

XI.

REPORT ON THE SOCIETY'S EXCAVATION OF ROUGH CASTLE ON THE ANTONINE VALLUM, BY MUNGO BUCHANAN, C.M.S.A. SCOT. ; INTRODUCTORY HISTORY BY DR DAVID CHRISTISON ; DESCRIPTION OF THE RELICS BY DR JOSEPH ANDERSON. (PLATES I., II.)

I. HISTORY.

As the funds of the Society had been considerably encroached upon in defraying the expenses of excavating Roman sites for a period of eight years, the Council instituted in 1902 a subscription among the Fellows and others for the purpose of continuing that line of investigation, and ample funds were thus obtained for the excavation of Rough Castle, leaving a considerable balance in our favour.

Leave having been freely granted by Mr Forbes of Callander and the Very Rev. Dr J. C. Russell, proprietors of the ground, the work began early in March, and was continued, not without some interruption from bad weather, till October 1903. Several members of the Council kept up a general superintendence, Mr Thomas Ross's great experience being again available in directing the work. Mr Mungo Buchanan once more gave his valuable services in taking the plans, devoting every moment he could spare from his own business to a careful study of the complex structures that were revealed ; and Mr Alex. Mackie, who had served us already so well as Clerk of Works in four excavations of Roman sites, was re-appointed on this occasion.

Position of Rough Castle.

According to Robert Stuart's chart in *Caledonia Romana*, Rough Castle was the thirteenth fort on the line of the Vallum counting from the west, and the seventh counting from the east. Evident remains of nine forts are still to be seen to the west, but nothing exists above ground of the six to the east. Castlecary, the nearest fort on the Vallum, lies $3\frac{1}{2}$ miles westward of Rough Castle ; the station at Camelon,

situated 1100 yards in front of the Vallum, is $1\frac{1}{2}$ miles to the north-east; and the town of Falkirk lies $2\frac{1}{2}$ miles to the east.

The fort, consisting of a main work and an annex (fig. 1), stands on a rough boggy bit of moorland, overgrown with trees, near the west end of an extensive strip of wood that stretches nearly a mile eastward towards Falkirk. The site itself, and the ground to the south and east, is nearly level, but northward there is a gentle descent to the bottom of the valley, and to the west a rather steep declivity, about 40 feet in height, falls on the Rowantree Burn. This slope was strongly fortified down to the burn, no doubt to command a water supply, which was very necessary, as there was apparently no well within the fort. The north front, formed by the Antonine Vallum, was very strong, and the other three sides of the main work, as well as the east end of the annex, were also strongly fortified; but the south front of the annex was less protected by art, probably because the marshy ground in front, a considerable obstacle in the present day, was still more of an obstruction formerly. Although a stone bottoming, similar to that of the rampart of the Vallum, extended round the rampart of the main fort also, there was no trace of stone revetments, and the fort must be classed as an earthwork, notwithstanding the statement by some of the early observers that it was of stone.

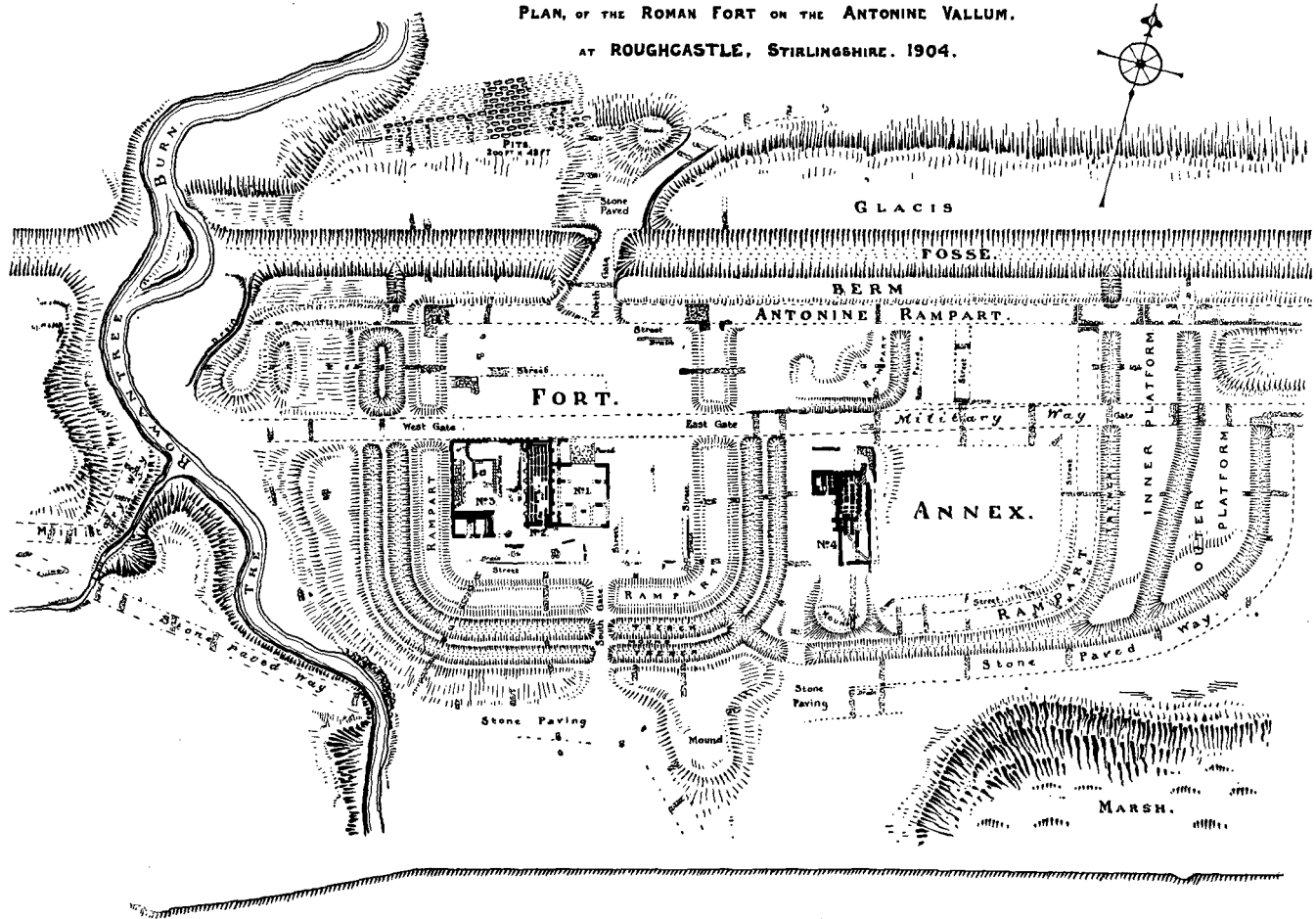
Former Notices.

The early notices of Rough Castle are brief, and contradictory. The earliest is in an anonymous letter describing an excursion to the west of Edinburgh in 1697 (*Historical MSS. Com.* XIII., App. ii., 57).

“About two miles from the Maiden Castle is a large square work of stone with a double ditch about it. The common people hereabouts call it *Castle Ruff*. Here are the ruins of several stone buildings. About the middle of the square is an overture thro which shepherd boys creep into a Vault underground.”

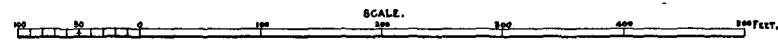
Thus the very earliest informant calls it a work of stone, and mentions a vault, of which, however, we could find no sign.

PLAN, OF THE ROMAN FORT ON THE ANTONINE VALLUM.
AT ROUGHCASTLE, STIRLINGSHIRE. 1904.



PROFILE OF THE SURFACE, THROUGH THE FORT.

PROFILE OF THE SURFACE, THROUGH THE MILITARY WAY.



Mungo Buchanan, Del.
FALKIRK.

Fig. 1.

Sir John Sibbald (*Historical Inquiries*, 1707, p. 30) merely says: "At the Rowen Tree Burn Head is a great Fort."

Alexander Gordon (*Itinerarium Septentrionale* 1726, p. 59, plate xxv.) states that on the east bank of Roundtree Burn "are the distinct vestiges of a vast Roman Fort upon the Wall, called Rough Castle, which for intireness and magnificence exceeds any that are to be seen on the whole Track from sea to sea. Here I spent several hours, taking minutely its dimensions, and an eye Draught of it on the spot, as indeed I did of all the others. One circumstance is very remarkable ;

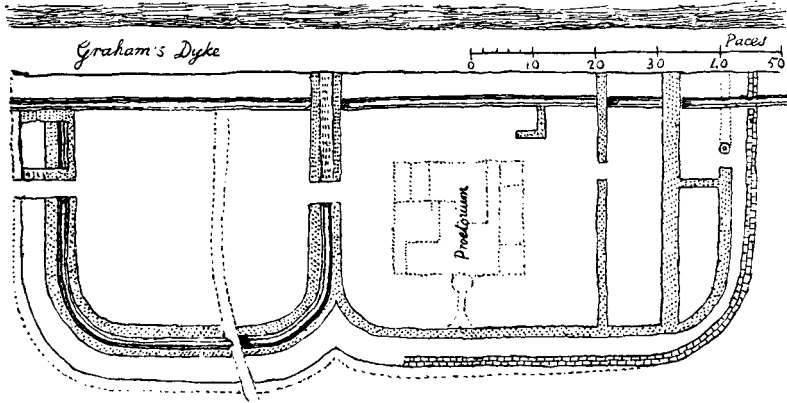


Fig. 2. Reduced Plan of Rough Castle by Alexander Gordon, published 1726.

namely, that the same Freestone Wall, already mentioned (*at Grimesdyke, a short distance westward*), seems by its foundation here to have surrounded the whole Castellum. I also remarked that the great Ditch of Grimes Dyke is part of its Fortification northwards "

Gordon's plan (fig. 2) is by far the best of all his plans of Roman forts, but it does not show the freestone wall he speaks of as surrounding the fort. Something like it is represented at the annex, but as it is outside the trenches, and precisely in the position of the "paved road" in Mr Buchanan's plan, it is probably to be identified with that. Gordon places the ramparts of the main fort between the two trenches

instead of in their rear, and there are other errors in the details of the fortification. He must also have made some mistake with his scale, as it would require a pace above 6 feet in length to bring his measurements near the truth.

It is singular also that he represents a well-defined "Prætorium," divided into compartments, in the centre of the annex, where we found no corresponding building, and he shows no building in the main fort, where we found extensive remains.

Horsley (*Britannia Romana*, 1732, p. 173) describes the descent on the west to the "Rowintree-burn" as gentle, and the ground as now wet

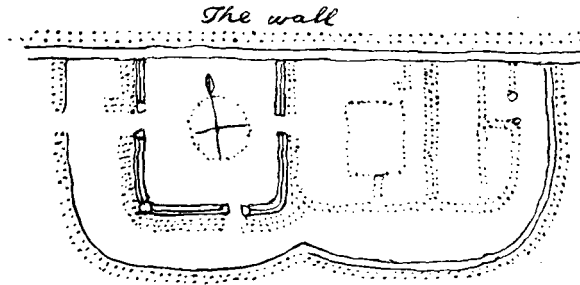


Fig. 3. Plan of Rough Castle by William Horsley, published 1732.

and the fort overgrown with heath. He also says that "No ruins are visible either within or without the ramparts, which are lower than I should have expected from Mr Gordon's account, but I have endeavoured to give the best notice of the walls and contrivances in the draught."

Horsley's plan (fig. 3) is very small and wants a scale. In a general way it is tolerably good, and represents the ramparts and trenches more correctly than Gordon's. Although Horsley says that no ruins were visible, his plan shows in the annex a rectangular enclosed space with an approach from the south, much as Gordon shows his "Prætorium," but nearer the east side, and with its greatest length from north to south instead of from east to west. Horsley also gives what may be presumed

to be the paved road outside, but makes it take a wide sweep beyond the trenches, which is certainly an error.

Maitland (*The History and Antiquities of Scotland*, i. 173) briefly and inadequately describes Rough Castle as "a strong fort about 90 paces square, inclosed with a double rampart and ditch with obtuse angles."

Roy (*The Military Antiquities of the Romans in North Britain*, p. 161, pl. xxxv.), whose survey was made in 1755, calls Rough

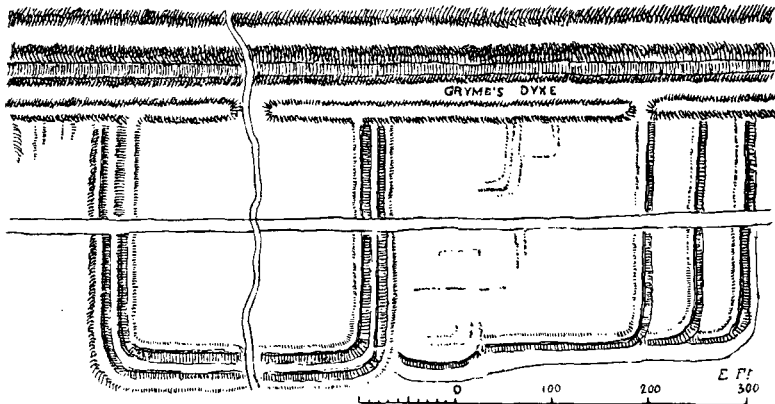


Fig. 4. Reduced Plan of Rough Castle by General Roy, 1755.

Castle the last or easternmost of the forts now existing, and states that it "consists of two divisions, whereof the principal seems to have been that towards the west, as it is surrounded with a triple envelope. The eastern was probably an addition for lodging a greater body of troops, when on some particular emergency the Wall was repaired, and within it some foundations may be seen." His plan (fig. 4) seems to show a "triple envelope" of ramparts, separated by two trenches in the main fort. Faint indications are also shown of the additional fortifications, which were fully opened up by us afterwards, on the descent to the burn. The weak defence of a single trench on the south side of the

annex, and its strong eastern flank, protected by three trenches defining and separating two wide platforms, are depicted much as we found them, and the dimensions given are wonderfully accurate, considering that they were taken on the unexcavated site. The vague remains shown in the interior of the annex cannot well be identified with what we uncovered, and the area of the main fort is blank.

The Rev. William Nimmo (*History of Stirlingshire*, 1777, p. 8) says, "Rough Castle, though all overgrown with heath, from whence it probably drives its present name, yet the plan of it, which is square, is quite distinct. But nothing remarkable is to be seen amongst the ruins of the station; it hath been surrounded with a double ditch and rampart. Mr Gordon observed the foundations of a freestone wall, but there is not at present any appearance of stonework about it, except in the middle, where the Prætorium stood, the stones having been carried off to build houses in the neighbourhood."

The *Old Statistical Account of Scotland*, 1797, only mentions Rough Castle, along with Castlecary and Camelon, as "the most remarkable forts or stations in the neighbourhood," and states that the sites of the two former are still to be seen.

On the other hand, the *New Statistical Account*, 1845, makes the extraordinary statement that "no vestige of Rough Castle can be discovered; and its situation is only marked by a slight elevation of the ground."

Robert Stuart (*Caledonia Romana*, 1852, p. 354) describes the mounds of the dilapidated ramparts as still quite distinct, but "so densely covered with young trees and brushwood that it is with considerable difficulty any part of the general plan can be distinguished. It appears to have consisted originally of two compartments." No vestiges of the traces of masonry in the east enclosure seen by Gordon, or of the Prætorium mentioned by Nimmo, could be seen by Stuart. "Three or four hundred yards south of it, in 1843, was ploughed up an altar, now in Mr John Buchanan's collection, pl. xv. 5."

