

THE ROMAN FORT AT MUMRILLS, NEAR FALKIRK. BY SIR GEORGE MACDONALD, K.C.B., F.B.A., D.LITT., LL.D., F.S.A.SCOT., AND ALEXANDER O. CURLE, F.S.A.SCOT., F.S.A.

I. INTRODUCTORY.

After traversing the rising ground now covered by the southern portion of the town of Falkirk, the line of the Roman Wall enters the grounds of Callendar House and runs due east through these for rather more than three-quarters of a mile. So long as it is within the policies, its elevation is but little above that of the Carse, which spreads in front of it towards the north. As soon, however, as it quits Callendar Park and crosses the high road, it begins to climb rapidly through the village of Laurieston, its course coinciding roughly with that of the street to which it has given its own name of Graham's Dyke. Presently it emerges on a broad plateau, at the north-eastern extremity of which the farmhouse of Mumrills, with its cluster of trees, is a conspicuous feature. For at least two hundred years¹ it has been suspected that here or hereabouts had stood one of the forts erected by Lollius Urbicus in A.D. 142, when he constructed his great barrier between Forth and Clyde. But it was not until 1910 that the precise site was identified with any approach to confidence, and then on the general ground of its suitability only.²

The preliminary identification once made, confirmatory discoveries followed in rapid succession.³ As long ago as 1913 systematic excavation was contemplated by the Society, and the necessary permission obtained from the owner, the late Mr Forbes of Callendar. Before plans could be matured, the war had broken out, and the return of peace found the Society's hands so full elsewhere that it seemed prudent to let Mumrills lie fallow. In 1923, however, came the news that the fields within which the fort was known to lie had been included in a housing scheme, and that, in point of fact, more than one villa was already in being. Clearly it was a case of now or never. Accordingly, with the ready consent of Mr Charles Forbes, who had succeeded to the property, it was decided to begin operations at once, there being immediately available a generous donation of £100 from Mr John Bruce of Helensburgh.

The task was destined to be heavier and more lengthy than had

¹ See Gordon, *Itinerarium Septentrionale* (1727), p. 60.

² See *The Roman Wall in Scotland*, p. 240, footnote 4.

³ See *Proc. Soc. Ant. Scot.*, vol. xlix, pp. 117 ff.

been originally anticipated. Four and a half years were required to complete it. At the outset, too, the exigencies of cultivation necessitated a restriction of the work to the winter season, with all the risks of bad weather and imperfect light that were thereby entailed. Fortunately, however, a different arrangement ultimately proved practicable, so that for the last fifteen months digging proceeded continuously. In this connection it would be impossible to speak too highly of the forbearance and consideration shown to the Society by the tenants, the late Mr James Smith and his brother, Mr Samuel Smith. Nor were they content to be merely acquiescent. They followed every development of the investigation with an exceptionally keen and intelligent interest, and the practical help which they gave in various ways was of real value, their intimate acquaintance with the ground often enabling them to make fruitful suggestions. At the same time their household laid the members of the Supervising Committee and their friends under a deep personal obligation by the exercise of a hospitality as never-failing as it was cordial.

It goes without saying that Mr Bruce's gift of £100 was very soon spent. Indeed, although the Council of the Society had accepted the ultimate financial responsibility, their own resources would have been exhausted long before the end had been reached. Steady support was, however, forthcoming both from the Haverfield Bequest Committee of the University of Oxford and from the Carnegie Trust for the Universities of Scotland, while an appeal for private subscriptions met with a characteristically liberal response from the Fellows and other sympathisers. To the aid thus received is primarily due the successful conclusion of the enterprise. Mr D. P. Maclagan took entire charge of the business arrangements, and, moreover, his motor-car was always at our disposal for transport, even on the rare occasions when he was unable to accompany us and give us the benefit of his advice. Nor are we less deeply indebted to Mr G. P. H. Watson, on whom fell the main burden of surveying and planning, and who never once failed us despite the tempestuous conditions that had sometimes to be faced.¹ The zeal and acumen of our foreman, Mr John Campbell, also merit a special word of praise. In connection with the preparation of this Report we have to thank Drs Oswald and Pryce for valuable assistance in identifying the more difficult pottery fragments, and Dr James Ritchie for his Note upon the Animal Remains. For the rest, we must content ourselves with a general expression of gratitude to all of those from whom we sought either counsel or encouragement.

¹ The plans as they appear in this report were drawn by Mr C. S. T. Calder, of the Ancient Monuments Commission, from Mr Watson's sketches and under his supervision.

II. DESCRIPTION OF THE SITE.

The area once tenanted by the Romans is almost wholly included in that of the two fields which occupy the south-eastern corner of the broad plateau already referred to. These fields, numbered 2095 and 2106 on the Ordnance Survey Map, are bounded on the south by the main road from Falkirk to Linlithgow, and on the north by the road that

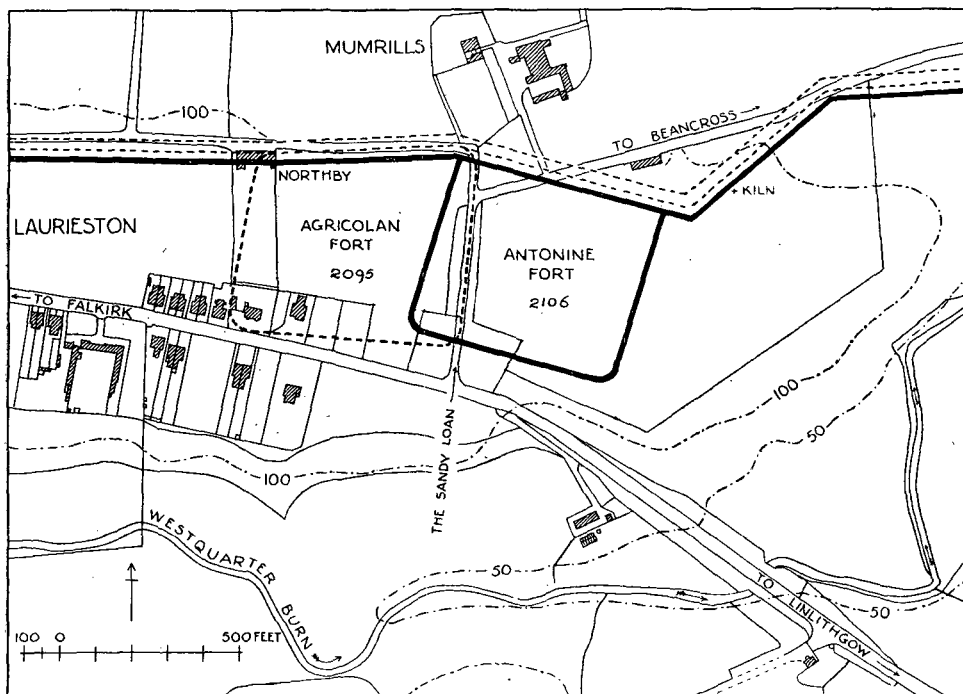


Fig. 1. Map of the Site.

leads from Laurieston through the hamlet of Beancross to Polmont Church (fig. 1). A connecting road running due north and south, and bearing the name of the Sandy Loan, forms the dividing line between them. In its present form the Linlithgow road is of comparatively recent date, and its construction has involved a certain amount of cutting away and a good deal of making up, in order to provide an easy gradient for its passage over the valley that has to be crossed before it approaches the village of Polmont. Here, therefore, there have been considerable alterations since Roman times. Nevertheless, enough of the southern escarpment remains to show how formidable

was the natural glacis which the invaders found ready for adaptation. The declivity on the eastern face was originally somewhat less steep. On the other hand, it is to-day very much what it was when the Romans looked upon it for the last time. Then, as now, it must have projected like a great bluff into the level expanse through which, more than fifty feet below the brow of the hill, the Westquarter Burn meandered slowly towards the Forth (fig. 2).

To the south and east, then, the position was exceptionally strong. It was much more exposed to attack on the west, where the slope is



Fig. 2. South-east corner of the Site, viewed from the east.

at first so gentle as to be hardly perceptible. On the north, too, the ground immediately in front is flat; but there the weakness is more apparent than real, for a vigorous sally of two or three hundred yards would have sufficed to drive an attacking party back to the edge of the plateau, whence it would have been an easy matter to hurl it headlong into the Carse beneath. The line represented to-day by the Bean-cross road had thus a substantial tactical value. And to this the Romans were fully alive, as is clear from the general course which the Antonine Wall follows. As far east as the dividing line between the fields the modern road is actually laid on the top of the Antonine Ditch. At the north-east corner of Field No. 2095, however, the two part company. The road makes an abrupt rectangular turn to meet the Sandy Loan

approaching from the south, but resumes its former direction as soon as the meeting takes place, the point of junction being only three or four yards beyond the corner. Wall and Ditch, on the other hand, swing slightly but decidedly to the south-east, and, after crossing the road in the neighbourhood of the gate that gives access to Field No. 2106, continue straight on for 133 yards, when they bend towards the road once more. Taken by itself, this temporary deflection of the Antonine Wall would be hard to account for. It becomes intelligible at once, as soon as it is realised that the stretch which exhibits a southerly trend was designed to serve as the northern rampart of the Antonine fort. The deviation made it possible to lay the southern rampart along the top of the natural escarpment, and at the same time to avoid any departure from the conventional shape of a *castellum*.

We have spoken of the extent to which the appearance of the site has been altered by the construction of the Linlithgow road. An even more drastic change has been effected by the making of the Sandy Loan, which has been cut (and cut deeply) right through the western portion of the Antonine fort, not very far from the rampart. A third modification, less deliberate in character, must also be attributed to human agency. The plateau still shows a very pronounced tilt, the southern part being the higher; but our excavations proved that since Roman times the tilt has been considerably reduced by the gradual transference of soil from the upper level to the lower. This was particularly noticeable in Field No. 2095, where the earth that covered the Roman surface was much deeper along the northern front than it was elsewhere—obviously a direct, if unpremeditated, consequence of the action of the plough, repeated season after season over a long series of years. That the land here was brought into cultivation not very long after the fifteenth century may perhaps be inferred from the fact that fragments of mediæval pottery, which had been fired in a kiln constructed in the north-western corner of the Antonine fort, were found lying on or close to the original Roman surface.

III. THE EARLY FORT.

The discovery of the Agricolan fort on the Bar Hill¹ made it clear that, in future excavations along the Antonine Wall, the possibility of lighting upon traces of the first-century invasion would always have to be borne in mind. Such traces duly appeared at Mumrills. They were certainly slender, but their slenderness will hardly seem surprising if

¹ *Proc. Soc. Ant. Scot.*, vol. xl. (1905-6), pp. 413 ff.

regard be had to the subsequent history of the site, with particular reference to the probable position of the Agricolan defences as indicated on the plan (PLATE).

The first hint of an occupation earlier than the Antonine period was obtained, quite accidentally, a few months before our own excavations began. In the winter of 1922-3, when the northern end of the Sandy Loan was opened up for the insertion of a drain, there was observed, underneath the middle of the present roadway, a ditch which ran southwards for a short distance and then disappeared. Thanks to its dark filling, its outline stood out distinctly against the background provided by the light soil in which it had originally been cut, and it was noted that it had been V-shaped, and that it had had a steep-sided drainage trench at the bottom. All of those who saw it, including Messrs James and Samuel Smith, as well as the late Mr Mungo Buchanan, whose experience was exceptional, were convinced that it was Roman. Confirmatory evidence was forthcoming in 1927, and will be cited presently. Meanwhile it may be pointed out that its sudden disappearance admits of a simple explanation. Its course had been identical with that which was afterwards marked out for the Sandy Loan. But the makers of the latter found that excavation was necessary if an unduly steep gradient was to be avoided. Accordingly, over most of the distance, they cut away the ground to a depth greater than the spades of the Roman diggers had reached. Only at the lowest level—that is, at the northern end—was the ditch allowed to survive.

No record had been kept of its dimensions, but as soon as the outline of the Antonine fort was determined—and this was done at a very early stage—we realised that the truncated ditch must have belonged to some system other than the Antonine, since the point where it had come to light was inside the fort. At the same time its direction was roughly parallel to that of the western rampart, the interval between the two, where they approached one another most closely, being about 74 feet. Either, therefore, it was the western ditch of a fort somewhat smaller than the Antonine fort, but otherwise occupying much the same position, or it was the eastern ditch of a fort that had lain mainly within Field No. 2095. From our first season's work we learned that it was the latter.

We had begun by attacking Field No. 2095, not only because such a plan of campaign suited the farmer's convenience best, but also because this was the part of the site on which houses were being erected. Along the southern margin of the field, the space still remaining unfeued was very restricted. Fortunately it was large enough to admit of a careful examination of the south-west corner of the Antonine fort, including the

four ditches by which it had been defended. It was even large enough to reveal, outside of these altogether, a fifth ditch, which was running east and west, and which had a breadth of 19 feet and a depth of not less than 9 feet, including a drainage trench at the bottom (fig. 3). The line would have been admirably adapted to serve as the southern limit of an Antonine annexe, such as pottery finds and other marks of occupation had led us to expect that we should discover here. That it had been so utilised seems highly probable. But that it had in the first instance been cut for quite another purpose became evident when it was seen that, instead of starting from the outer margin of the Antonine defences, it started from a point within the Antonine fort, by the ditches of which it was crossed. A connection between it and the lost north-and-south ditch under the Sandy Loan was immediately suggested. Nor was this all. What happened at the points where the east-and-west ditch was intersected by the various Antonine ditches proved that, when the latter were made, the former was already there: they were deeper, and passed right through it at a lower level. In fig. 4 the spade in the foreground is lying along the bottom of one of the Antonine ditches, while its fellow in the background is similarly placed in the bottom of the east-and-west ditch.

It thus seemed certain that we had located the eastern and southern lines of a fortified enclosure of older date than that constructed by Lollius Urbicus. The chance that it was merely a marching camp had, of course, to be reckoned with, for at Newstead, Ardoch, and elsewhere such camps occur in the immediate neighbourhood of permanent *castella*. For a while it looked as if this question would have to be left open. Trenching within the boundaries of the field brought it no nearer a solution, although signs of inhabitation during the Antonine period were almost invariably present. In January 1928, however, Messrs Young, the tenants of the field adjoining on the west,¹ were good enough to give us permission to open up their ground, with the result that, a few yards beyond the boundary fence (see PLATE), we struck, not one ditch running north and south, but two. At the point selected for measurement, the outer of those ditches was 21 feet wide and 10 feet 6 inches deep, while the corresponding dimensions for the inner one were approximately 15 feet and 9 feet (fig. 3). It is quite certain that at the southern extremity one (or both) of them must have linked up with the east-and-west ditch already described. But verification was impossible, since the area within which the meeting would take place is covered by a modern villa with its garden.

A glance at the PLATE will show that the double ditch is continuous;

¹ A strip that had been fenced off from the original No. 2095.

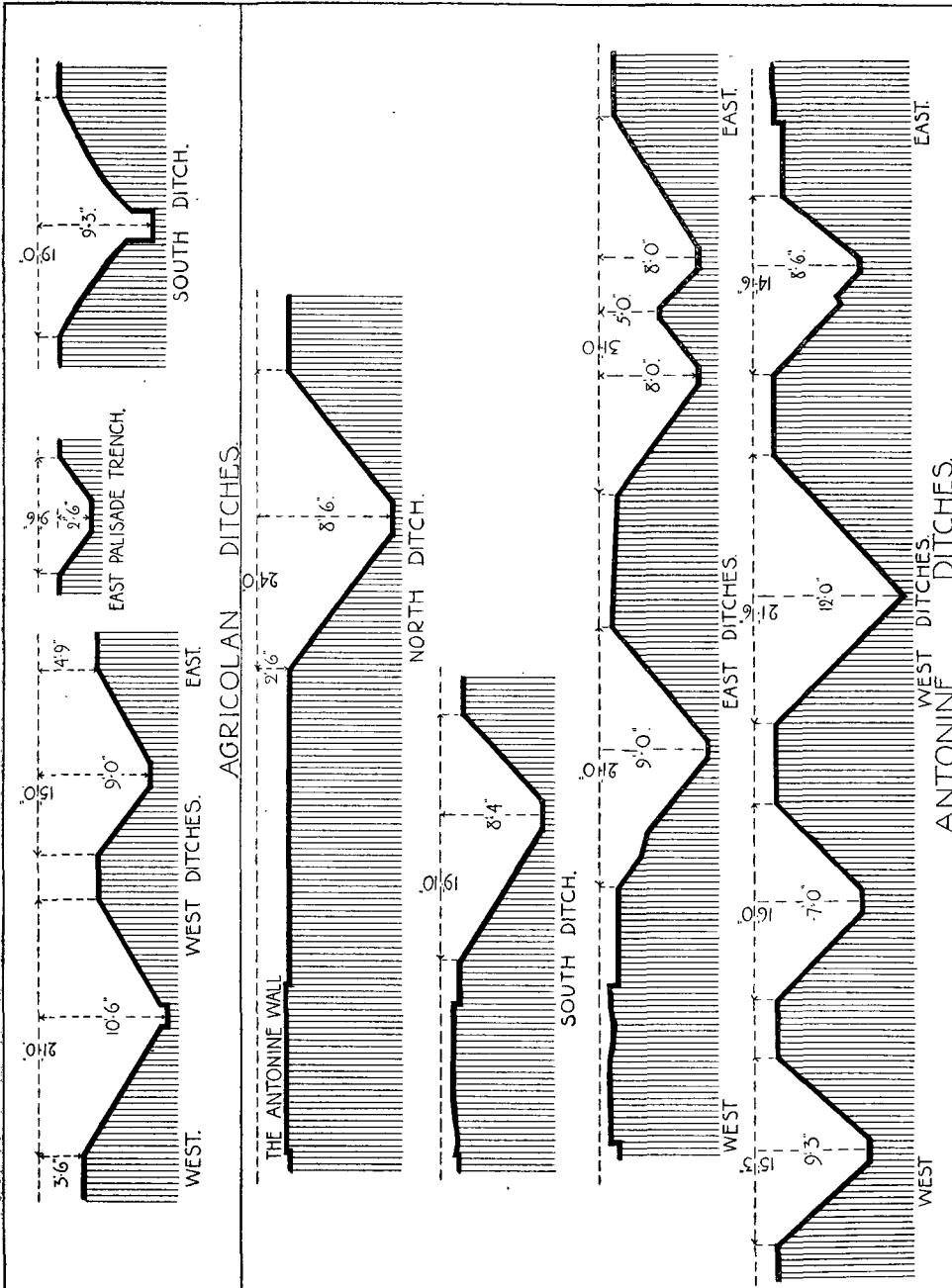


Fig. 3. Sections of Ditches.

there is no indication of a break to give passage for a roadway. On the other hand, *a priori* likelihood apart, there is reason to believe that such a break had once existed. Just at the spot where the gate would naturally have stood—that is, about midway down the field—our foreman drew attention to a change in the character of both outer and inner ditch. The appearances which he had observed were consistent with the hypothesis that the cutting here was secondary, and we concluded that, when what had been the western defence of the early fort was made to do similar service for the Antonine annexe, the opening in front of the original gate had been dispensed with, the Military Way being brought in by an entrance on the more level ground towards the north. If we are right, the continuity of the ditches will date from the Antonine period only. Here again, however, we were compelled to leave our conclusion unverified. The double ditch disappeared under a boot factory¹ before the line suggested for the Military Way was reached. Its story, therefore, could not be completely read.

The evidence for the eastern, southern, and western sides of the early fort, though sadly mutilated by the advance of modern civilisation, is thus distinctly legible. That for the northern side must have been entirely destroyed by the hands of the Romans themselves. After a fruitless search, we can only suppose that it has been obliterated by the ditch of the Antonine Vallum. In the circumstances, any estimate of the size of the enclosure is bound to be rough. But, before attempting to form one, we must cite the confirmatory evidence regarding the eastern side, of which we spoke at the outset. A reference to the map (fig. 1) will show at the north-east corner of Field No. 2095 a rectangular easterly projection, about 140 feet long by 30 feet broad. Within this, and close to the entrance-gate, we found a small trench, 9 feet 6 inches wide and about 2 feet 6 inches deep, having sides that sloped inwards to a relatively broad bottom (fig. 3). On being looked for, it reappeared outside the field in the waste ground at the side of the Sandy Loan, its north and south course corresponding exactly to the assumed course of the ditch buried under the roadway (see PLATE). That the two were associated is clear. Nor is it difficult to divine the meaning of the association if we recall the very similar conjunction of ditch and narrow trench on the German Limes.² The narrow trench marks the line of a wooden palisade, the proof being that in Germany the stumps of the actual stakes sometimes survive in the bottom. No example of this type of defence has previously been noted in southern

¹ Marked "Northby" on fig. 1.

² See, for instance, *O.R.L.*, Abt. A, Bd. i., Strecke i. (Lief. 40), Taf. 9, 1.

Scotland. On the other hand, in the Rhind Lectures for 1927 it was suggested that the narrow trench under the second-century rampart at Ardoch—a feature which puzzled the excavators of 1896¹—was in all probability the palisade-trench of a slightly larger first-century fort. The bearing of this on the date of the early fort at Mumrills is obvious.

As soon as the significance of the discovery just described was realised, search was made elsewhere for traces of the palisade-trench. On the south side it was already too late: since we had worked there before another feu had been given off and another house erected. On the west side, too, things seemed at first sight to be unpromising: the ground in the rear of the inner ditch had never been seriously disturbed. Reflection, however, suggested that here the inner ditch itself may represent an original palisade-trench, which has been widened and deepened, instead of being filled in, when the defences of the early fort were converted into a boundary for the Antonine annexe. The suggestion, it may be added, helps to account for two anomalies—the fact that the inner ditch is a good deal smaller, as well as rather more irregular, than the outer one, and the very unusual feature of a double ditch being employed to delimit an annexe.²

Even if absolute certainty on the last point were attainable, the exact dimensions of the early fort would still remain doubtful. But on a moderate computation it can scarcely have measured less than 576 feet from east to west and 487 feet from north to south, figures which would mean a size of rather more than 6 acres for the whole enclosure, as against rather more than half an acre for the little fort on the Bar Hill. This disparity notwithstanding, the two were in all likelihood contemporary. While the positive indications of date were different in kind—at Bar Hill the brushwood on the sides of the ditches, at Mumrills the palisade-trench—they agree in according best with a first-century origin. And in another respect the resemblance between the forts was striking: the occupation of both had been of the most transitory character. At Bar Hill there was nothing whatever that one could associate with first-century tenants. At Mumrills it is just conceivable that the group of post-holes near the middle of Field No. 2095 (see PLATE) may mark the position of an Agricolan structure, but the only Flavian objects identifiable among our finds were one or two small pieces of Samian ware and two or three fragments of coarse

¹ *Proc. Soc. Ant. Scot.*, vol. xxxii. (1897-8), pp. 440 f.

² It is worth adding that, as will be seen from the sections given in fig. 3, both the outer ditch on the west and the east-and-west ditch on the south had had a drainage trench in the bottom, exactly like that which had been noted in the bottom of the ditch under the Sandy Loan.

pottery.¹ Both forts would thus seem to belong to the series of temporary *praesidia* which Agricola established on the isthmus in A.D. 80 or 81.² How, then, is the remarkable contrast in size to be explained? Probably by the supposition that in the first century Mumrills was assigned a rôle analogous to that which we shall see it playing in the second, when Lollius Urbicus appears to have selected it as the headquarters of the officer in general command of the Vallum.

IV. THE ANTONINE FORT.

A. *Its Position and Size.*

The position and size of the Antonine *castellum* were easily ascertained. Many years ago it had been deeply scarred by the excavation of the Sandy Loan, and less seriously mutilated by the construction of the Beancross road, while two recently-erected modern villas now occupy the south-west corner of the Retentura and the portion of the defences immediately in front. The rest of the area was, however, available for examination with the spade, and the liberality with which it was put at our disposal made it possible to lay down a fairly complete plan (see PLATE). It will be noted that the Antonine Wall served as the northern rampart of the fort. This indication that Wall and fort formed parts of a single, homogeneous design is confirmed by the manner in which the former turns aside from its course to accommodate the latter, a feature the real meaning of which has already been explained in our description of the site. Internally and from gateway to gateway the east-and-west measurement of the fort is about 577 feet and the north-and-south measurement about 492 feet, so that the space enclosed was more than 6½ acres. Compared with those from other forts on the isthmus, the figures are exceptionally large.³ It is a legitimate conclusion that the Antonine Station at Mumrills was particularly important, a conclusion for which further support will in due course be forthcoming from certain features of the interior arrangements.

¹ There were a few other pottery fragments which might possibly have been early. Flavian coins, of course, do not count in this connection, as they were still current during the Antonine period. It would be otherwise with the two coins tentatively assigned to Claudius, if the attribution were certain.

² Tacitus, *Agricola*, c. 23.

