I.

SOME RECENT DISCOVERIES ON THE LINE OF THE ANTONINE WALL. By GEORGE MACDONALD, F.B.A., LL.D., F.S.A. Scot.

Of the three main elements that went to make up the barrier which Lollius Urbicus drew from Forth to Clyde in 142 A.D., the Military Way, always the least conspicuous, has vanished almost entirely. At one or two points a discerning eye can still distinguish its track. At a few others its remains would doubtless be found if they were systematically looked for. As a rule, its course can only be conjectured. The Wall itself is in somewhat better case. Consisting (as the Glasgow Archæological Society's *Report*[1] first taught us) of a substantial mass of turf, heaped some 10 feet high and resting on a solid and carefully-laid stone foundation from 14½ to 15½ feet broad, it was well calculated to resist the ordinary influences of time and weather. It is therefore not surprising that here and there across the isthmus it has been preserved in something approaching a recognisable shape. The Ditch, originally some 40 feet broad and 12 feet deep, was naturally much harder to eradicate. Even where it is no longer strongly marked, its precise direction can often be determined by the aid of a more or less faint depression on the present surface of the fields.

By following up this obvious clue it has been possible to map out the actual line of the Roman frontier for many miles with very substantial accuracy. The detailed description which I published in 1911[2] was based upon observations of the sort, coupled of course with such information as could be gleaned from the accounts furnished by earlier writers. But, after all the aid that surface appearances can give has been exhausted, there remain a considerable number of points, and some of them rather critical points, where we are left without any apparent guidance and where certainty is only to be obtained by properly directed exploration. During the past year or two, with the help of a Research Grant from the Carnegie Trust for the Universities of Scotland, I have been carrying on, in odd moments of leisure, a modest series of investigations designed to clear up some of the more conspicuous cases of doubt. Although the task I have set myself is not yet completed, the results already secured seem to possess sufficient interest to justify their being chronicled. And perhaps this is the most appropriate place in which to put on record my sense of

[1] Glasgow (MacLehose), 1899.
[2] *The Roman Wall in Scotland*, pp. 108 ff.

how deeply I am indebted to the proprietors and farmers on whose land I have had occasion to work. Individual names will be noted in connection with the different localities. Here it will be enough to say generally that without a single exception they have shown the greatest cordiality in giving leave to open up the ground, while several of them have rendered practical assistance of a very valuable kind. Of others whom I was fortunate enough to press into the service, I would specially mention Mr John M'Intosh of the Gartshore Estate and Mr Mungo Buchanan of Falkirk. I have also to thank the Director General of the Ordnance Survey, as well as Major Robinson, R.E., formerly officer in charge of the Northern District, for putting at my disposal the skill of Mr John Mathieson, one of the most experienced members of their staff. Mr Mathieson has grudged neither time nor pains to provide an accurate series of maps. Through the courtesy of the Controller of H.M. Stationery Office I have been able to utilise the publications of the Survey in preparing illustrations for this paper.

Before entering into details it will be well to give a brief description of the *modus operandi*. Theoretically the procedure is simple enough. If there is any hope of finding the stone foundation, that must be looked for first. As a rule, if it is to be got at all, it can be got by digging a foot or two below the present surface. And it would not be unnatural to expect that so substantial a mass would, for the most part, have remained undisturbed. Experience, however, goes to prove that in the case of all really difficult gaps the chances are that, if the Ditch has been rendered invisible, the stone foundation of the Wall has also been deliberately torn up, and all marks of its former presence removed, the progress of agriculture having been the common foe of both. In such circumstances one is thrown back upon the vanished Ditch. However completely this may have disappeared, it is hardly possible for it to be altogether lost. The earth that fills it cannot have consolidated so firmly as to be indistinguishable from the natural soil. The spade, properly wielded, will always bring out the difference. Sometimes, indeed, the difference is made apparent in another way. Where, as not infrequently happens, the foundations of a building of any size have been so laid as to extend on to the softer and less compact substratum, subsidences are apt to take place. Cracked walls and twisted gables may thus be highly significant.

The search for the Ditch, it should be added, has one obvious advantage as compared with the search for the stone foundation. Since it was 40 feet broad as against only 14½ or 15½, the odds in favour of hitting upon it within a given area are two or three times as heavy. On the other hand, to look for the Ditch is a much more laborious

business, and has in it not a little of the element of speculation. Thus, if one happens to strike the middle instead of the edge, one may have to go down 5 or 6 feet before one's eyes are rejoiced by the blackish patches that denote decayed vegetation and give the necessary assurance that one is really in the footsteps of the legionaries. Many blanks, too, may have to be drawn before one lights upon a prize, while at the best the indication of future direction which is gained is uncomfortably vague as compared with the much more helpful conclusions that are yielded by the accurately laid kerbs of the stone foundation. When working by the Ditch, one has an unpleasant sense of having to grope one's way. *Per contra*, the satisfaction that attends success has a correspondingly keener edge.

Of course no map constructed by the aid of the methods I have been describing could claim to be absolutely accurate. We know, from what is still to be seen at the points where the barrier survives in tolerable completeness, that, while the dimensions of the stone foundation are fairly constant, the Ditch varied somewhat in breadth, as also—and to a much greater extent—did its distance from the northern face of the Wall. Interesting examples of such variation are carefully registered in the Glasgow Society's *Report*. For practical purposes, however, it was necessary to fix an average, and in the maps which Mr Mathieson has laid down under my direction, and which have now been adopted by the Ordnance Survey as their permanent record, it has been assumed that the Ditch itself was always 40 feet wide, and that its southern lip was always 20 feet away from the northern kerb of the Wall. I have over and over again found that these averages approximate very closely to actuality. At the most they can never be more than a very few feet astray. Bearing this *caveat* in mind, let us see what measure of progress has been achieved in each of the three sections where the work done approaches most nearly to completeness. It will be convenient to proceed in the traditional order—that is, from west to east.

I. From Old Kilpatrick to Duntocher.[1]

Ever since people began to write about the Roman Wall, there has been a certain amount of doubt as to the precise point at which its western extremity touched the Clyde. Horsley and others long ago balanced the *pros* and *cons* as between Dumbarton and Bowling and

[1] In connection with this portion of the line my best thanks are due to the proprietor of the land, Mr W. A. Baird of Lennoxlove, and to his tenants, Mr James Cadzow (Gavinburn), Mr James Filshie (Mount Pleasant), Mr J. M'Laren (Carleith), and Mr J. Jamieson (Wester Duntiglennan).

Old Kilpatrick. The opinion in favour of Old Kilpatrick has grown with the lapse of years, and for some time past the green knoll just opposite Gavinburn Public School has been generally regarded as the site of the fort that once stood sentinel over the river. Hitherto, however, there has been a lack of convincing evidence. None of the earlier observers could find any trace of Wall or Ditch upon the surface for some distance eastwards from the town. Roy's line, for instance, stops abruptly at the Sandyford Burn. As can be seen from the hatched markings on the map (Plate I. A), the Ordnance Survey officers who went over the ground in the nineties believed that they had located a fragment of the Ditch in the field (No. 425) that lies immediately to the west of the streamlet I have named. It seemed to them to be pointing straight for the church of Old Kilpatrick, very much as Roy said a hundred and fifty years ago that he thought the Roman Wall must have done. In 1911 I ventured to suggest[1] that the hollow in question was not the Ditch at all but a natural depression, and that the true line must be looked for somewhere in the neighbourhood of the farmhouse of Mount Pleasant, which stands a good deal higher up the hill. Here, then, trenching appeared to be eminently desirable.

The view just mentioned was based upon information I had received from Mr John M'Intosh as to a mysterious subsidence which had taken place many years ago in a wall of one of the outbuildings of the farm. Mr M'Intosh was certain that the subsidence was due to the foundation having been laid on the filled-up Roman Ditch, and on investigation I was satisfied that he was right. In the autumn of 1913 Mr Filshie, the tenant, when I opened communications with him about digging, informed me that the dryness of the preceding summer had brought confirmation of Mr M'Intosh's hypothesis as to the real whereabouts of the Wall. A portion of the field directly north-west of the farmhouse had been under crop, and as harvest approached there became visible a distinct line along which the corn grew much higher than in the parched soil on either side of it. Obviously the reserve of moisture in the Roman Ditch was responsible.

Acting on this hint, we began our search for the old frontier line close to the eastern side of the hedge that separates the field numbered 355 from that numbered 342. No sign of the stone foundation was discoverable, but after one or two false starts we eventually found ourselves on what seemed to be the southern lip of the Ditch, and were able to clear a sufficient length of the slope to make certain there was no mistake. Crossing over into Field No. 342, which belongs

[1] *Roman Wall*, p. 111.

to the farm of Gavinburn, we again succeeded in striking the southern lip of the Ditch, this time in a trench almost due west from our earlier one. It followed that, if our starting-point in the sunk wall of the farm building was correct, there must be a bend very close to the spot where we were standing—in other words, that the line, having reached the summit of the high ground, was now about to swing round in order to reach the river. This turned out to be the case. But the bend proved to be considerably greater than we had been at first inclined to suppose. A good many disappointments awaited us before we were able to lay down the track as it is shown on the map, and these disappointments were invariably due to a tendency to work too far towards the north. Ultimately, however, the Ditch was got at intervals in four trenches in Field No. 342 and in two trenches in Field No. 340, the last trench being close to the railway line; while our diagnosis of the Ditch was confirmed in the case of the second last by the finding of one or two kerbstones of the Wall still *in situ* just at the proper distance to the south. To sum up, the line once followed by the Wall (as a glance at the map will show) passes out of Field No. 355 at a point about 230 feet south of the N.E. corner of Field No. 342, continues in the same direction for some 60 feet beyond the hedge, and then swerves very markedly towards the left, to run almost straight to the railway embankment. The point at which it quits Field No. 342 is about 80 feet south of the N.E. corner of Field No. 340, while its disappearance beneath the embankment takes place about 135 feet west of the bridge that carries the railway line over the farm road.

At the railway embankment it was decided to call a halt. The field beyond was in young grass, and it seemed hardly fair to tax the farmer's good nature by suggesting that he should allow the surface to be broken. There was nothing for it but to turn our faces eastwards again. Expectations had, however, been raised high by the manner in which the frontier line suddenly abandons all pretence of being a defensive structure. When it traverses the farm buildings, it is climbing steadily towards the top of a ridge. In due course it reaches the summit, but instead of proceeding along the top for two or three hundred yards further, as it might quite easily have done, it swings round and descends obliquely along the face of a slope so steep that occasionally the top of the Wall can hardly have been above the level of the upper edge of the Ditch. It was clear that the soldiers had by this time almost completed their task, and that they were now making the shortest possible cut for home. The fort for which they were heading could not be far away, and there was good reason to hope that we should be

able to learn something as to its situation when operations could be resumed beyond the railway. The photograph reproduced as fig. 1 will show that we had at least succeeded in tracing the Roman Wall to within measurable distance of the banks of the Clyde. I owe it, as I do the rest of the illustrations to this and the following section, to the never-failing kindness of Mr John Annan.[1] It is taken from a point in Field No. 342 a little below the actual line of Wall and Ditch. The knoll which has usually been identified as the site of the fort

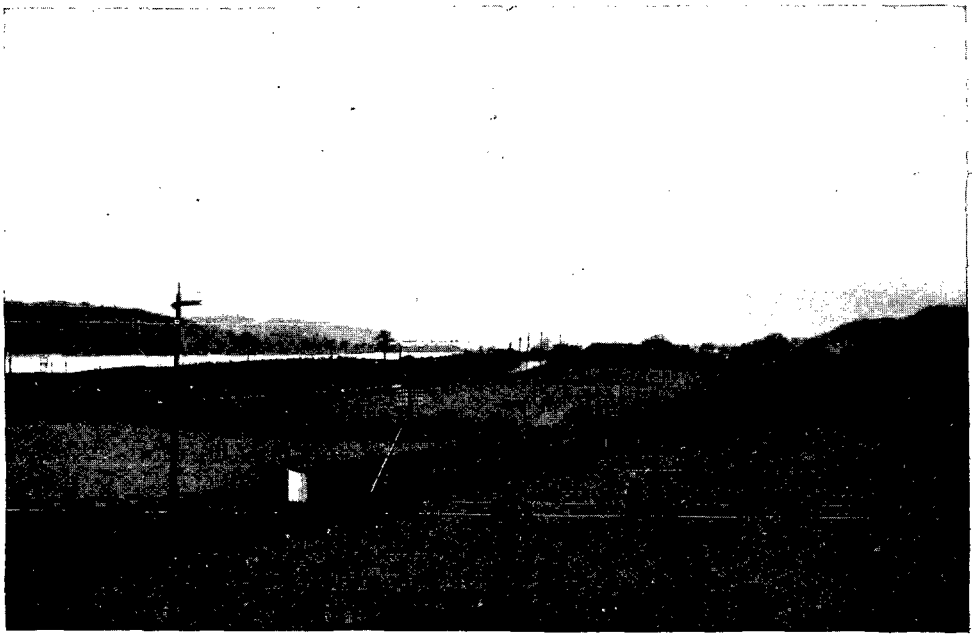


Fig. 1. The western end of the Roman Wall adjacent to the Clyde at Old Kilpatrick.

lies immediately to the left of the school, on the other side of the public road.