The Ordnance plan (fig. 5), taken by Lt.-Col. O. E. Ruck, R.E., published in 1897, surpasses all its predecessors, and is valuable as

showing how near a careful surface-plan of the fortifications of a Roman fort may come to what prove to be the main facts on excavation. There is hardly one of the ramparts, trenches, etc., subsequently revealed, which is not indicated in the plan. The interior is blank, as we found it to be on the surface.

The Antonine Wall Report, Glasgow Archæological Society, 1899. In the course of the extensive investigation by a Committee of the Glasgow Archæological Society from 1890 to 1893, of the plan and structure of the Vallum, three sections were made through the ramparts of Rough

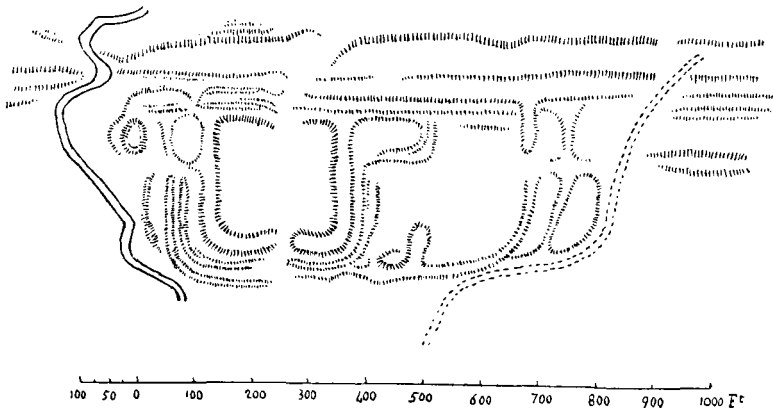


Fig. 5. Ordnance Plan, by Lieut.-Col. O. E. Ruck, R. E.

Castle, two in the Vallum, which was its northern defence, and one through its own rampart to the west (pp. 115–119, and Plate V.).

These excavations were the first ever made at Rough Castle, as far as is known, and contributed greatly to the confirmation of the *cespitiitious* character of the rampart of the Vallum and to our knowledge of its precise structure. The excavation of Rough Castle itself did not fall within the scope of the inquiry, but the Committee drew attention to the importance of a full investigation, such as so soon afterwards it was the privilege of our Society to carry out, the results of which will now be described by Mr Buchanan.

II. REPORT ON THE EXCAVATION. By MUNGO BUCHANAN,
C.M.S.A. Scot.

In the plan of Rough Castle there is a great resemblance to that of the neighbouring fort on the west. Like Castlecary, it is built on the east bank of a stream, on elevated ground and close to it. It is likewise extended on the east by an annex of similar form. Its northern defence is the Antonine Vallum, and along the south front there lies a wide stretch of marshy ground. Here, however, comparison ends, for the strong stone-built walls of Castlecary are not repeated at Rough Castle, and, whereas the fortifications of the former are almost entirely obliterated, the latter still retains its earthworks in splendid preservation. Burial in a coppice, the remains of an ancient forest, and the cover afforded nearly everywhere by a luxuriant undergrowth, may partly account for the preservation of these works, but the main cause has been the great care bestowed upon their construction.

To avoid confusion, only the positions of the principal excavations are shown on the plan (fig. 1).

These, with many more exploratory cuttings, were excavated through the varying strata of forced soil, down to the original natural surface, and carefully examined and noted during the process.

GENERAL DESCRIPTION OF THE FORTIFICATIONS.

The main fort is square in plan, having the Antonine rampart as its base, and the other three sides defended by a rampart and two trenches, rounded at the corners where the east and west sides join the south.

The interior dimensions are 223 feet each way, measuring between the inner margins of the stone foundations of the ramparts, giving an area of nearly $1\frac{1}{7}$ acres. By the extension of the earthen ramparts to the interior, this area is reduced to little over an acre.

Each rampart is pierced by a gateway on a level with the surface of the interior. The east and west gates are in line with the military way

which crosses the fort, dividing it into two unequal parts, the part on the south being nearly twice as large as that on the north. The north and south gates, also, are directly opposite each other, and are placed more to the east than the true centre of the ramparts.

On the east the fort is supplemented by an annex, which differs considerably from it in construction. It is nearly a square of 250 feet within the defences, but the south side is inclined slightly inward, with a bold rounded corner on the south-east, reducing the width at this part to about 230 feet.

Including a portion where one of the trenches of the fort is omitted, the area is about $1\frac{1}{2}$ acres. It has evidently been surrounded by a rampart, now all levelled, and an accompanying trench. Towards the east the latter branches into three widely separated trenches, the intervening spaces being formed into large platforms.

I. DEFENCES OF THE MAIN FORT.

A. THE ANTONINE RAMPART.

The Antonine rampart and trench (figs. 1 and 6) form the north defence of the fort and annex. The rampart appears to have been purposely enlarged, within the compass of the fortifications, by additions externally and internally. The foundation (fig. 7) is of stone, 15 feet wide, bordered with squared kerbstones averaging 15 inches long by 12 broad and 9 deep, placed close together and firmly bedded.

The superstructure in all the cuttings showed the stratified nature of its formation very distinctly,—the apparent addition in width being indicated by the presence of laminæ beyond the stone foundation, generally in continuation of the inner layerings, but occasionally separated from them, and always tapering downward on the outer edge (fig. 6).

About 200 feet of the inner kerb of rampart was uncovered at the east end, and exposed in that length 4 culverts passing through it. The channels of the culverts are 1 foot square, and are constructed of large boulders about 2 feet by 1 foot, placed close together. On the margins they rest for about 3 feet on flat stone bottoming, and for the

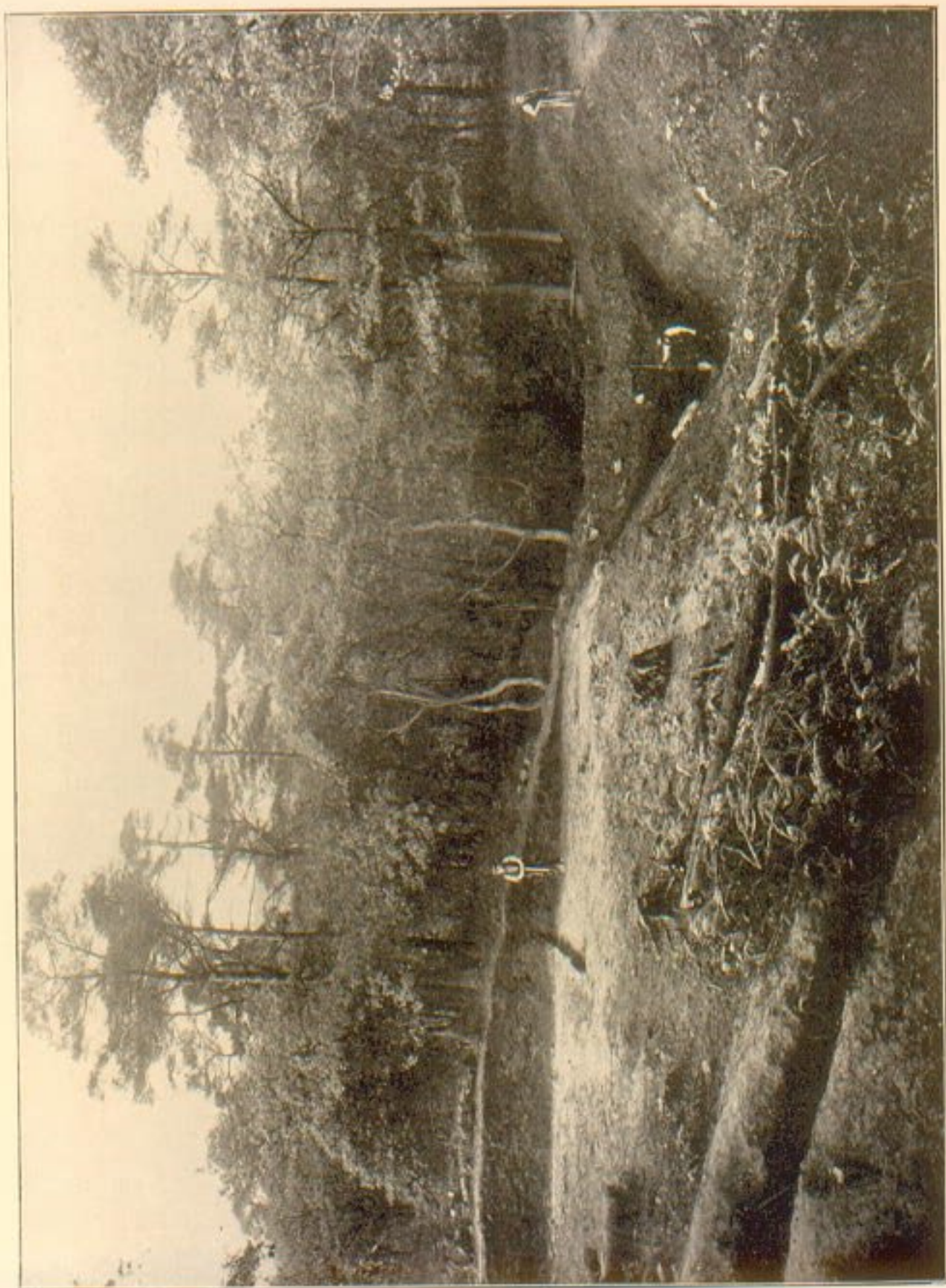


Fig. 6. The Antonine Vallum at Rough Castle, looking west.

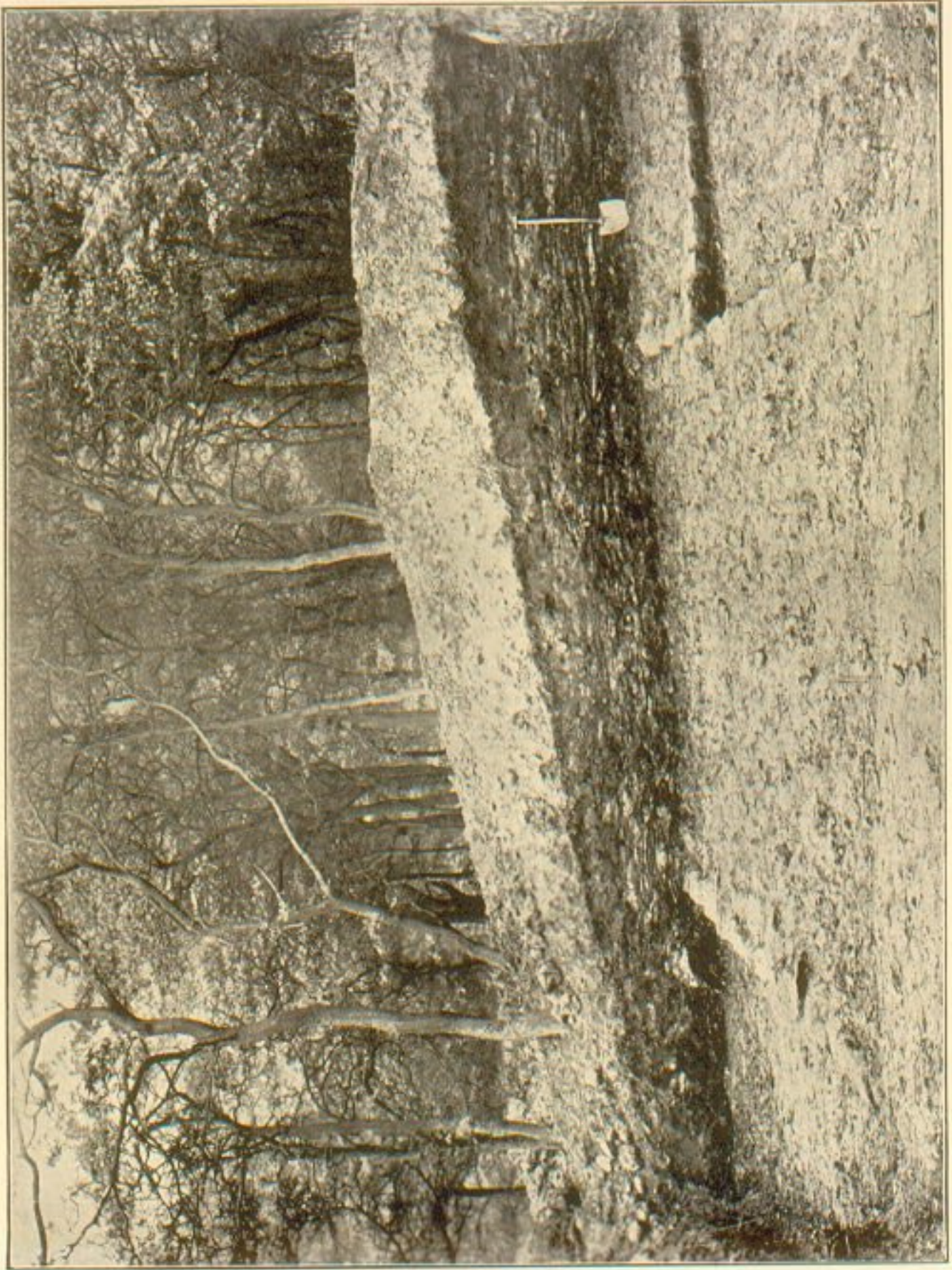


Fig. 7. Junction of East Rampart of Rough Castle Fort with the Antonine Vallum, looking east.

remainder of their length on the natural surface. They are covered with large natural stones, averaging 30 inches long, 15 broad, and 8 deep (fig. 8).

The fosse (fig. 6) in front of the rampart is 40 feet wide and not less than 14 feet deep, and has been strengthened along the margins with



Fig. 8. Culvert passing under Rampart.

stones. The berm next the fort is about 27 feet wide, measuring up to the stone foundation; but as the rampart extends beyond the foundation, the width is reduced to about 20 feet.

The glacis is all forced soil, from 3 to 4 feet deep, averaging about 75 feet in breadth, nearly flat on the surface, with a quick taper downward on the north. Along the edge of the fosse large stones are placed,

occasionally appearing in heaps, as in the section (Plate I.). These stones are all natural boulders ; there is no indication of lamination in the body of the glacis.

A paved roadway is formed across the fosse at the north gateway of the fort, having a gentle slope to the opposite side. It is about 50 feet wide next the rampart, and 20 feet wide in line with the inner margin of the glacis. A deep cutting made by us through its centre for the purpose of drainage revealed a soil identical in nature with that of the glacis, and apparently undisturbed, with the exception of a portion on the extreme east edge, which was much darker in colour, and showed a definite line of junction, while it in no way resembled the organic remains common to the fosse.

From the evidence of other cuttings it seemed to be an extension of the width, and originally the road at its exit could have been little more than 10 feet wide, showing that the fosse had probably terminated against the east side of the passage with a square end, instead of being angled as it now is. (See dotted line on plan.) The west side of the passage is very much angled, and along the whole edge is a raised border of stone-pitching, which is carried for fully a foot down the slope of the trench.

The stone-pitching stretches the whole distance between the Antonine rampart and a small narrow mound at the neck of the passage on the north side of the trench (fig. 1). This mound is 10 feet wide, and is supported along the edge of the fosse by a retaining wall 18 inches high of squared stones in two courses, rounded at the corner to join the stone-pitching.

The area in front of the passage is stone-paved, sloping up the glacis to the west, and in the opposite direction sweeps round in the form of a street, to pass between the glacis on the east and a traverse lying before the gateway. This traverse is 70 feet north of the fosse, and in alignment with the angled west side of the passage. It rises about 5 feet above the adjoining street, is all forced soil, showing no lamination, and is stone-pitched along the bottom of the sloping sides.