³ At Castlecary the area was fully 3½ acres, at Rough Castle little more than 1 acre, at Bar Hill just over 3 acres, at Balmuildy and at Old Kilpatrick rather less than 4 acres, and at Cadder 2¾ acres. These are the only cases in which the dimensions are accurately known.

B. *The Defences.*

(a) *The Ramparts.*—There had been no previous opportunity of excavating any of the forts to the east of the point at which the Antonine Wall appears to lose its turf-built character.¹ Special interest, therefore, attached to the examination of the northern rampart. It was sectioned in various places, with the result that the cradling was found to have its normal breadth of 14 feet increased to 15 feet, and otherwise to present its usual aspect—kerbs of large hammer-dressed stones with a packing of smaller stones between them. In the superstructure there was no evidence whatever of the use of turf. Clay, on the contrary, was abundant, but in the outer or northern half only. In regard to this the testimony of the sections was as unanimous as it was unexpected. A solid mass of puddle, resting directly on the cradling, extended inwards from the northern kerb for a distance of 6 or 7 feet, and then came to an abrupt end. Farther south, not merely was there no indication of clay in the superstructure, but there was no trace of it on or among the stones of the cradling. It thus appeared that the inner part of the wall had been entirely of earth.² The arrangement, however, seemed to be restricted to that portion of it which lay within the limits of the fort. Outside, towards the west, more than one section was cut in Field No. 2095, and in these the clay showed itself both on the north and on the south, just as it had done in the section cut outside, towards the east, in 1913 when a pottery



Fig. 4. The Agricola ditch, the line of which is indicated by the upper spade, intersected by one of the Antonine ditches, in the bottom of which the foreman is standing.

¹ See *Proc. Soc. Ant. Scot.*, vol. lix. (1924-5), p. 285.

² The first-century rampart at the Brecon Gaer was of somewhat similar construction (Wheeler, *The Roman Fort near Brecon*, p. 7).

kiln was excavated there.¹ Are we to suppose that within the fort there had been a sloping bank of earth, designed to give the garrison ready access to the top? Or is there a more convincing explanation? The suggestion of lack of material may be ruled out at once, for clay was abundant in the Carse. It may be added that, in order to test the possibility of the outer face having been strengthened by timber struts, search was made for post-holes immediately in front of the northern kerb. None were discovered. The mass must have been compacted with sufficient firmness to be self-supporting.

The other ramparts were much more severely damaged; in some

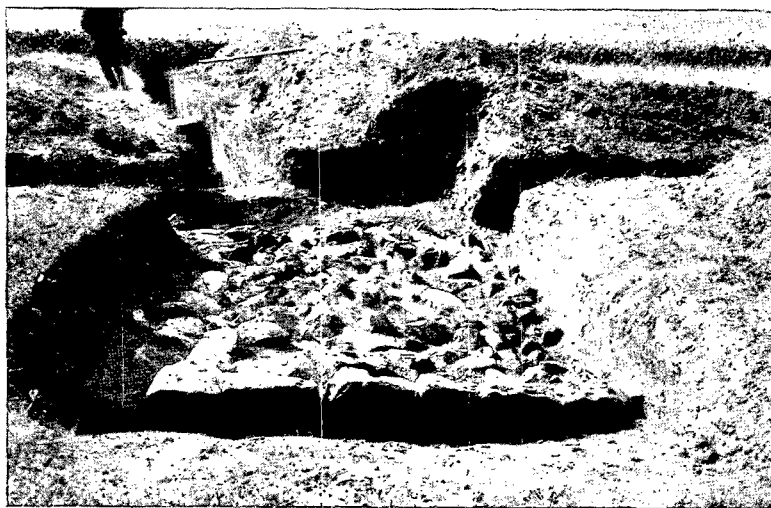


Fig. 5. Stone cradling of west rampart looking west.

places, particularly on the east and south, they had been entirely removed. Still, quite enough of them remained to make the method of their construction fairly clear, and perhaps, incidentally, to render necessary some modification of the inferences drawn from the superficial examination which was all that had been practicable in 1913.² The cradling turned out to be very similar to the cradling of the Antonine Wall, except that it was narrower, varying in width from 12 feet 6 inches to 13 feet (fig. 5). On the west, as it descended the slope from the south towards the gateway, the kerbs were carefully stepped (fig. 6), in order to reduce the force of the downward thrust of the superstructure on an incline that was considerably steeper in Roman times than it is to-day.³ Further,

¹ *Proc. Soc. Ant. Scot.*, vol. xlix. (1914-5), pp. 124 ff.

² *Ibid.*, p. 122.

³ See *supra*, p. 400.

on the outer or western side of the gap for the entrance, a bed of clay, lying against the stone-edging and extending to a depth of 8 inches below the kerb, seemed to be the foundation of a sort of buttress that had been piled up as an additional precaution. Such measures of protection indicate that the body of the rampart was heavy, and there were appearances which pointed to its having been largely, if not wholly, composed of clay. In the first place, the traces of this material, instead of stopping before the middle was reached, as they had done in the case of the Antonine Wall, invariably extended right across. They were, it is true, more abundant at the kerbs, as had been noted in 1913, but that may merely mean that the mass had been more tightly rammed on its outer faces. In the second place, on all three sides great quantities of clay unmixed with sand were found in the filling of the ditch immediately in front of the cradling. This suggested that, when the site was levelled, the remains of an all-clay rampart had been torn down and shovelled into the nearest hollow.

The north-west corner of the fort could not be properly examined owing to the proximity of the public road, combined with the intrusion of the mediæval pottery kiln mentioned above.

But at or near the other three corners there were culverts through the cradling. Two of these yielded evidence which is not without historical significance. When the large slabs covering the one at the south-west corner (fig. 7) were lifted, it was found that the sides of the drain beneath were lined with stones which had obviously seen previous service as building-stones (fig. 8). If, therefore, the culvert with its lining had been an integral part of the cradling as originally laid down, it followed that the Antonine fort must have been preceded by a fort which had left ruins substantial enough to be drawn upon for the purpose. That seemed



Fig. 6. Stepped kerb of west rampart.

improbable. A more likely explanation was that the lining dates from a period when the buildings of the fort were being reconstructed after a temporary abandonment. If this be so, the defences must have undergone restoration, no less than the interior buildings. Only if the superstructure of the rampart were removed could access have been had to the culvert. The condition of the corresponding culvert at the south-east corner proved to be all in favour of the second alternative. There the drain showed two levels. The original floor, which was 1 foot 10 inches deep and paved with flags, had been overlaid by a filling of clay, no less



Fig. 7. Foundation of west rampart running north, with culvert at south-west corner.

than 1 foot 2 inches thick, which then became the base for a new bottoming of stones. At the same time the course of the drain outside the fort had been modified. On the lower level it had apparently run straight forward to discharge into the angle of the ditch, whereas on the higher one it turned abruptly towards the south almost immediately after passing through the outlet. The evidence for at least two periods in the life of the rampart could scarcely be more convincing.

(b) *The Corner Towers.*—We were unable to obtain any satisfactory information regarding the towers which once stood at the corners of the fort. At the south-west angle, the ground which any structure served by the culvert must have occupied lay within the garden of a villa, while at the north-west the situation had been hopelessly confused by the erection, perhaps in the fourteenth century, of the mediæval pottery

kiln, which we have already had occasion to refer to more than once. On the east, although we had elbow-room to dig, our work was almost equally barren of results. At the south-east angle numerous fragments of pottery, a mass of burnt material, and patches of cobbling bore witness to former inhabitation, but no coherent interpretation of their evidence was possible. Much the same may be said of the north-east angle, where, moreover, a disturbing element had been introduced by building long after Roman times. Here, however, some of the cobbling did look as if it might have been designed to support a ballista, and



Fig. 8. Re-used building-stones from lining of culvert shown in fig. 7.

what seemed to be the remains of a clay floor extended along the face of the kerb of the Antonine Wall. If the clay were really laid by Roman hands, there must have been reconstruction, for it blocked the mouth of a culvert that ran through the cradling about 17 feet west of the corner.

(c) *The Gateways.*—The gateways were almost as completely destroyed as the corner towers, and the little that we learned about them can be summed up in a few words. On the north the entrance through the Antonine Wall was well defined. The roadway had been rather more than 11 feet wide and was paved with cobbles. On each side, close against the edge of the cradling, were four post-holes, doubtless to hold posts supporting a gangway and a wooden tower—an arrangement identical with that observed at three of the four gates of the fort

at Bar Hill.¹ About 12 feet west of the edge of the roadway a culvert ran through the wall. This had probably been connected with a guard-chamber, the whereabouts of which was indicated by a somewhat amorphous collection of stones, large and small, firmly bedded in the ground and apparently belonging to two different periods. There was no trace of any corresponding chamber on the east. The site of the southern entrance has been included in the garden of the villa called "Fort Knowe." Through the courtesy of the proprietor, Mr Hain, who kindly allowed us to dig a few trenches, we were able to verify



Fig. 9. Bottoming of roadway passing through west gate.

its position. But that was about all. No structural remains could be identified, although two solitary post-holes survived to suggest that the gateway here had been of the same type as the gateway on the north. In laying out the approach to the new house the ground in front had been so drastically cut away that it was impossible to determine the line which the Roman road had taken in descending the steep bank outside.

On the west, as on the north, the entrance was found without difficulty. It was clearly marked by a gap in the cradling, as well as by the remains of the bottoming of the road (fig. 9). The full breadth of the space between the two edges of the cradling was 25 feet, but the entrance proper was evidently a good deal narrower. There were no

¹ *Proc. Soc. Ant. Scot.*, vol. xl. (1905-6), p. 426.

surface-signs of any building and no indication of holes for wooden posts, nor had the slightest trace of a guard-chamber or guard-chambers survived. Within the gap, however, the roadway, which was here 8 feet wide, was flanked by two oval pits, the one on the north having a length of 11 feet with a maximum breadth of 3 feet 3 inches and a maximum depth of 3 feet 6 inches, while the one on the south was 11 feet 10 inches long, 4 feet broad, and 3 feet 9 inches deep. Both had been carefully packed with boulders set in clay (fig. 10), showing that they had been dug for the foundations of a stone archway, through which the road had passed, and one or both ends of which would be closed by a gate. The interval between the kerbing of the gap and the outer edge of the nearest pit was 5 feet 3 inches on the north and 4 feet 6 inches on the south. The room thus left would have been ample for side-entrances, but it is impossible to say whether it was so utilised. It can hardly have been, if the mass of clay on the south¹ was really the foundation of a buttress.

In any event the eastern gateway to the fort seems to have been designed on very similar lines, except that the place of the two oval pits was taken by two parallel rows, each of three circular pits, and that larger stones were used for the filling.² These circular pits with their contents were the only landmarks here; the cradling of the rampart had been torn out for a considerable distance on each side and the bottoming of the road removed. A few building-stones were, however, found beneath the filling of the ditch hard by, when it was cleared. If



Fig. 10. Pit for foundation of south pier of archway at west gate, partially cleared.

¹ See *supra*, p. 409.

² Even this difference may be the result of a reconstruction. The western gateway was opened up three years before the eastern one, and at the time we noted that the oval pit on the south "had been formed by digging out three pits in the sand," and that the one on the north "had been formed by digging out two pits with a ridge between."

these can be regarded as *débris* from the gateway (and that is the most likely explanation of their presence there), then the masonry must have been very substantial indeed. Two large blocks were particularly noteworthy. Fully 18 inches square by 13 inches high, they were hatched

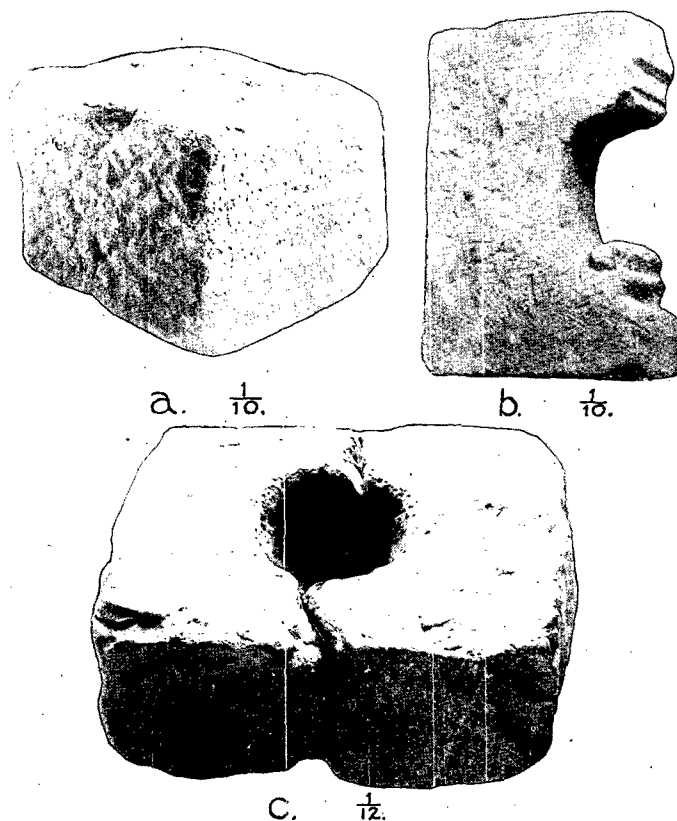


Fig. 11. *a*, Block of stone from east gateway. *b*, Stone leg of bench (p. 453). *c*, Socket-stone of gate-post, the two halves of which were re-used as hypocaust pillars (p. 456).

or "scabbled" on the bottom, as if to leave a grip for mortar, and similarly treated on two of the four faces (fig. 11, *a*). They may well have formed parts of the supports of a heavy arch. Finally, just inside the rampart and immediately to the north of the entrance were the remains of a thick layer of clay, which may possibly have represented the floor of a vanished guard-chamber.

Thus much for the gates themselves. Their position also deserves attention. Exactness of measurement was hardly practicable on the south, but we are justified in assuming that the opening there was approximately in the middle of the rampart. It certainly was so on the north, where the difference between the distances from the corners was only about 7 feet, the eastern corner being the nearer. Matters were very different on the two remaining sides. On the east the centre of the gateway was 157 feet, and on the west 153 feet south of the northern corner, while the distances from the two southern corners were as much as 337 feet and 331 feet respectively.¹ More than two-thirds of the enclosure thus lay to the rear of the Via Principalis, the street which ran in front of the Principia or Headquarters Building, and the situation of the gates was such that a space at least 33 feet wide would be available for the roadway. Relatively, therefore, the Praetentura, or portion of the fort in front of the Via Principalis, was unusually small. In all probability this is to be accounted for by a natural desire to keep the main thoroughfare as far down the slope as was practicable.

(d) *The Ditches.*—In respect alike of number and of size the ditches round the fort exhibited a diversity which was in striking contrast to the comparative uniformity that characterised the ramparts. Sections taken at selected points are illustrated in fig. 3, but fuller details may be of interest. In front of the Antonine Wall on the north was the Antonine Ditch. Where sectioned, it was found to have a present width of 24 feet and a present depth of 8 feet 6 inches. On the south the steepness of the natural slope (fig. 2) rendered approach so difficult that there, too, a single ditch was deemed to be sufficient. It was some 19 feet 10 inches wide, and varied in depth from 7 feet 9 inches to 8 feet 4 inches. On the east also the slope was steep (fig. 2), but here the rampart lay farther back from the brow of the hill, and accordingly two ditches were dug to protect it. The inner one varied from 21 feet to 25 feet in width and averaged 9 feet in depth, while the width of the outer one ranged from 18 feet to 38 feet 10 inches, and its depth from 8 feet to 9 feet 6 inches. On the west, exceptional measures were adopted to counteract the natural weakness which we have pointed out in describing the site.² From a line just short of the southern face of the Antonine Wall three ditches ran parallel to the rampart as far as the entrance. They stopped short there for the breadth of the roadway, but resumed their course again just beyond

¹ The shape of the fort was not quite regular, there being a difference of 10 feet between the total lengths of the ramparts concerned.

² See *supra*, p. 399.

it, when they were joined by a fourth ditch which accompanied them to the south-west corner. After rounding this, all four apparently coalesced to meet the single southern ditch coming towards them



Fig. 12. The four ditches approaching the north-west corner of the Fort.
The position of each is marked by a standing figure.

from the east (see PLATE). Fig. 12 shows them still running side by side. Only in the case of the two innermost was it possible to verify the actual junction by digging. In the case of the others it had to be inferred from the direction they were seen to be taking when they entered the garden of a villa. The following is a record of their dimensions:—

Ditch.	Width.	Depth.
Innermost . . .	From 10 feet to 18 feet 3 inches.	From 6 feet 6 inches to 11 feet 6 inches.
Second . . .	From 17 feet 16 inches to 21 feet 6 inches.	From 7 feet to 12 feet.
Third . . .	About 16 feet.	From 7 feet to 10 feet 11 inches.
Outermost . . .	About 15 feet.	From 7 feet to 9 feet 3 inches.

It will not have escaped notice that in some instances the same ditch is fully 5 feet deeper at one point than it is at another. In considering the figures, however, it is necessary to bear in mind the change which the level of the surface has undergone since the Roman period. Where they are smallest, the measurements have been taken on the higher part of the ridge, whence much soil, loosened by the plough, has slipped (or been washed) down towards the north. Where they are abnormally large, they have as a rule been taken at the foot of the slope and are therefore, so to say, artificially inflated. Still, even when every allowance for this has been made, the differences remain considerable enough to suggest that the orders under which the various gangs of diggers worked were fairly general. Moreover, it was not merely in size that differences revealed themselves. The innermost ditch on the west, for example, stood alone in having a well-marked ledge or shelf on the counterscarp (fig. 13) for at least a part of its length. On the east, again, as can be seen from the plan (PLATE), the outer ditch broadened out once and the inner ditch twice, in order to leave room at the bottom for a very pronounced midrib. Both ledge and midrib are familiar enough features in Roman trenches, and more



Fig. 13. Counterscarp of innermost ditch on the west, showing well-defined ledge.

than one conjecture as to their purpose has been hazarded.¹ What was significant at Mumrills was the sporadic manner in which they occurred. We failed to discover any principle by which it could be explained.



Fig. 14. The Mumrills Braes from the west, showing line followed by the Military Way.



Fig. 15. The Mumrills Braes from the east.

On the other hand, the puzzle presented by the curious loop which the ditches form at the south side of the eastern entrance (see PLATE)

¹ See, for instance, Miller, *Balmuildy*, p. 5, for a recent discussion of the midrib.

was easily solved. It indicates a change of plan, decided upon while the work was actually in progress. On this front the southern section of the defences had been the first to be completed, and the officers in charge had proceeded on the not unnatural assumption that the Military Way would pass straight out of the fort towards the east. The outer and inner ditches were therefore made equal in length and the connecting link between them was so cut that it would lie along the supposed margin of the road. The engineers of the Military Way, however, realised that, if they followed such a line, it would speedily bring them

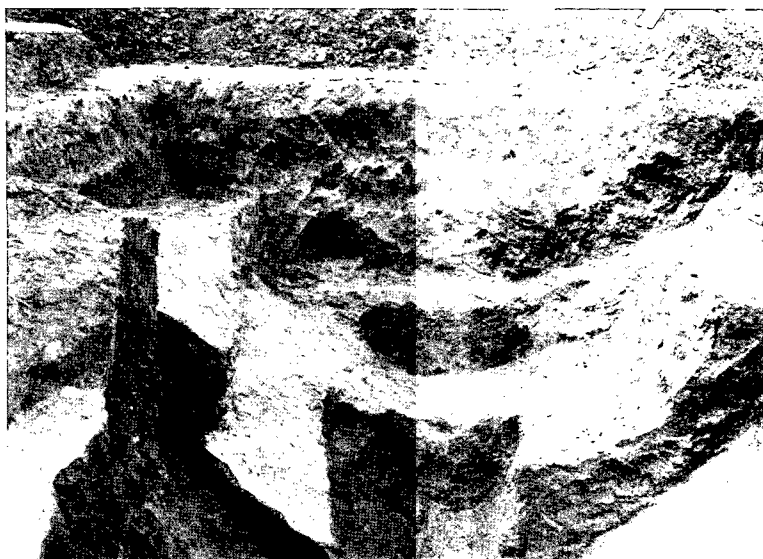


Fig. 16. The three levels in the outermost ditch on west.

to the edge of the steep descent from the plateau, whereas a north-easterly course would lead them direct, and by the gentlest of gradients, to the point where the escarpment is broken by the dip known as "the Mumrills Braes" (figs. 14 and 15). This consideration was too weighty to be set aside. Accordingly, when the ditches to the north of the entrance came to be dug, the outer one was made shorter than the inner and a north-easterly trend given to the link between them. The two sides of the entrance were then assimilated by the addition of the loop on the south. That the original link was nevertheless left open is proved by the fact that it was at the bottom of it that the blocks of stone from the demolished gateway were found.

When the loop on the south was first opened up, we were disposed

to think that the direction of the road had been changed, not while the fort was in process of building, but when it was being restored after a temporary evacuation. In that event, however, there would have been a corresponding, but inverted, loop on the north, and careful search satisfied us that there had been none. On the other hand, the



Fig. 17. Filling of outermost ditch on west, at the highest of the three levels.



Fig. 18. Cobbling of road laid above outermost ditch on west.

outermost of the four ditches to the south of the western entrance supplied evidence which more than confirmed the inference as to reconstruction that had been suggested by the culverts at the corners of the rampart.¹ Wherever it was sectioned, it showed three distinct surfaces (fig. 16), each of the three being proved by the pottery fragments lying on it to be Roman. It is thus clear that the fort had been twice abandoned and twice reoccupied before the final withdrawal,

¹ See *supra*, p. 410.

and that on neither of the occasions when it was reoccupied had it seemed worth while clearing the débris out of this particular ditch. Even with the accumulations left undisturbed it remained fairly deep (fig. 17), and the most that was done was to plaster the sides, like the sides of the other ditches, with clay in order to prevent more soil from slipping down under the influence of the weather. The latest occupants of the fort, indeed, appear to have regarded it as something of a superfluity, for at one point a road had actually been laid across it. In fig. 18 the late Mr James Smith is standing in the true bottom with his hand raised slightly above the level of the road, the stones of which are visible beyond him.

C. *The Headquarters Building.*

The Principia or Headquarters Building was the nerve-centre of the fort, and we looked forward to its excavation with the confident hope of discovering in it some clue which would add definiteness to the marks of reconstruction which had been observed in the defences. As it turned out, only one insignificant fragment of the walls had been left *in situ*, while even the foundations had sometimes been so thoroughly rooted out as to leave no trace of their former presence. Nevertheless our expectations were not entirely belied. Thanks largely to the more or less stereotyped form which this building assumes in *castella* of the time, we were able to disentangle the main elements in the complicated story which the surviving remains had to tell. It falls into three chapters. Our considered opinion as to the chapter or chapters to which the various portions of the foundations should be assigned—an opinion based on differences of type and differences of level—is set out on the “record” plan (fig. 19). We trust that this record is sufficiently intelligible to justify us in refraining from any attempt at minute verbal description. But it may be useful to supplement it by one or two illustrations. Fig. 20 conveys some idea of the appearance presented by the Shrine of the Standards when it was completely uncovered. The solitary scrap of masonry that survived in the whole building may be noted at the south-east corner. In fig. 21, again, the foundation of one of the latest walls is seen approaching the foundation of one of the earliest. Lastly, fig. 22 shows the cobbling of a third-period road running fully 1 foot above the level from which the back wall of the original Shrine of the Standards rose. The fragment of masonry which was visible in fig. 20 reappears here in the middle distance on the right.

It was obvious from the outset that in the course of its life the

THE ROMAN FORT AT MUMRILLS.