Compelled, as it seemed, to face eastwards, we returned to Field No. 355, and finally confirmed the accuracy of the original index by finding the Ditch at two points between the hedge separating this field from Field No. 342 and the subsidence in the farm building. The second of these points was close to the wall of the stackyard, and opposite to it we again discovered some fragmentary remains of the stone foundation. As is plain from the map, the line worked out precisely

[1] The only exception is fig. 6, which is from a photograph by Mr A. O. Curle.

as we had anticipated. The damaged portion of the steading proved to have been founded almost directly above what had been the deepest part of the Ditch. Field No. 425, which was next tackled, turned out a very difficult nut to crack, and our results are perhaps not quite so reliable there as they are in other places. There had apparently been a good deal of levelling in its upper or western half, so that not only the stone foundation but a substantial piece of the Ditch as well had been carried bodily away. In a very literal sense this greatly narrowed the possibilities of evidence being secured. Just about the spot where the bend becomes obvious upon the map, for instance, no fewer than eighteen trenches had to be dug before we were satisfied that the Ditch had been located. Nor is the bend itself at all easy to explain. Probably the extensive disturbance of the original surface has obliterated the clue. The most that is open to us is to note that the line is once more passing obliquely along a hillside, descending this time mainly towards the east, in order to reach the bottom of the valley through which runs the little streamlet known as the Sandyford Burn.

The Sandyford Burn is crossed close to the southernmost angle of Field No. 428. Thereafter we encountered practically no obstacle for fully a mile and a quarter eastwards. For nearly one-half of that distance surface indications were occasionally available for guidance. It will be noted that, from the western edge of Field No. 429 onwards, the Ordnance Survey of the "nineties" is at first almost absolutely correct: there is virtual coincidence between the red dotted lines and the earlier hatching. And the dotted lines are not conjectural. They were determined by test trenches dug close to the western edge of Field No. 432, close to the western edge of Field No. 434, and again in Field No. 436, where the farm of Carleith begins. To make assurance doubly sure, we tried for the stone foundation in Field No. 434, and were fortunate enough to hit upon part of the northern kerb *in situ* just 23 feet south of where we struck the Ditch. It is more than likely that an exhaustive search would disclose many similar isolated fragments. In this section of the line the work of destruction seems to have been accidental, not systematic and deliberate, as it has sometimes been elsewhere. What happened in Field No. 432 in December, 1909, was typical of the gradual process of attrition that has been going on for centuries. On that occasion the plough was driven rather deeper than had been usual, and as a consequence quite a number of the hammer-dressed kerbstones were thrown up to the surface, to be carted away presently as dangerous encumbrances.[1]

In Field No. 440 trenching was found to be unnecessary, for the

[1] *Roman Wall*, p. 112.

track of the Ditch is discernible almost from end to end in the form of a faint depression. Within the enclosure numbered 442 it is more than a mere depression; it is a quite unmistakable hollow, the centre of which reaches the higher level on which the farm road runs about 140 feet north of the corner. This hollow seems to have been variously interpreted by the earlier observers. Gordon and Horsley write as if they supposed it to represent the Military Way. Roy and Stuart more correctly accept it as indicating the remains of the Ditch. For a considerable distance farther east all four have gone somewhat astray. As the Ordnance Surveyors unwittingly took the same course, the mistake is perpetuated by the hatched markings on their map. It will be observed that these incline sharply to the right after crossing the farm road leading to Carleith, and that they continue to hug the road to Duntocher more or less closely thereafter. The clue to the error lies on the summit of the rising-ground at the upper or northern ends of the fields numbered 455 and 452, where a deep hollow running east and west on the crest of the hill has been universally supposed to be part of the Ditch. Writing in 1911, I gave reasons for declining to accept this view,[1] and the doubts then expressed have been amply borne out by the present investigation.

After consultation with the tenant of Carleith, Mr John M'Laren, who was able to point out certain spots in the neighbourhood of which unforeseen obstructions had been encountered in ploughing or in draining, several trial trenches were cut from north to south along the eastern edge of Field No. 443, the outcome being that the Ditch was laid open about 250 feet from the S.E. corner, close to a prominent thorn-bush. Once this point of vantage had been gained, the problem of further progress was greatly simplified. A backward glance showed that Wall and Ditch had been pursuing a perfectly straight course; even in Field No. 443 the faint depression became visible so soon as one knew where to look for it. A careful examination of the stretch of ground that lay ahead failed to reveal any reasons for expecting a deviation in the immediate future. Accordingly a ruler was placed upon the map, and the workmen were directed to dig on the eastern edges of Fields Nos. 445 and 449, at a distance from the S.E. corner of 130 feet in the former case and 250 feet in the latter. It was satisfactory to find that the policy of the Roman engineers had not been misunderstood. In both cases the Ditch was hit upon at the very first attempt. It should be mentioned that in quitting Field No. 445 we passed from the farm of Carleith to the farm of Wester Duntiglennan.

[1] *Roman Wall*, p. 113.

Field No. 506 brought complications. The Golden Hill above Duntocher, long known as the site of one of the frontier forts, was now well in view, and it was quite obvious that the ruler, which had been such a useful guide for the last 600 or 700 yards, would have to be thrown aside. There must be a turn almost immediately. Moreover, the surface of the field itself suggested difficulties, its southern end being occupied by a slight, though quite perceptible, elevation of somewhat irregular outline. Our good fortune, however, did not desert us. We were lucky enough to find not only the Ditch but also the kerbing of the Wall, each in two different places; and by keeping hold of the double thread we managed to carry the line round the awkward bend which appears upon the map, a bend due to the configuration of the ground—in other words, to the desire of the builders to utilise the slight elevation mentioned above. The middle of the Ditch leaves Field No. 506 about 140 feet north of the beginning of the road that leads to the farm of Wester Duntiglennan.

Following up our advantage, and crossing the road into Field No. 652, we were at once confronted by a well-preserved fragment of the Ditch, which seems to have escaped the notice of all previous observers, with the doubtful exceptions of Horsley and Maitland. It has been cut in the bottom of a natural ravine, and so looks very much like what is called in the vernacular a "sheugh"—a circumstance which in all probability explains why its true character has remained unrecognised. The northern face of the ravine is far higher and far steeper than the southern one, which indeed it completely commands. And the idea that the Roman Wall could ever be placed in a position where it was thoroughly dominated from the side of the Caledonians was incompatible with the common view of it as a structure which was designed with a single eye to protection against assault, and every yard of which was meant to be defended as obstinately as are the trenches of the rival armies in Flanders to-day.

The identification of the modern "sheugh" with the Roman Ditch was aptly confirmed by the discovery *in situ*, a little to the south of it, of part of the north kerb of the stone foundation. One could then advance with confidence to the point where the hollow is seen to leave the field and begin its gentle descent to the edge of the Duntocher Burn. Here the line becomes conjectural, for digging in the gardens of the houses was impracticable. At the same time the limits of possible error are so small as to be negligible. The general direction is not open to doubt in face of the marked surface indications which speedily present themselves on the opposite bank of the stream. As the Ditch climbs the steep declivity, its outline grows

more and more strongly pronounced until finally the summit of the hill is reached, and with it the site of the fort. In regard to this last it should be noted that the hatching of the Ordnance Surveyors is to be considered as provisional only. Without excavation the dimensions cannot be laid down even approximately.

When one turned to plot out on the map the result of the measurements made upon the ground, it was a great satisfaction to observe that the line as now determined ran close to the spot where, according to the Ordnance Survey records, a "legionary stone" had been found. The stone was evidently one of the well-known distance-slabs, in all likelihood No. 1138 in *C.I.L.*, vii.,[1] and the fact that it had been brought to light at this particular point afforded fresh corroboration of the soundness of the methods we had been employing. On the other hand, it is worth remarking further that the so-called Roman Bridge is not only not Roman, but does not even occupy the place that must once have belonged to the structure that carried the Military Way across the burn. The belief that it did so is perhaps partly responsible for the uncertainty that has so long obscured the true direction of Wall and Ditch at Duntocher. As a matter of fact, the existing bridge traverses the real frontier line diagonally. It may be that, as Roy suggests, some of "the stones whereof it is executed" are of Roman workmanship and "probably taken from the adjoining fort."[2] What is now beyond question is that the Roman Bridge proper must have been situated about 30 yards lower down the stream and must have lain at a very different angle.

The morning of Christmas 1913 saw the exposure of that part of the stone foundation which was discovered in Field No. 652. The same afternoon put us in possession of a very valuable clue at the opposite end of the section. It will be remembered that our progress at Old Kilpatrick had been interrupted through our reluctance to encroach on a field of young grass (No. 339 on the map) lying just beyond the railway line. Meanwhile, however, a letter of thanks to the farmer, Mr James Cadzow, conveying a hint of possible favours to come after the hay crop had been gathered in, had elicited a prompt reply to the effect that, if we were going to do as little damage to the young grass as we had done to the old, there was no reason why we should not begin work immediately. This kindness was most opportune. As will be seen presently, the rapidity with which success was attained was largely due to the particular season of the year in which the search was undertaken. It owed much to the pioneer labours of the plough.

[1] *Roman Wall*, p. 280, No. 7.
[2] *Military Antiquities*, p. 158.

I had already spent the last hour or two of daylight on a wet and foggy November afternoon in trenching for the Ditch about the point where it might be expected to emerge from beneath the railway embankment and enter Field No. 339. It was not altogether an easy matter to get it. Ultimately, however, it was found, proceeding apparently very much along the line it had recently been following. It looked as if it would not be difficult to trace it further. Accordingly, when we finished at Duntocher on Christmas morning and were able to return to the western extremity, I set the men to dig at intervals along the southern edge of Field No. 339 within an area where they could hardly fail to strike it, unless its course had been materially changed. The direct result was disappointing. None of the trenches yielded anything very definite. But, while I was watching their output, my attention was attracted by one or two very large stones lying on the newly ploughed surface of Field No. 338, which stretches between the public road and the canal, and looks across the latter to the Clyde. Closer examination showed them to be roughly dressed with the hammer, in fact to be extraordinarily like the kerbstones which were regularly used in constructing the foundation of the Wall. At the same time their position was puzzling. They were freshly turned up, and yet they lay a considerable distance east of where we supposed that the frontier line must run. The ploughman, on being questioned, explained that they had not been moved since his plough tore them from their original bed, and that there were others very like them still underneath the surface. In particular, some little way to the west and just beyond the brow of the hill he had encountered an obstruction which defied all his efforts to move it: he thought it must be "the foond o' a hoose." This information sounded most promising. The workmen were told to abandon Field No. 339 and to concentrate their efforts on Field No. 338, clearing first of all what had been described as the foundation of a house, and thereafter some of the ground in the immediate neighbourhood of the isolated stones.

When I reached the scene next morning, the first part of this task had been completed, and there lay exposed a quite unmistakable fragment of the foundation of the Roman Wall, running north-east and south-west, and consisting of two kerbstones, still *in situ*, with a mass of the smaller stones behind them (fig. 2). The larger of the two kerbstones was 20 inches long by 19 inches broad by 9 inches deep, and the whole formed a solid block 5 feet 9 inches wide. Then came a gap of a foot, and then 2 feet more of the centre packing. All the rest, including the kerbs on the further, or inner, side had disappeared. A smaller though equally recognisable fragment was discovered, by dint

Fig. 2. Remains of the western rampart of the fort of Old Kilpatrick, with the farmhouse of Mount Pleasant in the distance.

of probing, on the same line, but rather nearer the river. The general situation was by this time clear. The isolated stones were a good deal further east and also quite close to the public road; if they indicated a foundation running at right angles to the other, then the "foond o' a hoose" undoubtedly represented not merely the Roman Wall but also the western rampart of the long-lost Roman fort.

A careful inspection of their surroundings proved that the stones were not so isolated as had been at first supposed. As a matter of fact, they were an index to a stream of smaller stones which could be plainly traced along a line that was roughly parallel to that of the public road. The stream, which was visible for some 30 yards, was obviously the débris of a foundation that had been gradually broken up and destroyed by the plough. There was virtually no hope that any of it had been left undisturbed. But trial trenches were dug at selected spots, and a sufficient number of kerbstones uncovered—one or two still *in situ*, the majority displaced—to afford the amplest confirmation of our working hypothesis. Once satisfied that we had located the fort, we next set about endeavouring to ascertain its probable dimensions. By producing to a meeting-point the two sides on which we had already lighted—the west and the north — we were able to determine approximately the north-west corner. A few trenches, dug at what seemed a suitable distance away from the large fragment of the west rampart, soon took us into the ditch by which the front of the fort had been defended, this being presumably a continuation of the main Ditch of the frontier line. Thereafter we worked right across the field from north to south, beginning at that part of the ditch which was opposite the north-west corner of the rampart, and digging at such short intervals that there was no danger of losing touch, until we reached a spot where the dark earth and decayed vegetable matter gave way to virgin sand. Then we knew that we were at the end of the Roman Wall (fig. 3).

