the trenches as far as the first parallel.

At this part of the trenches you may make a greater number of turnings ; you may likewiſe carry it in a direct line to the first parallel. The most important article is, to take care not to let it be enfiladed from any part of the co­vert-way ; and the fewer angles and turnings it makes, the quicker it is constructed, which in transferring it to the ground is worthy of great attention. Take care alſo, that its extremity, I, do not fall far from the point where the pro­duced capital of the bastion meets the first parallel.

By the same method trace the trenches between the first and second parallel, as may be ſeen in the figure ; but as this part is nearer the place than the former, in order to avoid being raked, it must have a greater number of angles. All its sides ought to cut the prolongment of the capital of the bastion B, as appears by the figure. In like manner trace the trenches betwixt the second and third place of arms, by making as frequent turnings on the pro­duced capital of the bastion B, as ſhall be neceſſary, in order to its defiling from the covert-way. By the same method trace the trenches on the capital of the bastion A ; trace al­ſo a trench on the produced capital of the half-moon, be­tween the second and third parallel, to reach the flanked angle of its covert way.

When the garriſon happens to be strong and enterprising, it will be proper, between the second and third parallel, to make parts of trenches V, V, &c. parallel to the places of arms ; they are to be 30 or 40 fathoms long, and to com­municate with the trench, as may be ſeen in the figure. Theſe parts of the parallels are what we have distinguished by the name of *half parallels* or *places of arms.* At every angle of the trenches obſerve to produce the part of the trendies in thoſe places, ſo that this prolongation ſhall cover chat part of the trenches which it terminates.

This will be illustrated by an example.

Let ABCDFGMQ be a part of the trenches, and let AB be one of the sides oppoſite to the enemy ; produce AB, ſo that BE ſhall be five or six fathoms ; and in FG take alſo five or six fathoms from I to L, which will give