B. DEFENSIVE PITS OR LILIA.

100 feet to the west of the traverse, the unexpected discovery was made of a series of defensive pits, as the result of carefully following several indefinite appearances met with, by the trained excavators of the Society.

This unique defence was followed and examined with special care, so as to preserve a full record of its characteristics.

The series of pits extend east and west a length of 200 feet, from close upon the traverse to the brink of the declivity above the burn, and is 48 feet at the widest where entirely exposed. In this width there are ten parallel rows, with the pits arranged obliquely, so that pit and level surface alternate either way.

Each pit is about 7 feet long by 3 feet wide at the surface and 2 feet 6 inches deep, the sides tapering quickly downwards. They are so regular in arrangement that they divide out at 10-foot centres longitudinally, and 5 feet in the opposite direction, with very little variation.

It will be seen from the photographs, figs. 9 and 10, and the section (Plate I.), that the five south rows are covered by the tailing of the glacia. The depth of soil overlying the southmost row is nearly 3 feet, but northward it tapers down to 9 inches in a distance of about 25 feet, and continues at this depth over the other five rows.

As regards the strata of the covering soil, nothing particular was noted in the pits themselves, except that there appeared a few inches of dark soil near the bottom, such as is generally found in trenches; but about halfway between the top of the pit and the surface of the glacia a distinct dividing line was observed. This line varies from $\frac{1}{2}$ to $1\frac{1}{2}$ inches in width, and was almost black with streaks of iron pan through it. The soil under the mark was of a lighter colour than that overlying it. The appearance suggested that additions had been made at different times.

In this soil were many very small pieces of broken pottery, and they were found even near the bottom of the pits. Most of it was of a dark

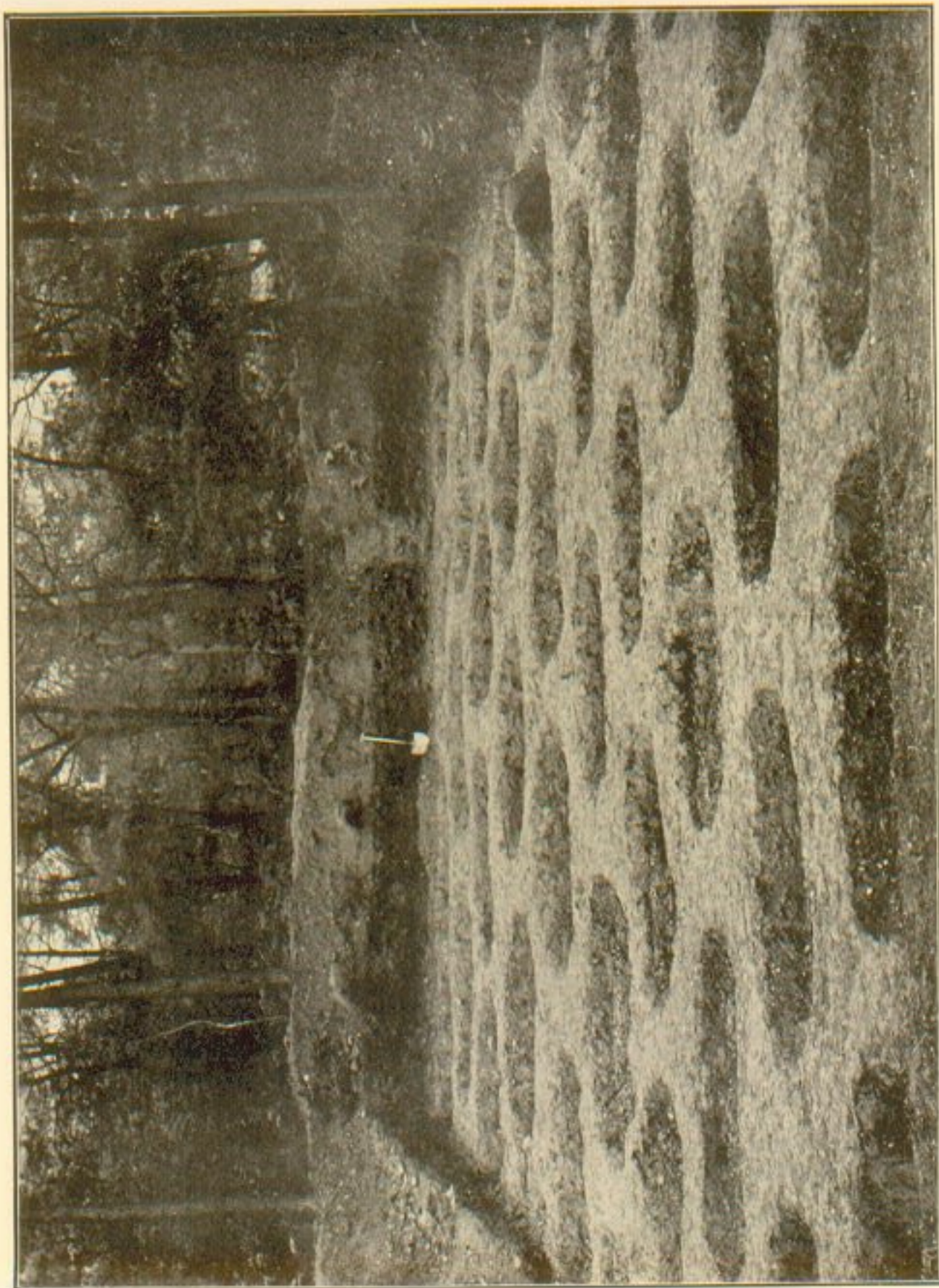


Fig. 9. The Pits (Lalia) to north-west of north gate of Rough Castle Fort.

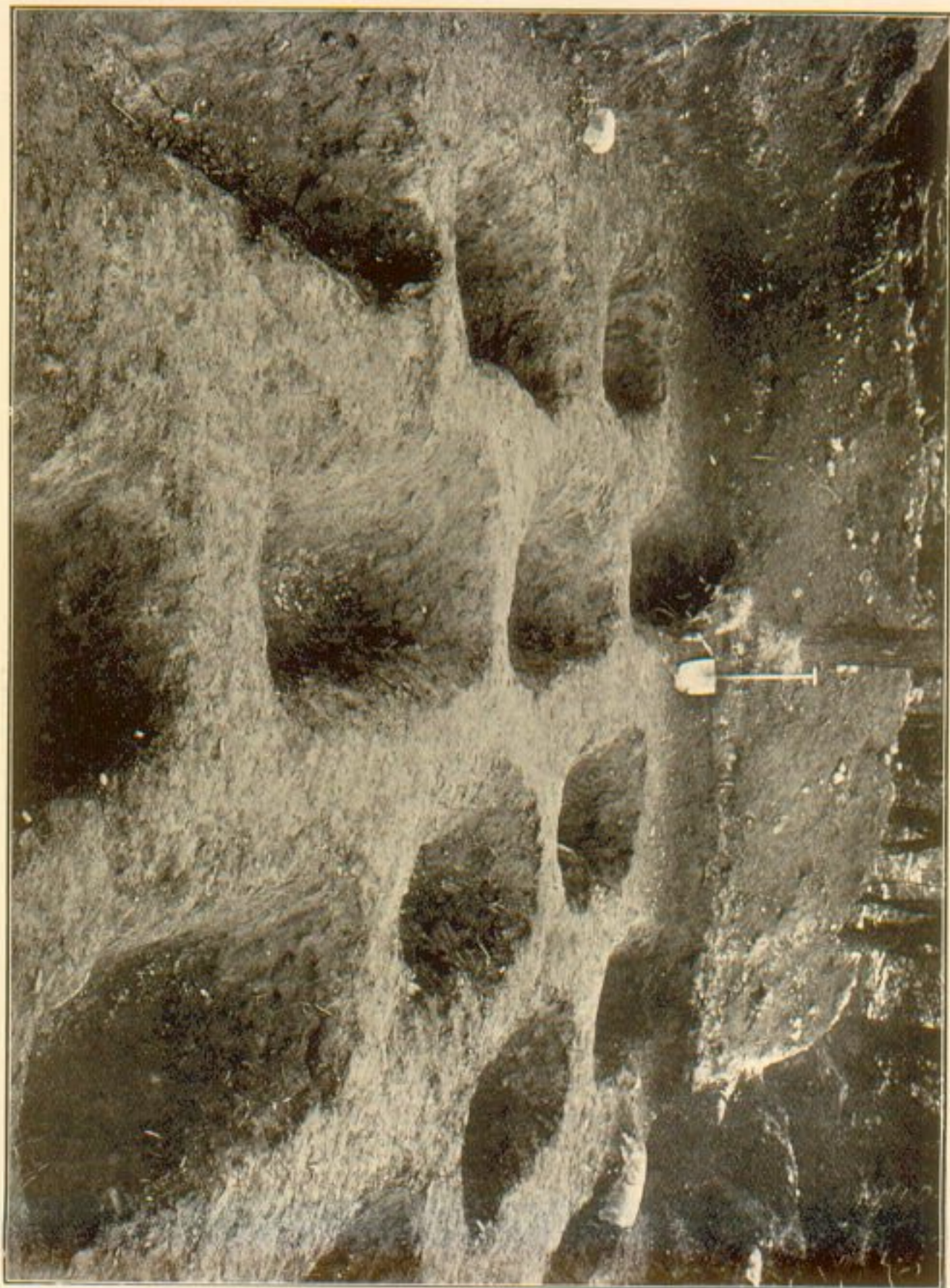


Fig. 10. The Pits (Lullia) to north-west of the north gate of Rough Castle Fort (looking into them from the east).

lead colour, with a black glaze showing reticulated lines on the outside, but a few fragments were coarser, and of a light grey colour.

It may here be remarked that outside the south gate a similar kind of soil, with pieces of pottery liberally mixed among it, covered a large area, over which in several places stone-paved roadways had been laid. These may have been refuse-heaps, spread out and covered or added to, and when taken in connection with other evidences throughout the fort, point to an alteration of the defences at these parts.

C. THE RAMPARTS.

The foundations of the ramparts of the fort vary to a great extent, and in the superstructure the layers are larger than in the Antonine Vallum. At the junction of the east rampart of the fort with the Antonine Vallum the foundations show distinct separation from one another (fig. 7). That of the fort is 20 feet wide, the outer margins being continued round the end, and stands several inches above the Antonine margin, close to which it is laid, otherwise both foundations at this part are identical in construction. About 40 feet farther south the foundation of the fort is changed; and while the inner margin is still maintained, the outer or east one is omitted, and the stone bottoming is carried out a distance of at least 25 feet, and is continued as a stone-paved surface into the annex adjoining. There is no trench in front of this portion of the rampart.

To the interior beyond the inner margin of the foundation there is a channel, stone-bottomed, 6 inches deep by 6 feet wide. This, again, is bounded inwards by a raised core of stones of about 3 feet in width, which ends upon the edge of a cobble-paved street rising about 9 inches above it. This street is 12 feet wide, runs parallel with the rampart, and has in the centre a drain 12 inches wide and 9 inches deep, made of large stones set on edge, as shown in the section on Plate I.

The arrangement above described is maintained throughout this rampart along the inner margin, but further south it is changed on the outer margin. The two trenches are now in front of it, and the margin facing

them becomes, in accordance, a strong stone revetment, about 7 feet 6 inches wide, built higher where facing the interior, and set back 5 feet from the edge of the inner trench. (See the section on Plate I.)

On the west the foundation of the rampart leaves the Antonine Vallum very similarly to that of the east, and, like it, soon changes, though in a different manner. 40 feet south of the Antonine Vallum the 20-foot stone foundation of the junction becomes the bottom of a channel, on each side of which additional margins are formed, rising 6 inches above it. (See the section, Plate I.) That on the outer side increases the width by 10 feet, and is composed of large rough boulders firmly bedded in clay, while the inner margin at the higher level is of flat stones like paving. The recess made by the raising of the margins gives a strong anchorage to the ramparts, as will be observed in fig. 11.

To generalise, it may be affirmed that underneath all the ramparts of the fort there are stone foundations of an average width of not less than 20 feet, supplemented by varying margins, adapted to suit special requirements, and increasing the width so that it is nowhere less than 30 feet; and amounts in the east rampart to 35 feet. Whatever berm there may have been originally—and there is evidence of the same—has been utilised for increasing the width of the rampart-foundation by an addition evidently purposely made, and continuous with the scarp of the trench in front.

Overlying the foundation, the core of the rampart (figs. 11, 12) is a clustered mass of large blocks of clayey soil, light grey in colour,—a character of soil common to the district. The average height of core in the centre is 4 feet, and its width terminates on the outer edges of the stone foundation, with a batter inclining inwards as it rises in height. The blocks are laid in a systematic manner, but appear depressed in the centre, and in a sectional cutting the outline of each block can be traced by the dark material that marks their line of division. This dark line is of a peaty character, and varies in thickness from 1 to 3 inches. In one instance, peat 5 inches thick was observed, actually in position as a block. In general the blocks are seldom less than 3 inches,

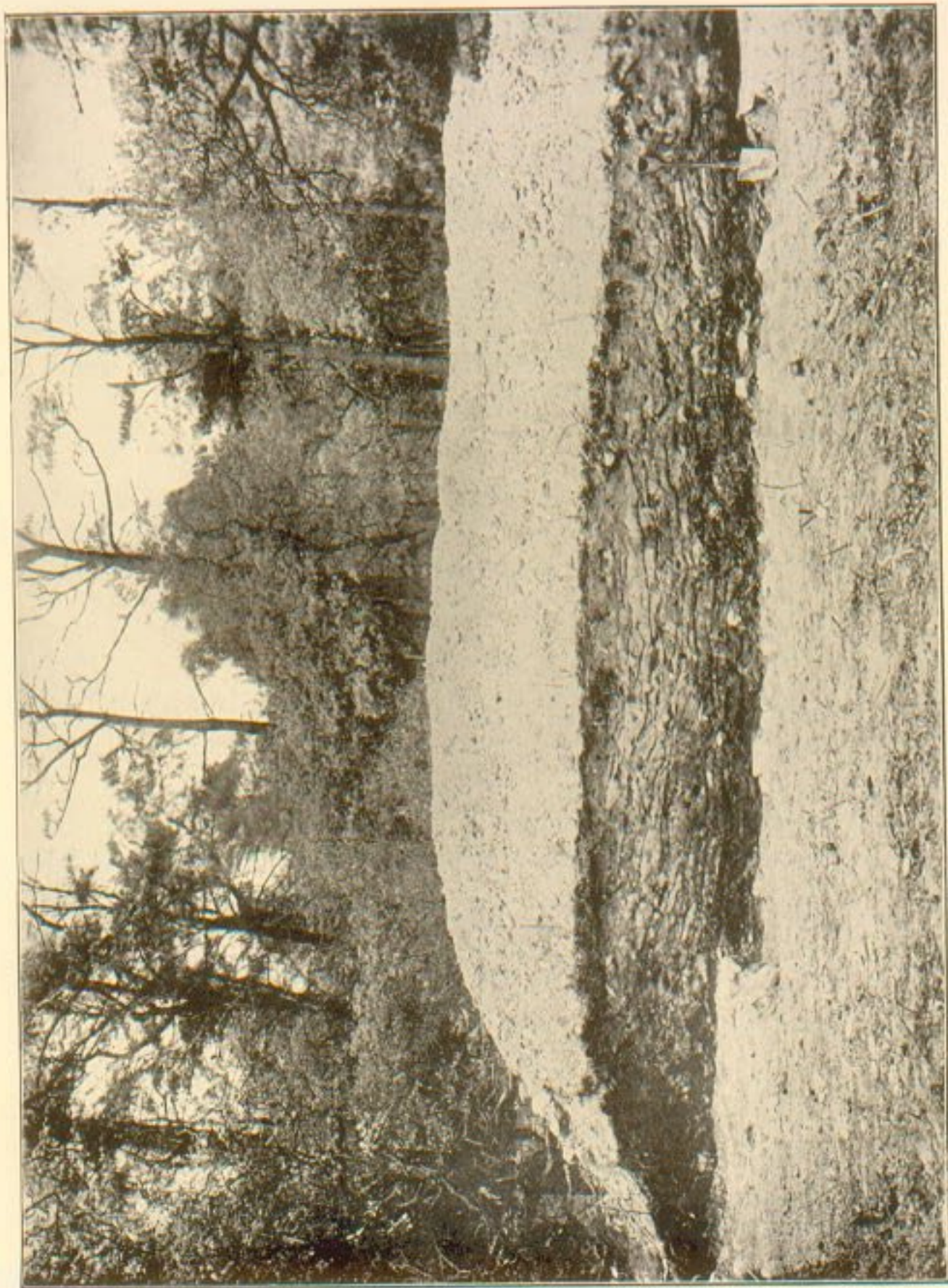


Fig. 11. West Rampart of Rough Castle Fort, looking north.

but it is not uncommon to find them 4 inches and even 5 inches thick, while in length they vary from 15 to 24 inches, and where they finish, they are tilted slightly upwards on the outer edge.