Next day—Saturday, December 27th,—was the last I could spare for the work at this particular time. Unfortunately the weather was so bad that it could hardly have been worse. It was blowing half a gale, the field was partially flooded, and wild showers of sleet and snow made digging almost impossible. Such trenching as was practicable was done at and about the south-west corner of the fort; its results went to verify the conclusions arrived at on the previous day, and incidentally to suggest that the ditch in front of the west rampart had been at least double. The lulls in the storm were, however, chiefly utilised for the taking of measurements. A survey carried out under such unfavourable conditions and carried out, moreover, by amateurs—

for Mr Mathieson's assistance was not available — was bound to be somewhat rough. Still, it was correct enough to serve, subject to the warning that, as no search could be made for the eastern limit of the fort, the line representing this on the map is perforce conjectural and the interior area correspondingly indeterminate.

It will be seen from the map that the site is some little way higher up the river than had generally been supposed, and that the fort looks north-west, the rampart on this side being about 400 feet long. No doubt the ordinary view as to its position is partly to be accounted for

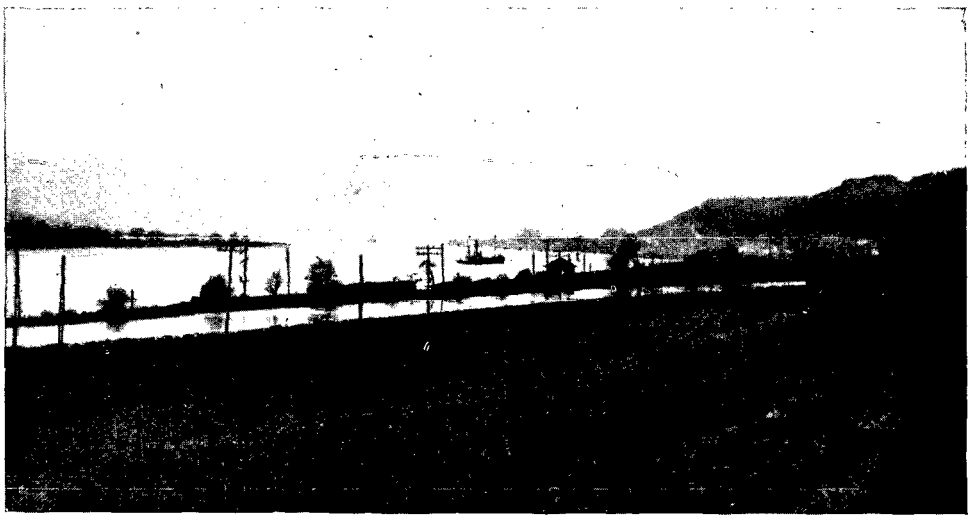


Fig. 3. The western end of the Roman Wall. The Clyde from the fort at Old Kilpatrick.

by the comparatively recent limitation of the name "Chapel Hill" to the green knoll opposite Gavinburn School; it is upon the "Chapel Hill" that the inscribed stones found in the seventeenth century are said by the older writers to have been discovered. As a matter of fact, however, even within living memory the term was applied to a much wider extent of ground, including the very spot in which the remains of the ramparts have now come to light. And there is another tradition that fits in admirably with the situation of the fort as now finally identified. When the canal to Bowling was being constructed in 1790, the workmen accidentally cut through what had evidently been a set of baths belonging to the Roman station. It has always been said that the discovery took place not far from the little group of houses known as the Ferry Dike. It will be observed that such a position would be singularly suitable. The baths would, as usual, be outside the ramparts,

but would at the same time be well within the limits of an annexe lying between the fort and the river.

The sudden bend which the frontier line makes as it approaches the Clyde is very remarkable. It had been sufficiently noticeable in Fields No. 342 and No. 340, where, however, it can be readily accounted for by a desire to reach the plateau above the river-bank. The manner in which it becomes accentuated in Field No. 339 is far harder to explain. It is dangerous to dogmatise in these matters. But one cannot help suspecting that the builders of the Wall, who worked (as I have shown elsewhere[1]) from east to west, altered their direction at the very last stage of their journey in order that their terminal fort might stand just where Agricola's had stood more than half a century before. Apart from some such special reason as this, there seems to be nothing in the nature of the ground to justify the unexpected change. If the suspicion could be verified, Old Kilpatrick would fall into line with Bar Hill, Castlecary, and Rough Castle as having been occupied both in the first and in the second century of our era.

To complete the record relating to this section, it should be noted that, although the stone foundation was uncovered in several different places, the superstructure was nowhere well enough preserved to admit of any positive inferences as to its character. In no case were the black lines, with which the Glasgow Society's *Report* has made us familiar, discernible. On the other hand, there was an equally decided absence of evidence to suggest any variation in the method of construction, and we may safely conclude that here, just as in the portions examined by the Glasgow Society, the main body of the Wall had been cæspiticious. And this conclusion is applicable not only to the Wall, but also to the fort, where the stone foundation was exactly the same. In other words, Old Kilpatrick was defended by ramparts of turf, like Bar Hill and Rough Castle, and not by ramparts of stone, like Balmuildy and Castlecary.

II. From Balmuildy to Cadder.

Along this section—now that the outline of the fort at Balmuildy and its relation to the Antonine Wall have been so happily determined by the Glasgow Society's excavations—the mapping of the frontier line presents no serious difficulties until after it has entered the policies of Cawder House; the Ordnance Survey of the "nineties" may be accepted as adequate. Within the policies, however, the problem has long been regarded as severe. The older writers give us no help at the crucial

[1] *Roman Wall*, pp. 308 f.

point, and from what they say it is clear that Wall and Ditch had both disappeared from the surface there at least two hundred years ago. It was evident that no advance was possible without the assistance of the spade and pick. Accordingly, in the autumn of 1913, I approached the proprietor, Colonel Stirling, who not only expressed his readiness to give me every facility, but most generously offered to provide the necessary labour. His overseer, Mr George MacKinnon, took an active and interested part in the operations. When it ultimately proved desirable to pursue the investigation into the glebe,

Fig. 4. Mound at Cawder House, looking E.

access was willingly granted by the parish minister, the Rev. J. Woodside Robinson.

A negative result of considerable importance should be chronicled at the outset. Successive generations of antiquaries, from Gordon downwards, have been tempted to recognise the remains of a Roman *castellum* in the fine tumulus (figs. 4 and 5[1]) that stands near the eastern edge of the Cawder policies. Its obvious proximity to the Roman Wall made the temptation a natural one, and only Maitland can claim the credit of resisting it. Probably he was saved by the perversity which compelled him to reject any opinion that had commended itself to Gordon and Horsley. At all events, writing in 1757, after refuting the current view, he proceeded: "Now as this small mount seems to have been neither a castle nor a place for observation,

[1] I am indebted to Messrs MacLehose for the use of the blocks of figs. 4 and 5.

that which bids the fairest for the use it was designed for, I think, is a tom-moid or court-hill, whereon courts of justice were anciently held."[1] If the definition here is wrong, the classification is right. The tumulus is beyond all question a mote-hill. A trench cut across the ditch at the north-west corner on October 9, 1913, revealed a broad, flat bottom at a depth of no more than 2½ feet beneath the present surface, while from the lowest level came several fragments of unmistakably mediæval pottery. Mr A. O. Curle, who was present, at once recognised the phenomena as closely analogous to those he

Fig. 5. Mound at Cawder House, looking N.W.

had met with in examining the ditch of the mote of Hawick. In the eyes of some the interest attaching to the tumulus at Cawder may possibly be lessened by its transference from the sphere of Roman antiquities. If so, there are others who will welcome its definite appearance as a mediæval landmark. In his *Stirlings of Keir*, Sir William Fraser says: "About the year 1180, the lands of 'Cader' and others, were given to the Bishop of Glasgow by William the Lion for the safety of his soul. Soon afterwards the bishop appears to have feued out the lands of Cawder to Sir Alexander de Striueling, whose descendants have continued to hold them for centuries under the Bishops of Glasgow and their successors."[2] Sir William justly remarks that there are few families which can boast of an inheritance which has descended through so long a line of ancestors. We may now add

[1] *History of Scotland*, i. p. 180.

[2] *Op. cit.*, p. 6.

that among these there must be fewer still who can point to the remains of their original stronghold.

The determination of the true character of the tumulus was but an incident in a long and troublesome search for the real line of the Roman barrier. It will be seen that the hatched markings on the map (Plate I. B) branch out, not unlike the fingers of a hand, just as they approach the fence which surrounds the innermost portion of the policies. The central branch, which represents a well-defined hollow that gradually decreases

Fig. 6. The Ditch near Cawder House.

in depth as one moves eastwards (fig. 6), has obviously been interpreted by the Survey officers as the remains of the Ditch, for the hatched markings are carried on until they reach the southern edge of the road that leads from the main avenue to the outbuildings of the mansion-house. Others, among whom I am bound to include myself, have been inclined to think that the hollow was a natural one, and that the Roman engineers had kept more to the south, clinging to the face of the hill in order to reap full advantage from its lower slopes.[1] Such a line would have included the high bluff which overlooks the Bishopbriggs Burn, and which is conspicuously indicated on the map just above the number 148; and it would have been only a short step thence across the valley

[1] *Roman Wall*, p. 119.

to the rising ground on which stands the "Castellum." But this plausible *a priori* reasoning must give way to the logic of facts. The spade has proved that the Survey officers were right.

Some 54 feet east of the fence we dug a trench through the mound that forms the southern boundary of the hollow. The result was to expose not merely the stone foundation, characterised by its normal features, but also a fine section of the original superstructure, traversed at regular intervals by the black lines which betrayed its cæspiticious nature. The angle at which the kerbs were laid was, roughly, north-east by east; and, as this corresponded exactly with the direction of the hollow, there could be no further question as to the identity of hollow and Ditch. The descent to the low ground is made in the frankest and most unhesitating fashion, a line of fine trees marking its course for the greater part of the distance between fence and road. Not until the latter has been crossed is there any perceptible deviation. To put the matter beyond doubt, the ground was opened up at three points along what was presumed to be the route followed by the Wall. In each instance the stone foundation was disclosed precisely where it had been looked for.

The last of the openings just referred to was close to the southern margin of the road. By this time the surface of the ground had become to all appearance level, and it was necessary to proceed with caution if the clue was not to be lost. Trenches dug at more frequent intervals in the park to the north of the road revealed a slight turn towards the right, the easterly trend being maintained for something like 250 feet. For more than 100 of these feet the stone foundation had survived to serve as a guide. Thereafter we had to have recourse to the Ditch. Presently, however, this too gave out, leaving us for the moment completely nonplussed. The cause was obvious: when the ornamental pond was formed, large quantities of earth had been removed from some parts and laid down in others, in order to provide it with a bed and with suitably sloping banks, and the track of the Ditch was consequently no longer distinguishable.

The point at which the chain had broken was peculiarly tantalising, and of the several alternative routes from which we had to choose, that which was apparently the least promising proved in the end to be right. Wall and Ditch, at the moment of their disappearance, had seemed to be pursuing a course that might quite naturally have brought them close to the "Castellum." Accordingly, even after we had satisfied ourselves that the mound was a mediæval mote, we could not quite shake ourselves free from its influence. Many fruitless attempts to pick up a clue were made by trenching on the top and shoulders of the bluff already referred to, as well as on both sides of the flat-bottomed valley through which

the stream flows. It was hard to convince oneself that the advantages attaching to the high ground had been, as it were, deliberately thrown away. And yet that was what had actually happened. Just about the spot where they had been lost sight of, Wall and Ditch had swung towards the left and passed right across the mouth of the valley, making for the western extremity of the spur of hills that bounds it on the north. Here they had turned abruptly towards the south-east, leaving sufficient space between themselves and the foot of the slope to permit of the Military Way being laid upon the level—an arrangement which doubtless explains the detour that puzzled us so much. The adoption of any other plan would have involved the road in a toilsome series of ascents and descents.

The remains of the Military Way were found in two trenches cut in the corner of the policies that adjoins the house known as the Lodge—first about 50 feet north-east of the main avenue and about 70 feet north-west of the road that comes from the direction of the Lodge to join it, and again about 60 feet further on. In the same corner, about 40 feet in front of the Military Way, we laid bare an excellently preserved section of the stone foundation of the Wall, with a foot or two of the original superstructure still in position. The fact that this was situated well within the limits of a depression so decided that we had at first been disposed to think that it might represent the Ditch, furnished striking proof of the extent to which the contour of the ground had been artificially altered since Roman times. The evidence was more than confirmed by what awaited us in the large field immediately to the east. Incidentally it should be noted that on entering the latter we were somewhat nettled to observe that, if we had only reconnoitred a little farther ahead, we might have saved ourselves much of the useless searching that had occupied the previous day or two. The Lodge has been built above the filled-up Ditch, with the usual result that the walls have threatened to collapse. They have had to be supported by tell-tale buttresses of stone.

Within the large field (No. 158) we were able to trace the stone foundation for practically the whole way. The details here were worked out under Mr MacKinnon's supervision, the numerous sections he had secured being subsequently examined by myself and their positions taken by Mr Mathieson. At first the Wall keeps close to the foot of the long ridge or tongue of high land that includes the knoll on which the "Castellum" stands, its direction being south-easterly. It must have had a narrow escape from destruction when the road was being made. Luckily the roadmakers seem to have thought that the easiest way to deal with it was to bury it. The earth which they cleared away was shovelled on to the top. Consequently, although

the surface to-day betrays no sign either of its presence or of that of the Ditch, yet a hole 2 or 3 feet deep will reveal not only the stone foundation but also a considerable section of the layers of turf it was meant to support. About 200 yards beyond the Lodge the Wall abandons its southerly trend, and runs along the face of a slight elevation, to pass through the upper corner of Field No. 166 before reaching the canal, which it ultimately does just at the lower end of the great mound that rises on the western bank. This mound has sometimes been supposed to be part of the Wall. It was so interpreted, for instance, by the officers of the Survey.[1] In all probability it consists of soil thrown up when the canal was being constructed towards the end of the eighteenth century. And it does not represent anything like the whole of the débris from the excavations at this point; much had evidently been deposited in Field No. 166, for there the stone foundation of the Wall was found fully 5 feet below the present surface, the black lines of the turf superstructure being plainly visible in the sides of the cutting for a distance of more than 3 feet from the bottom.