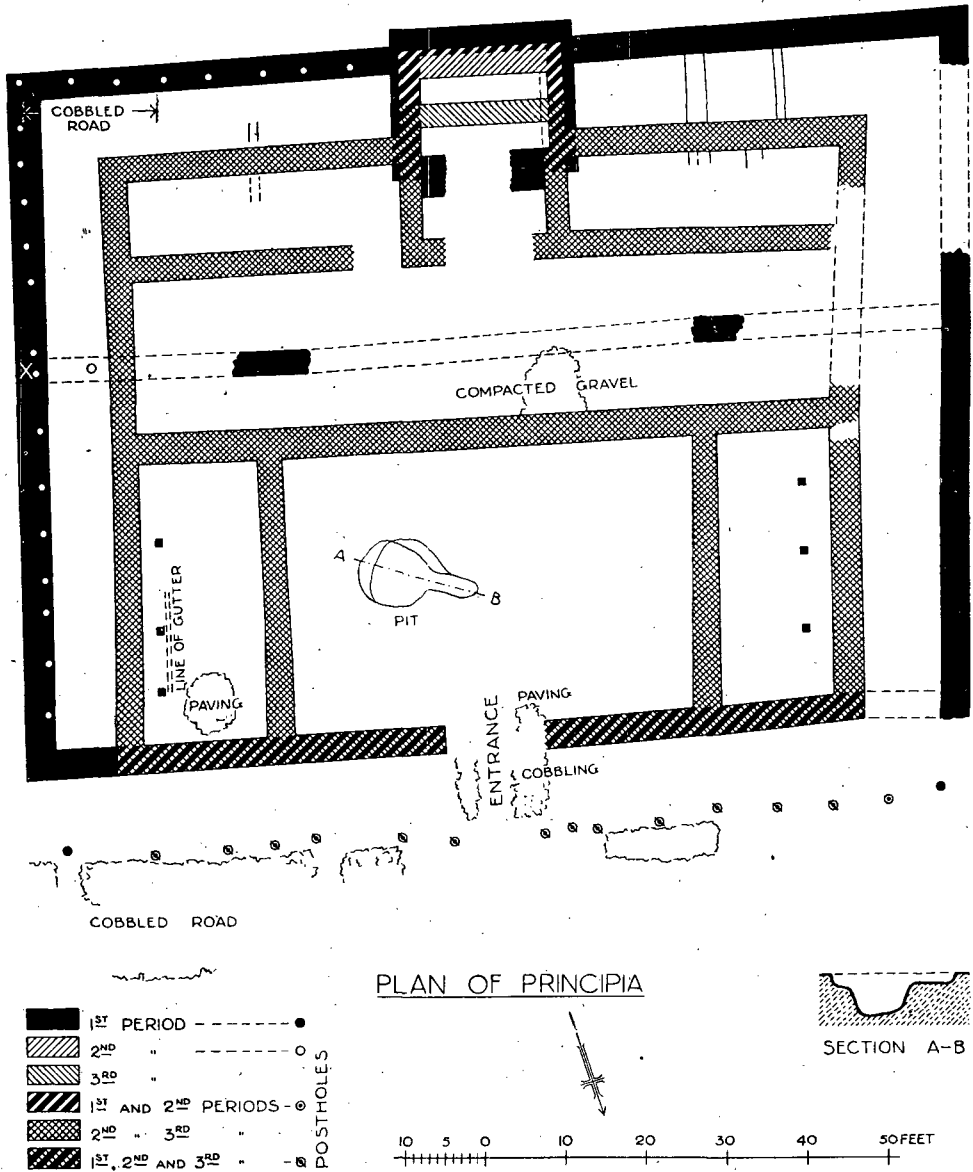


Fig. 19. The Headquarters Building.

Building had been twice destroyed and twice reconstructed, and further, that with each reconstruction it had shrunk more or less appreciably in size. Two features which deserve notice appear to be characteristic of all three stages. In the first place, its breadth was considerably in excess of its depth—that is, its longer axis lay parallel to the *Via Principalis*. Although this represents a reversal of the ordinary arrangement, it seems unlikely that any special significance attaches to it. In the second place, the front wall was separated from the nearest margin



Fig. 20. Remains of the Shrine of the Standards, looking south.

of the road in front by a verandah, some 10 feet wide, the evidence for which was furnished by a series of holes for wooden posts. These post-holes ran along the southern edge of the roadway in exact alignment with the northern walls of the other stone buildings abutting on the street. The intervals which separated them from one another were rather irregular, and this irregularity is most simply explained by supposing that they do not all belong to the same period. The occurrence of a verandah as an adjunct to the *Principia* is very unusual, but not unprecedented. Parallels can be cited from Ribchester and from Caersws, at both of which places, however, the colonnade was of stone.¹

¹ See Haverfield, *Roman Britain in 1914*, p. 12.

Possibly it served in a humbler way the same purpose as the great fore-court—long misnamed the “Exercier-Halle”—which is so common in the *castella* on the German Limes, but which in Britain has been found only at Newstead and at the Brecon Gaer.

At one time the outer court had been paved with flags and the



Fig. 21.—Foundation of third period approaching foundation of first period.

inner one laid with compacted gravel. Indeed, this may well have been the case from first to last. It is more doubtful whether the paving had in all three periods been interrupted to make room for the basin-like excavation which we encountered a little to the south-east of the main entrance. As outlined on the “record” plan (fig. 19), where it is also shown in section, it resembles a hand-mirror in shape. The basin proper was approximately circular, with a diameter of 7 feet and a maximum depth of 5 feet. But about 1 foot 10 inches below the surface

it broadened out on two sides, leaving on each side a shelf or ledge 1 foot 10 inches across at the broadest part. The projecting "handle" was a channel or adit, 6 feet 6 inches long, 3 feet wide, and 1 foot 3 inches deep. When cleared, the whole was found to be filled with a mixture of earth and clay, interspersed with which were some wrought stones, a few pieces of carbonised wood, a tiny handful of pottery

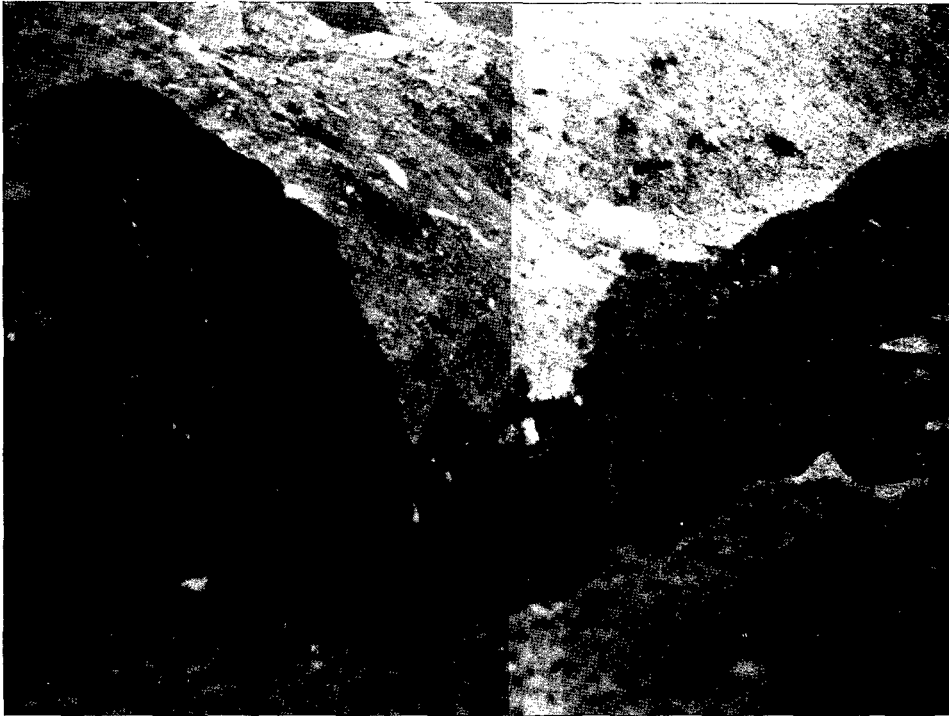


Fig. 22. Cobbling of third-period road running from east to west behind back wall of first and second periods.

fragments, and one or two scraps of "daub," burnt red and bearing the impress of wattle. Resting on the shelf on the east side was a compact mass of lime, whose form and size suggested that it had originally been contained in a small sack. The position of the excavation would have been quite normal for a well. But it had been dug in hard, dry sand, where there was no trace of a spring. In the circumstances we are at a loss for any convincing explanation of its purpose. There was nothing to suggest that it had held a water-tank, although the absence of any other provision for a water supply within the Principia

might be regarded as lending colour to the idea that it had had something to do with a cistern. The nearest parallel we have noted is at Stockstadt on the German Limes, where there is a well on the right-hand side of the outer court of the Principia, and on the left a circular excavation bearing some resemblance to the one we have been discussing. It was about 6 feet 6 inches in diameter and about 6 feet 8 inches deep but it had had no "handle," and it had been surrounded by a stone wall.¹

Having dealt with certain features that were, or may have been, common to all three periods, we shall next endeavour to portray the various changes that the Building seems to have undergone in the course of its chequered history. Reference to fig. 23 will make it easier to understand the descriptions that follow.

First Period.—As originally laid down, the Building had over all a maximum breadth of 119 feet from east to west,² and a maximum depth of about 100 feet from north to south. The latter figure includes 10 feet for the verandah and 2 feet for the projection at the back. But, even if these were left out of account, the Mumrills Principia would still remain one of the largest in Britain. Others which fall into the same group are Newstead (123 feet by 97 feet), Chesters (125 feet by 85 feet), and the Brecon Gaer (110 feet by 92 feet). The outer court (No. 1 in fig. 23) had, within walls, a breadth of 111 feet and a depth of 44 feet. Taken in conjunction with the analogies that could be cited from Newstead and elsewhere, the discovery of the remains of pillar bases on east and west (and also, at one point, of traces of a gutter) justifies the assumption that it had been surrounded on three sides by an ambulatory, 14 feet wide on the east and 16 feet wide on the west. The position assigned on the plan to the northern series of pillars is purely conjectural, there being nothing left to show where any of them had stood. Regarding the inner court (No. 2) there is little to be said except that its depth (20 feet) was not nearly so much below the average as its breadth (110 feet) was in excess of it. Nor was satisfactory information forthcoming as to the spaces we have designated Nos. 4 and 5. That each had been subdivided into rooms is certain. Indeed, we detected the foundation of one stone partition and possibly of two wooden ones. But the evidence was too scanty to enable us to determine whether there had been three subdivisions or four on each side of the central chamber (No. 3). This explains the non-appearance of dividing lines in our reconstructed plan.

¹ See *O.R.L.*, Nr. 33 (Lief. 33), p. 11, where it is left as an unsolved puzzle.

² The Building was not symmetrical. This figure represents the length of the east and west wall at the south end. At the north end it was 3 feet shorter.

The central chamber at the back (No. 3) was, of course, the Sacellum or Shrine of the Standards. Within walls it measured 16 feet by 12 feet, and was thus both relatively and absolutely small, hardly larger than the corresponding chamber in the tiny fort of Rough Castle. In view of the uncommon size of the Principia as a whole, this is at first

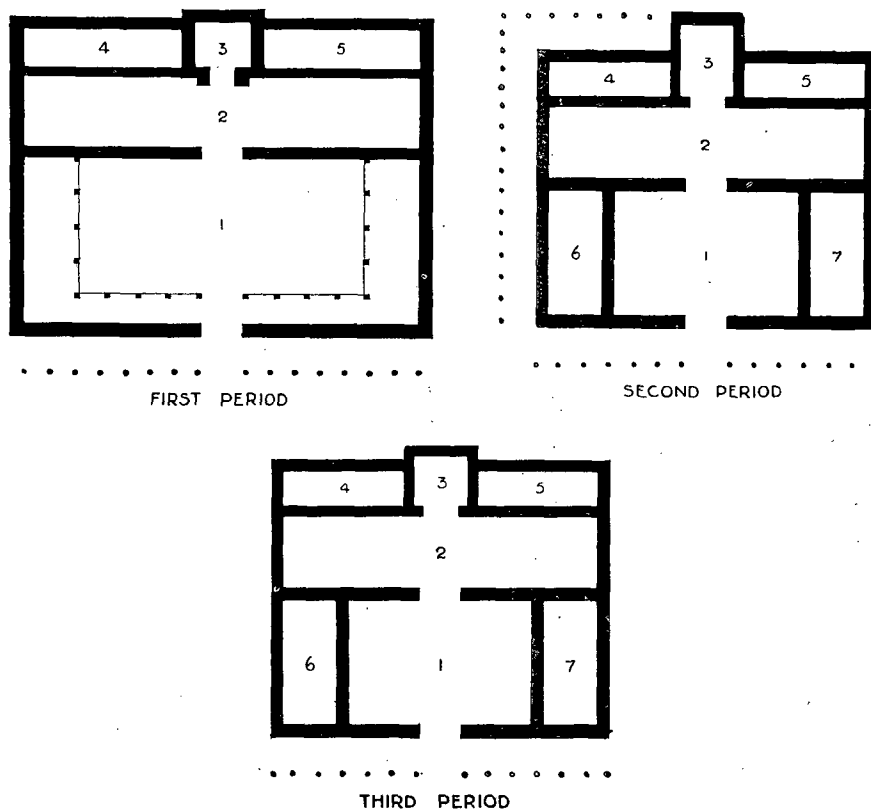


Fig. 23. The Headquarters Building reconstructed.

sight surprising, particularly as there was no underground vault for the treasure-chest, such as there had been even at Rough Castle. An explanation of the seeming anomaly is, however, suggested by the extraordinary solidity of the foundations. They were composed of boulders about twice the size of a man's head. In his account of the Limes fort at Cannstatt, where the back wall of the Shrine of the Standards was buttressed, Barthel points out that at other forts the foundations of the Sacellum had been observed to be exceptionally strong, obviously

(he adds) because they were intended to support a lofty superstructure.¹ It looks as if there had been more than a single storey at Mumrills. In that event the treasure-chest was doubtless kept upstairs. A final feature of interest is the projecting base on either side of the entrance. It is difficult to account for these bases except on the supposition that they were laid down to bear pillars. If so, with the aid of the design sculptured on the well-known altar from Birrens (fig. 24), they enable us to visualise the appearance of the doorway.

Second Period.—The next phase was marked by changes so extensive as to imply a complete rebuilding. The most striking of these was a

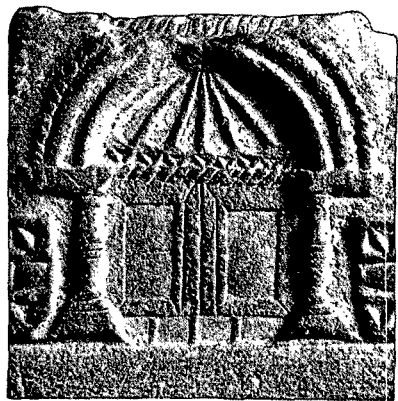


Fig. 24. Representation of doorway on cornice of altar found at Birrens.

drastic reduction in size. The breadth of the new Principia was about 25 feet less than that of the old one, while the front wall of the earlier Nos. 4 and 5 was transformed into the back wall of the later (fig. 23). At the same time the ambulatory disappeared, its place being taken by two walls, running north and south and forming, with the sides of the outer court, two new enclosures (Nos. 6 and 7), which in their turn would probably be divided by partitions into smaller rooms. The Sacellum, on the other hand, actually had its area increased. Its front wall was moved forward about 10 feet to conform to the alignment of what was now the front wall

of Nos. 4 and 5. But its back wall—with which, by the way, must be associated the only fragment of masonry left *in situ* (figs. 20 and 22)—still rested partly on the original foundation. The result was that very nearly one-half of the whole chamber projected beyond the line of the main building. The projection was utilised in a somewhat remarkable fashion. The outside face of the east wall was made to do duty as the end of a wooden “lean-to,” which was reared against the outer face of the main walls on the east and south-east, and which must have been 10 feet or 12 feet broad. Proof of this was afforded by the series of post-holes which appear on the plan at very regular intervals. They had no counterpart on the west. That they had belonged to the second period is beyond doubt. For, while they had been driven into the

¹ *O.R.L.*, Nr. 59 (Lief. 28), p. 8, with a reference to Hettner, *Westd. Zeitschr.*, vol. xvii. (1898), p. 343.

footings of the first-period walls, they lay well beneath the cobbling of a third-period road. It is not easy to find an exact parallel to this anywhere else, but something not unlike it (though in stone) has been observed at the Brecon Gaer in Wales¹ and at Weissenburg on the German Limes.² It may have been a stable or, alternatively, it may have provided extra accommodation for stores.



Fig. 25. Hearth built upon footings of foundation of east wall of original Principia.

Third Period.—To judge from the foundations, the final phase (fig. 23) was characterised by very indifferent workmanship.³ But the reduction in size was comparatively small, being, in fact, confined to the Sacellum, the back wall of which was moved about 4 feet farther forward, thus reducing the extent of the projection from 10 feet to 4 feet. The “lean-to” was done away with, and its site partially covered by a new roadway, the cobbling of which we uncovered both

¹ R. E. M. Wheeler, *The Roman Fort near Brecon*, p. 41.

² *O.R.L.*, Nr. 72 (Lief. 26), p. 17.

³ Within the Sacellum, however, three fragments of what may have been a stone balustrade were picked up, showing that the building was not entirely devoid of architectural pretensions.

on the east and on the south. Lastly, at a point which is indicated by X on the "record" plan (fig. 19) a well-laid hearth had at some time or other been constructed on the top of the original foundation of the main east wall (fig. 25). Obviously this cannot have been in existence during the first period. Nor can it have belonged to the second, since its removal

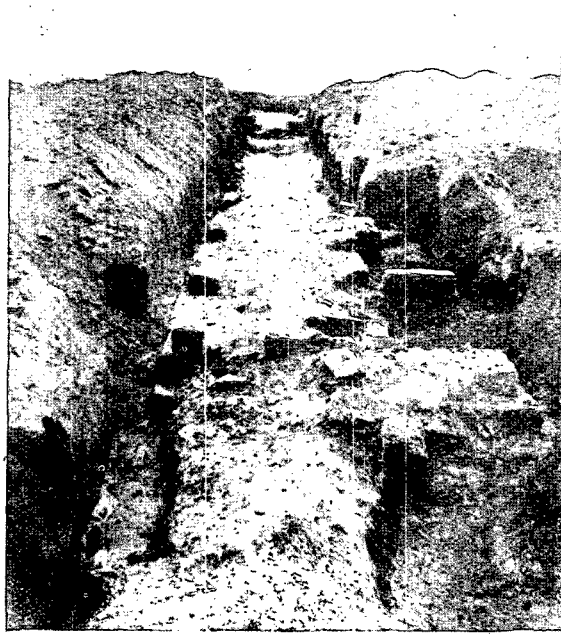


Fig. 26. Foundation of west wall of East Granary.

disclosed the first of the post-holes shown on fig. 19, and thus led to the discovery of the remainder. Accordingly it must be assigned to the third, unless indeed it be native rather than Roman. There were no associated relics to throw light upon the point. That is typical of what happened elsewhere in the Headquarters Building, and, indeed, throughout the fort generally. Such objects as were found were rarely, if ever, of any assistance in solving chronological difficulties. We had to rely almost exclusively on the structural *data*.

D. The Granaries.

The Headquarters Building was flanked by two granaries which resembled one another closely in plan and in dimensions. The East Granary was the better preserved. Not only were its foundations intact (fig. 26), but near the southern extremity of the east wall a short stretch of the original masonry was still standing three courses high (fig. 27). The illustration gives a good idea of the method of construction employed to ensure stability—a bed of boulders, covered with a



Fig. 27. Remains of east wall of East Granary.

layer of dressed stones, which in turn formed a scarcement for the wall proper. As an additional precaution, the foundation had been stepped in descending the slope towards the north. Within the walls, which were 4 feet thick, the building measured 90 feet 8 inches in length by 13 feet 6 inches in breadth. It was strengthened by thirteen buttresses on each side and two at each end, each buttress having a width of 2 feet 10 inches and a projection of about 3 feet. The slit for ventilation, which is shown in fig. 27, was 7 inches wide at the face and was splayed inwards for 10 inches, when it reached its maximum of 1 foot and then narrowed again. It was doubtless repeated between each pair of buttresses. The floor under which the fresh air so admitted

would circulate had rested on three dwarf walls, 1 foot 7 inches wide, running from end to end.

Of the West Granary practically nothing had survived save the footings of the foundation courses (fig. 28), and at the north end even these had been partly removed. It was, however, apparent that the method of construction followed was identical with that noted in the



Fig. 28. Remains of foundations of West Granary.

companion building on the east, except that there had been no stepping of the foundations, which at some places were lying very unevenly. The length within the walls was 90 feet 6 inches and the breadth 14 feet 8 inches. There had been two buttresses at the south end and probably also two at the north, although the foundations of the latter had disappeared. There had been twelve on the west side, but only eleven on the east, where the space between the second from the north and the third was utilised for what may have been the foundation of a loading-platform. In the interior the remains of the three dwarf-walls were here and there recognisable.

E. *The Barracks.*

Of the buildings in which the soldiery were quartered we can say little more than that they had been *hemistrigia* of the ordinary type and that they had been constructed of wood, as seems to have been usual in the forts along the line of the Antonine Wall. Conclusive proof of this was supplied by the numerous post-holes found in both Praetentura and Retentura (see PLATE). Whenever we hit upon a line of these in our trenching, we endeavoured to follow it up until it "petered out." No systematic effort was, however, made to recover



Fig. 29. Post-holes and pits in Retentura.

the complete scheme by stripping the surface over the whole field. This would have been a costly process, and it was, moreover, obvious that the chances of success would have been very slight. The confusion that reigned among the post-holes in the Praetentura, no less than the manner in which these, as well as the more clearly marked lines in the Retentura, were mixed with pits (fig. 29), indicated plainly that, in the course of the successive reconstructions which the fort had witnessed, the position of the wooden buildings had more than once been changed. In the absence of any criterion for determining the period to which a particular post-hole or series of post-holes had belonged, we should have been hopelessly at sea.

Nevertheless there are one or two points of interest to be chronicled. In the first place, the walls of the *hemistrigia* had been of wattle and

daub, and they had been destroyed by fire. After centuries of tillage, pieces of daub, burnt hard and red and still bearing the impress of the wattles, were picked up fairly frequently throughout the area. Again, the pits had probably contained refuse. But the dry, sandy soil is not conducive to the preservation of anything that is liable to corrosion,¹ and, as a rule, little was found in them except a few scraps of pottery. Lastly, the two stone fireplaces that break the line of the most westerly of the three rows of post-holes in the *Retentura* (see *PLATE*) show that the innermost recess of each subdivision of the *hemistrigia* had been provided with its own hearth for warmth and for cooking, while at the same time their direction confirms the inference, already suggested by the post-holes themselves, that, during one period at least, the *hemistrigia* in the *Retentura* had lain at right angles to the line of the *Via Principalis*. It may be that the isolated fireplace further west, which faces southwards, is the solitary relic of a set of *hemistrigia* which had had a quite different orientation.²

F. *The Commandant's House.*

Beyond the East Granary, and likewise abutting on the *Via Principalis*, lay a complex of buildings which differed in many respects from anything yet found in a Roman fort in Britain. One part of it had been residential and the other had consisted of a suite of baths. The closest parallel we have noted is at Weissenburg on the German Limes, where there seems to have been a similar, but considerably smaller, combination of dwelling-house and bathing establishment in a very similar position. The resemblance, however, is general only and did not carry us far. In fact, the Weissenburg analogy, itself very hard to interpret,³ gave us practically no help towards a right understanding of Mumrills. Much of the difficulty we met with was due to the impossibility of discovering any coherent plan. So far as we could judge, Baths and Dwelling-house had never formed parts of one organic whole; rather, the former had been of the nature of an intrusion into an area that was at first wholly occupied by the latter. In the various reconstructions that took place in the next forty years each had continued to be treated as a separate entity. The changes were sometimes drastic, and consequently the mass of ruined foundations bequeathed to posterity (fig. 30) was at once confused and confusing.

¹ The farmer tells us that where wooden stakes are used for fencing they require to be renewed at frequent intervals.

² The *locus classicus* for the interpretation of such fireplaces in the *contubernia* of wooden barracks is Ritterling's account of Niederbieber (*Bonn. Jahrb.*, vol. cxx. pp. 270 ff.).

³ *O.R.L.*, Nr. 72 (Lief. 26), pp. 15 ff.