The ramifications of the division lines are very intricate, ever changing with the least removal of the soil; but by repeated trial at one part in the east rampart, it was found that the number of layers in the height of the core did not exceed 20.

Boulder stones from 3 to 6 inches in size are very plentiful among the layers (figs. 7, 11, 12), and if their presence be not accidental, there is no evidence of their practical use. They are too small to add strength by their weight, and in most cases appear rather to break bond in the layers, thus reducing the cohesion of core, especially when a few happen to be close together.

While it is noted that the layers terminate at the edge of the stone foundation, similar laminated soil appears beyond its kerbs, both externally and internally, lying on the original surface, extending outwardly 6 feet and inwardly fully 8 feet, sometimes in continuation of the core, but more often quite separate, and always showing the same systematic layering, evidently intentionally laid, to add to the width of the rampart.

Overlying the laminated core across the whole width of the rampart is a depth of 2 feet of dark brown soil, uniform in substance and very compact.

D. THE TRENCHES.

The ramparts are surrounded externally by two trenches 8 feet deep covering a width of 40 feet, including the intervening mound. On the original surface, near the apex of the mound, a course of heavy stonework, about 9 inches high and 3 to 4 feet wide, is laid along the whole length and firmly bedded, over the top of which the earthwork is carried, increasing the height.

Lining the top on the edge of the outer trench there is also a course of similar firm-bedded stonework, and this stone lining, at all parts liable to be easily damaged, is a noted characteristic of the whole work.

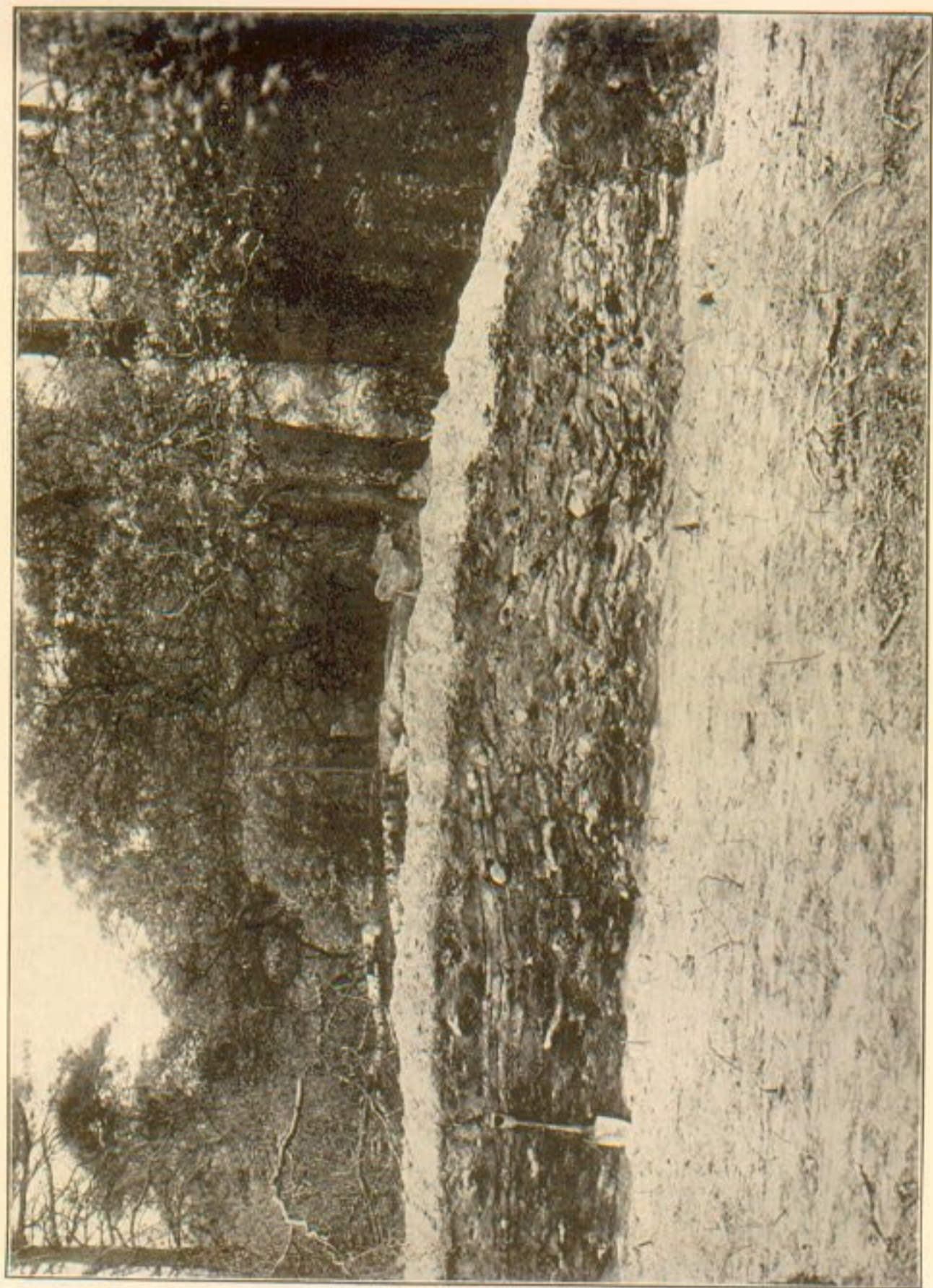


Fig. 12. West Rampart of Rough Castle Fort: longitudinal section and cross section of the Antonine Vallum.

It has been seen applied in various ways in all directions. Besides the above-mentioned, it is carefully laid along the base of all ramparts, mounds, and traverses, and is always prominent on the edges of declivities or trenches (see the sections, Plates I. and II.),—an enduring evidence of the care taken to render the work strong and permanent.

The defences on the west are very strong, and are a striking object viewed from the level of the burn. The whole formation is made of forced soil, and every advantage has been taken to make the most of a fine position by means of trenches and mounds. (See the section, Plate I.)

The burn to all appearance has altered but little during the centuries, at least where it first approaches in touch with the defences, and there still exists evidence of the method adopted to divert its course (fig. 1). The stream coming from the south strikes against the foot of the defence at the south-west corner, and with a quick bend sweeps away from it. To protect this point from encroachment a massive wall of boulders is built, giving direction to the stream. It rises 6 feet in height, and some of the stones used are over 2 feet in diameter. The stonework is not confined to a facing merely, but has a heavy backing inwardly, which is traceable eastward along the tailing of the outer mound of fort for at least 30 feet.

On either bank of the stream at this part stone-paved roads approach directly opposite each other, and for passage some method of bridging would be a necessity.

Going west and north, following the stream, a strong revetment wall is carried along the low level at the foot of the large mound in front of the trenches, composed of large natural boulders, sometimes placed singly, but generally having a second row lying against those in front. Other stone revetments appear in the mound at higher levels, and all terminate approaching the military way.

The foundation of the Antonine rampart is carried down the declivity in a straight line to the small burn at the bottom, but the superstructure is turned at an angle, and finishes as a prominent mound at the foot of the

military way. Between this lower mound and the trenches in front of the rampart of the fort is a steep incline, the slope of which is accentuated near the lower rampart by the formation of an oval-shaped trench close to the latter (see the section on Plate I.).

The military way, apparently, has crossed the Rowantree Burn on the level,—although paving is not traceable,—as it approaches the stream in a suitable manner. From the fort it is continued straight down to the edge, and from the edge immediately opposite it rises again, taking an oblique direction up the steep bank, where easier ascent is gained along the side of a small tributary of the burn.

The trenches along the east face stop at the south border of the military way and are not continued on the north of it, a different arrangement being substituted. Running close upon and parallel with the north border of the military way is a trench 10 feet wide, which beginning about 20 feet in front of the rampart, proceeds for about 130 feet further, when it turns at right angles with rounded corner, and continues up to the inner margin of the Antonine rampart, the width of the latter extension being increased to 15 feet. To the interior of the trench a rampart is still traceable, which takes the form of a prominent mound at the south-east corner. In the centre is a core of stones, among which was observed evidence of the effects of fire. The soil forming the rampart is not laminated, and the surface is all stone-paved.

Projecting outward on the east of the south gateway is a large mound or platform, 100 feet long by 50 feet broad, composed entirely of forced soil. The top is level with the margin of the outer trench, and presents a large flat surface. It is stiffened internally with courses of stone, and on the exterior, round the bottom, at the tailing of the sloping sides, it is stone-pitched in the manner common throughout the fort.

Indications of stone-paving were found in front of the south gateway over a large area, and a street runs along the west side of the platform, beyond which it becomes somewhat indefinite, but appears to continue south for about two hundred yards, where it is again observed connecting

with a flat stone-paved floor. This floor is on the east side of a rounded knoll on the edge of the burn, and is about 15 feet by 10. There is no appearance of any walling, the paving finishing with square edges on two of the sides, the others being irregular. On the south edge, near the centre of the length, there is a small construction like a cist, made of four slabs placed vertically, and with a bottom stone hollowed in the centre.

It will have been remarked that the defences of the fort are very complete. The large rampart is protected in front by two wide and deep trenches strongly constructed; to these is added, before the gateways, a special defence, situated in each case on the right hand of an enemy approaching the entrances: viz., the traverses or platforms adjoining the north and south gates, the flanking trench at the east gate, and the expanded platform close to the west gate.

II. DEFENCES OF THE ANNEX.

Excavation revealed evidence of a rampart surrounding the annex on the east and south, although there is little indication of it on the present surface.

About 2 feet under the surface there is a stone foundation 15 feet wide, similar in construction to that of the Antonine rampart, and to the interior the stonework continues for another 15 feet like to a paved roadway. It appears much disturbed in several cuttings, but is always distinguishable. Where it abuts against the Antonine rampart a portion still remains very perfect, in which there is a culvert, with an opening 12 inches square. It is close to the junction and has connection on the inner side with a similar culvert going through the foundation of the Antonine rampart.

The trenches of the annex are special in arrangement and peculiar to this work.

On the south the rampart is defended by a single trench 15 feet wide, by 8 feet deep, which, beginning at the inner trench of the fort at the south-east corner, cuts through the intervening mound and the outer

trench in a bold sweep, and continues along in front of the rampart, following the same bend, and trending northward till it reaches the Antonine rampart. It is intersected by the military way, which crosses it on a level with the surface. In front of the above trench, facing the east, there are two platforms, separated the one from the other by a wide trench of about 20 feet, and beyond the outer of the platforms is another trench 15 feet wide. All the trenches unite into one near the south-east bend of the annex. The central and widest trench is placed obliquely where it separates the platforms, but becomes parallel with the other trenches as it approaches the military way, through which it pierces, separating the connection with the interior. Down the slopes of the trench here the stone-pitching is carried heavier and further than is usual, but the method adopted for passing the military way across the trench was not ascertained—no evidence of bridging could be found.

The outer trench on the east is in continuation of that on the south, from which it sweeps with a wide curve, approaching the military way at right angles. It ends against the roadway at the entrance of the annex, beyond which, unlike the other two trenches, it is not carried.

Referring to further evidence of the isolating of these fortifications, it may be mentioned that, besides the severance of the military way above noted, similar disjunctions occur on the Antonine berm. It will be observed on the plan, fig. 1, that, in line with the inner trenches of both east and west defences, the berm is pierced by a trench of the same width as those of the fort they are opposite; these are return cuts from the great fosse, and are carried up close to the foundation of the Antonine rampart, completely disconnecting the interior from the exterior. Further eastward, and directly in line with the mid trench, the Antonine rampart appears to have been cut through, for part of the foundation is decidedly removed; but instead of the trench being cut through the berm, the latter shows an irregular stone-pitching on the surface. From here, to the eastward, the Antonine rampart is much bolder in outline than anywhere in the interior of the fortifications, and

here also it is joined by the continuation of the raised outer platform of the annex.

All along the interior the Antonine rampart is reduced in height, and is almost level with the inner surface; at the same time it still shows a bold front facing the berm. In like manner, the rampart which surrounded the annex on the south and east is now also reduced to the level of the interior, which is found to be raised by forced soil for a depth of fully 2 feet. This lowering of the annex rampart is made conspicuous by comparison with a still existing portion near its junction with the fort at the south-west corner. This apparently untouched portion stands up bold and distinct, having the appearance of a small platform on the upper surface. The section through this rampart showed that the construction is different from any of the fort ramparts, but similar to what remains of the rampart round the annex.

In several of the excavations the foundation is found to be composed of stones laid flat on the ground, but generally it takes the form of a core of stones bedded in clay, occupying the centre of the structure.

It was observed that towards the margins the stones are purposely placed to resist the outward thrust of others superimposed upon them; this is very marked in the section referred to (see the section on Plate II.).

In the superstructure there is no lamination such as was found in the fort ramparts, but marked differences appeared in the character of the soil. In one of the cuttings the outer half in front of the stone core is of a rich brown colour, close-grained, while that on the inner side is almost as black as soot, and in much greater quantity. In the remaining high portion of the rampart the soil is of a uniform nature and colour, and being adjacent to a prominent building, the surface is all stone-pitched between the rampart and the building.

The platforms on the east defence are raised 3 to 4 feet above the original surface by added soil, and are stiffened internally with courses of stonework at intervals, and along the edges of the trenches by heavy boulder stones. The outer platform is the higher by 2 feet, and both

show a decided increase in height where facing the south-east. The inner platform is 50 feet wide at the widest and 25 feet at the narrowest part, and 250 feet in length north to south, the area of surface being fully 9700 square feet. The outer, which is shorter and broader, is 55 feet at the widest, 42 feet at the narrowest part, and 150 feet long, the area of the surface being about 7000 square feet.

On the outer edge of the trench which encircles the annex there is a close strong pitching of stones, carried well down the counterscarp of the trench, similar to what was observed on the fort trenches; but in this instance it is spread outwards to such an extent, from 14 to 16 feet, that it suggests the idea of a paved roadway. In several places, and especially near the west end of the annex, it decidedly has been used as a road (see the section on Plate II.). It branches off from the military way at the entrance to the annex, and continues very distinct along the whole front on the east and south till it approaches the traverse at the south gate, over which it rises, and connecting with the pitching on the same, is carried across the platform.