We had now succeeded in bridging over the gap which we had originally set out to cross, for beyond the canal lies a long stretch where the track of the Roman frontier has always been tolerably clear. But it seemed a pity to leave Cadder without endeavouring to determine the exact position of the fort by which this part of the barrier had once been defended. Arrangements were accordingly made for a two days' search, which was much facilitated by Colonel Stirling's kindness in once more putting the necessary labour at my disposal. I could not be present myself on the first day, and was glad to be able to entrust the supervision of the workmen to the competent hands of Mr John M'Intosh, who wired me in the evening that the fort was found. In my *Roman Wall* I had brought together the various pieces of evidence from which its existence could be inferred, and had drawn from them certain conclusions as to its probable situation. I had even gone so far as to say that in all likelihood the ruins of the principia were buried somewhere in the field (No. 656) that lies between the canal and the garden of the manse.[2] This was the hypothesis that formed the basis of our search.

In the course of a preliminary survey Mr M'Intosh noticed a slight subsidence in the east wall of the manse garden about 123 feet from the north-east corner. Going round to the other side he found a similar subsidence in the west wall about 100 feet from the north-

[1] On the 25-inch map it is designated, "Remains of the Wall of Antoninus Pius."
[2] *Op. cit.*, p. 173.

west corner. Trenches were then dug in Field No. 653 along the line indicated by the subsidences, the result being to supply a striking demonstration of the value of such finger-posts. In a very short time the south ditch of the missing fort lay revealed. Its most remarkable feature was its relatively great breadth; to all appearance it had measured as much as 30 feet from lip to lip. This is fully 10 feet above the average for the ditches of the other known forts on the Wall. It must, however, be remembered that as a rule these are double. If the Cadder ditch was single, as the evidence certainly suggested, that fact alone might suffice to account for its exceptional size. An alternative supposition is that it may really have been not one ditch but two, separated by a midrib so slender that it had collapsed, or at all events had escaped our observation. While that is hardly probable, it is perhaps unsafe to be dogmatic, in view of the necessarily restricted character of our investigation. It will be enough to add that, so far as could be ascertained, the conditions on the east side were identical.

To discover the east ditch was, however, a much more troublesome business than might reasonably have been anticipated. In the confident expectation of striking it about the middle of its course, Mr M'Intosh had begun by having a short trench cut north and south, in a carefully selected spot, some 75 feet north of the hedge that divides Field No. 656 from Field No. 653. To his great disappointment the soil showed no sign of ever having been disturbed. A series of similar trenches cut at frequent intervals along the same line, first for a short distance towards the west, and then for a much longer distance towards the east, proved equally unfruitful, and it looked as if there was something seriously amiss with the reckoning. This was the position when I arrived on the second day. Mr M'Intosh had by that time decided to return to Field No. 653 and endeavour to pick up the ditch nearer to what he believed to be the south-east corner. The venture was successful at once. The ditch was located not far from the hedge, exactly where it had been originally calculated that it ought to have run. This being so, there could only be one explanation of the previous failure to find it. The first attempt must have been made at a point where it had never been dug at all—in other words, on the piece of solid ground that had been left in front of the gate of the fort. This hypothesis was verified by a fresh visit to Field No. 656, when the ditch was cleared out on either side of what had formerly been the road. The gap was only about 11 feet wide. If the road were the Military Way, this would be exceptionally narrow. It is, however, quite possible that at Cadder—as during the second period at Rough

The background has been reproduced from Ordnance Survey Maps with the sanction of the Controller of H.M. Stationery Office.

GEORGE WATERSTON & SONS LTD. EDINBURGH

A. THE ROMAN WALL FROM THE CLYDE TO DUNTOCHER.

(From the CLYDE to CARLEITH)

(From CARLEITH to DUNTOCHER)

B. THE ROMAN WALL AT CAWDER HOUSE.

Castle[1]—the Military Way did not pass through the fort from west to east, but ran on the south side of it to avoid a steep gradient. At Barhill, where (for a different reason) it ran on the north side, the branch roads leading to the north and east gates were much narrower than the Military Way itself.

We had now sufficient data to map the fort out roughly. We had recovered the line of the defences on the south and on the east, while we knew that on the north it must have been merged in the great Wall and Ditch. Nor was there much room for doubt as to the west. The subsidence in the west wall of the manse garden indicated that the south ditch had passed beneath it. On the other hand, it could not have extended far beyond, for the edge of the plateau is reached almost immediately. . We therefore felt justified in trusting to conjecture, all the more because a search might not improbably have been inconclusive owing to the changes that had been effected when the canal was being dug. Against this may be set the momentarily annoying, though really very fortunate, accident that enabled us to fix the site of the east gate. The west gate must have been directly opposite, while the north and south sides would have gates as nearly as possible in the middle. At one point in Field No. 653 we came upon what appeared to be remains of the rampart. They were very fragmentary; but, such as they were, they suggested a wall of turf rather than a wall of stone, with a berm of about 10 feet in width. The interior area of the fort may be put down at a little under 3 acres. Centuries of cultivation have obliterated the handiwork of its occupants with more than usual completeness. A hearth was exposed in one of our trenches, and here and there we picked up stray pieces of coarse pottery, including an amphora handle. Finally, not far from the eastern end of Field No. 656, at the point indicated by a small cross on the map, we encountered, but did not follow up, another ditch, indicative perhaps of an annexe.

III. From Falkirk to Inveravon.[2]

It will conduce to clearness if, in dealing with the third section, we proceed, so to say, geographically rather than historically. It covers a

[1] *Roman Wall*, p. 229.

[2] My best thanks are here due to the following proprietors or representatives of proprietors:—Mr William M'Lintock, C.A., Glasgow; Mr Robert Baird, Falkirk; the late Mr William Forbes of Callendar; Mr Charles Brown, factor for the Marquis of Zetland; Mr John Colville, Polmont Park; Mr T. Douglas Wallace, chamberlain on the Hamilton Estates; and Mr James Young, resident factor at Kinneil. Also to the following occupiers or tenants:—Rev. T. Marshall Pryde, Rosehall; Messrs Ramsay, Laurieston; Mr Samuel Smith, Mumrills; Mr William Wilson, Polmont; Rev. J. Buchanan Mackenzie, Polmont; Mr A. Caldwell, Polmont; and Mr W. Meikle, Polmonthill.

stretch of some four miles, and the work of exploration had to be carried on now at one portion, now at another, as the season of the year and the state of the ground permitted. A simple narrative would consequently be confusing. On the other hand, it will be convenient to begin with a brief account of the circumstances that first drew my attention to this particular part of the line as a hopeful area of investigation. They included a discovery which threw a new and interesting light upon the structure of the Wall.

About midway between Falkirk and Inveravon, and a little way east of the village of Laurieston, lies the farm of Mumrills, in the immediate neighbourhood of which it has long been suspected that a Roman fort had once existed. In my *Roman Wall* I expressed the belief that this fort should be looked for in the field numbered 2106 on the Survey map (Plate IV.), adding that if a look-out were kept when ploughing was going on, many relics might be found.[1] I had discussed the possibilities more than once with Mr James Smith, the son of the tenant, who was soon every whit as keen as I was myself to get the problem definitely settled, and the very next spring, February 1912, he was able to send me word that he had discovered, not only fragments of pottery and glass, but also the foundations of what was obviously an ancient building. He had wisely communicated with our Corresponding Member, Mr Mungo Buchanan, who had had large experience of Roman work at Camelon, Castlecary, and Rough Castle, and with his assistance he had cleared away enough of the soil to enable a judgment to be formed. When I visited the spot, I could only confirm the conclusion at which Mr Buchanan had already arrived. Two lines of foundation had been laid bare, meeting at a right angle. The one on the north had been traced for 25 feet, the one on the east for 11½.[2] They were from 33 to 36 inches wide, and had been carefully bedded in puddled clay after the usual Roman manner. Broken bricks and roofing-tiles were abundant, and there were one or two pieces of "Samian" ware. The position of the remains, some 300 or 350 feet back from the centre of the public road, suggested that they represented a portion of the principia or headquarters building, and this suggestion appears to be corroborated by all that we subsequently learned as to the size of the fort and the precise whereabouts of its ramparts. In another part of the field there was found the pillar of a hypocaust, lying amid what seemed to be the débris of a furnace.

[1] *Op. cit.*, p. 240.

[2] The north wall was subsequently traced for 15 feet beyond the junction in an easterly direction (see fig. 7). If, then, as is suggested below, this wall represents the north wall of the principia, there must have been an "Exerzierhalle," or portico, thrown over the Via Principalis in front, as at Newstead.

Sowing followed hard on ploughing, so that there was no time to pursue the inquiry further, even if the means for a more thorough excavation had been available. It was, however, arranged that, after the crop had been gathered in in autumn, I should be allowed the "run" of the field for a few days in order to make a closer examination. When the date fixed for this reconnoitring expedition had come round, it seemed best to restrict our efforts to an endeavour to establish the exact situation and limits of the fort, and to postpone any attempt at learning more about the central building until exploration on a really systematic plan could be undertaken. Fragmentary as was the knowledge we had acquired of the principia, it was enough to supply us with a starting-point. And it had contained an element of surprise which served as a useful stimulus. The walls were not lying at the angle at which we should have expected to find them, if the northern front of the fort had been in alignment with what we believed to have been the course followed by the great Rampart and Ditch as they approached Mumrills from the west.

Work was begun about the middle of November, 1912, and in an hour or two we struck the stone foundation of the great Wall in Field No. 2106, about 200 feet south-east of the cart-shed which adjoins the road. It was running parallel to the foundation of the north wall of the principia, thus confirming our suspicion that it had changed its direction. Thinking it well to look into the change more narrowly, we left the fort alone for the time being, and dug eastwards along the line of the Wall, to find that it very soon turned somewhat abruptly to the left, as if to return to the path it had so recently forsaken. Simultaneously there emerged an extremely interesting feature, which will be described in detail presently, and the investigation of which absorbed the whole of the remaining days that had been set apart for our search. The information necessary for laying down the outline of the fort was not secured until the succeeding autumn. I propose, however, to anticipate a little, and to bring together now all the facts relating to it that it has so far been possible to gather.

In November, 1913, Mr James Smith, the value of whose practical help throughout will be apparent from the narrative, determined to drive the plough a little deeper than usual in passing over certain spots which had seemed to him in previous years to be rather different from the remainder of the surface. His experiment was most successful. It brought to light the rounded south-east corner of the rampart of the fort, thus giving us at one stroke the position of two of the sides; and at the same time it supplied a reliable indication as to the whereabouts of a third by revealing at the western end of the field a line

of stones, about 15 feet broad, which had all the appearance of being a disturbed foundation. With the fourth, or northern side, we were of course already familiar. These data, when transferred to the map, disclosed a fort of the normal shape, having an interior area of about $4\frac{3}{4}$ acres. This is very considerably larger than the average of the other known forts on the Wall. Castlecary, for instance, had an area of $3\frac{1}{2}$ acres, Bar Hill of 3, and Rough Castle of no more than 1. Possibly the exceptional size of Mumrills is to be connected with the presumption, which the epigraphic evidence affords, that it was garrisoned by a regiment of cavalry. Obviously space would be needed to accommodate the horses.

However that may be, Mumrills was undoubtedly an important station. Signs of Roman occupation are unusually abundant, chiefly in the shape of broken tiles and shards of pottery. Mr Smith has picked up débris of the kind from all parts of the interior of the fort itself. But he notes that it does not appear to occur outside the line of the eastern rampart. On the other hand, there is much of it to be got in the large field towards the west, No. 2095 on the Survey map, and there too he has observed indications that seem to point to the presence of buried foundations. It is justifiable to infer that on this side there was an extensive annexe. And there is some reason to believe that, in spite of the absence of débris, there may have been occupation of a more limited kind upon the other side as well. In the spring of 1913, when ploughing the eastern half of Field No. 2106, Mr Smith encountered the remains of foundations about 200 yards beyond the rampart of the fort and not far from the edge of the steep declivity that runs down towards the Westquarter Burn. Mr Buchanan, who was fortunately able to examine them while they were still exposed, reports that they consisted chiefly of clay and rubble. At the same time there were two worked stones of fair size and good proportions, which I had myself an opportunity of seeing later on. One of them was square-dressed. The other, which had a rounded face, had evidently formed part of an apse—a circumstance which tempts one to think that the building to which it belonged may possibly have been a suite of baths. The line probably followed by the Military Way is close at hand; it can hardly have run otherwise than between the Mumrills Braes.