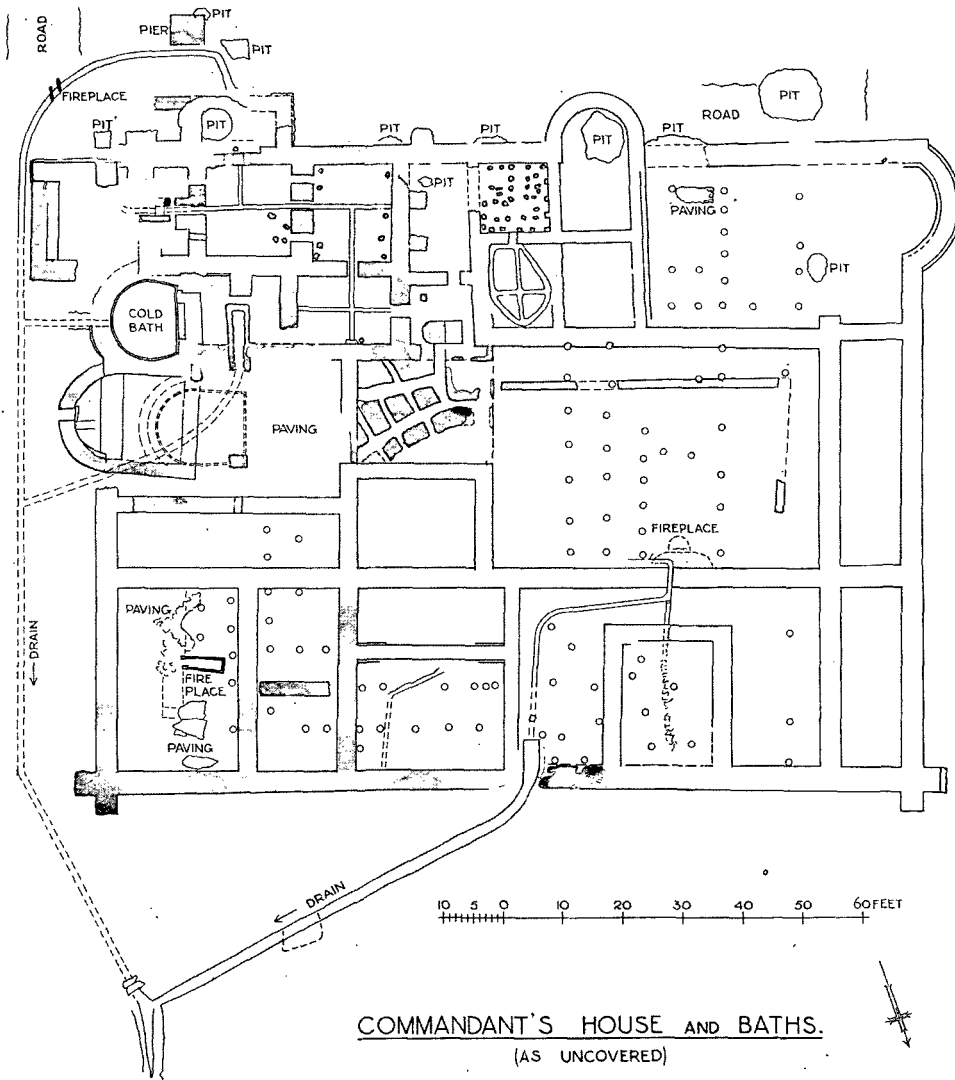


Fig. 30. The Commandant's House and the Large Bath-house.

In trying to bring order out of chaos we propose to leave the Baths alone in the meantime and to deal with the Dwelling-house first.

We need not hesitate to identify it as the residence of the Commandant, and it may also have accommodated his staff. One cannot conceive any other purpose which a structure of the kind could have been intended to serve. At the same time its size, like the size of the fort, was exceptional (fig. 31). In the heyday of its fortunes—for, as we shall see, it varied in size at various times—it had measured 138 feet by 108 feet, the longer axis being parallel to the *Via Principalis*, just as had been the case with the Headquarters Building. Its area



Fig. 31. West wall of Commandant's House, looking north.

was thus only a little less than that of the Commandant's House in the nine-acre fort of Newstead. So far as our information goes, it was considerably in excess of that of the corresponding building in any of the other *castella* on the Forth and Clyde isthmus. The dimensions at Balmuldy were 88 feet by 78 feet, and at Rough Castle 84 feet by 60 feet. As we have already hinted,¹ therefore, it is not unreasonable to infer that, when the Antonine Wall was built, the officer in charge of Mumrills may have been given a special position, involving some sort of supervision over the line as a whole.

During the earliest phase, however, the House was not so large as it afterwards became. On that point we can speak with confidence, because the original structure was of wood and the testimony of the post-holes that have survived is clear. The facts as to this are set out.

¹ *Supra*, p. 406.

in fig. 32, where each post-hole is marked in the exact spot on which it was found, and where the probable outline of the Wooden House is indicated by a series of broken lines, so drawn as to connect the outermost of the post-holes on each side. It will not escape notice that the

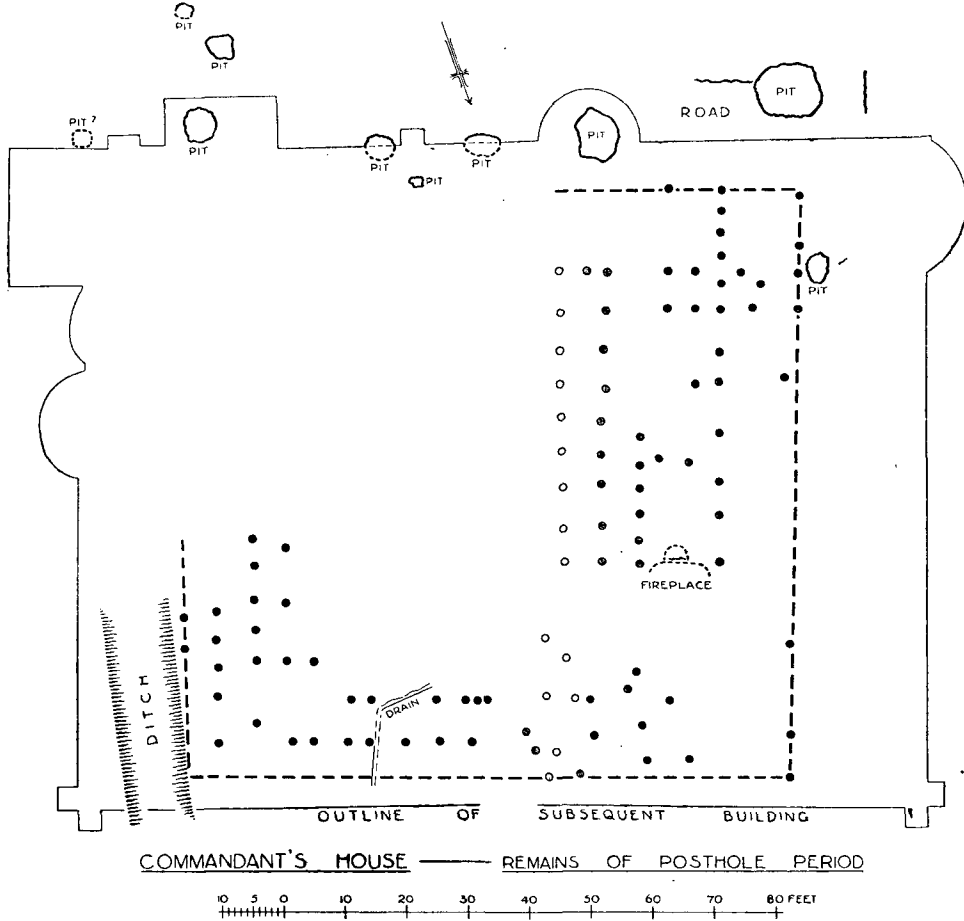


Fig. 32. The earliest phase of the Commandant's House.

outline thus arrived at is confirmed by the position of the refuse-pits on the south and west, which are obviously contemporary with the post-holes, as well as by that of certain of the roads and also of the ditch on the east. On the other hand, the continuous line, which has been introduced as a framework, represents the outer face of the wall of the House of the second phase, when stone took the place of timber.

The chronology of these two houses is definite, whether it be looked at relatively or absolutely. In the first place, one or two of the post-holes were partially buried beneath foundations, while the foundation of the south wall had actually been laid on the top of one or two of the pits. Post-holes and pits were therefore earlier than the foundations.



Fig. 33. Interior of the Commandant's House, looking east. The wall in the foreground is that which divided Area No. 8 from Area No. 6 (fig. 35). Its foundations had been cut through the débris of the fireplace, whose remains can be seen on the right. This fireplace had therefore belonged to the Wooden Building.

In the second place, the pottery fragments recovered from the pits were all of Antonine date. Post-holes and pits therefore belong to the opening of the Antonine period.

It will be observed that in fig. 32 the outline of the Wooden House has been left incomplete in the south-east or upper left-hand corner. The gap represents part of the area which was subsequently excavated for the insertion of the Baths, a procedure which necessarily entailed the disappearance of the post-holes. Very little imagination is needed to fill

the blank. The House had evidently been of the normal type—approximately square, with an open courtyard in the centre. The courtyard was vouched for, not only by the arrangement of the inner lines of post-holes, but also by a portion of the drain which had carried off the rain-water from the eaves and which in all probability had originally discharged into the open ditch on the east. When the House was rebuilt in stone, the drain, being no longer needed, was blocked by the foundation of the north wall. One other feature of the Wooden House deserves mention. When a fresh wind is blowing from the snow-covered hills across the Forth, Mumrills is as bleak and cold a spot as the Romans can have lighted upon in these islands. Then, as now, a warm atmosphere indoors

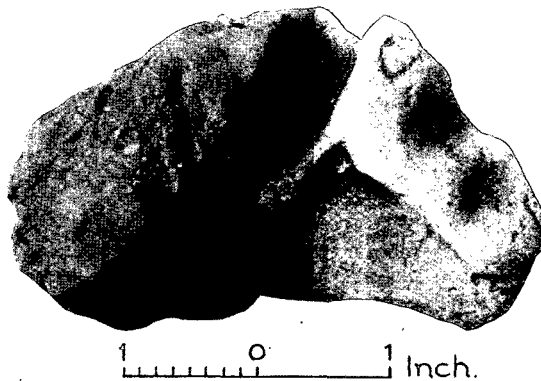


Fig. 34. Piece of burnt "daub" with impression of wattle.

would be essential for comfort. In Pompeii the ordinary method of securing this was by charcoal braziers, open hearths being reserved for cooking or industrial purposes. We cannot doubt but that the same custom was in vogue in houses of any pretensions north of the Alps.¹ Accordingly, when we uncovered among the post-holes a stepped fireplace, partly buried beneath one of the interior walls of the Stone House, we knew that we had strayed into the earliest Commandant's Kitchen (fig. 33).

As in the case of the Barracks, so here, the walls which the timbers supported had been of wattle and daub. This circumstance enables one fact regarding the history of the house to be definitely established. It came to an untimely end. Over much of the ground which it had covered there was spread, a little way down, a thick layer of burnt matter, including many fragments of wattle-marked daub (fig. 34), baked

¹ This was rightly stressed by O. Krell in his *Altrömische Heizungen* (1901), a book whose main conclusions are, however, quite unsound.

red by exposure to fierce heat. The bed of the ditch (fig. 32) was almost choked with it. At one point, too, there was a black mass which expert analysis proved to consist of straw and twigs, as if a portion of a roof had collapsed while the thatch was still smouldering, and had been saved from complete destruction by being buried under the débris. It is, of course, impossible to say *when* the fire took place. One's natural impulse is to connect it with a successful attack or a forced evacuation. But there is some reason to think that it had been accidental. If the destruction of the Wooden House had coincided with the close of the first of the three periods in the life of the fort, it is hardly likely that the stone structure which replaced it would have been laid out on a more ambitious scale than its predecessor. It will be remembered that at the opening of the second period the size of the Headquarters Building was materially reduced.

Thus far all has been comparatively plain sailing. It is with the Stone House that our real troubles begin. One's first impression of the whole complex as it appears on paper (fig. 30) is that of an inextricable medley of post-holes, foundations, and hypocausts. If, however, the post-holes and also everything that is clearly referable to the Baths be eliminated, the problem assumes a somewhat less formidable aspect (fig. 35). At all events, it becomes immediately obvious that there is no hope of recovering the original plan. When the Baths were erected, the walls and foundations in the south-eastern corner suffered much the same fate as befell the adjacent post-holes. It may be that some of them were utilised in connection with the new buildings. But the only tolerably certain remnant is the isolated fragment at the south-east corner (figs. 30 and 51), which constitutes the justification for our assumption as to the full extent of the first stone Commandant's House. As it stands, it bears no relation to any part of the Baths, and thus indicates that something had been demolished to make way for them.¹ Nor was that the end of the matter. The Baths themselves underwent at least two subsequent reconstructions, each of which must have entailed alterations in the internal arrangement of the house. In fig. 35 hatched markings are used to denote those foundations which must quite certainly be associated with one or other of the later phases. But the absence of hatching must not be taken as necessarily implying that a particular foundation is primary. It may merely mean that it is doubtful. Subject to this and to the further *caveat* that some of our conclusions are tentative, we may proceed to sketch the probable course of events.

Room No. 1 had been paved and had contained an open hearth

¹ The southerly projection opposite (fig. 51), on the other side of the south wall of the Baths, represents an indeterminate piece of cobbling, which *may* be the remnant of a buttress foundation.

(fig. 36), a circumstance which points to its having been the kitchen of the original Stone House. In due course we shall adduce reasons for

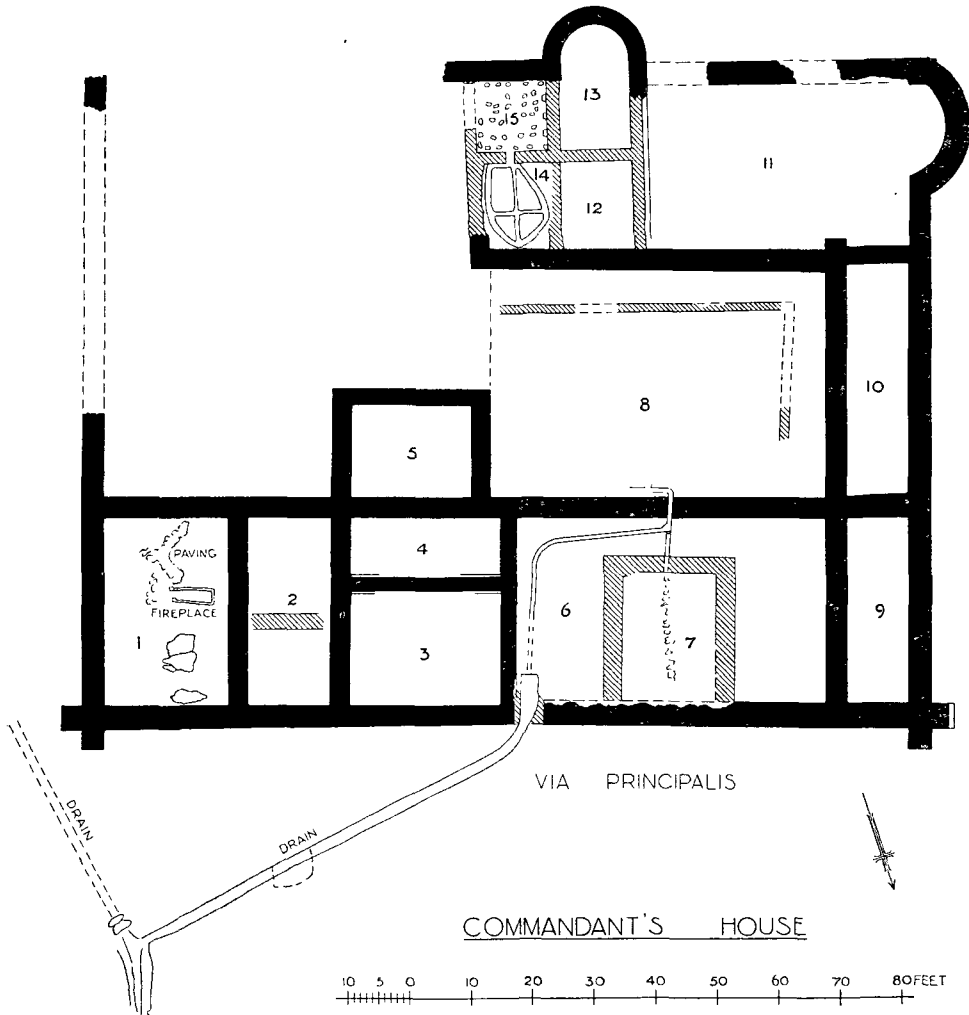


Fig. 35. The later phases of the Commandant's House.

believing that, in their earliest form, the Baths were approached from the south-west corner of the block, but that in the two latest phases of their existence the entrance was from the north-east. If we are right as to this, Room No. 1 may well have continued to serve as a kitchen until the first reconstruction of the Baths took place. Thereafter the

space which it occupied, as well as that occupied by its immediate neighbour (Room No. 2), would be put to a different use. The area would be appropriated in order to provide the necessary access from the Via Principalis to the new Apodyterium or dressing-room. It may then have been transformed into a paved courtyard, and may have become the site of one or more of the comparatively unsubstantial structures which were often run up in this position as recreative or other adjuncts to the main bath buildings; the stretch of late walling in Room No. 2



Fig. 36. Room No. 1 in Commandant's House, showing open hearth and remains of paving.

(fig. 35) looks as if it might have belonged to something of the sort. It may be objected that, if there had been such a transformation as we have suggested, more of the secondary masonry and some of the secondary paving might have been expected to survive. But the wonder is that even the primary foundations should have been spared by the plough, so near are they to the modern surface. That anything secondary must have lain a good deal higher was plain from a fragment of paving which we found in Room No. 11. It measured 6 feet long by $2\frac{1}{2}$ feet broad, and stood up like an island more than 1 foot above the first-period level.

Of Rooms Nos. 3, 4, and 5 we can say nothing definite. We could not even be sure that their walls were contemporary.¹ Certainly, if they were,

¹ Note that the wall dividing No. 3 from No. 4 was a good deal narrower than the foundation on which it rested.

the lighting of No. 4 must have presented some difficulty, unless, indeed, its roof was the sky. Of Nos. 6, 7, and 8 we can speak more positively. No. 8 seems to have been a central court of the ordinary type, since the late wall, which flanked the interior on the south and west, was too slight to have supported anything heavier than a verandah. For the earlier periods even stronger evidence was furnished by a drain, whose obvious purpose was to carry away surface water, and whose channel was a structural part of the foundation bounding the enclosure on the north (fig. 33). On entering No. 6, which must at the time have been an open yard, the drain had at first run due north towards the line of the Via Principalis. Subsequently Room No. 7 was erected, possibly to replace No. 5, which it resembles in shape, and which may have been "commandeered," like Nos. 1 and 2, when the Baths were reconstructed. The encroachment involved a diversion of the drain. The original channel was accordingly blocked and thrown out of action very soon after passing into No. 6, while an entirely new channel was led first eastwards and then northwards to the north-east corner. Two distinct stages in the history of Area No. 6 are thus fully attested. But there was a third.

On approaching the corner the new drain discharged into a carefully built stone trough, shaped somewhat like the blade of a cricket bat, and having a length of 8 feet and a depth of 1 foot 2 inches, with a maximum breadth of 3 feet (fig. 37). Its bottom was paved, except for a bank of earth at the inner or south end, where there may have been a small tank. On the north it extended right through the front wall, which had been broken down to receive it, and then opened into a paved and built drain, which ran north-eastwards, passing under the Via Principalis. It is difficult to form a definite opinion as to the end which this trough was designed to serve—the guesses have ranged from a urinal to a washing-tub. But, whatever be the truth of the matter, before the final evacuation of the fort a day came when it was utilised for a purpose very different from that for which it had originally been constructed. The drain on the south was torn up for a distance of 8 or 9 feet, the exit at the outer face of the front wall deliberately closed with a packing of clay and stones, and the trough converted into a fireplace. That the change had taken place in Roman times was proved by the fragments of Roman cooking-pots and Roman glass that were mingled with the débris of the hearth. We may conjecture that this had been the kitchen during the concluding phase of the occupation.

Beyond some possible traces of clay flooring we found nothing that threw any light upon the uses or the further subdivision of Rooms 9 and

10. We may, therefore, pass at once to No. 11. Here, again, the situation was obscure. The presence of the large apse on the west (figs. 35 and 31) indicates a room rather than an unroofed space. At the same time its position suggests that the area must have been subdivided in such a way that the apse would occupy the whole of one end of a single apartment; and the case for subdivision is further strengthened by the distance which separates the south wall of No. 11 from the south wall of No. 8. A single span of nearly 30 feet would be abnormal for

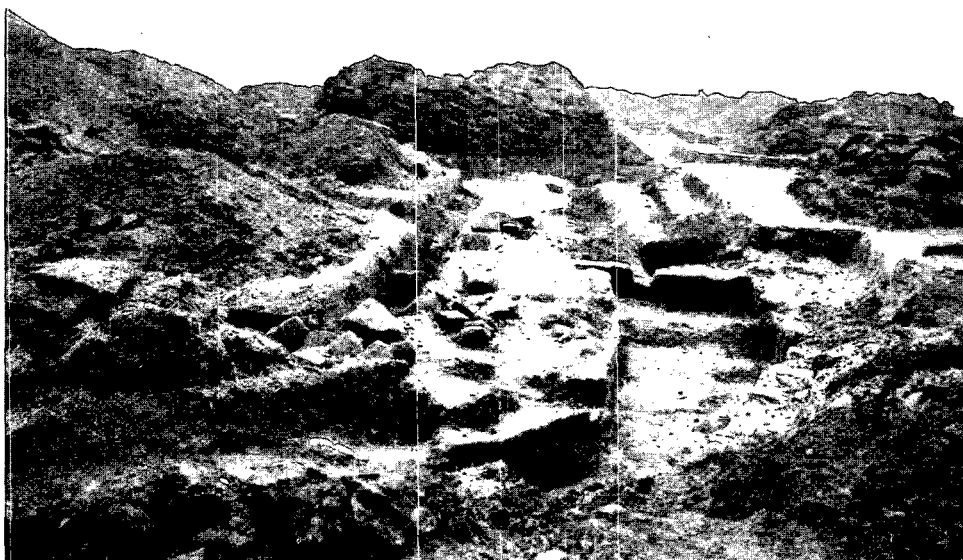


Fig. 37. Stone trough at north-east corner of Area No. 6 in Commandant's House.

a roof. On the other hand, no sign of partitions or of foundations for partitions was discoverable. If we exclude post-holes belonging to the Wooden House and exclude also the patch of paving which we have referred to above, and which must undoubtedly be connected with the latest phase of the Stone House, the interior yielded nothing save a few odd scraps of pottery. Perhaps its barrenness during the intervening period is to be accounted for by the use to which it would presumably be put if and when the Baths were approached from the south-west.

The homogeneous group represented by Nos. 12-15 is much more easily understood. The four apartments it contains had been "living rooms" and, in the form in which they appear in fig. 35, they had

belonged to the final period of the occupation. The character of the masonry spoke with no uncertain sound as to their comparative date, and it will be noted that the wall separating them from No. 11 was laid upon an earlier and broader foundation, the floor corresponding to which was reached about 1 foot below the later level. The testimony of the walls was confirmed by that of the pillars in the hypocaust chamber which had lain beneath No. 15 (fig. 38). As will be seen from the illustration, they were often stones, or combinations of stones, which



Fig. 38. Hypocaust pillars beneath Room 15 of Commandant's House.

had been removed from demolished buildings, and were therefore being put to a secondary use. Another point that attracted our attention when we uncovered them was their freedom from discoloration. Only one of them—and that a stone which might have done duty in a similar capacity before—was stained with soot. It would not be unreasonable to infer from this that the active life of the hypocaust had been unusually short. But our description of the Baths will show that another explanation is possible.¹ Meanwhile we must complete our account of the House by noticing its most remarkable feature.

The literary authorities mention three ways in which the hot air

¹ See *infra*, p. 491.

generated by the furnace of a hypocaust might be utilised, and each of these ways can be illustrated from extant remains.¹ Firstly, the heat might be conveyed upwards through the medium of a thick concrete floor, from the upper surface of which it was diffused by radiation through the chamber above. This was the idea originally underlying the invention, which is generally attributed to Sergius Orata, an older contemporary of Cicero.² Orata, however, seems to have used the device only for the warming of water. By the time of Vitruvius its application to the warming of rooms was well understood.³

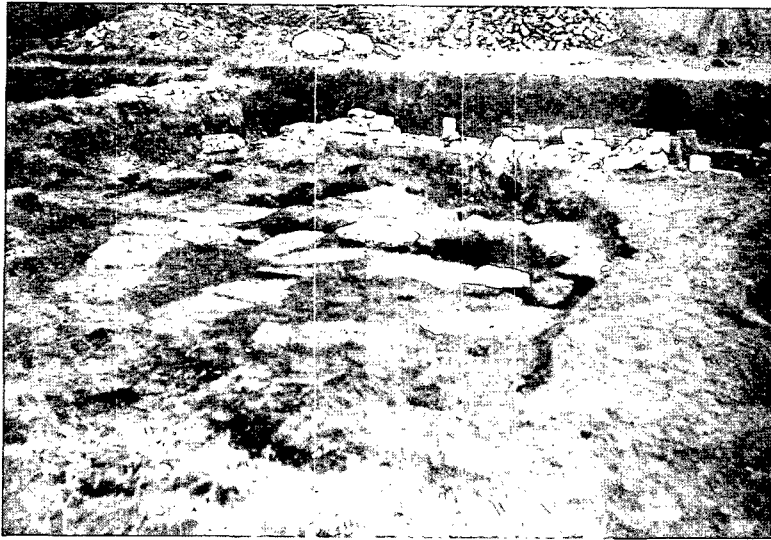


Fig. 39. Room No. 14 in Commandant's House. In the foreground the slab-covered heating flues, and in the background the tops of the hypocaust pillars under Room No. 15.