In front of the stone-paving and close to it the ground dips and falls away into a wide marshy tract.

III. THE MILITARY WAY.

This paved street passes straight through the fortifications. Entering the annex from the east, it terminates at the foot of the slope near the burn on the west.

The average width is 18 feet, but there are additions made on both sides where it passes through the annex, which increases the width to about 40 feet.

It is formed of cobblestones closely placed together, the surface being of fine gravel, with a well-rounded top.

IV. BUILDINGS IN THE FORT.

The remains of the buildings of the interior are in a very dilapidated condition: in most cases only the foundations exist; but where walling

is gone, it is fortunately possible to trace them by the remaining clay sub-base, indicating the position they had occupied.

A. BUILDING NO. 1.

Of the buildings (fig. 13), No. 1 appears to be the principal and largest. There is a careful paving in front of it, leading from the entrance to the military way. Internally it is 50 feet long from north to south and $38\frac{1}{2}$ feet from east to west. On the west side of the entrance there is a small enclosure $17\frac{1}{2}$ feet long and $9\frac{1}{2}$ feet broad, formed by three walls, and open along the front next the pavement. A similar enclosure may have existed on the opposite side, but of such no definite evidence was obtained, the position being very much disturbed. The floor of this portion is of hard-pounded clayey soil, the surface showing bright, with broken pieces of red tile mixed with it. The same kind of flooring is common through the entire building.

On the east side of the entrance, within the threshold, in a hole among other debris, the remains of the inscribed tablet (fig. 14) were discovered. It was in three pieces, two of which were close together, and the third only a few feet apart. A careful search failed to find the portions still wanting. Fortunately the missing part of the inscription can be easily supplied from the context:—

[IMP · CAE]SARI · TITO
 [AELIO ·]HADRIANO
 [ANTO]NINO · AVG
 [PIO ·]P · P · COH · VI
 [NER]VIORVM · PRI
 [NCI]PIA · FECIT

Which being expanded would read:—*Imperatori Caesari Tito Aelio Hadriano Antonino Augusto, Patri Patriae, Cohors sexta Nerviorum Principia fecit*:—In the reign of the Emperor Cæsar Titus Aelius Hadrianus Antoninus Augustus, the father of his country, the sixth cohort of the Nervians made the Headquarters. This is the first instance of the occurrence of the word Principia in Scotland for the headquarters

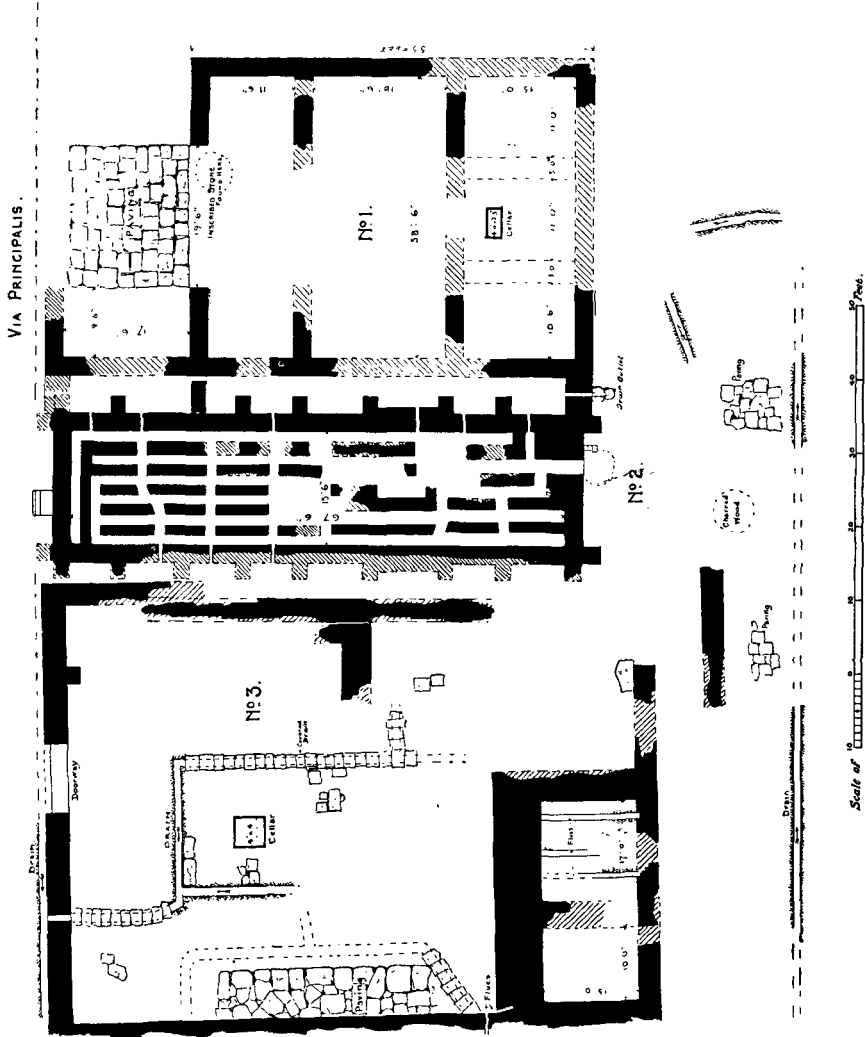


Fig. 18. Buildings inside the main Fort.

of a station. There are inscriptions in England commemorating the restoration of ruined Principia at Bath and Lanchester.

The interior of the building is divided by partitions into three apartments, the inner of which is again divided into three chambers.



Fig 14. Inscribed Tablet found in Rough Castle.

Of the three apartments, that to the north is $11\frac{1}{2}$ feet wide, the centre one is $18\frac{1}{2}$ feet wide, and the south one 15 feet wide, within the walls. The two former run all the length of the building from east to west, but the latter is apparently subdivided by two cross walls. These appear as incomplete foundations, of a character not anywhere else observed. In position they are on a level immediately below the

other adjoining stone foundations, and pass under them similarly to the sub-base. They are composed entirely of chips of sandstone, no clay being used with them, nor is there any appearance of walling having been reared upon them.

In many instances the mixture of clay with stones in the lower foundations, surviving the upper stonework, is the only way of tracing connection between existing pieces of walling. As regards these two

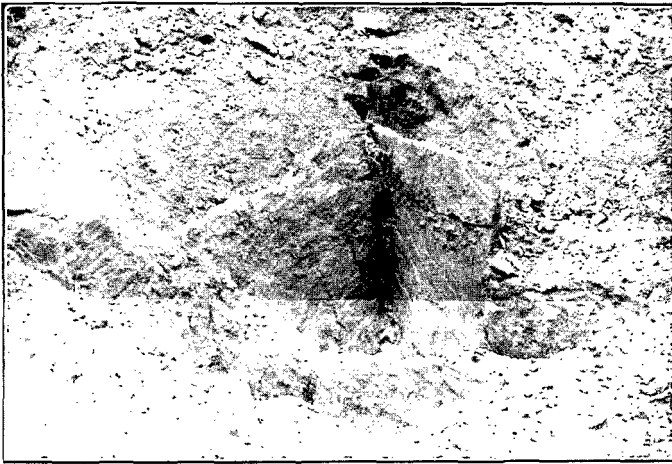


Fig. 15. Pit in Building No. 1.

cross walls, the difference is so great as to call for remark, particularly as they do not extend further than the walls of the apartment in which they appear.

The other walls dividing the apartments were distinctly traced, but they showed no indication of footings in the centre. It is possible they were not projected into the interior any further than to be in line with the opening at the entrance. The width of the entrance is $19\frac{1}{2}$ feet, and the walls are 30 inches thick where they show above the foundation, which has a 2-inch scarcement projecting to the outside. In the

southmost apartment, in the centre and near the division wall, there is a sunk stone-lined pit, 4 feet long, 2 feet 3 inches wide, and 2 feet 6 inches deep (fig. 15). The flagstones of which it is composed are placed on edge and rest upon a similar stone in the bottom. It has no outlet or overflow, nor is there any drain near it; and although it is watertight, it has more the appearance of a cellar than a water-cistern.

B. BUILDING No. 2.

This lies to the west of No. 1, and is a structure of a kind invariably met with in all our explorations of Roman works. It is separated from No. 1 by a space of 5 feet, and has been a strongly constructed building. The portions now remaining are all under what was probably the floor, pieces of which still remain *in situ* (figs. 16, 17). Within the walls the length is $67\frac{1}{2}$ feet and the width is $15\frac{1}{2}$ feet. The walls are 30 inches in breadth, except where an expansion between the third and fourth buttress from the south increased it to 42 inches.

Nine buttresses, projecting 2 feet, are arranged along each side, and two at each end.

Between the buttresses the walls are pierced with holes 5 inches wide by about 9 inches high, and the whole interior is arranged into a series of channels, divided by stone-and-lime built dwarf walls, interrupted at intervals to allow of the connecting channels passing from one side of the building to the other, the latter being opposite the holes pierced in the walls (figs. 16, 17). The channels average 15 inches in width and the dwarf walls about 16 inches. Overlying the walls in several places are pieces of flagstone 2 inches thick that here and there still cover the channels, and are carried through the walls and buttresses as a bonding course (fig. 18). The arrangement seems to have been for ventilation and keeping the floor of the building dry. A few of the holes in the walls appeared to be purposely filled up with hard-rammed puddled clay.

Between buildings Nos. 1 and 2, at both ends, the intervening space



Fig. 16. Building No. 2, viewed from the east



Fig. 17. Building No. 2, from the Military Way, looking south.

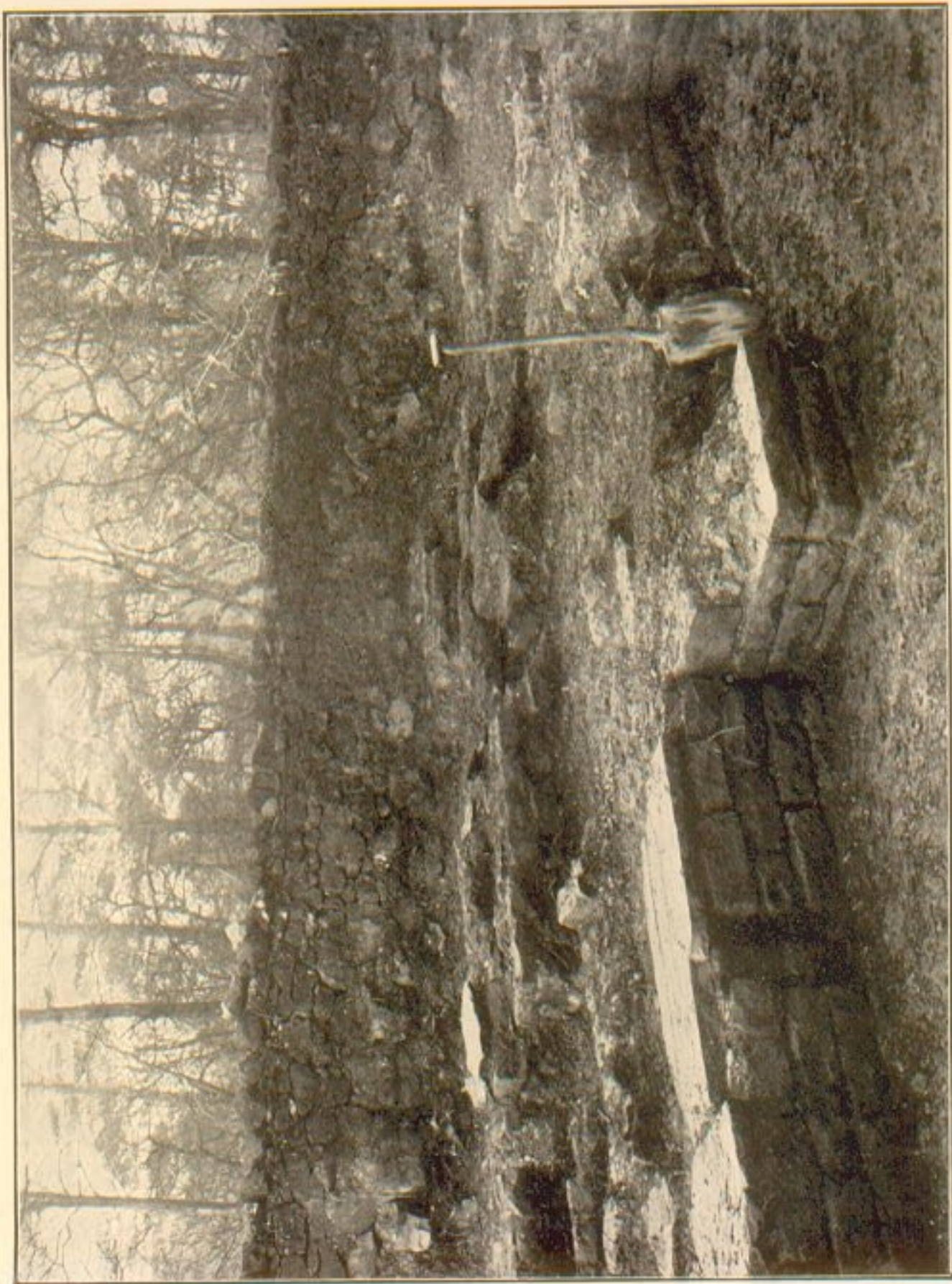


Fig. 18. Building No. 2, showing Flagstones in position.

has been closed at a subsequent time by the erection of connecting walls, through which a free passage is left for draining away the water. Part of the drain on the outside is still preserved (fig. 19).

At the north end of building No. 2, facing the military way, there



Fig. 19. Exit for water between Buildings No. 1 and No. 2.

is a small platform, composed of flagstones bedded upon rough-built stone supports $3\frac{1}{2}$ feet wide and projecting 21 inches from the building, having two stone steps leading up to it (fig. 17). As it is on the same level as the top of the flagstone floor, it may have been a landing before the entrance.

C. BUILDING No. 3.

This enclosure is almost obliterated, and no definite plan is now attainable, but a few interesting points remain worth recording.

The wall along the west is built against the rampart and is 30 inches in breadth. It forms a revetment to the lower part of the rampart, the laminated structure of which lies close against the stonework. At the south-west corner there is an oblong chamber 13 feet wide by 28 feet long, apparently divided by a partition, but certainly separated by a difference of floor-level. The portion close to the rampart for 11 feet is 18 inches below the other portion, being separated from it by a partition, of which only a short piece remains.

The higher and larger portion has three flues about 9 inches wide and 5 inches deep, built of stones, crossing on the floor-level from north to south, which were recessed into the south wall, but only abutted against the north wall. They were only definitely traceable in this direction, although there were indications of at least one cross flue passing up the centre.

Outside the broad wall on the north of the chamber, where it unites with the west wall, there are two flues, 5 inches wide, placed very low and near the ground. One is directed upwards and through the wall on the west; the other angles eastward and upward through the broad wall above mentioned. This extra broad wall is the remains of two walls, so closely situated as to rest on a foundation all on the same level. The northern part of the wall rises above the other, this latter evidently being a basement wall only.

The outer or south wall is continued eastward beyond the chamber a distance of 14 feet, and ends with a square return like the jamb of a doorway, on the inside of which a large flagstone-paving still lies undisturbed.