The site of the fort has been admirably selected. To the south, and to a less degree to the east, it is protected against any sudden attack by the declivity first mentioned, which at this point descends almost sheer to the level of the burn. The ground on the north is flat and open, excellently suited for a tactical offensive on the part

of a defending force, who had only to drive their assailants back 250 or 300 yards in order to hurl them headlong down a long slope that leads all the way to the Carse. A lesser distance would have sufficed for the purpose without appreciably weakening the position in the rear, and in these circumstances one cannot but wonder why the great Wall bends so suddenly towards the south, seeing that it makes for its former course again as soon as it is fairly clear of the eastern

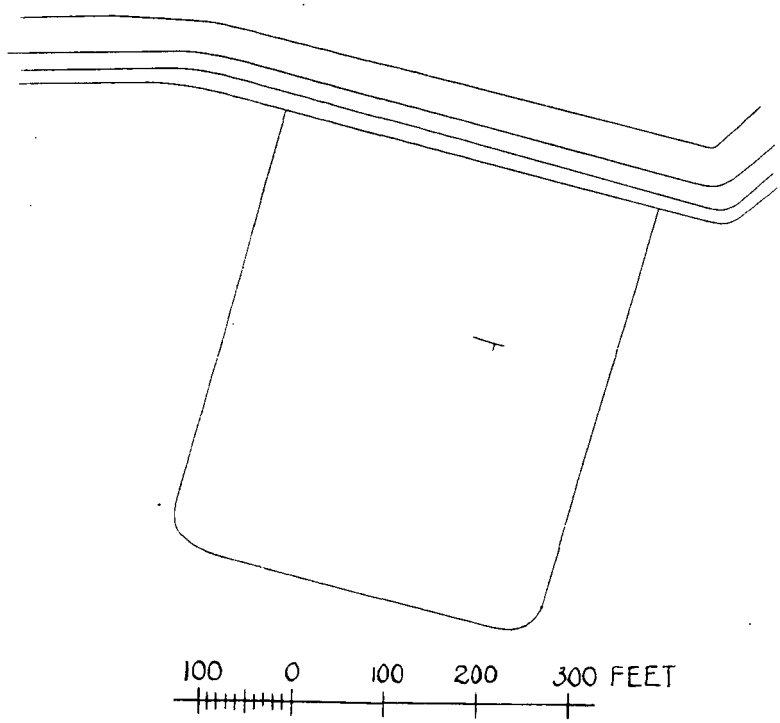


Fig. 7. Outline of the Fort at Mumrills showing its relation to the Wall.

rampart (fig. 7). It is conceivable that, as at Bar Hill, digging might furnish a clue to this departure from the normal by laying open the outline of one of Agricola's stations. The fort as we know it now is certainly Antonine. That is manifest not merely from the relation in which it stands to the Wall, but also from the character of the pottery that has been found. All of it that I have seen may be assigned to the second century. The buildings would appear to have been of the type that one would naturally expect; the more important of them at least were substantial and were roofed with red tiles. Not a few of the stones that have been quarried from them can still be

detected in the wall that supports the bank on the right-hand side of the road that leads to Beancross, while two or three fine specimens of cross-hatching have been preserved in the construction of the adjoining cart-shed.

In one important respect, however, Mumrills differed from all of the other forts on the great Wall of which anything definite is known. Its ramparts were of earth—not of stone, like those of Castlecary and Balmuildy; nor of turf, like those of Bar Hill and Rough Castle. In order to make the grounds for this statement clear, it will be necessary to resume the story of the week's digging that was done in November, 1912; I indicated that, at an early period of this, the emergence of an extremely interesting feature had led us to abandon our original plan of campaign and concentrate our attention on the Wall. Where we first lighted upon it, the stone foundation proved to be singularly well preserved. In all essentials it conformed strictly to the description given in the Glasgow Archæological Society's *Report*, and the variations in breadth were slight, ranging from 14 feet 6 inches to 15 feet 9 inches as a maximum. The uniformity of construction in different parts of the isthmus was further emphasised by the discovery of a conduit (fig. 8[1]) which bore a close resemblance to those that have been from time to time laid bare in the western half. But the similarity which was so apparent in the foundation did not extend to the superstructure. Although there was no indication that the soil immediately above the stones had been in any way disturbed, it was in vain that the face of one section after another was scanned for traces of the black lines with which the experience of the west had made us all familiar. There was literally nothing to suggest that the body of the Wall had been cæspiticious, in spite of the fact that a considerable proportion of it remained available for examination, the stone foundation being sometimes as much as 27 inches below the present surface.

On the other hand, we were everywhere confronted by a new phenomenon. Mixed with the brown sandy loam were large quantities of a whitish clay, which was obviously foreign to the immediate neighbourhood, and which (as I satisfied myself by inquiry) had in all probability been carried up from the Carse. This clay was not diffused at random through the native soil. It was mainly concentrated in two heaps, one at either margin of the foundation; and it had been laid directly upon the stones, the interstices between which it often filled. The greatest height to which the marginal heaps were observed to rise was 15 inches, while they generally extended inwards for a

[1] I have to thank Mr Buchanan for the photographs from which figs. 8, 9, and 10 are reproduced.

distance of about 3 feet. As a rule, there was a corresponding, but less decided, outward spread, which, however, may well have been secondary and induced by the superincumbent weight of the completed Wall. The 8 feet in the centre consisted almost entirely of earth; such stray patches of clay as showed themselves were probably accidental. In short, it was plain that the often quoted words of Julius Capitolinus—*alio*

Fig. 8. North kerb of the Wall, with conduit, near Mumrills.

muro cæspiticio ducto—were not strictly applicable to this portion of the barrier. Rather it appeared that, after the stone foundation was laid, two mounds of clay had been piled up on either edge of it and used to support a wholly earthen rampart.[1] It is a remarkable circumstance that these mounds had sometimes turned out to be the most enduring part of the Wall. Towards the eastern end of Field No. 2106, for example, where the stone foundation had been torn up and carried bodily away, we were nevertheless able to trace its course with perfect confidence by following two parallel bands of whitish matter which

[1] On Croy Hill the Glasgow Committee (*Report*, pp. 49-79) noticed a somewhat similar arrangement: the sods towards the outer edges of the Wall had been cut from clayey soil.

clung persistently to the soil with an interval of 15 or 16 feet between them.

Events proved that the method of construction just described was not peculiar to the two or three hundred yards within which its existence was first detected. Along the four miles or so that lie between Falkirk and Inveravon, the line of the Wall has now been opened up at many points. Over and over again, at widely separated distances, vestiges of the clay mounds were more or less distinctly visible, while nowhere was there the slightest sign to suggest that turf had been used at all. Further, the defences of the fort at Mumrills had been reared in exactly the same fashion. Indeed, Mr Smith's success in locating the south-east corner of the ramparts was directly due to his suspicions having been aroused by the mass of clay through which the ploughshare had to cut in passing over it. The quantity of clay there was far above the average, the only other spot where the accumulation was at all comparable being immediately over that part of the great Wall which was adjacent to the corresponding north-east corner. This fact is not without significance. It was precisely at the corners that the strain on the ramparts would be heaviest, for it is as certain as anything can well be that each of them would have to bear the weight of a wooden tower. If, then, most clay was laid where most strength was required, the meaning of the clay becomes tolerably clear. Its purpose was to give stability. Occasionally stones seem to have been packed against its outer face, as if to hold it better in position.

Probably this particular way of building an earthen rampart has been noted in Roman works elsewhere, but I have not been able to lay hands on any definite example. Professor Haverfield, however, reminds me that there has lately been noticed on the English Wall, in the north mound of the Vallum, a line of matter along each side at the bottom, suggesting that, before the main mound was built, two lines were laid out along its bottom edges.[1] In some places these lines appear to be turf, as if the sods had first been cleared off and neatly laid out; that, however, would seem to have been a pointless proceeding, and in other cases no trace of sods or their lamination was observed. Such lines may have been intended to stop the earth from slipping too easily, or their object may have been merely to mark out a course for the actual builders. In the case of the Scottish Wall the latter idea must, of course, be excluded; here the alignment would be given by the stone

[1] *Cumb. and Westmor. Antiq. and Arch. Society's Transactions*, xiii. 456, and *ibid.* (N.S.), iv. 245. Mr Buchanan also drew my attention to his section of the south rampart of the 'North Camp' at Camelon (*Proceedings*, vol. xxxv. pl. iii. No. 3).

foundation, which was already in position before the clay was brought upon the scene at all. Accordingly the combination of clay and earth can only be regarded as an alternative to the turf, of which, as was conclusively demonstrated by the Glasgow Society's *Report*, the mound is composed across the greater part of the isthmus. The most likely explanation of the change of system is perhaps that, in the end of the second century of our era, the ground through which the eastern portion of the Wall ran was thickly wooded, so that suitable sods would not be readily procurable; whereas to the west of Falkirk the country was, as it is to some extent to-day, a moorland where thick grass and heather flourished. Whether this conjecture be well or ill founded, the change provides a striking warning against the danger of being too dogmatic in drawing chronological conclusions from the material of which the rampart of a fort may be constructed. In a general way it is doubtless true that *Erdkastell*, *Rasenkastell*, and *Steinkastell* succeeded one another in the order of enumeration. But it is equally true that on the Scottish Wall, which is a homogeneous work, the three types were contemporaneous.

Another discovery of some interest has to be registered before we leave Mumrills. In January, 1913, I paid a visit to it with Professor Haverfield, who happened to be spending a day or two in Edinburgh and who wished to have a look at the site of the recently identified fort. The sections cut across the great Wall in the previous autumn had been filled in as soon as we had made our notes upon them. But Mr Smith, who had been forewarned of our coming and who was anxious that we should see as much as possible, had most kindly set about digging a fresh one expressly for our benefit. The spot he had chosen was about 40 yards east of the elbow-like bend which the Wall takes to the north soon after it has quitted the precincts of the fort. When he had got a little way below the surface he was surprised to find his spade throwing up fragments of tiles and lumps of clay burnt red. Following these indications for a few feet towards the south, he presently struck the face of a well-built wall, still standing at least 2 feet high. Whatever the remains might represent, the character of the débris left no room for doubt as to their being Roman. The building did not appear to be large, and it was obviously in very fair preservation. Two or three weeks had yet to elapse before the field was required for agricultural purposes, and it seemed worth while utilising the opportunity for a closer investigation. I was too busy myself to accept responsibility for daily and constant supervision. Mr Buchanan, however, was available, and threw himself heartily into the task. I have to thank him for plans, photographs, and notes. These, supple-

mented by a certain amount of personal observation, have provided the material for the description now to be given.

The removal of 15 inches of superincumbent soil disclosed the outline of a small rectangular structure (Plates II. and III.[1]) lying about 7 feet south of the great Wall, with the kerb of which it was in virtually direct alignment. It seemed to be, roughly, about 13 feet square, with walls that varied from 2½ feet to 3½ feet in height and from 2 feet 6 inches to 3 feet 9 inches in thickness. The variation, however, was more apparent than real. So far as height was concerned, it was to be explained by partial destruction, while it soon became evident that there was no proper basis of comparison in respect of thickness, for only the wall on the north was solid. The centre was a confused mass of burnt clay, broken bricks and tiles, and tumbled stones, conspicuous among the last being a number of more or less complete slabs such as might have belonged to a floor. When this miscellaneous gathering of rubbish had been carefully cleared away, we found ourselves in what seemed to have been originally an underground chamber about 3½ feet high. At the top it was as nearly as possible 7 feet square, at the bottom only a little more than 5, the difference being due to a projecting scarcement on the north and to a very decided batter on east, west, and south. The wall on the north was, as already stated, solid. It was 2 feet 6 inches thick, and was pierced by an entrance 2 feet 5 inches wide. On the remaining three sides what had happened was that the excavated space had received an interior facing of stone, which inclined inwards as it rose, in order that it might offer a stronger resistance to the pressure of the surrounding earth. The delusive appearance of thick walls, which had coloured our first impressions, was caused by the occurrence, on the south and west, of what may be termed an outer boundary of stones, laid one or two courses deep upon a line of clay. At one time this boundary probably extended all the way round. What its precise purpose was, and whether it was ever any higher, we cannot now say with certainty. The most likely explanation seems to be this. The fact that the floor of the "underground" chamber was on very much the same level as the kerb of the great Wall suggests that it was not "underground" in the proper sense of the word at all, but that it was made so by heaping up a bank of earth around it. In that event the line of stones would serve as a sort of parapet, indicating perhaps the outside limits of a superstructure.

The interior was remarkable for the presence of four short walls, each about a foot wide, which jutted out opposite to one another, two

[1] These plates should be consulted throughout the following description.

on either side, for a distance of about 2½ feet at the top. Those on the east had suffered very little damage; they are well shown in fig. 9, which gives a view of the chamber from the south-west corner. Those on the other side were much more dilapidated (fig. 10). This latter view, which is taken from the north-east corner, is also interesting for the peep it gives of the scarcements, with which the walls on the north and south sides were supplied. These scarcements were largely

Fig. 9. Roman kiln at Mumrills from the south-west corner.

torn away; that on the eastern section of the north wall had disappeared completely. We may be sure, however, that when the structure was entire they would rise to the same height as the projecting walls, and that the framework so formed was designed to support a roof (or, if looked at from above, a floor) of heavy flags. It will be remembered that the débris with which the interior was choked was partly composed of slabs of stone. As a matter of fact, one of them can be seen in fig. 10 lying to the right on the top of the west wall. One point more. The whole of the inside bore manifest traces of having been exposed to intense heat. The stones were dis-

coloured, and the clay that had been used to fill the interstices between them was burned as hard as brick, while the floor for several inches downwards, particularly in and about the entrance, was a compact mass of soot or wood ashes, a broad band of which also extended for some distance outside in the direction of the great Wall.