In the second place, the radiation from the floor might be reinforced by radiation from the walls, up the sides of which the hot air might be conducted in hollow box-tiles. Whether this development was known to Vitruvius is uncertain. But Seneca was familiar with it,⁴ and so was the younger Pliny.⁵ In the third place, the hot air from the hypocaust might be admitted direct to the chamber by shafts, the apertures of which could be opened and closed at will, thus allowing the temperature

¹ At this point we ought to say that our understanding of the hypocaust arrangements at Mumrills has been greatly facilitated by G. Fusch's admirable dissertation *Ueber Hypokausten-Heizungen und mittelalterliche Heizungsanlagen* (Hannover, 1910).

² Valerius Maximus, ix. 1, 1.

³ *De Architectura*, v. 10, 2 (p. 125, 15 ff.).

⁴ *De Providentia*, iv. 9.

⁵ *Ep.*, ii. 17, 9.

to be regulated. There was at least one installation of this sort in Pliny's villa at Laurentum.¹ Normally, then, a hypocaust warmed the chamber above it in one or more of the three ways just enumerated. That was what happened in the case of Room No. 15. But Room No. 14 exhibits a novelty. It was warmed, not by a hypocaust immediately beneath it, but by the hypocaust properly belonging to the adjoining chamber, the hot air being conveyed through a passage in the wall into a system of channels just below the floor, which was about 1 foot 6 inches higher than the floor of the neighbouring hypocaust. The somewhat irregular arrangement of the channels or flues, which were not very deep and were covered with thin slabs (fig. 39), will be easily gathered from the plan. We failed to locate a ventilating shaft, but there must have been something of the kind to ensure the free circulation of the warm current. Not impossibly it had been at the south-east corner, where the covering slabs were a good deal disturbed. Taken as a whole, the scheme makes a closer approach to the modern system of central heating than anything we have noted in Roman work elsewhere.

G. *The Baths.*

The excavation of the Baths proved to be at once the most troublesome and the most fruitful part of our labours. The *balneum* or bath-house was, of course, an indispensable adjunct of all Roman forts. Generally it lay outside the gates.² The rule, however, was by no means invariable, and along the Forth and Clyde line the proportion of exceptions seems to have been uncommonly high. Thus there are known to have been bath-houses outside the forts of Old Kilpatrick, Duntocher, and Rough Castle, and inside the forts of Bar Hill and Castlecary. At Balmuildy there was a double set, one outside and the other inside. There were two sets at Mumrills also, but both were inside the gates. Our description of them can be made briefer and clearer if we are allowed to preface it by a short sketch of a typical military *balneum*. The simplicity and completeness of the example discovered by the Society in 1901 at Inchtuthil render it specially suitable for the purpose. Moreover, the account of it which appeared at the time in these *Proceedings*³ requires to be supplemented and corrected in the light of the fuller knowledge now available.

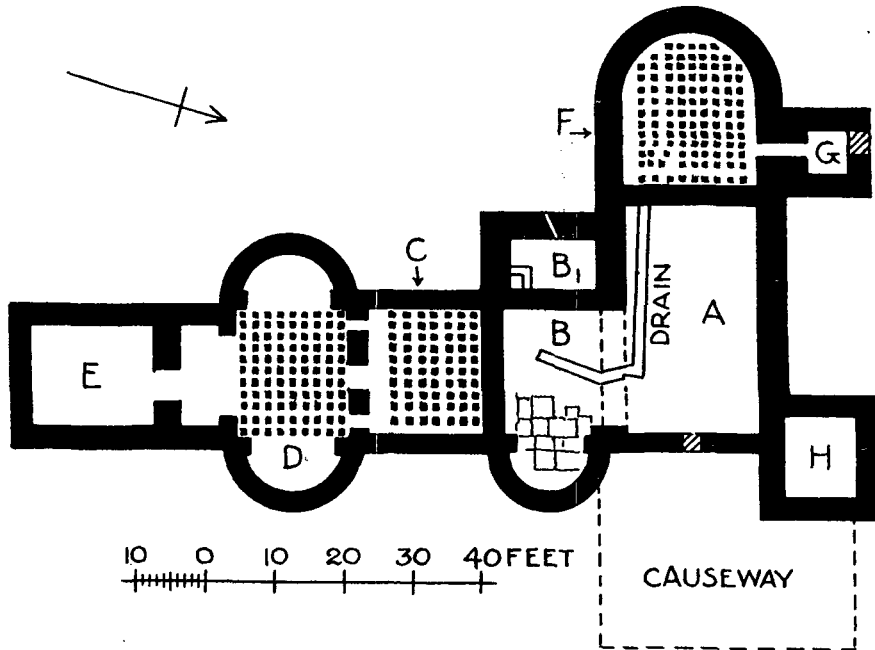
As the Roman bath, like its lineal descendant the Turkish bath, was a matter, not of soap and water, but of more or less profuse perspiration,

¹ Ep., ii. 17, 23.

² See, for instance, G. Wolff on "Kastelle und Bäder im Limesgebiet" in *XI. Bericht der röm.-germ. Komm.* (1918-9).

³ Vol. xxxvi. (1901-2), pp. 214 ff.

a furnace and two hypocausted chambers were essential. Usually there was a second furnace and a third hypocausted chamber, and not seldom the minima were further increased. Arrangements for cooling the body were equally necessary. At Inchtuthil (fig. 40) there were two *praefurnia* or furnace-rooms (E and G), each communicating by a *hypocaustis* or stoke-hole with one of three *hypocausta* or pillared vaults, the roofs of which were at the same time the floors of three hypo-



PLAN OF BATHS AT INCHTUTHIL

Fig. 40.

causted chambers (C, D, and F). B and B₁ were for cooling. From the courtyard, where he had previously indulged in active exercise, the bather would enter the Apodyterium or dressing-room (A), the small apartment at the north-east corner of which was probably a latrine (H). After disrobing he would pass through the Frigidarium or cooling-room (B) into the Tepidarium or warm room (C), and thence into the Caldarium or hot room (D), in one of the *scholæ* or apse-like recesses of which he would find the *alveus* or hot bath, and in the other the *labrum* or warm-water basin.¹ One or both of these he would use as required.

¹ The water for these was heated in metal vessels placed over, or close to, the *hypocaustis*.

After he had perspired sufficiently, he would return to the Frigidarium. There he would cool himself by a douche of cold water from a basin which stood in the centre of the room, and the drain from which can be seen on the plan running away under the floor of the Apodyterium,¹ and by sitting for a time on a low seat at the edge of the cold bath (B₁) with his feet and legs in the water, the depth of which was quite insufficient for a plunge. Then would follow a second bout of perspiration, this time in the Sudatorium or sweating-chamber (F), where a dry heat was maintained. The final stage would be a thorough rubbing down.²

Not only in its details, but also in its general plan, Inchtuthil illustrates admirably the commonest type of military Bath-house—Frigidarium, Tepidarium, and Caldarium arranged in a single line, having at one end the Apodyterium with the Sudatorium attached to it, and at the other end the main furnace-room.³ The smaller of the examples from Mumrills conforms to this type very closely, and so, we believe, at one time did the larger. In examining them we shall begin with the less complicated of the two.

(a) *The Men's Bath-house*.—As the title we have ventured to give it shows, we are of opinion that this was intended for the use of the rank and file. That seems the obvious explanation of the comparative simplicity by which it was characterised. Its position in the eastern portion of the Praetentura is not unlike that occupied by similar, if slightly more elaborate, bath-houses at Oberscheidental and Neckarburken on the German Limes,⁴ which may possibly have served a similar purpose. Except for one or two doubtful features its remains can be interpreted with virtual certainty. In describing them we propose to follow the same method as we adopted in the case of the Headquarters Building. Accordingly we have provided (a) a "record" plan (fig. 41), setting out what was actually found, and indicating to which of two periods we believe that the various pieces of walling belong; and (b) two partly conjectural plans (fig. 42), setting out the form which there is reason to think that the Bath-house took during each of the two periods in question. From first to last there was no alteration in the

¹ In the original report this is erroneously described as a flue.

² For the literary references to the various steps described above see Mau in Pauly-Wissowa, *Real-Encyclop.*, ii., 2756 f. Sometimes the bather omitted the earlier stages and proceeded direct to the Sudatorium.

³ See Pfretzschner, *Die Grundrissentwicklung der römischen Thermen* (Strassburg, 1909), pp. 37 ff. The isolated position of the Sudatorium was probably due, not (as Pfretzschner suggests) to its being "inorganic," but to a desire to keep it as far away as possible from the vapour that would be generated by the water. A dry heat there was all-important (*cf.* Martial, vi. 42, 17, *arido vapore*).

⁴ See *O.R.L.*, Nr. 52 (Lief. 6), p. 6, and Nr. 53 (Lief. 9), p. 7. So, too, at the Brecon Gaer, where, however, the bath-house appears to be a later insertion (Wheeler, *The Roman Fort at Brecon*, p. 51).

general scheme. It will therefore be convenient to include in our account of the individual rooms all that has to be said regarding the changes they experienced.

During the first period the Apodyterium (A) and the Frigidarium (B) were apparently combined in a single apartment, a by no means unusual arrangement. In supposing the entrance to have been on the south-east we have been guided by the fact that the foundation of the

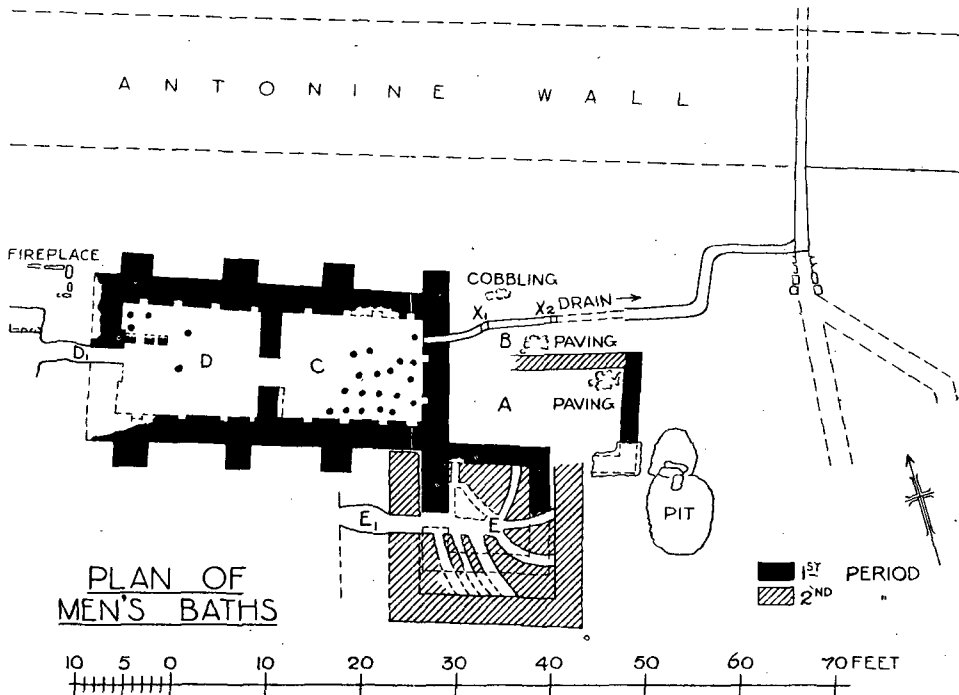


Fig. 41. The Men's Bath-house.

wall at that corner appeared to stop abruptly at the point where it breaks off on the "record" plan, but it is only fair to admit that here we are guessing. There is also an element of conjecture in the dimensions we have assigned to the room, for no trace of the north wall or of the northern termination of the east wall was discernible. At the same time we can hardly be far wrong in giving it an interior measurement of some 18 feet by 16 feet, with a wall-thickness of 2 feet on three sides and 3 feet on the fourth. The floor had been paved. We confidently expected to find a cold bath, but a diligent search for it was absolutely unrewarded. We were driven to conclude that none had

ever existed—a very surprising omission. On the other hand, a prominent feature of the northern end was a carefully built stone channel. It was led in over the west wall a little below floor-level and then ran eastwards, with a slight northerly inclination, to discharge into a drain which connected with what must have been the main sewage-system of the fort. The channel (fig. 43) was $8\frac{1}{2}$ inches wide, and at one

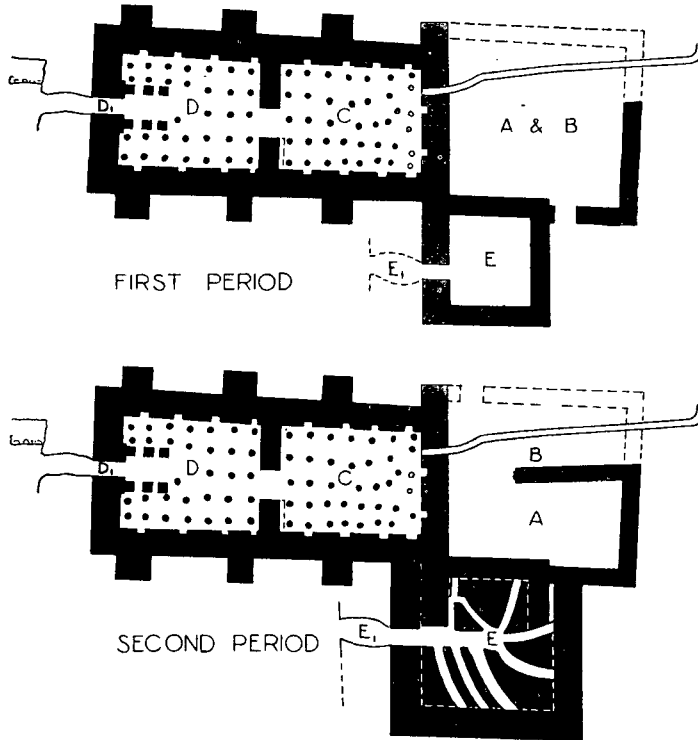


Fig. 42. The Men's Bath-house reconstructed.

point was as much as 1 foot 5 inches deep, while the fall was fairly rapid, being $6\frac{1}{4}$ inches, between X_1 and X_2 on the "record" plan (fig. 41). No covering slabs were to be seen anywhere, and their absence suggests a possible explanation of the omission of a cold bath. May not the rough-and-ready process of swishing with water from a bucket have been considered good enough in the circumstances? After all, the Emperor Augustus himself seems to have eschewed the cold bath and to have preferred a cold or tepid douche.¹

¹ *Sudabat ad flammam, deinde perfundebatur egelida aqua vel sole multo tepifacata* (Suetonius, *Aug.* 82). For a parallel to Mumrills see Pfretzschner, *op. cit.*, p. 56 (Eining).

Coming to the second period, we have hazarded the conjecture that the Apodyterium may then have been entered from the north. A small patch of cobbling just outside looked as if it might be a remnant of an approach from a road passing along the inner side of the Antonine Wall. Besides, the original entrance (if our guess as to its position is

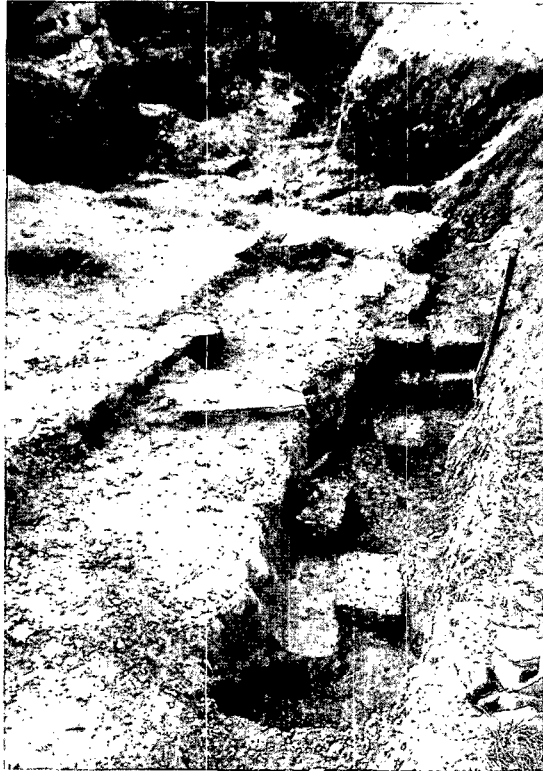


Fig. 43. Stone-built channel on north side of Apodyterium of Men's Baths, looking west towards the still uncleared Tepidarium.

right) would be partially blocked, as a reference to the "record" plan will show. The chief modification, however, was what would seem to have been an endeavour to screen off the Frigidarium from the Apodyterium. A partition of somewhat indifferent workmanship (fig. 44) was run up, at a slight angle, for a distance of at least 13 feet 6 inches westwards from the east wall, which was itself rebuilt in the same inferior style. We could find no evidence of the partition having extended further towards the west wall. We should add that at the

west end the floor was covered by a layer of burnt matter, about 6 inches thick, of which we have no explanation to offer.¹ Lastly, during the second period the channel appears to have been substantially reduced in depth. Portions of the later floor survived at the points marked X_1 and X_2 on the "record" plan. At X_1 a reduction of $6\frac{1}{2}$ inches had been effected by the introduction of a single block of stone. At X_2 , where the total reduction amounted to 5 inches, there were 3 inches of packing, and, above that, a slab 2 inches thick. There was no doubt as to those two changes being structural. Elsewhere stones had fallen in accidentally.



Fig. 44. General view of Apodyterium of Men's Baths, looking west. The stokehole of the Sudatorium is just being opened up.

One such was the block shown in fig. 11, *b*. It measured 1 foot 3 inches by $10\frac{1}{2}$ inches by 6 inches,² and had been hollowed out on one side for a length of $5\frac{3}{4}$ inches and a depth of 4 inches. On either edge of the hollow are flutings. Its architectural character is obvious. The most likely suggestion that has been made is that it may have been a support for a stone bench.³

The Tepidarium (C) and the Caldarium (D) formed parts of a single block of unusually substantial masonry. Over the walls, which averaged

¹ The layer can be distinctly seen both in fig. 43 and in fig. 44.

² Narrowing to $4\frac{3}{4}$ inches at the lower end.

³ For analogies see Krencker-Krüger, *Kaiserthermen in Trier*, Abt. I. (Augsburg, 1929) pp. 226 f., figs. 322 and 325.

3 feet in thickness, it had a length of 37 feet 5 inches and a breadth of 17 feet 8 inches, narrowing to 16 feet 6 inches at the eastern end. On each side were four buttresses, which projected for about 2 feet 6 inches¹ and varied in width from 3 feet 6 inches to 2 feet 6 inches. The ground had been excavated to receive these, so that their sides and ends, like their foundations, rested almost immediately against the natural soil. A measure so exceptional was a clear indication that the roof to be supported was unusually heavy. The surmise that it had been arched was confirmed by the shape of one or two of the stones which



Fig. 45. Portion of south wall of Men's Baths, showing (a) in the foreground the remains of partition wall dividing Caldarium from Tepidarium, (b) to the right of it two of the recesses for heat flues, and (c) behind these one of the buttresses.

were lying among the débris in the interior. A few pieces of window-glass showed how the rooms had been lighted. Both had, of course, been hypocausted, as was proved by the survival of twenty-four stone pillars, as well as by the finding of some fragments of thick and rather coarse cement, which had obviously belonged to the floor. Broken box-tiles were fairly abundant. With these must be associated a series of recesses or rebates, about 6 inches deep, on the inside of the walls (fig. 45), eighteen in all—four on the north of each room and four opposite to them on the south, with two on the east of the Tepidarium. They were blackened with soot in a manner which left no doubt that they had

¹ The buttress at the south-east corner was prolonged for 4 feet further, to form part of the side wall of the original Sudatorium (E).

served to convey the heated and smoke-laden air to a point beneath the surface of the cement floor, whence it would be carried upwards in box-tiles, placed one above another, warming the walls of the chamber in its ascent. How many exits there were from the roof it is impossible to say. It may be that, as in the case of the bakery in the House of Sallust at Pompeii,¹ a single chimney sufficed.

The arrangements for generating the heat were extremely simple. A sloping channel, 2 feet wide, was cut in the ground for a distance of 5 feet to the outer face of the west wall of the Caldarium (D₁), and



Fig. 46. Opening up the stoke-hole of the Caldarium in Men's Baths. The fallen mass to right of the yard measure represents the remains of three brick pillars that had flanked the entrance.

was used for feeding the fire with logs or faggots. The actual stoke-hole was an opening (also 2 feet wide) in the wall, the thickness of which was here increased from 3 feet to 4 feet in order to provide "cheeks" of sufficient length. The whole of the masonry on the south side, as well as the pillars beyond it, had been torn out. But what remained on the north side (fig. 46) made it plain that within the Caldarium itself the stoke-hole had been, in a manner, continued for 5 feet more, the smoke and flame, impelled by the draught, being driven straight on between two lines of brick pillars, three pillars in each line and the lines about 3 feet apart. Only five of the other hypocaust pillars were left; but they would all appear to have been of stone and

¹ See Fusch, *Hypokausten-Heizungen*, Taf. 1.

to have been arranged in the ordinary way. There was no means of knowing where the hot bath or basin had stood, but it was presumably not far from the stoke-hole. That it had not been, like the cold bath, omitted altogether may be inferred from the description already given of the stone-built channel, which was led into the Frigidarium through the east wall of the Tepidarium. This must have run from the Caldarium, and can only have drained a bath or basin.

Internally the Caldarium measured about 14 feet 5 inches by 12 feet, narrowing at the eastern end to 11 feet. The corresponding dimensions



Fig. 47. General view of Tepidarium of Men's Baths, with remains of partition-wall in foreground and Apodyterium in background.

for the Tepidarium were 15 feet by 11 feet. The two were separated by a wall about 2 feet 2 inches wide, through which there was a connecting passage 3 feet broad. On the north of the passage the partition-wall had been reduced almost to the foundations (fig. 47). Otherwise, as will be seen from the illustration, the Tepidarium was much better preserved than the Caldarium, no fewer than nineteen of the pillars remaining more or less *in situ*. That this part of the building had undergone reconstruction, just as the Frigidarium had done, was suggested by the fact that some of the pillars were obviously being put to a secondary use. Two of them, for instance, when placed side by side (fig. 11, c), proved to be the two halves of a single stone that had measured 1 foot 10 $\frac{3}{4}$ inches by 2 feet 1 inch by 9 inches, and had had in the centre a bowl-shaped hollow, 10 inches in diameter and 6 inches

deep, which looked as if it might have been cut for the reception of a gate-post, especially as the lower part of it showed distinct signs of wear.

It was, however, from the Sudatorium (E) that the most striking evidence of two different periods came. During the first of these it had been a very small room, measuring no more than 9 feet 5 inches (N. to S.) by 8 feet 5 inches (E. to W.). Three of the walls were but 2 feet thick. That on the west, however, which was a prolongation of the most easterly of the southern buttresses of the Tepidarium, had a thickness of 3 feet and was broken by a gap, 2 feet in width, which formed the stoke-hole. As in the case of the Caldarium, the approach to the gap was by a sloping channel, excavated in the natural soil. In our "first period" plan (fig. 42) we have not ventured upon any indication of the character of the hypocaust by which the chamber had been heated. All evidence as to this was effectually destroyed at the beginning of the second period (fig. 42), when the size of the room was increased to 14 feet (N. to S.) by 14 feet 5 inches (E. to W.), the north wall retaining its original thickness and position, while new walls, 3 feet thick but less deeply founded, were built on the remaining three sides. As before, a gap of 2 feet had been left in the western wall to serve as the stoke-hole. It was just opposite the gap in the original wall, part of which seems to have been allowed to stand so as to lengthen the "cheeks." No doubt the approach behind was at the same time carried further back to suit the altered conditions. A view of the stoke-hole is given in fig. 48.

Whatever may have been the case during the first period, the hypocaust of the second period was not an ordinary pillared hypocaust, but a channelled hypocaust. Although channelled hypocausts are by no means unknown in Southern Britain, Mumrills is the first site north of the Border on which anything of the kind has been found.¹ Unless we are mistaken, it is also the first site anywhere that has furnished materials for determining the real difference between the two types of heating. The details therefore deserve to be fully recorded. On emerging from the stoke-hole the warm air had passed into a series of channels ranging from 1 foot to 2 feet in width. These were formed by masses of masonry, which consisted of stones piled up "higgledy-piggledy" and packed with clay. Each mass rested on a foundation of carefully worked blocks, irregularly placed and varying in size, the largest being 3 feet by 1 foot 2 inches by 10 inches. In some instances the ruins of the original walls had been adapted for the

¹ Except at Balmuildy (see *infra*, p. 461), where, however, it was so much damaged as to be hardly recognisable.

purpose, and other signs of the "secondary" nature of the masonry were abundant. Thus many of the stones had previously been used as building-stones, and some of them, though far removed from the stoke-hole, were burnt-red for a considerable depth below the surface, showing that they had stood in the immediate neighbourhood of an earlier furnace. On the top of the masonry, and bridging the channels at a height of 2 feet 6 inches over the bottom of the vault, lay the slabs which had formed the floor of the chamber above. A few of them were still in their original positions (fig. 49), but neither these nor any



Fig. 48. Stoke-hole of Sudatorium of second period in Men's Baths. Part of the floor, still *in situ*, appears in extreme right of foreground.

of the displaced fragments that lay scattered about bore the slightest indication of having been covered with the thick layer of concrete so characteristic of the floors of chambers that have been heated by pillared hypocausts. It was evident that there had never been any concrete upon them at all.