The north wall at the military way is continuous along the whole 60 feet of frontage, but is apparently of two distinct types. A portion in the centre, in which there is the entrance, is superior in workmanship

to the remainder. In the former the stonework is small and regularly laid; in the others the stones are larger and roughly hammer-dressed. The foundation appears to be of a uniform character throughout.

The entrance doorway is $9\frac{1}{2}$ feet wide, and has a stone cill on the threshold, recessed 9 inches from the outer face of wall, and a stone-built open gutter 9 inches wide runs along the whole front of the wall, close to it.

The No. 3 enclosure is not parallel with the adjoining buttressed building, but with the military way, and is square set-off from the west wall, whereas buildings Nos. 1 and 2 lie parallel to the line of the Antonine rampart. The difference is not great, but is marked at their junction by the presence of the remains of another wall built over the returned east wall of the No. 3 building, this apparently later erection being parallel with those to the east (fig. 13). There is another distinct piece of walling lying close against the latter, near the centre of the enclosure, and running parallel with it for about 8 feet, which, with a square return, projects into the interior about 11 feet; the part close to the other wall is 30 inches broad, the return being increased to over 48 inches. These are now only remnants of walling, the connections and continuations of which are completely destroyed.

Near the centre of the enclosure, placed equidistant 25 feet from the north and west walls, is a sunk pit 4 feet square by $2\frac{1}{2}$ feet deep, built of four vertically-placed flagstones, and with two pieces of the same laid in the bottom. This pit is similar to that in building No. 1, but is larger and better finished. Although it is surrounded on three sides by drains, it has no connection with any, nor has it any outlet or overflow.

The whole area appears to have been covered with flagstone-paving in a very substantial manner, from the evidence of several undisturbed portions, the covering of the drains being part of the floor. Along the west wall there is a complete stretch of stone-paving about 30 feet in length and $6\frac{1}{2}$ feet in breadth, which is laid with irregular-shaped flat stones. At both ends and in front of it runs a channel, part of which

is still complete, showing that it is the remains of a drain similar to the others, and which, to appearance, is connected with them. They are all conducted into the one channel, which passing through the north wall, joins the gutter in front of it, the fall being towards the west gate of the fort. The width of the drains is about .15 inches at the top ; they are **V**-shaped, tapering to the bottom, and are 9 inches deep. This formation of drain is not general throughout the fort ; in most cases the sides are vertical.

The floor in the south-east portion of the enclosure is entirely different from that in the centre. It consists of a flat surface of pounded clay and sand, with a large quantity of finely-broken red brick among it, which when first uncovered made it a conspicuous object in the surroundings.

In this portion of the interior of the fort, it may be remarked, we have evidence of alteration or additions, and the most complete and finished workmanship side by side with that of an inferior character.

Regarding the remainder of the interior of the main fort there is nothing definite to report. Here and there streets and pieces of paving were brought to light, and deep holes were opened showing evidence in their interior of the continued use of fire. Generally, it was found that every piece of ground within the ramparts had been utilised to the utmost advantage. Of stone buildings there were none, and it is probable any erections above ground—occupying the blank space on the plan—were temporary, perhaps of timber, and subject to occasional re-arrangement.

Whatever may have been located in those evidently much used positions can only be matter of conjecture, as there was no evidence of any definite arrangement, although the whole area was explored down to the original surface.

V. BUILDING IN THE ANNEX.

From the exploratory cuttings taken through the annex in various directions, it was ascertained that no stone building had been erected

within its area other than that now to be described. But before doing so, attention may be drawn to a probable roadway between the fort and the annex (fig. 1). The roadway runs along the outer edge of the eastmost trench of the fort, and as it passes outward, crosses over the south trench. At the latter, immediately between the projecting platform on the south and the terminating mound of the annex rampart, the trench is observed to be filled up almost to the top, for a width of 15 feet, with tumbled stones, which make a passage across on the level. No similar formation appears anywhere else in the annex trench. It is connected with a broad stone-paving directly in front, and its further prolongation eastward takes the form of a well-defined stone-paved road.

To the inside of the annex the road was traced at intervals: passing up the slope at the corner, it continues northward till it joins the military way, a part of it being very perfect near an adjacent building, where it is seen to branch towards the paved surface of the mound already mentioned. That the trench has been unobstructed originally is evident, for the stones and soil used in the filling up are distinctly additional, and are only found in the hollow of the trench.

The stone-pitching along the margin of the trench is part of the original construction, but it is probable there have been additions subsequently, and a roadway made at this particular place. This is the more likely from the fact that both of the fort trenches on the east defence were in a like manner almost wholly filled up with large stones and gravel, as if additional accommodation had become a necessity.

BUILDING No. 4.

This is the only building of stone within the annex (fig. 1). It is situated in the centre of the space between the oblong defence in the north-west corner and the prominent mound in the south-west corner of the annex, the whole having the appearance of a combination for a definite purpose.

What remains of the building is sunk fully $2\frac{1}{2}$ feet below the surface of the military way, from which it is separated by a wall enclosing a

PLAN of BUILDING in ANNEX.
No 4.

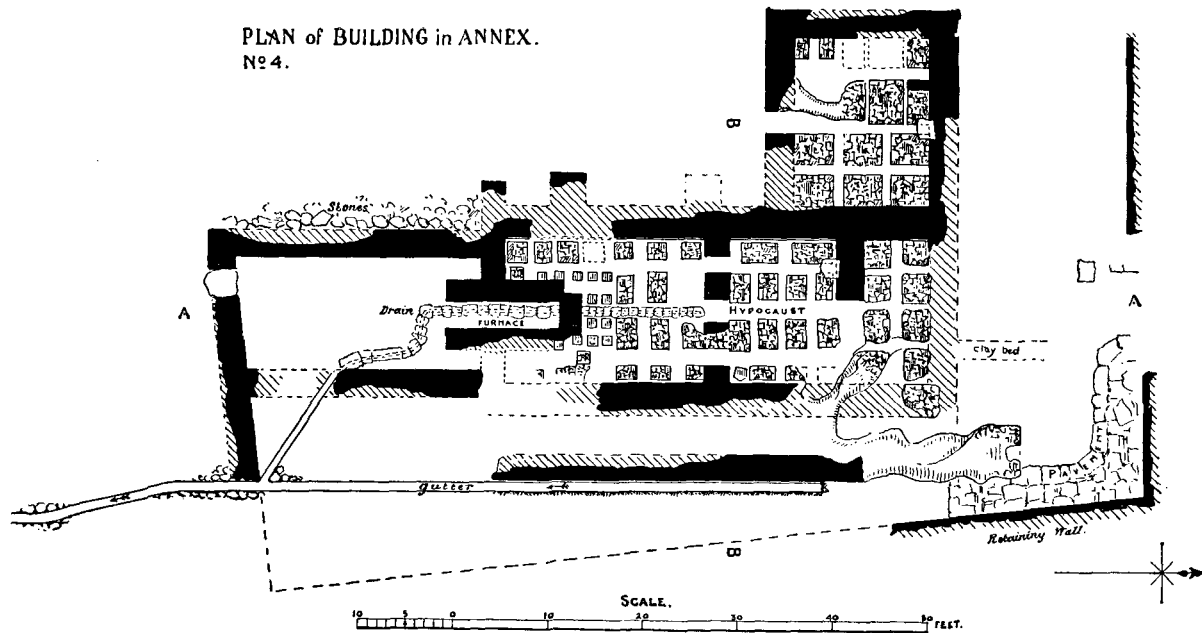


Fig. 20. Building in the Annex.

court, the surface being of hard-pressed gravel. In the wall there is a blank, possibly the position of the entrance, from which a flagstone-pavement leads to the east side of the building, and is carried along the same a distance of 21 feet.

The building is L-shaped, arranged in two distinct chambers; the larger is 45 feet long and 15 feet wide, the enclosing wall being $3\frac{1}{2}$ feet



Fig. 21. Building No. 4, showing two kinds of built work.

broad. The other is $17\frac{1}{2}$ feet long by 15 feet wide, and the walls are 3 feet broad.

Evidence of alterations and additions appear throughout the entire building, and that they have been extensive is all the more probable as it is only the basement that now remains in which the differences are so distinctly noticeable.

In the enlarged plan, fig. 20, the portions shaded black indicate what exists of the earlier walling; the cross-hatching the remains of the same walling traceable but destroyed, the dotted

lines alone being conjectural. The remainder of the stonework of the interior is later or additional, in many cases being built upon the remains of the earlier work. The distinctive difference in the built work is shown in the illustration (fig. 21).

Outside the east wall there is a large sewer 1 foot wide and nearly 2 feet deep, built in three courses of dressed stones on the outer edge, the wall of building forming the inner edge. Beyond the building it is continued to the outer trench by a drain built of large boulders, along the east side and at the foot of the rising mound on the rampart. The furnace is placed in the centre of the south wall; it extends outwardly about 3 feet, but the greater part is projected into the interior. The walls are 2 feet broad, and are partly built of stone and partly of red bricks. The dimensions of the interior are 12 feet in length and 3 feet in breadth. It gives every indication of having seen much service, the destructive influence of fire being very noticeable on the inside of the walls and the near surroundings, while all about the building soot is plentiful in every direction.

Around the inner end of the furnace, regularly arranged, are a series of hypocaust pillars (figs. 22 and 23), built of red bricks about 10 inches square by 2 inches thick, regularly laid and set in lime, —(lime is freely used in all this building, particularly in the later work). One of the pillars, however, is of solid stone, in the form of an altar (fig. 23).

In the interior are four rows of pillars (fig. 24), built entirely of stones and lime, the intervening spaces forming channels for the passage of the heated air; the pillars placed next to the walls stand clear of them by 2 or 3 inches, the space between being completely clogged with soot, among which were many broken pieces of tile, having the edges returned and with reticulated lines on the flat surface.

A small drain, 5 inches wide and 9 inches deep, covered with flagstones, runs down the centre of the floor, and passing under the furnace, is conducted into the large drain outside the building. It probably served at one time to take the water off the area, but when opened it was

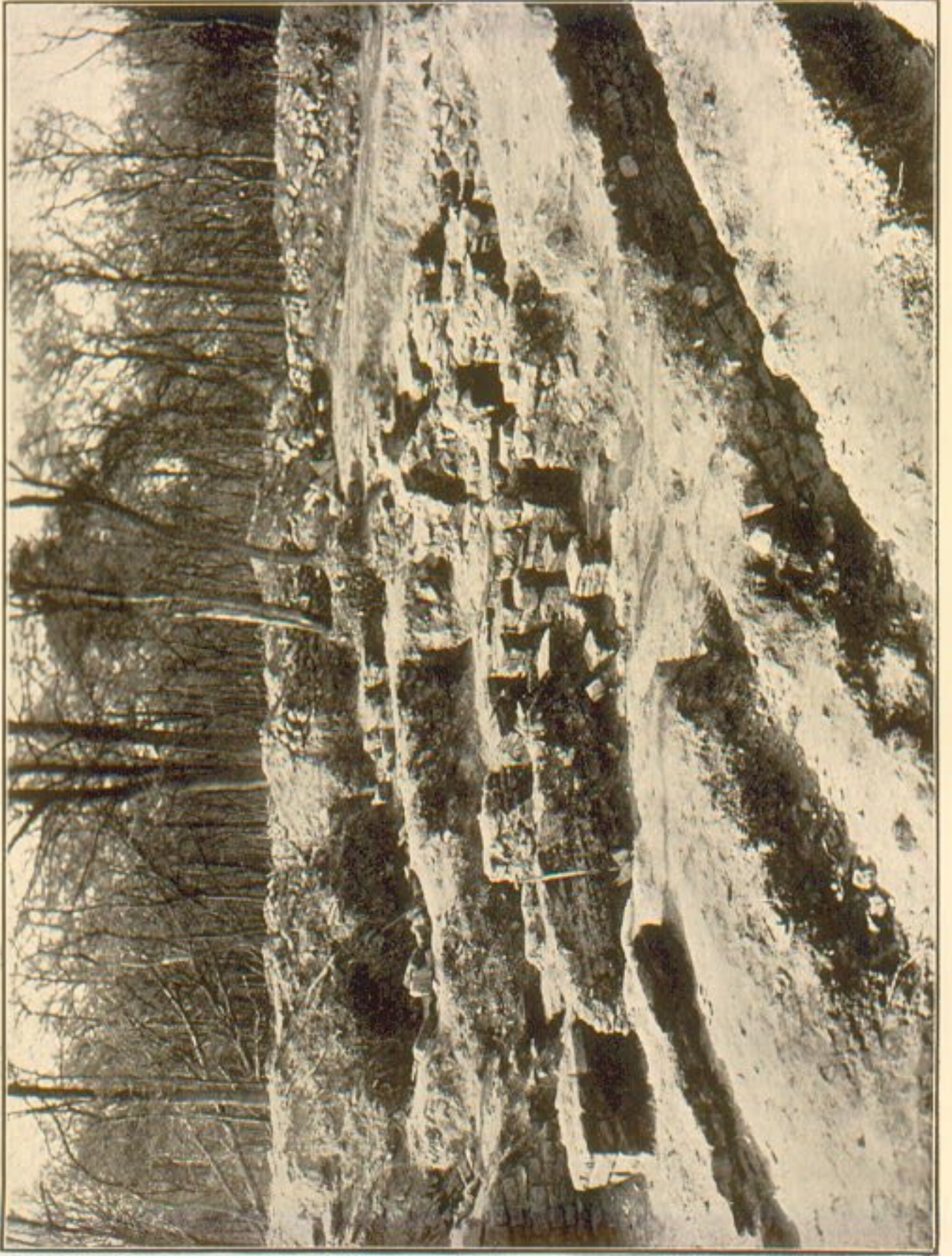


Fig. 22. Building No. 4, from the south-east.

found to be entirely choked with hard soot. The inlet to it was not discovered. Opposite the mouth of the furnace there is a chamber about 25 feet long and 12 feet wide, which probably was the stokehole. An opening in its end wall leads on to the paved way on the inclined mound in front.



Fig. 23. Hypocaust Pillar of a single stone and Pillars of bricks in Building No. 4.

The other chamber, forming the return at the north end, is similar in arrangement to the larger one, but is quite independent of it. Although there is now no indication of a furnace, everywhere there was evidence of soot, and it is probable the entrance seen in the south wall may have had some connection with it.