These being the conditions, the riddle was not difficult to read. The chamber was the furnace of a kiln. The wonderful potteries

Fig. 10. Roman kiln at Mumrills from the north-east corner.

lately discovered by Mr Arthur Acton near Wrexham are on too elaborate a scale to be of much assistance in interpreting this humble centre of industry among the frontier wilds.[1] Continental analogies are more helpful, notably one of a group in Alsace that was described some years ago by Forrer.[2] It is rather larger ($7\frac{1}{3}$ m. × 5 m.) than the Mumrills building, to which in other respects it offers a striking

[1] I am indebted to Mr Acton for a most interesting series of photographs. Some account of Mr Acton's remarkable discoveries will be found in Professor Haverfield's *Roman Britain in 1914*.

[2] *Die römischen Terrasigillata-Töpfereien von Heiligenberg-Dinnsheim und Ittenweiler in Elsass* (Stuttgart, 1911), pl. vii. and figs. 26 and 27 (p. 50).

resemblance. The chief differences are that, being larger, it has three projecting walls on either side, and that the entrance is flanked by cheeks which jut outwards and were doubtless intended to increase the draught. A neat little pottery kiln at Corbridge, a plan of which Mr Knowles was good enough to send me, is also instructive. Most illuminating of all, however, is an example found many years ago near Colchester, and figured and described by Mr George Joslin in vol. vii. of Roach Smith's *Collectanea Antiqua*.[1] Except that it is oblong in shape and slightly smaller, the ground-plan of the interior is almost identical with that of the chamber at Mumrills. But the method of construction was different. The side walls and the roof of the furnace were made, not of stone, but "of clay in the form of bricks of various sizes," and the interior had been "vitrified by the intense heat, forming it into one mass, so that it is difficult to distinguish the brick from the joint."[2] The roof was pierced by a series of holes, two inches in diameter, which carried the hot air up into the body of the kiln, distributing it in such a way as to secure uniformity of temperature.

Some similar means of communication between furnace and kiln must have existed at Mumrills, although the ruinous state of the remains prevented us from detecting it. As regards the character of the kiln itself, we can only indulge in conjecture. It is, however, far from improbable that there was no permanent superstructure. If so, when a sufficient quantity of bricks or tiles had been prepared for firing, they would be piled up systematically on the stone slabs, after which a thick wall of clay would be built round them and over them, covering them completely and protecting them from rapid cooling. According to Steiner,[3] that is how things seem to have been managed at the legionary kiln at Xanten, where, as at Mumrills, the ground in the neighbourhood was plentifully strewn with masses of clay burned red. That our kiln was mainly used for bricks and tiles was manifest from the débris. But it is just possible that it was occasionally employed for pottery. Two small shards were found upon the floor. Their shape did not suggest any particular date, but their texture was so close and firm that Mr James Curle was disposed to attribute them to the first century. The circumstances of their discovery, however, make it difficult to accept their texture as a safe criterion; if they had lain long in the furnace, they would be hope-

[1] Plate i. is specially instructive.

[2] *Op. cit.*, p. 4.

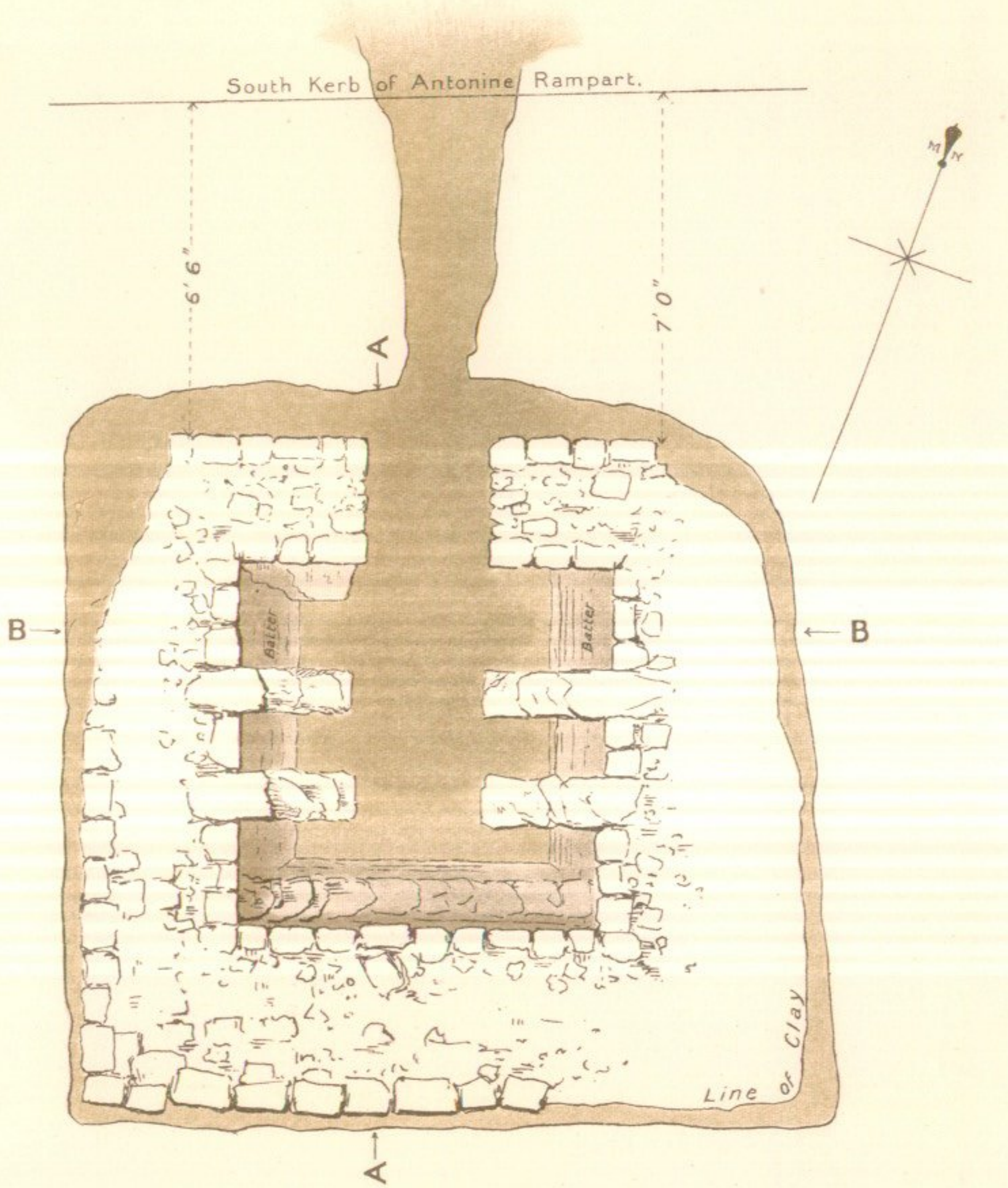
[3] *Ein römischer Legionsziegelofen bei Xanten* in *Bonner Jahrbücher*, 110, pp. 70 ff. See also Drexel, *Kastell Stockstadt* (Nr. 33 of *Obergerm.-raet. Limes*), p. 30.

lessly overfired. The fact that the kiln was in exact alignment with the great Wall leads me to believe that the two were contemporary—in other words, that the kiln and its contents are to be connected with a fort of the Antonine period.

The interesting results secured at Mumrills supplied a stimulus to further investigation along that section of the line in the centre of which it lay. The track of Wall and Ditch was accordingly explored for a distance of some two miles on either side of it. Whether the extreme points reached were also the sites of forts is a question that may meanwhile be postponed. However they may have appealed to the legionaries, they were certainly the most obvious halting-places for the present purpose. As has already been indicated, the somewhat piecemeal fashion in which the operations had of necessity to be carried out renders it desirable that the account to be given of them should be geographical rather than historical. I propose to begin at Falkirk, and proceed thence eastwards to the Avon.

The estate of Rosehall, not far from the centre of the town of Falkirk, has succeeded in maintaining itself as a sort of oasis amid the wilderness of villas and houses, great and small, by which it is surrounded. It lies astride of the high ridge along which it has always been supposed that the Wall must have passed, and there was thus a reasonable expectation that trenching within its area would prove fruitful. The efforts of the first day or two were disappointing. In the end, however, we struck a substantial fragment of the stone foundation, just where it was about to cross the avenue that leads from the north entrance, and almost exactly 100 feet from the gate. It was 15 feet broad and was in fairly good preservation, the south kerb in particular being virtually intact. Although 2½ feet of soil had to be removed before it was reached, there was not the slightest trace of lamination in the section of earth so exposed. Towards each of the edges, however, a certain amount of clay was visible.

The length of foundation uncovered was sufficient to enable us to determine the exact angle at which the Wall itself had run. Its direction had been south-east by east, almost coincident, in fact, with the conjectural markings on the Survey map of 1898 (Plate IV.). That this direction was maintained for some distance beyond the boundaries of Rosehall was *a priori* probable from the nature of the ground to be traversed. Various indications now justify a more positive assertion. The back portion of the house on the south side of Booth Place, which immediately adjoins Rosehall, has been placed directly above the northern half of the Ditch. When it was being built, the foundations proved so insecure that they had to be supported by the insertion of



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PLAN OF KILN AT MUMRILLS.

Mungo Buchanan del.

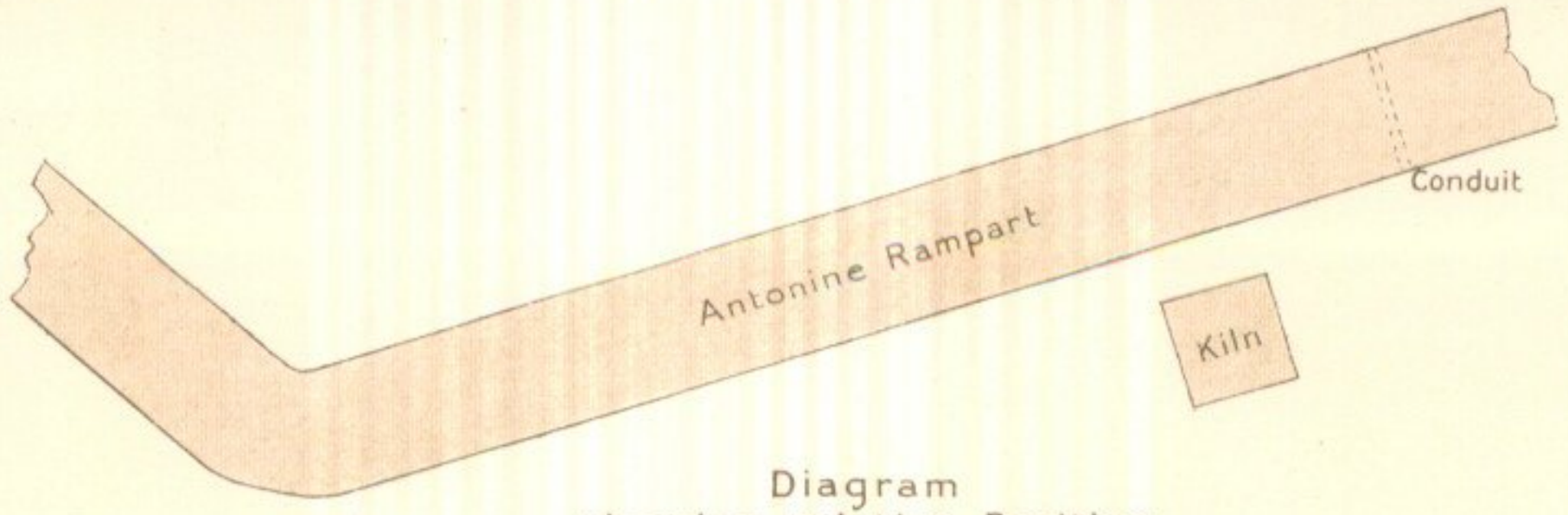
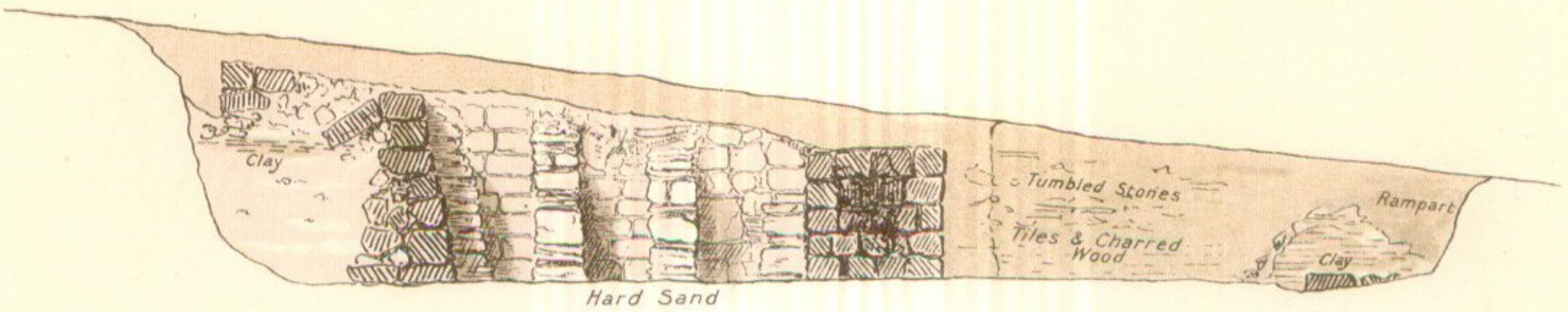
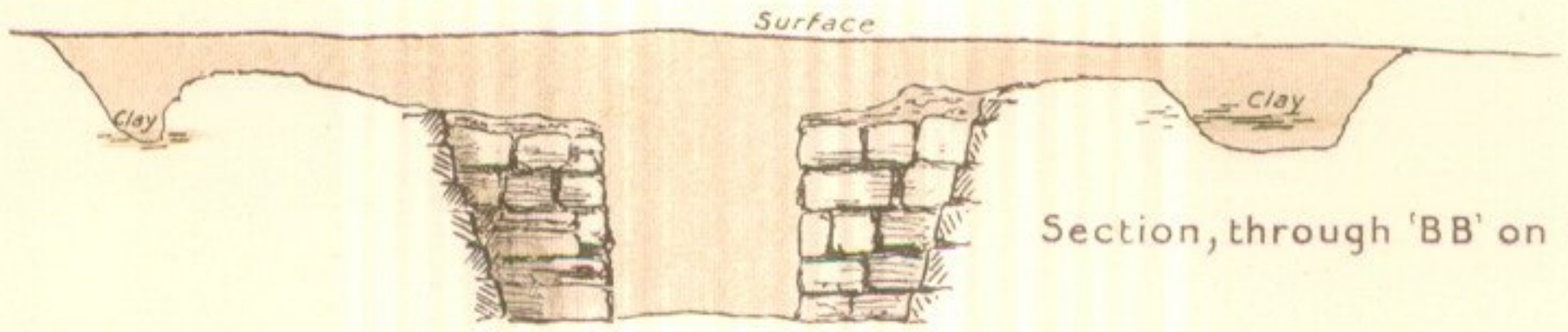