The occurrence of the two types of hypocaust in such close juxtaposition affords a good opportunity for comparing them, and also some hope that thereby it may be possible to discriminate between their uses. The more salient differences, so far as they are structural, have been noted in the descriptions already given, and they will be referred to again below. But there was a difference of another kind, which was as striking as it was significant. While the remains of the pillared hypocaust were blackened with soot, the remains of the

channelled hypocaust were singularly free from such discoloration. That this was not due to infrequency of use was proved by the accumulation of black matter above the stoke-hole, coupled with the intense redness of the soil beneath it. The obvious explanation is that the fuel used was not the same—that the pillared hypocaust had been fired with wood and the channelled hypocaust with charcoal. In the former case combustion, in its earlier stages at least, would produce great



Fig. 49. General view of Sudatorium of second period in Men's Baths. The standing figure marks the south-east corner of the foundation of the wall. Note remains of floor.

quantities of smoke and soot. In the latter it would generate carbonic oxide, which, though poisonous, is not fuliginous. These are the conditions of the problem. If a nexus can be established between the distinctive methods of fuelling and the structural differences, a solution may be within sight.¹

It will be remembered that within the two rooms above the pillared hypocaust the maintenance of a temperature higher than that of the outer air was secured partly by radiation from the floor and partly by radiation from the walls. As the floor was to be a vehicle of trans-

¹ In working out this solution we have been constantly indebted to Fusch's excellent monograph (see *supra*, p. 446, footnote 1).

mission, it was clearly desirable that it should be capable of storing a large supply of heat. Hence the thick layer of cement. It was no less desirable that as much of its under surface as possible should be in direct contact with the warm air emitted from the stoke-hole,¹ and therefore the smaller the space taken up by its supports the better. Hence the comparatively slender pillars. It was apparently in the combined application of those two principles that the merit of Sergius Orata's original invention consisted. Again, when the walls were first called upon to play their part through the introduction of the practice of "tubulating" them—that is, jacketing them with box-tiles—their action too was limited to radiation pure and simple. The heated air remained within the flues and there was no question of admitting it to the rooms. Consequently its contamination with smoke and soot mattered not at all. Provided a sufficiently high temperature could be obtained, there was no reason against the use of wood for fuel, while the readiness with which it could be procured was all in its favour.

The phenomena observed in the two pillared hypocausts have thus been satisfactorily accounted for. The channelled hypocaust—for the moment we are speaking of this particular example only—presented a very different picture. The absence of the thick concrete floor, taken along with the substitution of masses of masonry for pillars, appears to indicate that but little importance was attached to radiation from the floor; and there were no "rebates" or similar evidence suggestive of "tubulation" of the walls. At the same time the employment of charcoal points to an anxiety to prevent the production of smoke and soot. Are we not justified in putting all these things together and concluding that here the third of the three methods which we enumerated² was in use—in other words, that the room above was warmed by the direct introduction of heated air, the admission of which could be regulated in some such fashion as Pliny describes?³ The acceptance of this hypothesis would throw fresh light on the structural features. As radiation from the floor and the walls had become a negligible factor, everything would depend upon keeping up the temperature of the air that passed through the hypocaust and thence into the room. For such a purpose it would have been dangerous to trust to the charcoal furnace alone; the air would have been polluted by the continuous generation

¹ Direct contact with the flames was undesirable as tending to produce cracks. This explains the length of the stoke-hole (Fusch, *op. cit.*, p. 39).

² *Supra*, pp. 445 f.

³ He speaks (*Ep. ii.*, 17, 23) of a bedroom to which was attached "*hypocauston peregigium, quod angusta fenestra suppositum calorem, ut ratio exigit, aut effundit aut retinet.*" Fusch (*op. cit.*, p. 9) cites from Winkelmann an interesting example of a similar system in a house at Herculaneum.

of carbonic oxide. In all probability the real function of the furnace was to heat the masses of masonry.¹ When that had been thoroughly done—and in this connection it should be remembered that charcoal would produce a higher temperature than wood—the furnace would be allowed to die down and the poisonous fumes to disperse. Thereafter the stream of fresh air entering the hypocaust through the stoke-hole would be very effectually warmed by radiation from the masses of masonry, which after the manner of stone would part but slowly with their accumulated heat. It should be added that all trace of the mechanism by which the warm air was conveyed into the chamber above had disappeared. Incidentally, it is plain that the stoking of a Roman hypocaust demanded skill and that the preparation of a Roman bath took time.²

If the solution we have reached is sound, a further question naturally arises. Why was the third method of warming a room employed in this particular part of the Bath-house? The obvious answer is that it was because it was much more suitable for a Sudatorium, where a high temperature and a dry heat were prime requisites. When we deal with the large Bath-house that was inserted in the Commandant's quarters it will be found that there also the Sudatorium was heated by a channelled hypocaust. The same would seem to have been the case with the Sudatorium at Balmildy, although its ruinous condition obscured the full significance of the little that was left of it.³ Now that attention has been drawn to the matter, it will not be surprising if other examples are noted. We do not, of course, suggest that all Sudatoria had channelled hypocausts, any more than that every channelled hypocaust necessarily connotes a Sudatorium. Some of them certainly had pillared hypocausts. Even when the hypocaust was pillared, however, charcoal was, sometimes at least, used in the furnace. Inchtuthil provides an illustration ready to hand. Reference to fig. 40 will show a marked disparity in size between E and G, the *praefurnia* of the Caldarium and of the Sudatorium respectively. The latter was very much smaller, and (as L. Jacobi long ago remarked⁴) a small *praefurnium* points to fuelling with charcoal.

¹ For instructive mediæval parallels see Fusch, *op. cit.*, pp. 93 ff.

² In the letter which we have already quoted more than once, Pliny speaks of the great advantage of having in the neighbourhood of his Laurentine villa a *vicus* in which there were three public bath-houses: "*magna commoditas, si forte balneum domi vel subitus adventus vel brevior mora calfacere dissuadeat*" (*Ep.*, ii. 17, 26).

³ Miller, *Balmildy*, p. 51. The Sudatorium is Room G on the plan (p. 49). The fact that there seems to have been a spread of concrete on the floor does not affect the main point. On the German Limes the two Sudatoria in the outside bath-house at Neckarburken (*O.R.L.*, Nr. 53 (Lief. 9), pp. 17 f.) were heated by channelled hypocausts, one of which (No. 5) bears a very close resemblance to the channelled hypocaust at Balmildy.

⁴ *Das Römerkastell Saalburg*, p. 248.

Before we quit the Men's Bath-house a word or two must be added regarding the chronology of the alterations it had undergone. The two periods which the excavations revealed appear to correspond to the two earlier of the three periods so distinctly marked in the Principia and elsewhere. During the third of the three phases in the life of the fort the building would seem to have been entirely disused and its ruins covered in. No other hypothesis is consistent with the position of the fireplace, which is marked on the "record" plan (fig. 41) immediately to the north of D₁. The pottery fragments found in this proclaim it to be Roman, and yet it is impossible to suppose that it and the stoke-hole immediately adjoining were functioning simultaneously. The inference that the Bath-house was left unrestored at the opening of the third period is strengthened by the fact that over the mass of débris, beneath which the Caldarium and the Tepidarium were buried, there was a layer of yellow clay about 3 inches thick, increased to as much as 10 inches over the stoke-hole.¹ A parallel is furnished by the surfacing of clay which had been spread over the abandoned Annexe Bath-house at Balmuilty.²

(b) *The Large Bath-house.*—It will be remembered that the difficulty attending the interpretation of the plan of the Commandant's House was in no small measure due to the fact that into the original structure there had been intruded a suite of baths, which subsequently had in their turn been subjected to alterations of a very drastic kind. The size and arrangement of the Large Bath-house, as we shall call it, are such that it cannot be regarded as a private installation. Whoever may have been allowed to frequent it, it was undoubtedly the *balneum* of the fort, corresponding to the bath-house that normally lay outside the gates.³ The plan given in fig. 30 shows the remains as uncovered, without any attempt to distinguish walls and foundations that are original from those that represent reconstructions. An even more graphic idea of the tangle that had to be unravelled may be obtained from a photographic reproduction (fig. 50) of the excellent model which the Society owes to the forethought and liberality of Sir John Findlay. In addition to the Bath-house proper, the model includes Rooms 14 and 15 of the Commandant's House with their interesting hypocaust.⁴

In dealing with the Large Bath-house we propose to follow the method

¹ Above the Sudatorium and the Apodyterium the layer was not nearly so well marked as it was elsewhere, if indeed it existed at all.

² See Miller, *op. cit.*, p. 55.

³ See *supra*, p. 447.

⁴ As some exploratory work was done after the model was completed and before the plan was finally laid down, it will be found that on some very subsidiary points the two are not quite in agreement.

we adopted in dealing with the Headquarters Building—that is, firstly, to reduce the verbal description of what was actually found to a minimum, relying rather upon the superior intelligibility of a “record” plan (fig. 51); and, secondly, to use a chronological framework for what we have to say by way of interpretation, referring frequently to plans

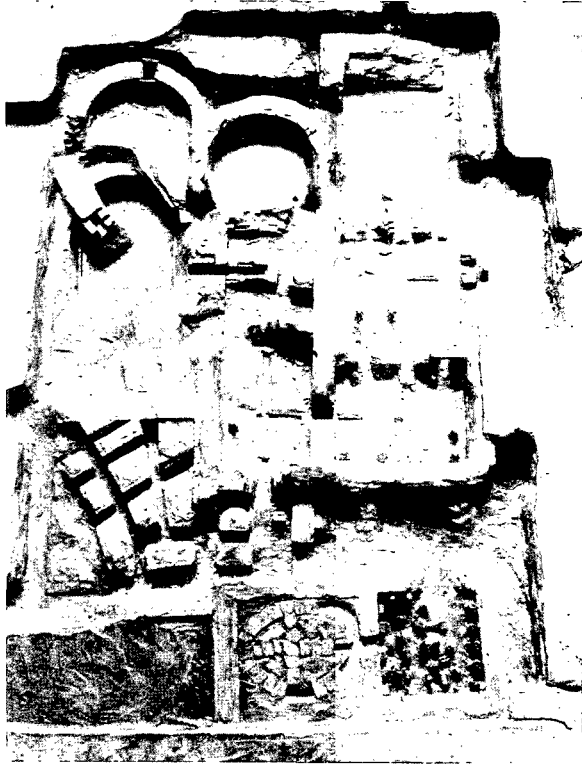


Fig. 50. Model of the Large Bath-house and of Rooms Nos. 14 and 15 in the Commandant's House.

(fig. 52) that must in the nature of things be more or less conjectural. In the case of the Bath-house the element of conjecture will inevitably bulk more largely than it did in the case of the Headquarters Building. The form of the Bath-houses attached to Roman *castella* varied much more widely than did the form of the corresponding Headquarters Buildings, and there is thus no standardised model available as a guide. Accordingly we can advance no claim of finality for our conclusions; indeed, at more than one point we shall have to confess ourselves

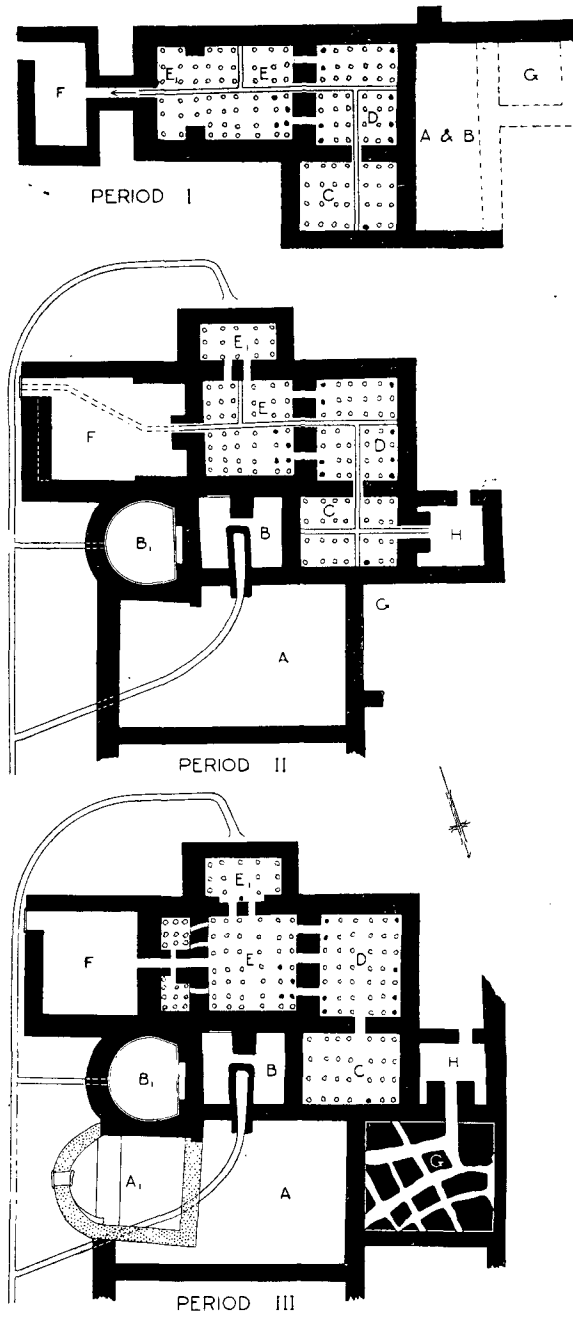


Fig. 52. The Large Bath-house reconstructed.

Bath-house to occupy this site was laid out on the lines usual for military establishments of the sort—that is, with the Apodyterium (A) and its adjuncts, the Frigidarium (B) and the Sudatorium (C), at the one end, and the furnace-room (F) at the other. Incidentally, the assumption has already proved useful as possibly throwing light on some of the more puzzling features of the Commandant's House. But the real arguments in its favour are structural, and will be found indicated on the "record" plan (fig. 51). Thus the cold bath (B₁) of the second and



Fig. 53. Caldarium of Large Bath-house, looking west. The view is taken from the furnace-room, where the three levels were most clearly marked.

third periods was obviously no part of the original scheme. The south-west corner of the apse within which it lies has been built up against the end of an older east-and-west wall, which at this point makes a rectangular turn; the difference in the styles of the two types of masonry left no doubt as to that.¹ So, again, on the opposite or south side of Room E the *alveus* or recess for the warm bath (E₁) appears to be an addition; the remains of foundations showed that at first the south wall of Room E had run on without interruption. Lastly, the west wall of Room C was continuous when built. It had been broken through to

¹ It is worth adding that some of the stones in this older wall had obviously been already used elsewhere—possibly in that portion of the Commandant's House which we believe to have been demolished in order to make way for the Baths.

form the opening which is marked on the "second period" plan (fig. 52), and which was subsequently filled in again. The assumption we have made would seem to be the simplest way of accounting for these anomalies, and it has the further advantage of being in accordance with a *priori* likelihood.

It will be noted that in our attempted reconstruction we have refrained from fixing with any definiteness the limits of the Apodyterium (A), the Frigidarium (B), and the Sudatorium (G). Not impossibly they were larger than the conjectural plan suggests, and farther west there would be a courtyard entrance. That no trace of their actual whereabouts should have survived will not, however, be deemed surprising if it be recalled that those apartments of the Commandant's House which ultimately replaced them included a hypocaust, in connection with which a good deal of excavation must have taken place. If it be objected that, excavation notwithstanding, we ought at least to have found somewhere the drain which led from the cold bath, we can only confess that we missed the opportunity of looking for it. The ground had all been covered in long before a study of our notes and plans had brought us to the conclusion we have formulated.

At Mumrills, as in most military bath-houses of any pretensions, there were two Tepidaria (C and D). Both had pillared hypocausts, communication between these being maintained through a single opening. Apart from the breach in the west wall of C, which has been referred to already, and apart also from the channelling in the floors, of which something will be said presently, there would seem to have been little or no modification in the plans of C and D as between one period and another. There were, of course, signs of restoration and repair in the walls, some portions of which were clearly older than the rest. It is just possible, too, that during one or both of the earlier periods the pillars had been of brick, for among the re-used material that had been employed in levelling-up for the lintel-stone of one of the openings between D and E (fig. 54) were bricks that might well have come from overturned hypocaust pillars. All that is certain, however, is that during the last period the pillars had been of stone. Large and small fragments of the covering slabs which they had supported were fairly numerous, and in the foreground of fig. 54 can be seen a fine piece of the concrete flooring which had rested on the slabs. It was of excellent quality and was about 9 inches thick. To complete the picture, it should be added that there was no lack of broken box-tiles from the lining of the upper walls, and that there were even a few bits of coloured plaster to testify to decoration.

From the second Tepidarium (D) the bather would pass into the Caldarium (E), the hypocaust beneath which was also pillared. Although the number of pillars left standing was smaller than in the hypocaust of D—five as against eight—the remains of the walling were higher at one point in the hypocaust of E than they were anywhere else, rising to as much as 3 feet 6 inches. During the first period the recess for the



Fig. 54. Partition-wall between Tepidarium (D) and Caldarium of the Large Bath-house, looking north-east. The block of cement in the foreground was the largest surviving fragment of the floor.

alveus or hot bath (E₁) would seem to have stood immediately in front of the stoke-hole (fig. 52). It was certainly not on the south of the room then, as it was during the later periods, and the oldest pieces of masonry as indicated on the "record" plan—in other words, those which were associated with the lowest of the three floors—fit in most easily with such an arrangement as we have suggested. Parallels for an *alveus* in a similar position can be cited from Stockstadt and from Rükkingen, both on the German Limes.¹ Nor could a more convenient position

¹ *O.R.L.*, Nr. 33 (Lief. 33), p. 19, Taf. iv., and Nr. 22 (Lief. 38), p. 8, Taf. i.

well have been found, since it was over the stoke-hole that the cauldrons for heating the bath-water stood.¹

The furnace-room (F) had undergone more extensive alterations in the course of its history than had any of the three apartments we have just been describing. The view that the ground which it occupied had originally been included in the Commandant's House appears to receive some support from the discovery, among the débris of the south-east corner, of a fine bronze fibula and a few pottery sherds which are suggestive of the beginning rather than of any later part of the Antonine period.² Such objects would have been strangely out of place in a furnace-room. Be that as it may, it must be frankly admitted that the form given to F and to the stoke-hole in our "first period" plan (fig. 52) is largely guesswork. The most that can be said for it is that it seems to be consistent with the very fragmentary structural remains, as shown upon the "record" plan (fig. 51). The resulting outline is certainly unusual. On the other hand, it closely resembles the arrangement of furnace-room and stoke-hole in the military bath-house on the Salisberg near Hanau-Kesselstadt.³ The back or east wall of F was sadly dilapidated, but enough of it was left to show that it had been reconstructed more than once. That is practically all that there is to be said, except that there had possibly been a staircase at the point where we show an opening on the "period" plan (fig. 52), and that one of the stones lying in the bottom had apparently belonged to a fairly large arch. The use of clay instead of mortar in some of the walls is precisely what might have been expected in view of the proximity of the furnace. Indeed, it is a little surprising that it was not more generally employed. Finally, the size of the chamber indicated that the fuel used had been wood. This was certainly the case in the latest period, as was apparent from the amount of soot and sooty discoloration in E.

Neither in the Caldarium nor in either of the Tepidaria were there any recesses or rebates in the wall such as those which were so prominent a feature of the corresponding rooms in the Men's Bath-house. Yet it is not open to question that the method of heating was identical in principle—radiation from the walls as well as from the floor. In this case, however, the cement flooring would be bordered by a continuous row⁴ of box-tiles, open at the ends and having a narrow slit about the middle of each side. The tiles would be set perpendicularly

¹ See Fusch, *op. cit.*, pp. 76 ff., where reasons are adduced for believing that the bath, like the cauldrons, was usually of metal.

² See *infra*, pp. 541 and 553 ff.

³ See Wolff in *XI. Bericht der röm.-germ. Komm.*, pp. 101 f.

⁴ That is, on the assumption that the entire wall was to be "jacketed," as it sometimes was.

and in such a position that they would form the natural means of escape for the warm air in the hypocaust, while they would also be at exactly the same level, so that the slits in the sides of each would be directly opposite the slits in the sides of its neighbours. Each box-tile would be surmounted by a stack of others, likewise perpendicularly placed and each stack reaching to the roof. Thus a section along the face of one of the upper walls would have resembled a honeycomb. This is no imaginary picture, for in not a few instances the lower tier (or tiers) has been discovered *in situ*.¹

The problem of how to provide a through draught and to dispose of the smoke would be solved by carrying a limited number of the stacks above the roof, whence they would vent into the open air. The remainder would be closed by a flat tile laid upon the top. Von Groller, from a calculation based on the standard sizes of the various sorts of tiles at Carnuntum, has made it probable that in the hypocausts there every fifth stack of box-tiles had served as a chimney. Incidentally, his reconstruction provides a very attractive explanation of the slits of which we have spoken; they would generate a series of cross-currents, which would carry the smoke from the closed stacks into those which were acting as chimneys.² On an earlier page of the same Report³ he describes a pillared hypocaust which was sufficiently well preserved to admit of the efficacy of the system being tested by actual experiment. His results are so interesting that it seems worth while repeating them here. A wood fire was kindled in the stoke-hole. As soon as it was fairly ablaze, a strong draught was generated and the whole of the smoke driven upwards through the box-tiles. At the end of ten minutes the tiles were so hot that it was impossible to touch them with the bare hand. Ten minutes later the upper surface of the cement floor was distinctly warm. The fire was kept up for three-quarters of an hour altogether, and then allowed to die down. By that time the floor was very warm, but not hot. Next morning, after the lapse of fifteen hours, it was not yet quite cold, despite the fact that it had been exposed throughout the night to the open air, the roof and upper walls having long since been destroyed.

Imperfect as von Groller's test necessarily was, it was sufficient to prove that the pillared hypocaust system, with radiation from floor and walls, was admirably adapted for its purpose. It would enable a high temperature to be maintained over a long period with comparatively

¹ An excellent example at Vinovia (Binchester) in the north of England is described and illustrated in *Arch. Assoc. Journal*, vol. xliii. (1887), p. 301 and Pl. v. Cf. *Arch. Ael.* (N.S.), vol. ix. (1883), pp. 198 ff.

² *Der römische Limes in Oesterreich*, Heft vi. pp. 90 f., with diagram.

³ *Op. cit.*, pp. 88 f.

little expenditure of fuel. What, however, about ventilation? Some provision for this would be essential, if the vapour generated by the hot bath in the Caldarium was to be carried off and if general hygienic conditions were to be properly secured. Different methods would appear to have been in use in different places. Thus, L. Jacobi describes and illustrates a well-preserved hypocaust, where a current of fresh air was admitted into the pillared vault through a special inlet and was ultimately carried into the chamber above by means of a vertical shaft constructed in the thickness of the opposite wall.¹ He speaks of the arrangement as "quite admirable," and says that something of the sort must always have been done, pointing out that, even if there were no special inlet, the stoke-hole could be made to serve the same end as soon as the fire had died down. That is undoubtedly so. But there was an obvious drawback. The current of fresh air would gather more than warmth in the course of its passage through the soot-stained vault, so that the air entering the upper chamber would be anything but pure. At Mumrills a more excellent way was chosen. The channelling in the floors of C, D, and E, as shown in the "record" plan (fig. 51), quite certainly represents the remains of a well-planned ventilation system, which would be entirely free from the objection just indicated. As we found it, the system was, of course, a wreck, and before being wrecked it had apparently been disused for a time. If we add that its true significance was not realised until after it had been covered in, the difficulty of describing it intelligibly will be appreciated. We propose to postpone the attempt until the changes made in the other parts of the building in the second period have been dealt with.

Second Period.—According to our reading of the evidence, the whole scheme of the Large Bath-house was radically altered at the opening of the second period, when it assumed the form which it retained till the close of the third. For a "lay-out" of the normal type, as illustrated by Inchtuthil,² there was substituted one which approximated more closely to what has been called the "block system"³—an arrangement occasionally, though rarely, found in military bath-houses, as at Seckmauern on the German Limes,⁴ but occurring more frequently on domestic sites, as in the example excavated at Caerwent in 1855.⁵ The general result is set out in our "second period" plan (fig. 52). It will be seen that the Apodyterium (A), the Frigidarium (B), the cold bath (B₁),

¹ *Das Römerkastell Saalburg*, p. 253 and fig. 37 (p. 250).

² See *supra*, p. 448.