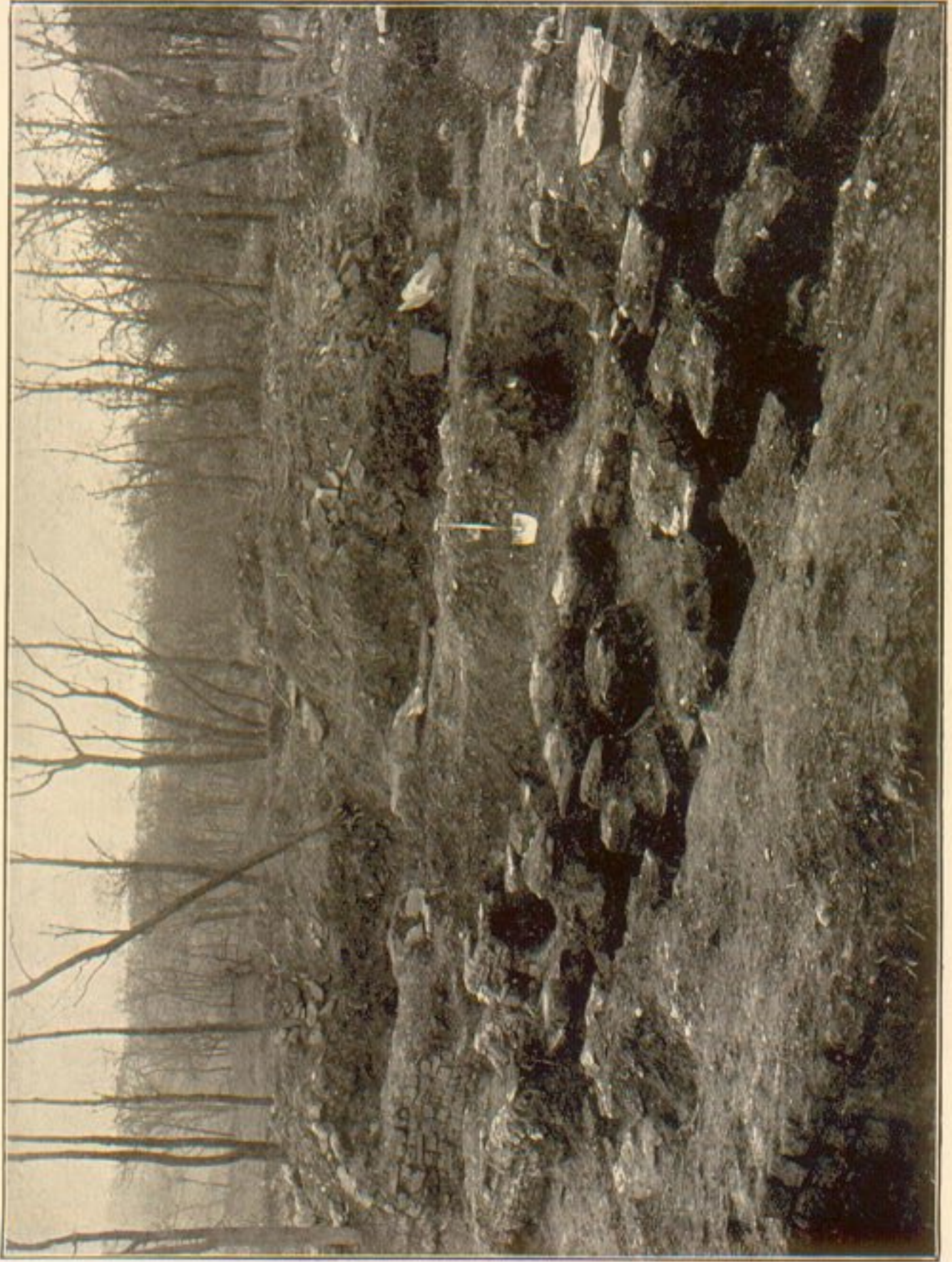


Fig. 24. Hypocaust of Building No. 4, looking south-west.

At the north-east corner there is a length of about 28 feet remaining of a revetting wall, which apparently has surrounded the whole building. In front of it the ground is raised 4 feet above the normal, and near the military way it has the appearance of a raised platform.

The work of surveying this fort has been arduous, by reason of its position in the heart of a dense wood, making it necessary to use the utmost care to secure accuracy. That it has been accomplished satisfactorily is to a great extent consequent on the able and willing assistance the writer received from local and enthusiastic friends, which he has great pleasure in acknowledging. To Mr J. R. MacLuckie, F.S.A. Scot., his best thanks are due for counsel and guidance, and for information freely given from his intimate acquaintance with the site; as also to the two young Civil Engineers, Messrs David Ferguson and Ian MacLuckie, for their able and effective assistance in plotting the levels of an intricate situation; and to my young comrade and constant assistant, Mr D. Maclay, junior, whose experience of such work greatly facilitated the progress of the survey.

For the excellent photographs illustrating this paper we are obliged to Mr J. G. Ure, of Bonnybridge, who, under the guidance of Mr Mackie, freely gave experienced assistance in their production.

III. NOTICE OF THE POTTERY, BRONZE, AND OTHER ARTICLES FOUND AT ROUGH CASTLE. By JOSEPH ANDERSON, LL.D., Assistant Secretary and Keeper of the Museum.

The number of relics found in Rough Castle was comparatively few. They include the usual varieties of pottery and tiles, a few fragments of bronze, some implements of iron, and some architectural fragments and other remains in stone, including an inscribed tablet.

Pottery.—The amount of "Samian" ware recovered was small, and the number of ornamented pieces few. The largest piece found is part of the bottom of a Bowl, the circular base of which is 4 inches in diameter, and the body of which must have exceeded 8 inches in

diameter. The ornamentation has been arranged in compartments filled with human figures, floral or foliaceous designs, and circular medallions ; but as only the lower parts of these compartments remain, the subjects cannot be definitely described.

The upper part of a large Bowl about 6 inches by $3\frac{1}{2}$ inches, having 2 inches of plain space between the roll moulding of the lip and the band of festoon and tassel ornament. This bowl has been decorated in compartments, of which the upper parts of two only remain. One contains the figure of an eagle, the other a seated figure with a lyre, and a third compartment shows part of the outline of a circular medallion.

A portion of the side of a small Bowl about $2\frac{1}{2}$ inches deep and the same in width shows, under the usual band of festoon and tassel ornament, parts of three compartments, one containing a human figure, the second a bird in a semicircular medallion, and the third a human figure stooping, and another which seems to have horns, but is much defaced.

A portion of the side of a small Bowl $2\frac{1}{2}$ inches by $1\frac{1}{2}$ inches has a variety of foliaceous pattern with a large leaf of octagonal shape, the sides of the octagon being concave, and above it what seems to be a small bird.

Another fragment of a small Bowl $2\frac{1}{2}$ inches by $1\frac{3}{4}$ inches has underneath the usual band of festoon and tassel ornament a cluster of leaves, and above it on one side a bird and an annulet.

A fragment of a Bowl $2\frac{1}{2}$ inches by 2 inches, of darker colour than the others, shows two bands of ornament just above the base, and part of the outline of a medallion above.

Of plain "Samian" ware there is a considerable quantity, some fragments showing the usual shapes of vessels of this description, but so much mutilated that none can be reconstructed. Among them is part of the rim of a Mortarium, showing the spout-like depression on the upper part of the lip. Two are shallow, saucer-like vessels, over $4\frac{1}{2}$ inches diameter ; the one has a sloping side 2 inches in height, with a plain rounded lip ; the other has also a sloping side $1\frac{3}{4}$ inches in height, with a roll-moulding on the outside of the lip.

Of the grey and black ware also the quantity recovered was comparatively small, and consisted chiefly of the fragments of the bottoms of vessels of the customary shapes. One Platter or saucer-shaped dish, with the usual flattened and turned-over rim, of which nearly one-half remains, is 5 inches in diameter and $1\frac{1}{2}$ inches in depth. The outside is ornamented with diagonally crossing lines scored on the surface. Another dish of the same shape is about the same size. A flat bottom

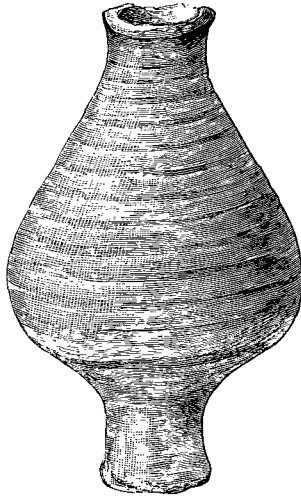


Fig. 1. Miniature Amphora. ($\frac{2}{3}$.)

of a wide shallow dish of highly glazed black ware is 6 inches in diameter and barely $\frac{1}{4}$ inch in thickness. The bottoms of small Jars in black or grey ware, varying from 5 to $1\frac{1}{2}$ inches in diameter are common, but portions of the sides or upper parts of the vessels are much less frequently represented.

Of the soft unglazed red ware there are a good many fragments, chiefly of bottoms and handles and parts of the necks of Jars of various sizes. Among them is a miniature Amphora (fig. 1) which has lost its neck. It is $3\frac{3}{4}$ inches in height and $2\frac{1}{4}$ inches in greatest diameter.

The bottom terminates in a solid prolongation $\frac{3}{4}$ inch in diameter and the same in length. The body of the vessel is ornamented with convoluted horizontal bands scored on the wheel. Another of larger size has been over $3\frac{1}{2}$ inches in diameter. The base of a small Jar of extremely thin ware, varying from about $\frac{1}{8}$ to $\frac{1}{10}$ inch in thickness, is only an inch in diameter, widening abruptly to about 3 inches in diameter. A large basin-shaped vessel, somewhat like a Mortarium, but thinner, and without the roughened interior surface, has a base of about 3 inches in diameter and is $2\frac{1}{2}$ inches in depth.

Portions of two if not three small vessels of extremely thin whitish paste, with the exterior surface blackened and rough-cast, similar to those found at Camelon, also occurred.

Portions of Mortaria of various sizes are rather abundant. One, of which three pieces have been put together, measures $10\frac{3}{4}$ inches in internal diameter and $3\frac{3}{4}$ inches in depth. One has been clamped together after breakage, in the way that the modern tinkers used to clamp together broken household pottery with leaden or pewter clamps. Five have palm leaves as potters' marks on the lip.

A considerable quantity of fragments of Amphoræ, including handles and lips of large size, were found, but none of special variety or unusual interest.

Potters' Marks.—The pottery from Rough Castle has yielded but few potters' marks. The following is a list of those that are decipherable:—

On Samian Ware.

TASCILLI · M
OF CVNI
... DOVICC ...
... NI · M

On Mortaria.

IOSSIA
SAR · R · IE
ICoIVS
DVRS . . IA
VINONI F

On the handles of Amphoræ.

DOM
COR . . . LL

Tiles.—A considerable quantity of fragments of tiles of reddish clay were found. They are flanged on the under side, and decorated on the upper flat face with diagonal scorings crossing each other so as to make lozenge-shaped spaces of about an inch in width. Those that retain the flanges on both sides are about 5 inches across the upper face, but none show the original length. They have been badly fired, and in consequence are very soft.

Glass.—A considerable quantity of fragments of window-glass of the usual character was found. The largest piece is 7 inches in length by about $2\frac{1}{2}$ inches in width, and fully $\frac{1}{8}$ inch in thickness. It shows along the two unfractured sides the original rounded edges of the rectangular slab, as it was spread out and cooled.

One piece about 2 inches square is part of the side of one of the square-sided blue glass bottles so often found in Roman sites. Another piece is part of the loop-handle of a large bottle or vase of the same blue glass, with crimping at the junction of the handle with the neck of the vessel. A third piece is part of the rounded margin of the bottom of a vessel of very thin bluish glass, blown to shape, and with $1\frac{1}{4}$ inches of the height remaining. A very small piece of a thin and almost transparent glass vessel shows two parallel lines about $\frac{1}{16}$ of an inch apart, cut as a moulding around the turned-in portion of the vessel.

Bronze.—The bronze objects found were very few and unimportant. The rounded end of the flat handle of a bronze *Patera*, measuring $1\frac{1}{2}$ inches in diameter, and scarcely more in its length, to where it has been broken off, shows the usual moulded ornament round the central perforation, and two small circles with central dots on the prolongation of the handle. The under part is, as usual, plain.

A fragment of what seems to be the expanding end of the handle of another *Patera* is $2\frac{1}{4}$ inches in length, $1\frac{3}{4}$ inches wide at the expanded end, narrowing to $\frac{7}{8}$ inch at the other end, and without ornament, except

that it is pierced in the middle of the expansion by a triplet of circular perforations.

A circular Ring of bronze, having a central circular aperture $\frac{7}{8}$ inch in diameter, round which the ring is concave on both sides, and $\frac{3}{8}$ inch wide, the circumference being a flattened rim $\frac{1}{4}$ inch in width.

Some greatly decayed pieces of thin bronze of indeterminate character were also found.

Lead.—A leaden Whorl, $1\frac{1}{8}$ inches in diameter, pierced by a central hole nearly $\frac{1}{4}$ inch in width, was the only determinate object found in this metal.

A round tapering Rod of lead 5 inches in length and $\frac{1}{2}$ an inch in

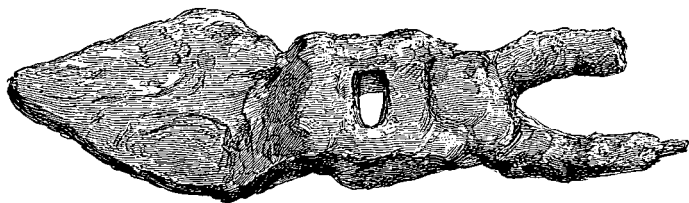


Fig. 2. Iron Hoe with forked end. ($\frac{1}{3}$.)

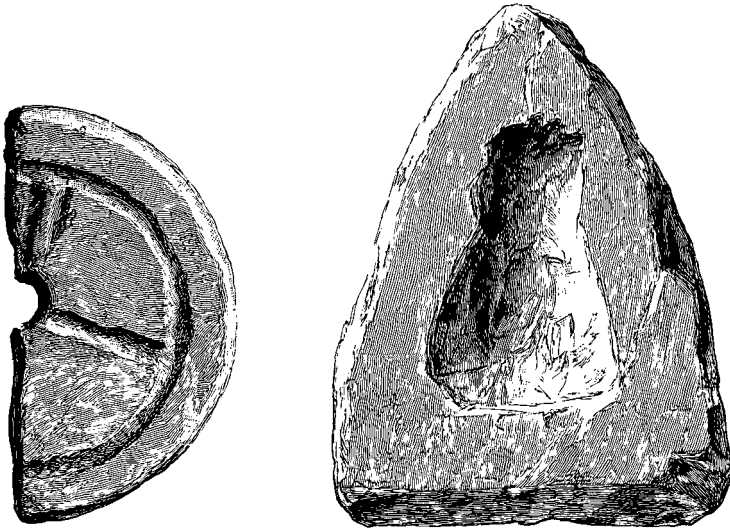
diameter at the thick end, and a portion of a ring $1\frac{3}{8}$ inches in diameter and of triangular section, were also found.

Iron.—As usual, a few implements of iron occurred, but mostly in such an oxidised and mutilated condition as to be practically indeterminate.

One implement is a Hoe (fig. 2) with a forked end opposite to the customary spade-like end. It measures 11 inches in length, the spade-like end being somewhat trowel-shaped, $4\frac{1}{2}$ inches in length by 3 inches in greatest breadth, the hole for the handle placed in the centre of a thickened part of the implement. The prongs on the reverse end are broken, so that their length is uncertain. Similar implements, found at the Roman station of Saalburg near Homburg, are figured by

Jacobi,¹ as examples of the *sarculum bicornis*, an agricultural or garden tool in common use among the Romans.

The iron Sheathing of what in comparatively modern times was called in Scotland "a shod shool," or an iron-sheathed spade (meaning a wooden spade mounted with an iron sheath round the edges), measures 9 inches in length by 8½ inches in width, having an opening in the middle of the



Figs. 3 and 4. Stone Disc and rudely made Lamp. ($\frac{1}{2}$.)

upper part 6 inches in depth by 3 inches in width. Examples of this implement were also found at Saalburg.

An implement 7 inches in length, resembling a shoemaker's knife, its crescentic blade 3½ inches wide and 1½ inches deep, being carried at the end of a rod about $\frac{3}{4}$ inch square and 5½ inches in length.

The other iron things are Nails, Staples, Rings, Hooks, and indeterminate fragments.