Diagram
showing relative Position.
Scale ¼" - 10 Feet.

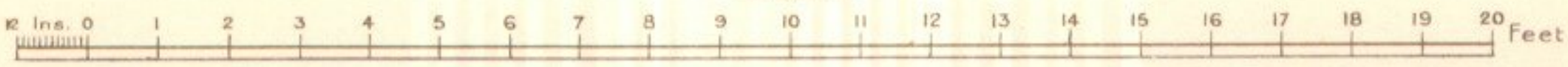


Section, through 'AA' on Plan.



Section, through 'BB' on Plan.

—Scale—



Mungo Buchanan. del.

DETAILS OF KILN AT MUMRILLS

PLATE III.

a series of low brick arches, to which access can still be had. The same holds good, though in a less marked degree, of the next house on the east. About 50 or 60 yards farther on, signs of subsidence can be detected in a group of buildings on the eastern side of the High Station Road, while cracked lintels tell the same tale in the row known as Comely Terrace. Opportunities for excavation are naturally very restricted so long as one has to do with streets and private gardens. But we had free access to the large field through which the East Burn flows, as well as to its neighbour on the west. The two are virtually one, there being a large open gap in the tall hedge that divides them.

The eastern, and more especially the north-eastern, part of the field is low-lying and apt to be marshy. Its western half, on the other hand, consists of a fairly steep slope, from the southern end of which a low ridge projects south-eastwards, descending slowly to the stream. It is along this ridge that we must suppose Wall and Ditch to have run, unless their direction had changed completely. Confirmatory evidence was not altogether easy to obtain. There had been much disturbance of the upper strata through tillage, and every vestige of the stone foundation seemed to have been swept away. At the same time the sandy character of the soil rendered it more difficult than usual to diagnose the line of the Ditch with perfect confidence. One trench, however, yielded what appeared to be a highly satisfactory result. This was dug at a spot 38 feet above the hedge and 315 feet from the southern boundary of the field. The sand proved to be abnormally "free" and to have numerous particles of decayed vegetable matter intermingled with it. A large fragment, fully an inch long, which was embedded at a depth of at least 4 feet, was submitted for examination to Professor Bayley Balfour, who has kindly favoured me with the following report, prepared for him by Mr H. F. Tagg:—

> "The substance contains wood fragments, but is not homogeneous. It appears to be composed of vegetable remains of various kinds caked firmly together in layers. Cleavage of the substance in the plane of the strata is readily effected and its stratified nature is distinctly observable when sections are made at right angles to the layers. Such sections, and sections in other planes also, reveal small patches of vegetable tissue, including patches of what I believe to be woody tissue scattered in a stratified matrix. The latter is doubtless of vegetable origin, but definite histological characters are no longer recognisable in it. The patches of cellular tissue observable in the sections are not sufficiently well preserved or large enough to enable me to identify the remains of any definite plant."

Mr Tagg's report shows conclusively that there must once have been a great hollow at this particular spot; the presence of such a mass of vegetable substance so far beneath the existing surface cannot be accounted for upon any other hypothesis. It seemed well to quote it in full, because the problem is here rather crucial. The spot in question is well within the space that would have been covered by the Ditch, if the assumption we have made as to its direction be correct. And under ordinary circumstances there need have been no hesitation in drawing the obvious inference. If the map be consulted, however, it will be seen that we are already fully 100 yards south of the Ordnance Survey markings, and that the gap rapidly widens until it reaches a maximum of at least 150 yards. How is the divergence to be explained? Very simply, I think, if we grasp the principle upon which the Survey officers proceeded. They accepted the traditional (and, it may be added, very natural) view that the deep gully which lies athwart the western approach to the mansion-house of Callendar Park, some 50 or 60 yards south of the lodge, was the actual Roman Ditch, and they accordingly produced the line of it westwards until it met the previously ascertained line of Wall and Ditch advancing from Rosehall towards the east. On the map the junction appears, as a bend, in the garden of the most westerly house on the south side of Booth Place.

It is thus clear that the case for the old survey as against the new must stand or fall with the supposition that the gully referred to above is identical with the Roman Ditch. The grounds for that supposition are, in the first place, that the gully is undoubtedly artificial; and, in the second place, that it is very nearly in exact alignment with the unmistakable track of the Ditch where it shows itself in the park further eastward. As against this it may be pointed out that, though the gully is artificial, it is altogether unlike the true form of the Ditch, being far too broad at the bottom. Besides, a series of trenches dug 20 or 30 feet to the south of it failed to reveal the slightest indication of the stone foundation of the Wall. It may be that it was originally cut to give passage to a road, and that it was subsequently enlarged with the view of imparting as imposing an appearance as possible to what was believed to be the Roman Ditch, and therefore an interesting relic of antiquity. If this were so, the excavation near Bantaskine House, on the west side of Falkirk, would be in some respects analogous.

But the argument for the new survey is even stronger on the positive side than on the negative. Within the policies of Callendar Park, some 60 or 70 yards beyond the gully, a slight but quite per-

ceptible depression can be seen to the west of the avenue, running south-west by west towards a corner of the park wall. Its centre is about 154 feet north of the point where the west railing of the avenue joins the north railing of a coppice which encloses an old quarry. On trenching the ground to the south of this depression we discovered a mass of stones some 40 or 50 feet distant from the centre and only a little way below the present surface. Their general appearance was exactly what one is accustomed to associate with the kernel of the Wall foundation, and traces of clay were detected here and there in the interstices. It is true that there were no kerbs; but, on the other hand, the breadth (13 or 14 feet) was consistent with the hypothesis that what we had struck was really the base of the Wall with the large outer stones torn away. The feeling that this must be so was deepened into certainty as we worked westwards, digging at intervals parallel to the depression and always finding ourselves confronted by the same phenomena, except that at one point, not very far from the corner of the park wall, we came upon a portion of the kerb still in its original position. There is thus no reasonable doubt as to the correctness of the line as now laid down upon the map. If that be produced so as to meet the presumed course of Wall and Ditch as we followed it, advancing from Rosehall towards the east, it will be seen that there must have been a fairly sharp turn close to the south-east corner of the field through which the East Burn flows. Search was duly made for the stone foundation there. But, in view of the extensive operations that must have been involved by the building of the high park wall, it is not surprising that no vestiges of it had survived. At the same time the reason for the deviation was not far to seek. The builders, it has to be remembered, worked from east to west. As they came near the low-lying, marshy ground on either side of the East Burn they swerved to the south to avoid it and to catch the foot of the ridge, which offered the easiest means of ascent to the northern front of the plateau that was to carry them 600 or 700 yards further.

Returning to the avenue, we have no difficulty in pursuing the depression eastwards until it merges into the perfectly unmistakable hollow of the Ditch about 450 feet beyond the railing. For the next 600 or 700 yards the line is straight and the Ditch, for the most part, admirably preserved. Trial cuttings made at two points revealed the stone foundation in equally good condition. There were no markings to suggest that the superstructure had been of turf, but the depth of soil was insufficient to render this negative evidence conclusive. Clay, however, was once again observed. After this there comes a stretch of close upon 400 yards from which all surface traces of the Roman

barrier have entirely vanished; there is nothing to correspond to the strongly marked hatching on the Ordnance Map. Even trenching did not succeed in bringing to light any quite definite evidence of the presence of the Ditch. The explanation of the gap is doubtless to be found in the great enclosed garden which lies immediately to the south. The heavy buttresses by which its walls have had to be supported show that the ground within and about it is to a great extent made up; and appearances suggest that the necessary soil was secured by stripping from the northern portion of the park such depth of earth as may have been required. In the process the Wall has been wholly removed, while the Ditch has been reduced to dimensions which make it extremely hard to detect.

It may, however, be taken as practically certain that the eastward direction was steadily maintained. No other view would be consistent with the line in which the hollow of the Ditch runs when it emerges again on the further side of the avenue leading from the eastern entrance to the policies. Here it is once more quite deep, its identity being placed beyond all possibility of question by the survival of the stone foundation of the Wall. Accurate plotting now became specially important, as it would furnish a clue which was likely to be valuable in guiding us through the streets and houses of Laurieston. The foundation was accordingly uncovered at several points between the avenue and the railway line. It was from 1½ to 2 feet below the surface, and was usually well preserved. The clay with which this section had made us familiar was noticed clinging to the stones, and there was no indication of the lamination characteristic of structures of turf. Digging near the southern edge of the plateau on which the Wall stands brought to light what seemed to be distinct vestiges of the Military Way.

The south kerb ran from a point 144 feet along the fence bounding the avenue to a point 133 feet out from the south-west corner of the sheepfold. Accepting this as a finger-post, we saw that the Wall was bound to cross the main road about the entrance to the village of Laurieston. To do this it had to descend somewhat rapidly. The ascent to the shelf of high land overlooking the Carse must have been accomplished in more leisurely fashion with the aid of a barely perceptible swing towards the north. Although Wall and Ditch are hopelessly buried for 500 or 600 yards, there is no doubt but that the street which still preserves the name of Graham's Dyke runs very close to the northern edge of the latter. A careful scrutiny of the houses on the right-hand side will discover cracked walls and gables at intervals almost from end to end, while at two spots nearly 130 yards apart we got news of the stone foundation having been torn up in the laying out of

gardens. In one case the notice was vague, but in the other Mr Buchanan had taken exact measurements at the time. On the whole, then, we need not hesitate to claim substantial accuracy for the line we have laid down through Laurieston, particularly as we were able to confirm and check it by excavation in Field No. 2001. In this field the stone foundation was opened up at two points, both to the west of the site of the now demolished cottage called Northby. It had a breadth of 14 feet 8 inches, and presented the same features as had been noted at Mumrills. The accumulation of clay at the outer edges was well marked. Indeed, in November, 1913, before we dug in it at all, the track of the Wall was plainly indicated by two light-coloured bands running from west to east along the freshly ploughed surface.

It will be remembered that there is good reason to believe that an annexe of the Mumrills fort once extended over a large part of Field No. 2095. The great Wall probably formed its northern defence. This must have continued to follow the same direction at least as far as the little field that separates the farmhouse from the public road, for the slope of the Ditch was observed some years ago in constructing a water-trough within the angle which the public road makes as it turns sharply towards the right.[1] But almost immediately after entering the enclosure it swerved slightly towards the south. The exact angle was exposed in November, 1912, in a trench dug diagonally across the little field by workmen who were leading a new water-supply into the farm. The stone foundation, as seen by myself, was here 16 feet broad, while the south kerb was 27 inches below the surface, the north kerb only 21. There was again a mass of clay at either side, and there was no trace of lamination anywhere. Still moving at the angle thus established, the Wall crosses the public road nearly opposite the entrance to the farm, where the remains of the stone foundation can be detected cropping out close to the edge on either hand. In Field No. 2106 it passes along the front of the fort in the manner already described, and then, at a point 80 or 90 feet further on, swings suddenly towards the north—a change of direction which was commented on above. The site of the kiln is about 120 feet beyond the turn, while about 20 feet beyond the north-east corner of the kiln the stone foundation was traversed by a conduit of the usual type (fig. 8).