³ Pfretzschner, *Die Grundrissentwicklung der römischen Thermen*, p. 38.

⁴ *O.R.L.*, Nr. 466 (Lief. 19).

⁵ *Archaeologia*, vol. xxxvi. p. 433; illustrated also by the late Mr John Ward in his *Romano-British Buildings*, p. 197, and again in his very interesting account of the baths at Gellygaer (*Cardiff Nat. Soc. Trans.*, vol. xlii. fig. 3).

and probably also the Sudatorium (G), have all been moved from the west of the building to the north, so that the approach to the Baths would now be from the Via Principalis. The furnace-room (F), the Caldarium (E), and the two Tepidaria (C and D) remained in the positions which they had occupied before, but with the exception of the second Tepidarium (D) they were all more or less extensively remodelled.

The reconstruction of the furnace-room (F) in our "second period" plan

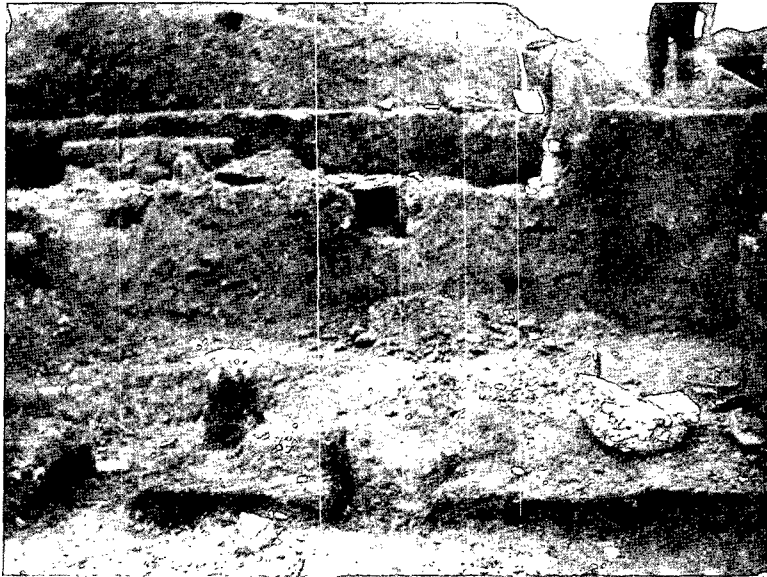


Fig. 55. Recess for the hot bath in the Caldarium of the second and third periods.

is almost wholly conjectural and may well be incomplete. The one fact that seems to be certain is that the size of the room was increased by the absorption of the space formerly occupied by the hot bath, the *alveus* being now transferred to a rectangular niche (E_1), built on the south side of E to receive it, and measuring internally about 12 feet by 5 feet 6 inches. The concrete floor on which the bath rested had been supported by pillars. One or two of the pillars and a portion of the concrete flooring can be seen in fig. 55, which also shows the mouth of the drain for the waste-pipe, and thus enables a trustworthy estimate to be formed of the level at which the bottom of the bath had stood. The heat would doubtless be carried up the walls of the niche in box-tiles, and would thus serve to keep up the temperature of the water which

(as has been already explained¹) would originally be warmed in cauldrons over the stoke-hole. The quantity of soot that had accumulated in and about E₁ was remarkable. Is this an indication of the position of the main vent or vents? Or does it merely mean that the vault within the recess could not be very easily reached during the periodical cleanings? Exclusive of the niche, the Caldarium measured 15 feet by 14 feet within walls.



Fig. 56. Caldarium and Tepidarium (D) of the Large Bath-house, looking west over the stoke-hole, before the recess for the hot bath had been opened up.

Immediately adjoining the Caldarium and connected with it by three openings (fig. 56) was the second Tepidarium (D), which measured 16 feet by 13 feet. As has already been stated, it appears to have been left substantially unaltered, except for necessary repairs. The smallest of the three hypocausted rooms was the other Tepidarium (C), which measured 15 feet 6 inches by 11 feet and was linked to its neighbour on the south by a single opening. Here an important change was made, presumably at the beginning of the second period. At a point indicated on the "record" plan (fig. 51) the wall on the west was broken through

¹ See *supra*, p. 469.

to admit the heat from a new stoke-hole, space for which had become available by the transfer of the Apodyterium and the Frigidarium to the north. The presence of a stoke-hole in the hypocaust of a room which must normally have served as a Tepidarium is no unusual occurrence. A similar arrangement has been noted over and over again in the military bath-houses on the German Limes. It is perhaps most simply explained as a reserve or relief installation. When the ordinary stoke-hole was put out of action by the need for cleaning or repair, recourse

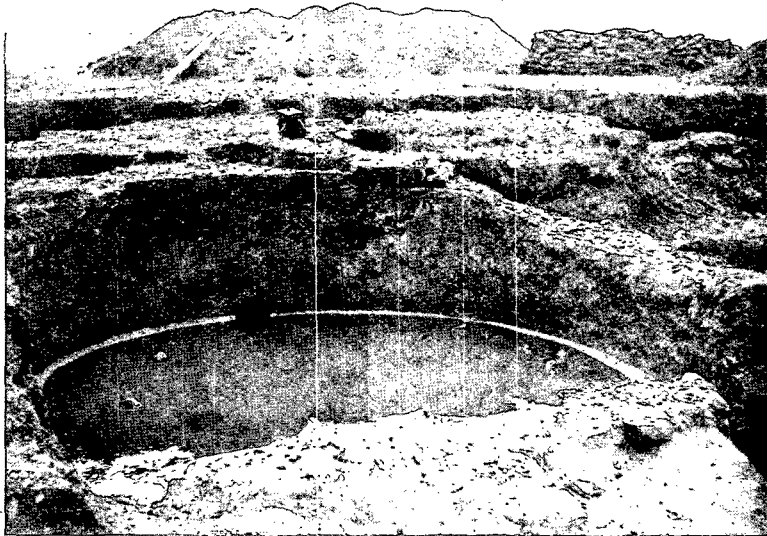


Fig. 57. Cold bath in the Large Bath-house.

would be had to the stoke-hole in the Tepidarium, the rôles of Caldarium and Tepidarium being temporarily reversed.¹ However that may be, the reddening of the "cheeks" showed that in this case the second stoke-hole had seen a good deal of service. A curious feature of Room C was a 2-inch scarcement which, starting at the north-west corner, ran along the inside of the north wall for about 4 feet at a height of 1 foot 2 inches above the floor. We have no satisfactory suggestion to make as to its significance, if it had any.

Although the Frigidarium (B) as exposed by our excavations must obviously belong to the third period, there is no reason to believe that its general outline differed in any way from that of the Frigidarium which

¹ *O.R.L.*, Kastell Köngen, Nr. 60 (Lief. 30), p. 17.

it succeeded. It will therefore be convenient to describe it now. The cold bath (B_1), which occupied an apse at the eastern end, was in singularly good preservation (fig. 57).¹ Its floor consisted of a 6-inch bed of cobbles, resting on sand and covered with a 10-inch layer of fine and exceedingly hard concrete. Over this, as well as over the sides, was spread a coating of reddish cement, 1 inch thick. All round, at the junction of floor and sides, was the usual $\frac{1}{2}$ -inch curved moulding. In



Fig. 58. Frigidarium of Large Bath-house, as seen from Caldarium (C). The drain for the cold douche appears in the middle distance, and beyond are the remains of the low seat in front of the cold bath. For the channel in the middle foreground see p. 482.

the centre of the apse was the hole for the waste-pipe, the drain from which ran eastwards for a distance of 11 feet, when it joined the drain which carried away the used water from the hot bath. In the south-west corner a hole in the floor, 6 inches in diameter, was carried in neatly circular fashion right through the bed of cement to the cobbles below. It may be surmised that the object for which it had served as a socket had been connected with the water-supply—possibly a pump.

¹ The photograph was taken in winter, when the rain-water, which had accumulated in the bottom, was covered with a sheet of ice.

The steps leading down into the bath had probably been close beside it, but no trace of them remained.

The floor of the Frigidarium itself had been completely removed;



Fig. 59. Recess in south wall of Frigidarium, with pedestal to right of it.

but, separated by a strip of clean, yellow sand from the ruined base of the low seat in front of the bath, was the squared end of a built drain, well seen in the middle distance in fig. 58. As indicated in the "second period" plan (fig. 52), this drain passed straight through the north wall and then swept in a long curve eastwards to join the

outflow from the two baths. The adventures it met with on the way are noted on the "record" plan and will be described in detail presently. Meanwhile it need only be pointed out that its purpose was obvious. It had carried away the waste water from the cold douche. Its position and its course under the floor of the Apodyterium can be paralleled from many sites besides Inchtuthil,¹ and in some cases the fragments of the basin have survived.² The carefully built pedestal which stood against the wall immediately to the south of the end of the drain (fig. 59) may also have been connected with the douching arrangements. It was about 3 feet 6 inches square and about 1 foot 3 inches high. Perhaps it was the stand for the basin. Adjoining it on the east there will be observed in the illustration a well-marked recess in the wall, rather less than 1 foot high and some 2 inches deep, along the top of which was a band of burnt material dipping slightly towards the east and adhering closely to the stones. We can only record this last feature without attempting to explain it.

The radical alteration in the general plan of the Baths seems to have resulted in a considerable increase in the size of the Apodyterium (A), the north wall of which, as shown in our "second period" plan (fig. 52), certainly dates from the time of the first reconstruction. Not much can be said about the apartment itself, except that it was floored with excellent paving, some of the stones of which can be seen in the background of fig. 60, a view taken from the rear of the apse of B₁. At one point, however, a paving stone or stones had been removed, and the blank so caused had become, as it were, a centre for a subsidence of the whole of the surrounding part of the floor. In endeavouring to determine the reason for the subsidence we lighted upon a chapter in the history of the building which might otherwise have escaped our notice entirely. In the illustration the stooping figure on the right is in the act of beginning the investigation by digging down into the space which had been denuded of paving. After working through forced soil for a depth of 6 or 7 feet he encountered a floor of puddled clay, and it was therefore decided to lift the rest of the paving and clear the whole area.

What was ultimately revealed was an excavated hollow (fig. 61), which it will be convenient to call the Deep Bath, that being the name by which it was known while operations were in progress. In outline, as indicated on the "record" plan (fig. 51) by a dotted line, it resembled an elongated apse projecting eastwards. At the level of the puddled

¹ See *supra*, p. 449.

² At Silchester, for instance (*Archaeologia*, vol. lix. (2), p. 344), and at Chesters (*Arch. Ael.* (N.S.), vol. xii. p. 126).



Fig. 60. Outer face of the apse containing the cold bath, with remains of paving of the Apodyterium in the background.



Fig. 61. The Deep Bath.

floor, which was bordered by a roughly laid but well-defined kerb, and on which patches of a pinkish cement were here and there visible, it was 14 feet 6 inches long with a maximum breadth of 12 feet 10 inches. Above the kerb the north and south sides and the rounded or eastern end rose steeply, though not quite vertically, to a height of some 3 feet, where they would seem to have terminated in a ledge rather more than 1 foot wide, along which lay a cradling of stones such as might have been designed to support a slight wall.¹ Portions of the sides and end were puddled like the floor, and, like it, they showed occasional patches of pinkish cement.² The straight or western end presented an entirely different appearance. There the kerb, instead of being surmounted by a steep bank of earth puddled with clay, formed a backing for the vertical end of a gentle slope of solid concrete, several inches thick and more than 10 feet long, leading up to what had been the Roman surface. The concrete had been run over a bed consisting almost entirely of pure sand and gravel with no admixture of foreign matter.

The shape of the hollow, the puddling, and the traces of pinkish cement combined to suggest that we had found another cold bath; and in our opinion that is certainly what the excavation was originally intended to be. On the other hand, closer examination convinced us that the intention had never been carried into effect. To begin with, there was no sign of any outlet in or near the floor and no provision whatever for drainage. Again, there were indications that the concrete slope was unfinished; a little way above the bottom there were two holes—one circular with a diameter of 7 inches, and the other oblong with dimensions of 1 foot 6 inches by 6 inches—which pierced the concrete but did not penetrate into the bedding below, thus leaving the impression of a purpose unfulfilled, and, similarly, towards the north of the slope there was a large irregular gap which looked as though it had never been covered with concrete at all. Finally, except for a number of pieces of burnt daub, which occurred very far down, the contents of the hollow consisted mainly of clean sand, with hardly any fragments of pottery or other débris such as one would have expected to find in an accidental accumulation, as distinguished from a deliberate filling-in.

As the figures we have given will show, the Deep Bath would have been exceptionally large and capacious had it ever been completed. Perhaps this explains why the scheme was abandoned. When those

¹ Ledge and cradling were visible only on the south and south-east. In view of other indications which we shall mention presently, it seems possible that they were never completed.

² The remark made in the previous footnote applies equally to the partial treatment of ends and sides.

responsible found themselves face to face with the question as to how the water was to be carried off, they may have realised that their plans were too ambitious, for it will be apparent presently that the floor of the Bath was 2 or 3 feet lower than what may be regarded as a normal drainage level for this part of the site. In saying so we do not forget the open ditch, which is marked on the plan (fig. 35) as passing northwards through the eastern portion of the Commandant's House. So far as the levels go, it would not perhaps have been impossible for that to have provided an outlet. It will be remembered, however, that it was blocked with burnt daub and similar débris to an extent which makes it difficult to suppose that it can have functioned properly after the destruction of the Wooden House. The Deep Bath, on the other hand, whether finished or unfinished, was not constructed until the conflagration was over. We satisfied ourselves as to this by a study of its relation to the layer of burnt material. The latter had been cut through in order to form the hollow.

By a fortunate chance the *terminus post quem* thus arrived at can be supplemented by a *terminus ante quem*. This was furnished by the north wall of the Apodyterium of the second and third "period" plans (fig. 52), the foundation of which had been laid at the quite abnormal depth of 3 feet below the Roman surface. A measure of precaution so unusual implies that there was a special danger of subsidence, and there can be no doubt but that the threat came from the proximity of the Deep Bath. The upper part of the excavated hollow was much closer to the foundation trench of the wall than might be gathered from the "record" plan, where it is, of course, the kerbing that is indicated (fig. 51). However thorough the filling-in, the risk of collapse would always remain. Unless, therefore, our view as to the original "lay-out" of the whole Bath-house is mistaken, the Deep Bath must be assigned to the very beginning of the second period. Only after it had been decided not to proceed with it, was the north wall of the Apodyterium erected.

This inference was confirmed by a curious piece of evidence. The two north and south lines drawn about the middle of the north wall on the "record" plan (fig. 51) mark the position of a carefully built opening (fig. 62), which had been left for the passage of a drain. But neither on the one side nor on the other had the face of the foundation trench been disturbed over against the mouth of the opening. In other words, the contemplated drain had never made its appearance to demand either entrance or exit. The architect's first intention can, however, be readily enough discovered from the plan (fig. 51). It will be seen that the opening in the north wall of the Apodyterium corresponds exactly to the gap by which the drain from the cold-water basin in the Frigidarium

passed through the south wall. Moreover, it was found when the levels were taken that ample allowance had been made for a reasonable fall between the two points. Obviously, when the north wall was built, it was assumed that the drain from the basin would be led straight northwards across the site of the Deep Bath. While the work was still in progress, it was decided to depart from that idea and to give the drain the easterly curve which it actually received. In its course through the Deep Bath it was carried on a wall constructed for the purpose and fully 2 feet 6 inches high, the top of the covering slabs of the drain being about 3 feet 4 inches higher than the floor of the Bath. In fig. 63 the drain is visible in the right foreground, running north-eastwards over the Deep Bath and disappearing into the body of a later north-and-south wall, which has not been mentioned yet, but which will be dealt with when we come to speak of the third period. The illustration gives a good idea of the mass of masonry that had to be removed before the Deep Bath, as shown in fig. 61, was exposed.¹

Before passing on to the third period it will be convenient to return to the channels in the flooring of the three hypocausted chambers.² The position of these is laid down on the "record" plan (fig. 51). They were from 5 to 6 inches deep and from 7½ to 9 inches wide, the sides being formed of building-stones set closely together. In Room C, as soon as the rubbish had been cleared away, they stood revealed in the form of a Latin cross. Here they had been cut in the higher of two clay-and-cobble floors, and had thus the upper surface of the lower floor as a bottoming. Over the end of the northern arm of the cross there lay a

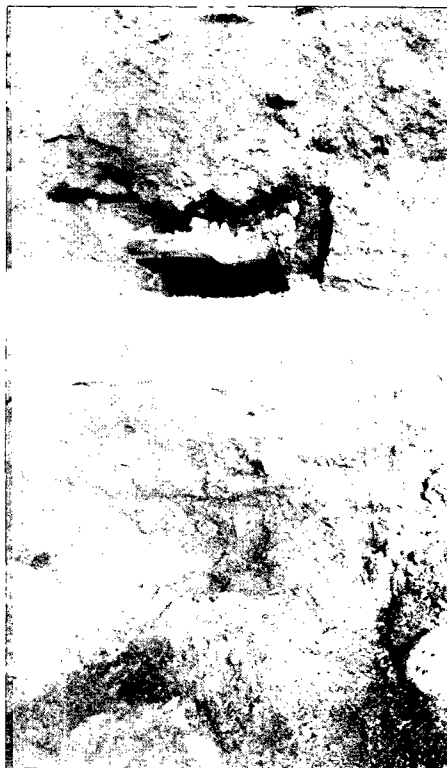


Fig. 62. Opening for drain in north wall of Apodyterium, seen from the Deep Bath.

¹ Fig. 50 should also be consulted, as the model was made before the drain and the supporting wall had been entirely removed to expose the Deep Bath.

² See *supra*, p. 471.

single slab, but no other sign of a covering was visible anywhere else. Indeed, had it not been for subsequent developments we might have concluded that the presence of the slab was accidental and that the channels had been open on the top (fig. 58). That they had originally been covered became clear when we examined the end of the southern arm, which disappeared under a large flat stone that had been laid as a



Fig. 63. Late apse (p. 492), the straight wall in front of which has been built over drain from cold douche in Frigidarium. For pedestal in left foreground see p. 491.

sill or threshold in the opening between C and D. When this was lifted, an empty space was found below, the stone being supported on either side by projections from the foundations of the flanking walls, while its southern end rested on what were evidently the ends of a channel similar to the others and running southwards into D.

Hitherto the existence of channels in D and E had not been suspected. The discovery made at the entrance to D showed that they were there after all, and that the reason why they had escaped detection was that they had been cut in the lower of two floors instead of in the higher (fig. 64). Until the latter was broken into there was

nothing to betray their whereabouts. The clue was followed up until they were completely laid bare, when it turned out that the general arrangement had not been the same as in C. In D and E one arm of the cross, if we can still call it a cross, was wanting. There were two other noteworthy differences, both resulting from the fact that it was the lower floor which had been utilised for the purpose. In the first place, the covering slabs had survived intact, protected and concealed by the upper floor, between which and them there was, moreover, a layer of lime 2 inches thick. In the second place, the bottoming was everywhere of clean sand—the natural soil—a circumstance that would



Fig. 64. Ventilating flue in Caldarium, partly opened up at the point where it sends off a branch to the south.

of itself have been sufficient to negative any idea that the channels had been drains for carrying off water. These various differences notwithstanding, it may be regarded as certain that the two sets of channels had belonged to one and the same system. No other view would be consistent with the intimate connection established between them under the sill that united C and D.

Covered channels in the floor of a hypocaust were noted in 1903-4 by the excavators of Silchester, who speak of the arrangement as a "very singular" one.¹ In discussing it they refer to a similar discovery made on the same site in 1897,² and also to one made at Cilurnum (Chesters) in 1886.³ They might have gone still further back. As long

¹ *Archaeologia*, vol. lix. (2), p. 349.

² *Ibid.*, vol. lvi. (1), p. 109.

³ *Arch. Ael. (N.S.)*, vol. xii. p. 126 and Pl. v.

ago as 1732, when the Roman bath at Netherby on the Esk was opened up, "the clergyman of Kirk Andrews," who planned it, recorded the occurrence of "two Funnels or Air pipes leading under the floor to the fireplaces."¹ His drawing, which is reproduced by Roy, shows that the "funnels" were in different rooms and that they were not connected.



Fig. 65. Ventilating flue passing in under stoke-hole of Caldarium.

His description of them as "leading to the fireplaces" is important. It applies to the channels at Silchester and at Chesters. And it was equally true of the main channel at Mumrills. As the "record" plan (fig. 51) indicates, this ran directly through—or rather beneath—the stoke-hole into the Praefurnium (F). What appears to be its mouth can be very distinctly seen in fig. 65, lying well below the level of combustion. Appearances, however, are deceptive. The building stones that had formed its southern edge were still *in situ* on the floor of the Prae-

¹ Roy's *Military Antiquities*, p. 197 and Pl. xlvi.

furnium itself for a distance of 4 feet 4 inches eastwards from the "mouth"—it is not difficult to make them out in the illustration—and though the corresponding stones on the north had been removed, the bed out of which they had been torn was very clearly marked. Nor had this been the end. Before all trace of it was lost, the channel had begun to swerve decidedly towards the south, as if heading for the south-east corner of the Praefurnium. At the very point for which it is making, as noted on the "record" plan (fig. 51), we found among the ruins of the wall a finished face, whose connection with the channel we did not immediately suspect, but of which we noted at the time that it had "evidently been the north side of a ventilating flue or doorway." At the outer or eastern end it had been closed by a thin slab, which was still in position, and which had, of course, been movable. The finished face on the south side had entirely disappeared, and the opening in front of the slab had been roughly filled in with broken and tumbled stones. Dilapidated as was its condition, there need be no hesitation in identifying it as the true mouth of the channel, the admission of air into which could therefore be regulated at will by merely adjusting the slab.

The identification makes it possible to offer an intelligible account of the purpose of the whole system and of its method of working. The writer of the report upon the baths at Chesters entered into no details regarding what he called the "ventilating drains," leaving his plan to speak for itself. The significance of the earlier discovery at Silchester was even less fully understood. Regarding the later one, however, Sir W. St John Hope and Mr Fox, after premising that it was "not easy to suggest an explanation of the curious arrangement," summarised their conclusions as follows:—¹

"Where the flues begin on the east they are 11 inches below the hypocaust floor, but gradually slope upwards until at their western end they are only 6 inches under the floor. Neither the flues nor the channel from which they start have any proper bottom, and since they did not at any time contain piping they can have been only for the passage of air.

"Now the floor which overlays the flues was covered continuously while the baths were in use with a glowing mass of charcoal and ashes, the heat of which must soon have been diffused through the concrete to the flues below. The air within them would consequently become warmed, and if we may assume that the flues turned upward on reaching the alcove walls, the air, assisted slightly perhaps by the slight upward slope of the floor, would tend to move slowly along from the inlet in the open end of the furnace room towards the alcove, becoming gradually warmer as it reached the latter. If the flues were carried a little way

¹ *Archaeologia*, vol. lix. (2), pp. 350 f.

up the walls and then left open they would serve to discharge into the western end of the *caldarium* a continuous current of warm air. And this would not be a mephitic compound, like that carried up the wall flues from the glowing fuel in the hypocaust, but pure air drawn from outside the building along a heated channel without traversing the hypocaust itself."

It will be observed that there were differences between Silchester and Mumrills. At the former, for instance, the floor of the hypocaust was of concrete, not of clay and cobbles, and the "flues" ended in an alcove instead of against a straight wall. *Mutatis mutandis*, however, we agree with not a little of what is said here. But there is more than a touch of exaggeration in the statement that the whole of the floor "was covered continuously while the baths were in use with a glowing mass of charcoal and ashes." That would be true only of the portion of it which formed the bottom of the actual stoke-hole. Nor can we accept the underlying implication that the arrangement was designed to raise the temperature of the chamber into which the current would be discharged. Rather, the effect would be to lower it. It was not warm air, but fresh air, which it was desired to introduce. In other words, what we have to do with was a ventilation-system pure and simple.¹ And one cannot but admire its ingenuity. The object of leading the channel in underneath the stoke-hole was to set up sufficient draught to ensure a steady circulation. Incidentally, the presence of such a ventilation-system proves that the hypocausted chambers in connection with which it is found were heated by radiation, and by radiation only. Had air been admitted into them direct from the pillared vault, either in the manner described by Jacobi² or otherwise, the installation of a separate ventilation-system would have been superfluous.