Stone.—The objects of stone that have been used as implements are

¹ *Das Romerkastell Saalburg*, von L. Jacobi (1897), p. 445.

chiefly naturally shaped pebbles of sandstone and hæmatite that have been used as Whetstones, Polishers, or Burnishers. Two of these are marked with grooves, as if used for sharpening awls or finely pointed instruments. Other two of coarse sandstone are shaped like modern sharpening-stones for reaping-hooks or scythes. There is a broken Quern of vesicular lava, and a large truncated Cone of sandstone 10 inches in height and $5\frac{1}{2}$ inches in diameter at the base, having a hole nearly 2

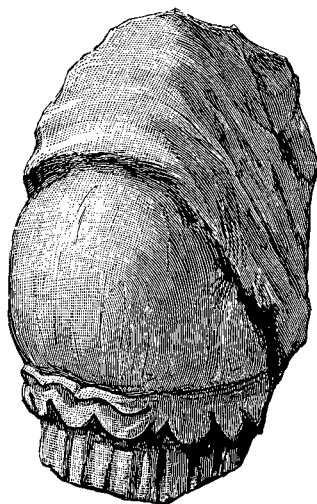
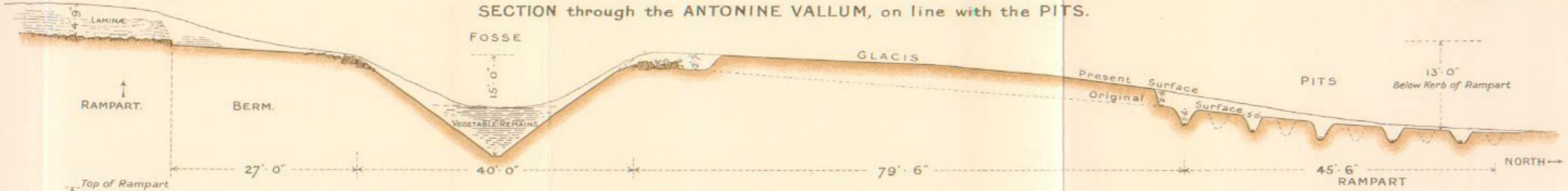


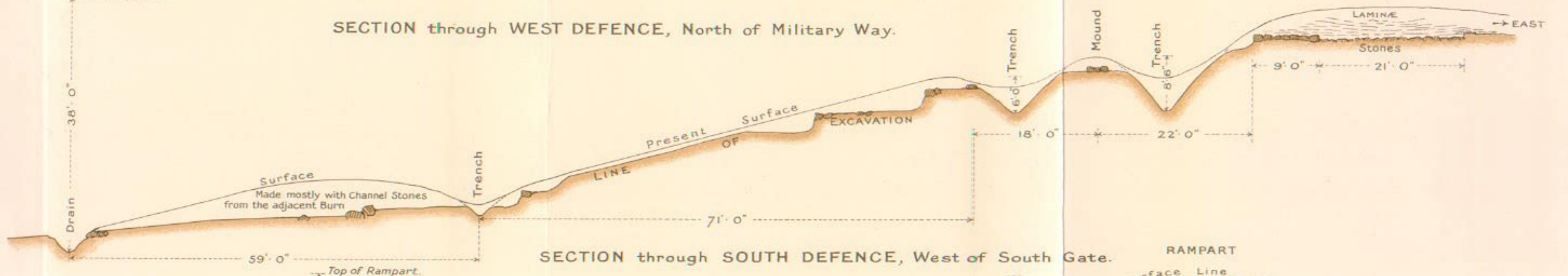
Fig. 5. Part of Shoulder of Statue in sandstone. ($\frac{1}{3}$.)

inches in diameter pierced through its upper part in the middle of its width, as if for suspension. A flat Disc of sandstone, $4\frac{3}{4}$ inches in diameter and about $\frac{1}{4}$ of an inch in thickness, is pierced by a hole about $\frac{1}{2}$ inch in diameter in the centre. Half of another such Disc (fig. 3), $4\frac{1}{2}$ inches in diameter and neatly made, has one of its faces ornamented with a cross within a circle. Seven other Discs of sandstone 5 to 6 inches in diameter, about $\frac{1}{2}$ inch to $\frac{3}{4}$ of an inch in thickness, and roughly chipped to shape, may have been used as covers for the mouths of

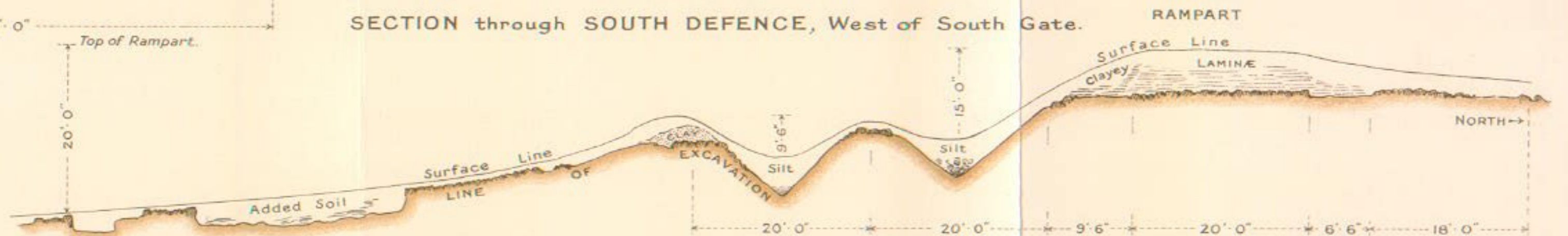
SECTION through the ANTONINE VALLUM, on line with the PITS.



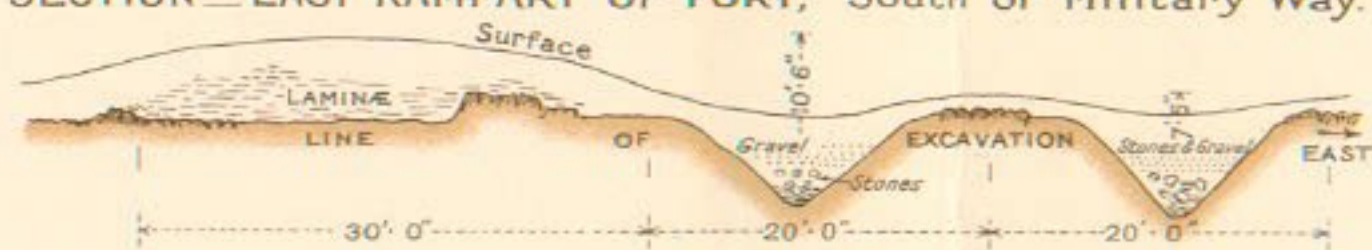
SECTION through WEST DEFENCE, North of Military Way.



SECTION through SOUTH DEFENCE, West of South Gate.



SECTION EAST RAMPART OF FORT, South of Military Way.

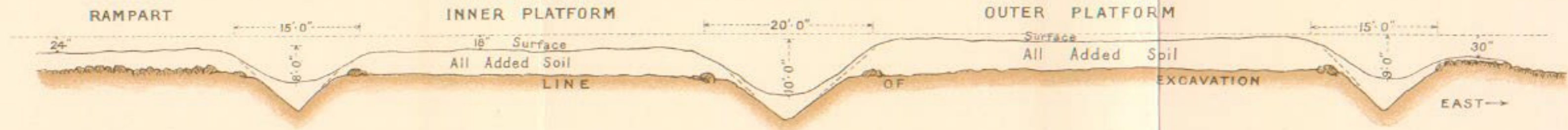


SECTION EAST RAMPART OF FORT, North of Military Way.

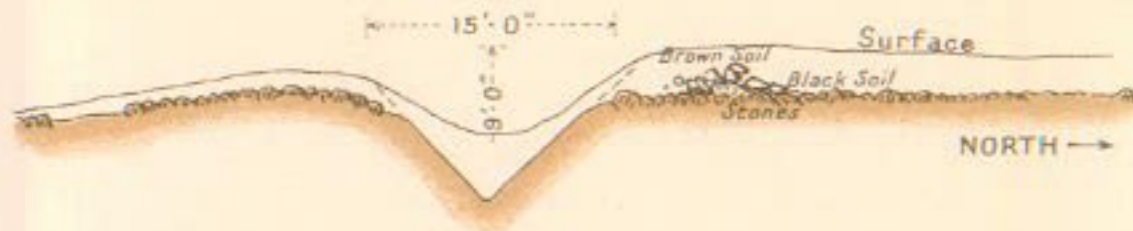


Scale of 0 10 20 30 40 50 60 70 80 Feet.

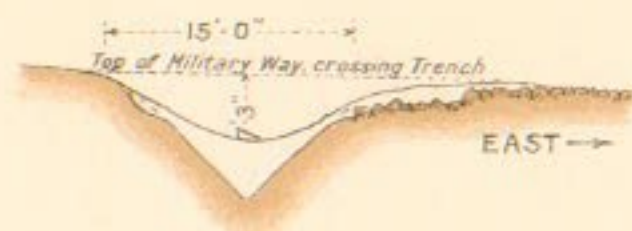
SECTION — Through the EAST DEFENCES of the ANNEX.



SECTION — Through SOUTH DEFENCE of ANNEX.



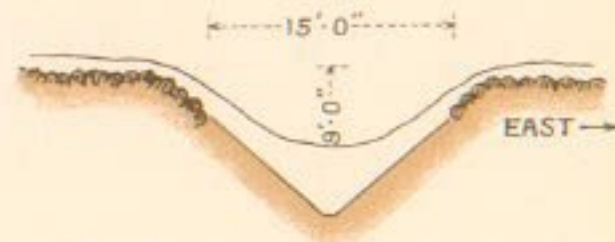
SECTION — At GATE of ANNEX.



SECTION — Military Way crossing Inner Trench of ANNEX.



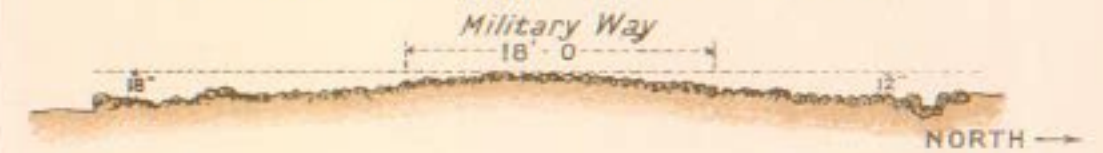
SECTION — Separation of Military Way at Centre Trench of ANNEX.



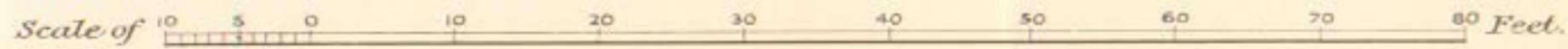
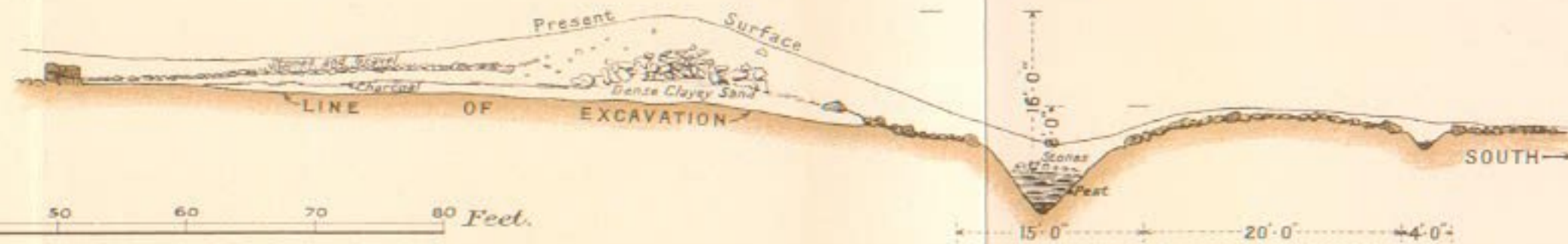
SECTION — SOUTH DEFENCE of ANNEX.



SECTION — Through Paving in ANNEX.



SECTION — Through MOUND, South of Building in ANNEX.



BUILDING in ANNEX, No 4.



Section through 'A A' looking west.

Section through 'B B' looking north.



amphoræ. A triangular piece of sandstone (fig. 4), roughly chipped to shape, has a roughly scooped hollow in the centre, as if intended to be used as a lamp.

Architectural fragments.—Four fragments of Slabs with edge mouldings were found. Two have raised flat mouldings, one has a rope moulding within a flat raised moulding, and one has a roll moulding. A slender piece of rope moulding with flat margins is 6 inches in length, and a thin fragment of red sandstone shows carving of curved lines. Part of an inscribed Tablet which was also found has been previously described and figured on p. 472. A portion of a sculptured figure in sandstone (fig. 5), measuring $7\frac{1}{2}$ inches by $6\frac{3}{4}$ inches, seems to be the upper part of the shoulder of a statue about life size. Though carefully looked for, no more of it was found.

Leather.—Portions of the sides and soles of shoes and sandals were found, but none showing features of shape or construction that have not been previously exhibited in the much larger and better preserved collection of these from Castlecary.

Animal remains.—Among these were some Antlers of red-deer, cut and sawn across, Horn cores of an ox, probably *Bos longifrons*, and Tusks of the boar of moderate size.

ANALYSIS OF METALS FOUND AT THE ROMAN STATION, ROUGH CASTLE.

By Mr R. R. TATLOCK, F.I.C., assisted by his Son, Mr CHARLES TATLOCK.

With regard to the yellow metal, the analysis shows that the proportion of lead is very high, that of tin being also much in excess of what is commonly found in modern bronzes. A typical modern bronze usually contains about 88 per cent. of copper and 12 per cent. of tin, and generally no lead nor zinc. In the *Encyclopædia Britannica*, last edition, 4, 367 D, the following occurs under the head of Greek and Roman Bronzes:—

"The Romans also used lead as an alloy in their bronze coins, but gradually reduced the quantity, and under Caligula, Nero, Vespasian, and Domitian, coined pure copper coins; afterwards they returned to the mixture of lead."

It would look as if the Romans used lead for the purpose of softening the metal intended for coining, as without lead the metal would be liable to crack.

With regard to the piece of rusty iron, I found it to be rather strongly magnetic, showing that there was either magnetic oxide of iron present or that there was a core of iron. On testing, no magnetic oxide was found, and on scraping away the crust a core of wrought-iron appeared, of a form that suggested a spear-head, as one end of it was hollow, as if to receive a shaft. Only the crust was analysed, as I did not wish to interfere with the shape of the core, at least in the meantime. The core consists of ordinary wrought-iron, however.

Analysis of a piece of Alloy from the Roman Station
of Rough Castle.

Copper	Per cent. 75.40
Tin	15.52
Lead	9.08
	100.00
	Per Ton.
Gold	ozs. dwts. grns. none
Silver	0 6 12
Specific gravity	7.330

The portion received weighed 546 grains. It was covered over the greater part of its surface with a greenish crust, which weighed 37 grains, leaving 509 grains as the weight of the core, which consisted of pure alloy in the metallic state, which had a fine gold colour.

The crust consisted of carbonate and oxide of copper, but it was not further analysed.

The analysis is that of the pure alloy alone.

Analysis of an Iron object discovered at Rough Castle.

	Per cent.
Peroxide of iron	66·36
Protoxide of iron	none
Silica	18·40
Alumina	traces
Sulphuric Acid (combined)	·62
Sulphur (combined, as Pyrites)	·32
Water (combined)	14·30
	<hr/>
	100·00
	<hr/>

The specimen consisted of a metallic iron core, encased in an incrustation of oxide of iron, which had evidently been produced exclusively by the oxidation of the metal.

The total weight of the specimen was 1617 grains, and of the crust 740 grains, leaving 877 grains for the pure metallic core.

The analysis is that of the crust alone.