The divergence between the old survey and the new now becomes at once very prolonged and very pronounced. For more than three-quarters of a mile they do not coincide, and at one time they are as much as 200 yards apart. The Ordnance officers, having no authority to dig, could only take refuge in conjecture, for there was no surface

[1] Information from Mr J. Smith.

evidence to guide them. Nor, in view of the unexpectedness of the knee-shaped bend, is it at all surprising that they should have gone astray. At one or two points—notably between the Mumrills Braes, and again further east on the slope of the hill that leads up to Polmont Park—they seem to have selected for Wall and Ditch the line that was really followed by the Military Way. Large stones that had probably belonged to the latter have been ploughed up in Field No. 2116,[1] about midway between north and south, and also towards the centre of Field No. 699.[2]

Apart from the knee-shaped bend, a possible explanation of which has already been suggested, the true course of the Wall was about as direct as it was possible to make it. In Field No. 2106 the stone foundation was well preserved for a considerable distance beyond the conduit. Gradually, however, the layer of soil concealing it decreased in depth, evidence of disturbance became more and more manifest, and we had to be content first with broken fragments, and finally with patches of white clay. As we approached the fence that separates Field No. 2106 from the public road, even our patches of clay failed us. Apparently the exposed position of the Wall on the brow and the steep face of the hill had favoured the influences making for destruction. At all events, digging in Field No. 2110 proved fruitless, and we were rather at a loss how to proceed until, guided by a report as to masses of clay turned up by the plough a year before, we were able to re-establish the line in most satisfactory manner in Field No. 2116. There the stone foundation was thoroughly examined by Mr Buchanan and Mr James Smith at a time when I was laid aside by illness. It was found to be in excellent condition, being 18 inches below the surface towards the west, and only 6 near the eastern boundary of the field. At one spot a continuous length of 10 feet was cleared, when the kerbstones were seen to be rather smaller than usual but "exceedingly beautifully dressed and neatly laid." Mr Buchanan, indeed, whose experience is exceptionally wide, says that they represented "the neatest work I have seen on the line."

From Beancross eastwards the ground is so perfectly flat as to afford no pretext for deviation. Accordingly we are justified in assuming that the Wall ran straight on. It hardly seemed worth while looking for direct evidence. The stone foundation appears to have been torn up, wholly or partially, as far back as two centuries ago,[3] while the soil

[1] Information from Mr J. Smith, who pointed out to me some of the stones lying at the side of the field.

[2] *Roman Wall*, p. 140, where it was suggested that the stones had come from the base of the Wall.

[3] Gordon, *Itin. Sept.*, p. 60.

in its neighbourhood has been so thoroughly and so frequently soaked by the overflowing of the two burns that the Ditch would have been hard to identify with confidence. In December, 1913, however, during the construction of a large drain, what may well have been the remains of the Military Way were incidentally laid bare in Field No. 691, about 100 feet to the west of the Polmont Burn and about 230 feet to the south of the public road. The indications were perhaps not definite enough to be quite free from doubt, but the position was certainly entirely suitable. For nearly 200 yards on the further side of the burn the Wall must have followed very much the same course as that now taken by the road. At Dollhouse, however, it seems to have turned a little towards the south. Such a change of direction at or about this point had to be postulated in order to secure agreement with the angle at which the stone foundation was ascertained to be lying in Field No. 894, and it was satisfactory to meet with confirmatory evidence close to the western edge of Field No. 896. There, about 100 feet along the hedge from the road and a foot or so beneath the surface, we unearthed a band of stones 13 or 14 feet wide. No kerbs were distinguishable, but the whole had been a good deal disturbed.

In Field No. 894 the stone foundation proved to be fairly well preserved as it passes up the shoulder of the Cadger's Brae, a good deal to the north of what has hitherto been believed to be its line. The hollow to the south cannot, of course, be any longer accepted as the Ditch, although it is not unlikely that it may indicate the track of the Military Way. In point of fact, for about 350 yards beyond the south-east corner of Field No. 896 the Ditch must lie beneath the modern road: this was quite clear from the position of the stone foundation as disclosed by digging at intervals from end to end of Polmont Park. It will be observed that about half-way along the park the old survey and the new coincide once more, only to diverge again almost immediately. The curious curve which Wall and Ditch here make was carefully verified by excavation; at some points the stone foundation still survived, at others one had to be guided by the loose dark soil that marked the progress of the Ditch. Its purpose can hardly be mistaken: the engineers wished to take advantage of a slight but convenient elevation. It will be recollected that a very similar bend was noticed a little to the west of Duntocher village.

On leaving the grounds of Polmont Park, Wall and Ditch enter the glebe, when the straight course is immediately resumed. Within the lower or western portion of the glebe the stone foundation remains virtually intact, about 2 feet below the surface and about 120 feet

south of the road. In the winter of 1912-13, when this field was freshly ploughed, the position of the Wall was betrayed by two parallel lines of clay running east and west amid the ordinary soil and supplying unmistakable testimony as to the character of the superstructure. This testimony, it should be added, was subsequently confirmed by closer investigation; the piles of clay at the outer sides of the foundation were less massive than they had been at Mumrills, but there was not the slightest sign of turf having been anywhere employed. In 1912–13 the upper or eastern portion of the enclosure was absorbed by an extension of the churchyard, the part of the stone foundation which it contained being uncovered and wholly removed, although not until after I had been able to plot it out on the map. The southern half of it lies beneath the shed where the grave-digger keeps his tools. It is worth adding that the Military Way is said to have been cut through some years ago, by workmen who were laying a new water-pipe, in a deep hollow that runs east and west between the church and the manse.[1]

For some distance beyond this point the hatched markings on the Ordnance Map are substantially accurate. The depression of the Ditch can, indeed, be quite distinctly seen in the enclosure to the north of the church, and silent witness to its former existence is borne by the cracked gable of the cottage which stands on the east side of the public road immediately to the left of the entrance to the orchard (Enclosure No. 872), into the mazes of which the line now plunges. Digging here was difficult, owing at first to the thick growth of fruit trees and bushes, and afterwards to the extent to which a naturally heavy soil has been trenched and drained. But the end of the high ridge on the farther side of the Millhall Burn served as a conspicuous landmark right ahead, and towards that all the indications we obtained appeared to point. The steep east bank of the burn has been subjected to so much cutting and alteration, in connection with the construction of the mill lade, that all traces of the handiwork of the Romans have been swept away or buried beyond recall. But as soon as one has gained the shoulder of the ridge one is confronted by a great natural hollow, that sweeps in a gentle curve towards the south and then suddenly straightens itself before disappearing altogether.

As might have been expected, the Roman engineers followed the course that lay thus ready to hand. The Wall was built along the top of the southern bank of the hollow, and the Ditch was doubtless dug at the usual distance in front. As the bank had never been under cultivation, its examination was keenly looked forward to, in the hope

[1] Information from the Rev. J. Buchanan Mackenzie.

that the structure might have suffered comparatively little from the attacks of time. The result, however, was disappointing. There had been little or no accumulation of earth upon the surface to act as a preservative, so that, for the most part, the line could only be traced by the aid of isolated stones—generally kerbstones—protruding here and there above the ground or, it might be, torn up and tossed aside into a clump of underwood. Only at one point was a section (and a very small section) of the south kerb discovered actually *in situ*, with traces of clay adhering to the edges.

From Millhall Wood to the bank of the Avon, a distance of about 1100 yards in all, excavation is hardly necessary. In Field No. 868, for instance, the hollow of the Ditch shows very plainly except at the eastern end, where it has been obliterated by the construction of the large reservoir for supplying water to the town of Grangemouth.[1] The same is true of Field No. 833, where it crosses from the farm of Little Kerse to the farm of Polmonthill, and near the middle of which it takes a slight bend in passing over the top of the hill. In Field No. 832 the track is still quite visible, though scarcely so distinct. In Field No. 827 it disappears, but there can be no doubt that (as the hatchings on the Ordnance Map suggest) it continued to pursue the course already set until it reached the eastern half of the field, when it can once again be discerned swinging slightly towards the right to pass beneath the hedge and embark on a steep and almost straight descent to the river. Mr Meikle, the tenant of Polmonthill, tells me that even within his own personal recollection the process of gradual filling up has made considerable progress. And the plough, which is of course responsible for the levelling, seems long ago to have played havoc with the stone foundation. An isolated block may occasionally be thrown up here and there.[2] But probing and digging at various points between Millhall Wood and the brow of the hill convinced us that anything more substantial was now sadly to seek. The one definite vestige of the Wall which we thought we detected was at the western end of Field No. 833, where, in walking along the track of the Ditch in November, 1914, I noticed among the freshly turned furrows a line of clay running parallel to the Ditch and apparently representing the north kerb. Starting about 220 feet south of the south-east corner of the field, it was distinctly traceable for at least 10 or 12 yards.

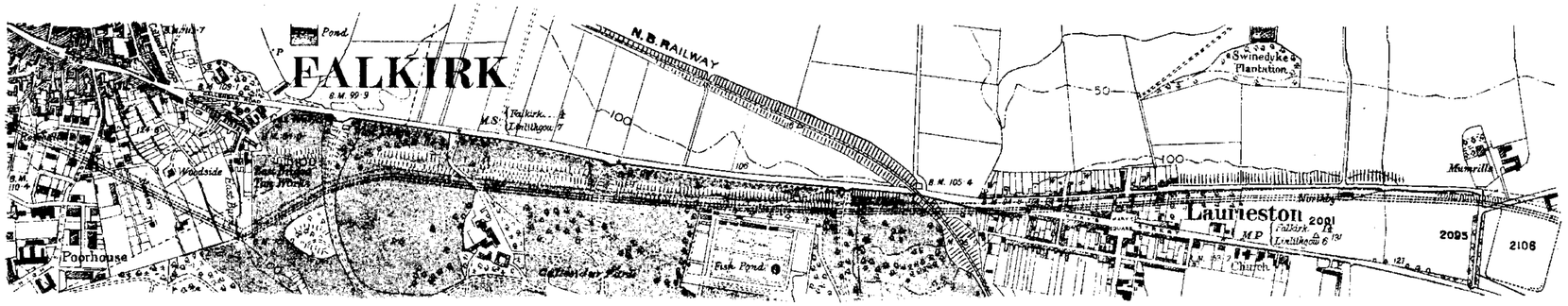
Field No. 825 occupies the slope of the hill, and in passing through it the Ditch drops somewhat suddenly to the level of the bank of the

[1] This is not shown on the map, being of comparatively recent construction.

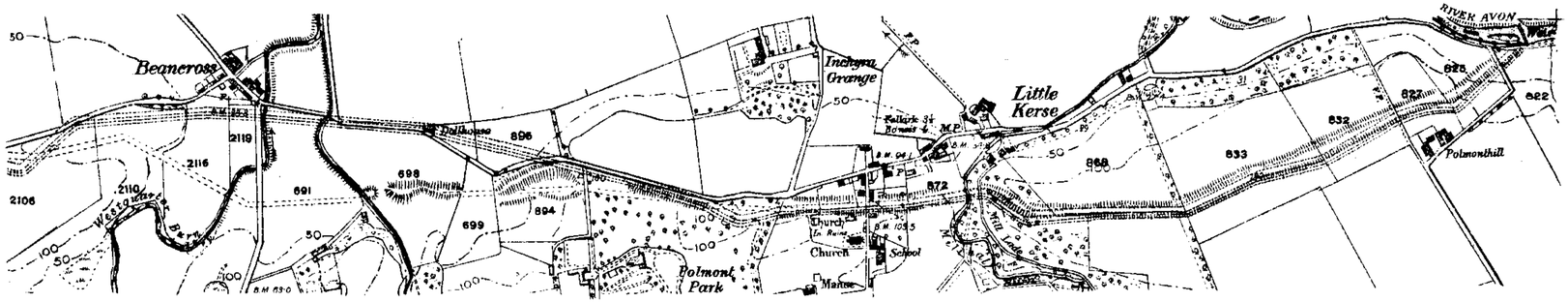
[2] I have noted one or two such blocks, and a few years ago the ploughmen on the farm told me that they turned them up not infrequently (*Roman Wall*, p. 141).

river. Its appearance still justifies the description given of it sixty or seventy years ago by Dr John Buchanan as "an immense slice cut out of the breast of the *brae*, with well-preserved edges." In the upper part of the field the stone foundation appears to have been completely removed. At all events we failed to locate it. About half-way down it proved to be in excellent condition. The north kerb was only some 3 or 4 inches below the surface, the south kerb about 18. The breadth was 15½ feet. There was no lamination visible, but traces of clay were observed among the soil towards the southern side. A similar section was laid open at the foot of the field not far from the hedge. There, however, the ground was so wet that the trench filled with water almost as soon as it was cut. Consequently it was difficult to secure an accurate note of details, and we had to be content with recording the position. Beyond the road, in Field No. 822, a dip in the farther hedge remains to show where the Ditch once ran. A search for the stone foundation was without result. But it is perhaps significant that in turning over the earth at this point we lighted on a small lump of stiff white clay which was obviously intrusive. Taken in conjunction with the other evidence obtained, it seems to set the seal upon the view already indicated — that the structure of the Wall which was observed at Mumrills was characteristic of the whole stretch from Falkirk to the Avon.

THE ROMAN WALL FROM FALKIRK TO INVERAVON.



(From FALKIRK to MUMRILLS)



(From MUMRILLS to the AVON)

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