While the general position as regards the ventilation system seems to be beyond dispute, some of the details are, as has been already hinted, doubtful and obscure. Even had the true meaning of the

¹ It may be taken for granted that Netherby, Chesters, Silchester, and Mumrills were not the only sites on which such a system was in use. At Benwell, for instance, in 1926 the excavators found in the floor of the hypocaust a roofed-in "gutter" which they were disposed to connect with some earlier building because it ran beneath the furnace-flue (*Arch. Ael.*, 4th series, vol. iv. p. 150). Can it not be more simply explained in the light of what we have written above? Curiously enough, at Benwell, too, the system seems to have been abandoned in the course of a reconstruction, for in 1927 it was ascertained that "the gutter came to a sudden end" immediately under the sole remaining hypocaust pillar (*ibid.*, vol. v. p. 48). Another possible case is Ashstead, where, as Mr A. W. G. Lowther writes (*Surrey Arch. Coll.*, vol. xxxvii. (1927), p. 148): "A further puzzle was the finding of a channel cut along the floor of the hypocaust right through its cement floor to the underlying clay, and extending the full length of the room. . . . At the end of the room furthest from the furnace it ended in a hole about one foot square made through the wall quite roughly."

² See *supra*, p. 471.

channels been adequately realised while investigation was still possible, it is far from certain that all the difficulties would have been solved— if only because the system appears to have been thrown out of use before the site was abandoned. The suggestion of disuse came from the Caldarium (E), where it was noted that the branch running southwards from the middle of the vault continued for some distance under one of the piers in front of the recess for the hot bath (E₁), but failed to emerge on the other side. It is difficult to account for this except by supposing that when E₁ assumed its final form the channel was deliberately blocked at the very point from which communication with the upper chamber had formerly been maintained. Something of the same sort may have happened elsewhere. It will be remembered that the solitary covering slab which remained in C was lying immediately over the end of the northern arm of the cross. Its position there may have been accidental. But the same can hardly be true of the slab at the west end of the channel in D, when the exit appeared to be quite as effectually blocked. There none of the covers were missing. On the other hand, when they were lifted, the stone edging of the channel was found to stop 3 inches away from the face of the wall, as if space had been left for the insertion of something that would serve as a shaft.

There is thus no means of determining how the fresh air was introduced into the rooms it was to ventilate. But it stands to reason that in each case the shaft must have been placed at the farthest point in the floor to which the current could reach. The fact that in C the channels were cut in a higher floor than in D and E may be due to the gradual rise in the level of their beds, for which it would be natural to look. The completion of the Latin cross in C is another puzzling feature. On the "period" plan (fig. 52) we have suggested— though with considerable hesitation in the absence of more positive evidence—one way in which it might conceivably be explained. We there show the Latin cross as in existence during the second period only. If this be right, then its completion is to be connected with the insertion of the additional stoke-hole in the wall on the west. During the first period there had been only one outlet in C, precisely as in D and in E, and the single channel had terminated in a ventilating shaft at the north wall. When, however, the facilities for firing were doubled by the provision of a reserve *praefurnium*, there was also added a reserve inlet for ventilation, to be brought into action when, and only when, the new stoke-hole was in use. At such times the air would be admitted to the room above C by the shaft at the east wall, which was directly opposite the new inlet, and the shaft at the north wall would be temporarily closed.

Third Period.—Reason has been given for believing that the ventilation system which has been described was no longer in use during the third period. Its supersession was not by any means the only important change that marked the opening of this phase. The main furnace-room (F) with its adjuncts was completely remodelled. The case for this particular part of the reconstruction suggested in fig. 52 will not be weakened if we state that it was based entirely on the evidence set out in fig. 51 and illustrated in fig. 53. Not until our “third



Fig. 66. Stoke-hole of the Caldarium in the third period, looking west.

period” plan had been committed to paper did we observe the extraordinarily close resemblance between it and the plan of the corresponding portion of the bath building uncovered at Caerwent in 1855.¹ Another illustration (fig. 66), taken from the west or inner side, shows that the cheeks of the actual *hypocaustis* were of brick. The bricks were of two sizes, a few towards the eastern end being $12\frac{1}{2}$ inches square and 3 inches thick, while the majority were no more than $6\frac{7}{8}$ inches square, although the thickness was the same. The mortar used for binding them bore unmistakable traces of the extreme heat to which it had been subjected. Clay would have developed a much greater power of resistance, and

¹ See *supra*, p. 471.

clay mixed with hair is, in fact, prescribed by Vitruvius, even for the brick pillars within the hypocaust¹—a prescription which is proved by existing remains to have been very generally disregarded.²

Extensive repairs were doubtless carried out in E and in D. But, except for the dismantling of the channels, we failed to note in these apartments any organic alteration which could be specifically assigned to the third period. In C, on the other hand, the reserve *præfurnium* was swept away and the gap in the west wall very roughly filled in. This was done in order to facilitate the construction of a new



Fig. 67. Channelled hypocaust beneath Sudatorium, looking north.

Sudatorium (G), which was erected to the north of C, and the furnace-room of which was placed transversely across the site of the earlier furnace-room, the latter being almost totally demolished to make way for it. As has been already stated,³ the new sweating-chamber was heated by a channelled hypocaust, the general arrangement and appearance of which will be readily gathered from the plan (fig. 51, G) and the photograph reproduced in fig. 67. To form the floor, a layer of lime had been spread on the natural surface and covered with a layer of pebbles and broken stones. The masses of masonry, between which the channels ran, were mortar-built, and were much more carefully con-

¹ *De Architectura*, v. 10 (p. 125, 22 f.).

² Fusch, *op. cit.*, p. 42, footnote 5.

³ See *supra*, p. 461.

structed than the clay-built masses in the Men's Bath-house. Clay had, however, been used for the sides of the stoke-hole in H, a partial concession to the principle which had found expression in the prescription of Vitruvius.

Here, as in the channelled hypocaust beneath the Sudatorium of the Men's Bath-house, there was little or no sign of discoloration by smoke or soot, except in and about the stoke-hole. We may therefore conclude that here too the fuel used had been charcoal, a conclusion which is supported by the comparatively small size of the furnace-room



Fig. 68. Stoke-hole of channelled hypocaust of the Sudatorium. The standing figure is looking down into the furnace-room, and opposite him can be seen the gap broken through the wall of the Tepidarium (C) in the second period, but filled in in the third.

(fig. 68). There was nothing whatever to show how the hypocaust had been roofed, but it is safe to assume that slabs had been used, with or without a covering of cement. If our view as to the significance of the use of channelled hypocausts in connection with Sudatoria is sound, the chamber would be heated, not by radiation from the floor and walls, but by the direct admission of warm air. The grounds for this view have been fully stated in dealing with the Men's Bath-house,¹ and they do not need to be repeated. But it may be permissible to supplement the argument by citing as confirmation a valuable piece of evidence from Neckarburken on the German Limes, where the excavators found still *in situ* the remains of an arrangement for admitting the warm air direct from a channelled hypocaust into a Sudatorium

¹ See *supra*, p. 460.

above.¹ Finally, it may be pointed out that the furnace-room by which the little hypocaust under Room 15 of the Commandant's House was served lay only a short distance to the south of H, and that it, like H, must have been abnormally small. That it also was fired with charcoal would be the simplest explanation of the almost entire absence of soot from the pillars.²

There is nothing that can usefully be added to the description previously given of the Frigidarium (B) and its cold bath (B₁). There are,



Fig. 69. Late apse, built up against north wall of apse for cold bath, looking west. The movable slab which covered the outer end of the opening was *in situ*, but has been removed in order to show the remains of the arch.

however, two points that call for notice in connection with the last phase of the Apodyterium (A). The pedestal-like structure, which can be seen in the left foreground of fig. 63, had possibly a predecessor during the second period, but, as it stands, it manifestly belongs to the third. It may well have supported an altar to Fortuna Balnearis or a statue of the goddess herself, for dedications to this divinity are frequently found in the dressing-rooms of military bath-houses.³ Far more difficult to understand is the building which appears immediately beyond in the illustration. That this had been among the latest parts

¹ *O.R.L.*, Nr. 53 (Lief. 9), p. 18.

² See *supra*, p. 445.

³ *E.g.* at Jagsthausen and Miltenberg on the German Limes.

of the whole structure was apparent. The workmanship was poor, and there was no mistaking the significance of the manner in which the apse forming its eastern end abutted on the apse of the cold bath of the Frigidarium (B₁). The relation between the two is well brought out in fig. 60 and still more clearly in fig. 69, the latter of which also shows, in the background, the inner face of the western end of the building—a straight wall carried right across the bottom of the Deep Bath, and



Fig. 70. Inner view of late apse, looking east, with transverse clay foundation in the foreground.

at the same time over the drain which carried away the water from the basin in B. Its western or outer face, with the drain passing into it, is well seen in fig. 63, a view taken prior to the Deep Bath being cleared out. It will be observed from the "record" plan (fig. 51) that the whole has been placed at a slight angle in order to provide a firm foundation for the north-west corner.

The broad clay-foundation, which crossed the building in a north and south direction at the inner end of the apse (figs. 63 and 70), had evidently belonged to an earlier wall. As it had been cut through the layer of burnt matter to which we have so often referred, we were at first disposed to think that it had belonged to the original Stone

House. The alignment, however, turned out to be unsuitable, so that the meaning of the foundation remains doubtful. The most remarkable element of the building itself was an arched passage which pierced the wall of the apse exactly in the centre (fig. 69). When first uncovered, it was closed at each end by a movable slab. Fig. 70 shows the inner slab in position, while in fig. 69 the outer slab has been lifted aside in order to display the arch. The arrangement suggests that the walling which remained had represented a substructure, the proper ventilation of which was important. On the other hand, as matters stood, it would have been impossible for a free current of air to have entered the passage from the outside. A little more than 1 foot east of the opening the natural soil was quite undisturbed; it had never been excavated beyond the minimum distance that was necessary to give room for the building of the wall. Other enigmatic features that should be noted were the well-marked scarcement on the inner face of the northern half of the apse and the high, round-topped ridge of clay which appears in figs. 63 and 70, projecting westwards for 2 or 3 feet from the north side of the arched opening. It is never very satisfactory to have recourse to the *pis aller* of a scheme that has been left unfinished, but in the case of this building we can see no alternative explanation that is equally probable.

H. Miscellaneous.

(a) *Water-supply and Drainage.*—To-day the sandy subsoil within the ramparts seems wholly barren of wells. The nearest spring lies some way down the south-eastern slope outside, and at the best it is little more than a trickle. Whether things were different eighteen centuries ago it is difficult to say; but it is certain that a considerable quantity of water would be required to satisfy even the minimum needs of so large a fort, while the scale on which baths were provided points to a supply that was not merely adequate but generous. Yet there was nothing to indicate where it was drawn from or how it had been introduced. If it came from the Westquarter Burn, which is perhaps the most likely source, it must either have been conveyed in pipes from a point at least half a mile farther up or it must have been raised by mechanical means from a point immediately below. Both methods would have been well within the competence of the Roman engineers. But no clay water-pipes were found, no cisterns for storage, nothing that was suggestive of an apparatus for pumping. The one feature which we were disposed to think might somehow or other be associated with the arrangements for supplying water was a mysterious pier or platform of stone (fig. 71), measuring 6 feet by 5 feet, which stood on almost the highest

part of the ground, above and directly to the south of E_1 on the "record" plan (fig. 51). It appeared to have been built, not only later than the pit, on one corner of which it rested, but also later than the drain which ran immediately in front of it.

The culverts at the corners of the ramparts, as well as those which were observed passing through the cradling of the Antonine Wall, have been described in connection with the defences,¹ and there is nothing that can be usefully added to what was said there. Nor can much light be thrown on the isolated fragment of a drain which is shown on the PLATE a little inside of the West Gate. Its course was at first from



Fig. 71. Stone pier or platform immediately to the south of the recess for the hot bath (E_1).

south to north, with the ground falling away gently on either side. Originally it had turned abruptly eastwards at what appears on the plan as a point of junction, but at some later date this easterly channel had been blocked by the insertion of a large stone and the current turned in exactly the opposite direction. As neither the point of origin nor the points of discharge could be satisfactorily ascertained, the significance of the change must be left obscure.

So long as the Commandant's House was of wood, the shallow trench, marked "Ditch" in fig. 32, would seem to have sufficed for carrying away the drip from the eaves as well as for any other drainage that may have been necessary. That it had been open was evident from its width, and, still more, from the deposit of clean soil underlying the

¹ See *supra*, pp. 409 ff.

mass of burnt material which had choked it after the conflagration. The amount of water which ran through it would not in ordinary circumstances be large, and would be readily absorbed by percolation through the sand. This may explain why no outlet could be traced through the Antonine Wall, although it is fair to admit that round

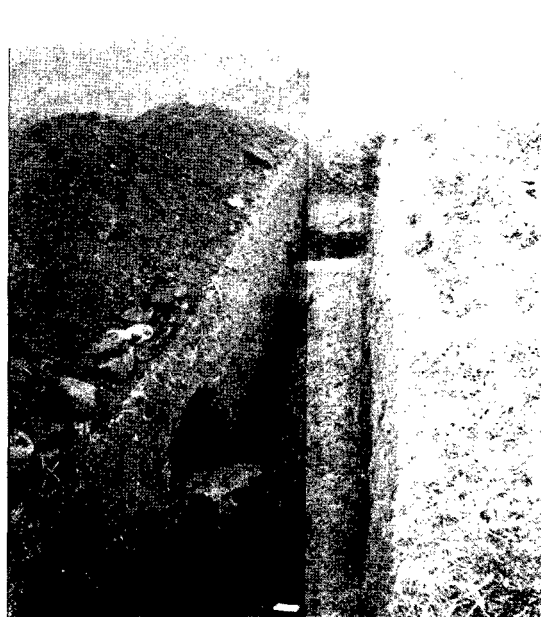


Fig. 72. Transverse section of open ditch which ran north from Commandant's House towards Antonine Wall.

about what would have been the natural point of exit the cradling was much disturbed and partially torn out, a condition of matters which we will endeavour to account for presently. When the Stone House was erected, the upper portion of the "Ditch" was buried under the flags which formed the floor of Room No. 1. Even at some points where it was sectioned between the House and the Antonine Wall, large stones were found lying across it, sometimes at least laid there of set purpose. The cut shown in fig. 72 was made 131 feet south of the

Wall. The stone there seen overlying the Ditch, the position of which is indicated by a piece of white paper, measured 3 feet 2 inches by 2 feet 4 inches, with an average thickness of 8 inches, and had been worked smooth on both sides. It had evidently been displaced from somewhere else.

During the first of the various phases through which the Stone House passed, the drip from the eaves was apparently carried away straight north by the more westerly of the two drains mentioned in our description of Area No. 6 and Room No. 7.¹ Nor does the intrusion of the Baths seem to have entailed any change in this arrangement so long as the Apodyterium and the Frigidarium remained at the west end of the new building. We know nothing of how the waste water from these was originally disposed of;² but their transference to the north of the Caldarium created an entirely new situation and led to the construction of the elaborate drainage-system, whose ramifications are set out on the plan. As indicated on the PLATE, the outflow from the Cold Bath and from the Basin in the Frigidarium passed into the drain that originated in the Hot Bath. This part of the system was in good preservation, the covering slabs being *in situ* practically everywhere. On their being lifted it was found that the channels were about 1 foot wide and about 8 inches deep. The drain from the south-east corner of Area No. 6 in the Commandant's House was in a much more ruinous condition, the covering slabs having been almost entirely removed. The contrast between the two can be seen at the point of junction (fig. 73), and beyond the confluence the dilapidation continued. In due course the combined stream was reinforced by the outflow from the Men's Baths. It is difficult to believe that it was not also utilised to flush the Latrines. These were probably somewhere on the north-east front, a position closely analogous to that which they occupied at Castlecary. But, if so, they had been entirely destroyed. Except for the Men's Baths and a few fragmentary patches of paving to the east of them, trenching revealed no trace of any structural remains in the neighbourhood of the lower end of the drain.

It will be observed from the plan that a bifurcation takes place some 50 feet below the confluence, and that the branches so formed reunite about 92 feet farther on. It may be assumed that this represents a change which should be associated with one of the breaks in the occupation, and on that assumption it is safe to conclude that the shorter branch was the later, since it was, on the whole, in better preservation than the other. When the drain reached the Antonine Wall, it was 1 foot 1 inch deep, with a width of 1 foot 7 inches. Moreover, its top was

¹ See *supra*, p. 443.

² See *supra*, p. 467.

as much as 2 feet 2 inches below the top of the kerbing of the base of the Wall. Unlike the ordinary culverts, therefore, it must have passed out of the fort, not on the same level as the cradling, but at a considerable distance beneath it. That it had done so was, indeed, proved by remnants of the paved bottoming and of the marginal slabs. The whole of the cradling that had lain above it, however, as well as its own covering



Fig. 73. Confluence of two drains.

slabs, had been ruthlessly torn out. And there were other signs of wanton interference. A row of stones had been inserted as an obstruction about half-way across, while the outlet on the north was completely blocked by a mass of pure clay mixed with cobbles, beyond which was a second mass of mingled clay and earth (fig. 74). Nor was the area of disturbance restricted to the part of the Wall that actually overlay the drain. Both the north and the south kerb of the cradling had been removed for at least 30 feet westwards. Such wilful damage can hardly have been wrought by Roman hands. We are disposed to date it to the period when the old farm-house of Mumrills occupied the ground between

the north-east corner of the fort and the modern roadway beyond,¹ and to interpret it as a rough-and-ready measure to check the oozing of moisture into the farm buildings through the abandoned drain.



Fig. 74. Main drain passing out of the fort underneath Antonine Wall, the level of the kerbing of which is indicated by the top of the spade. The blocking of clay and stones can be seen towards the farther or north end.

(b) *Roads and Streets.*—The position of the Principia and of the various Gates supplied a key to the whereabouts of the main streets within the fort, and here and there a little of the cobbling of these had survived. The course of the Military Way could also be followed in its passage through the West Gate and between the ditches outside. At and beyond the East Gate it had been wholly destroyed, but it was nevertheless

¹ A part of the old farm-steading appears in the background of fig. 74.

possible to say with certainty that there it had quitted the fort with a decided swing towards the north, clearly in order to find an easy passage eastwards between the Mumrills Braes.¹ So far as the subsidiary streets were concerned, there were traces of two different systems—an early one, which had been contemporary with the Wooden House,² and a later one which overlay the foundations of the first and largest Principia.³ Besides those two systems there must have been others.



Fig. 75. Oven lying to west of West Granary.

(c) *Fireplaces and Ovens.*—The most important of these have already been mentioned incidentally,⁴ but others will be found marked upon the plan. Among the latter a well-preserved oven, lying to the west of the West Granary, deserves a more detailed description. It had been carefully built of smallish, flat stones (fig. 75). Its walls varied in thickness from 2 feet at the entrance on the west to 10 inches at the opposite end, and over these the major axis measured 6 feet 3 inches. The floor appeared to have been paved, and there were indications that it had been surfaced with clay and that the sides had been lined with broken tiles and fragments of pottery, the latter including several pieces of a large vessel of coarse ware of a peculiar type, perhaps

¹ See *supra*, pp. 418 ff.

² See *supra*, pp. 437 and 464.

³ See *supra*, p. 429.

⁴ Those in the Commandant's House (pp. 439 and 442 f.) and in the Barracks (p. 434), and that near the Men's Baths (p. 462).

manufactured locally, although its nearest, indeed so far its only, parallels are from the Northern brochs.¹

(d) *Pits*.—The pits, which were of frequent occurrence throughout the whole of the occupied area, varied much in size and in depth. In some instances the bottom was reached at 2 or 3 feet. In others it was necessary to go down 8 or 9 feet. Even when they had been carefully sealed, as occasionally happened, they seldom contained anything except a few pottery fragments and possibly a handful of bones. The greater number of them were probably rubbish-pits. That certainly seems to have been the case with those among the barrack buildings (fig. 29) and also with those which furnished a clue to the chronological sequence of the remains of the Commandant's House.² The manner in which the latter were arranged suggested that they had been dug at the sides of one of the early roads. As has been pointed out before, the comparative meagreness of their yield is perhaps to be accounted for by the character of the soil.³ At the same time it is more than likely that some of the larger and deeper among them, particularly in the Annexe, had been opened up merely to obtain gravel.

V. ANNEXES.

(a) As at Bar Hill, the Agricolan *praesidium* would have its own Annexe, and it is possible that it may have lain to the east of the fort—that is, in the position which was afterwards chosen for the Antonine *castellum*. One or two of the early pottery fragments came from this area.

(b) However that may be, it is certain that the main Annexe of the Antonine fort occupied the site of the Agricolan *praesidium*.⁴ During our first season many trenches were dug there and not a few pits cleared out. Unfortunately the results were neither very definite nor very enlightening. The vast majority of the numerous pottery fragments recovered undoubtedly belonged to the Antonine period. The same is probably true of the pits, although on the plan (see PLATE) we have preferred to class them all as "indeterminate." The most interesting feature was the group of post-holes near the centre, which may conceivably represent the remains of the Agricolan *principia*. On the other hand, what we have termed the "boulder area"—an agglomeration of large stones, seemingly meaningless but nevertheless placed there by human hands—may very well date from the post-Roman epoch. Various stretches of cobbling were encountered indicating roads

¹ See *infra*, pp. 544 ff. (fig. 110).

³ See *supra*, p. 434.

² See *supra*, p. 437.

⁴ See *supra*, pp. 401 ff.

(fig. 18), but they were far too fragmentary to admit of a coherent scheme being evolved.

(c) The pottery kiln discovered in 1913 proved that there had been some occupation of the ground to the east of the Antonine fort. It cannot, however, have been intensive, as no relics have been left to be turned up by the plough. In this respect the contrast with the field in which the main Annexe lay is (the farmer tells us) very striking. But it is by no means impossible that the Baths had stood here before they were brought within the ramparts.¹ In 1913 stones which resembled an apse-like foundation were removed from a spot near the south-east corner of the plateau.

VI. POTTERY.²

From first to last the total number of pottery fragments recovered during the excavations ran easily into hundreds, and in practically every instance, exclusive of insignificant scraps, the "find spot" was noted at the time with as near an approach to accuracy as possible. While a careful study of these contemporary records, as well as of the pieces themselves, has formed an essential part of the preparation for writing this Report, we have had no hesitation in deciding that it would be idle to reproduce them in full. Instead, therefore, of attempting to provide a complete and exhaustive inventory of the individual potsherds, we propose to proceed as follows. Taking the various classes of ware in order, we shall begin with a brief general statement covering the whole of the specimens that passed through our hands, and shall then go on to describe in detail, with the aid of illustrations, every example of the class that could be regarded as typical or as in any way significant. Further, in our descriptions—and this applies not merely to the pottery, but also to the small objects to be dealt with later—we shall, as a rule, be content with "Field No. 2095" or "Field No. 2106" as an indication of *provenance*. In the great majority of cases it would be irrelevant, and might be confusing, to be more specific. Only occasionally will it be

¹ See *supra*, p. 464.

² The following abbreviations are used in describing the pottery: "Dr." refers to the list of forms in Dragendorff's article in *Bonn. Jahrb.*, vol. xcvi. pp. 18 ff.; "Déch." to the *corpus* of stamps in Déchelette, *Les vases céramiques ornés de la Gaule romaine*, vol. ii. pp. 5 ff.; "Ludow." to Ludowici's well-known series of volumes; "O.-P." to Oswald and Pryce, *Terra Sigillata*; and "B.M. Cat." to H. B. Walters, *Catalogue of the Roman Pottery in the British Museum*. Where the name of a site is printed in italics, the reference is to the description of the pottery given either in a report on excavations or in a separate publication which will be readily identified. We should like to take this opportunity of acknowledging valuable help given to us by Mr E. B. Birley, who happened to visit Edinburgh when these pages were passing through the press.

worth while saying that a particular sherd was found in a particular pit or ditch or within the limits of a particular building. Among the many pits which we opened, there was not a single one whose contents would justify us in suggesting that it was earlier than *circa* A.D. 140. Nor were the ditches much more helpful for chronological purposes. That which surrounded the Agricolan *praesidium* had subsequently been utilised for the protection of the Antonine annexe, while those which defended the western front of the Antonine fort—and none of the others yielded any pottery to speak of—had been cut within a definitely Agricolan domain, and would thus serve as a “catchment-area” for any first-century odds and ends from the Agricolan surface. This may be true even of the two upper levels of the most westerly of the four (*supra*, p. 420), which we shall designate “Level B” and “Level C” respectively, the true bottom being regarded as “Level A.”

Moreover, but little real importance can be attached to the distinction between Field No. 2095 and Field No. 2106, in spite of the fact that it has seemed desirable to maintain it. Both fields alike were in Roman occupation for some forty years during the Antonine period, and accordingly there is nothing to choose between them as a *locus* for finds of Antonine date. The most there is to be said is that No. 2095 was undoubtedly the scene of the brief life of the Agricolan *praesidium*, whereas the existence of an Agricolan annexe in No. 2106 is no more than a possibility. And a word of warning as to the interpretation of the evidence we are about to cite may not be amiss in the interests of the general reader. During the last thirty years the study of ceramics has made such strides that pottery is now a most valuable instrument for purposes of dating. Like other valuable instruments, however, it requires to be handled with care. Thus, while specialists in the subject are themselves under no illusions on the point, the unwary are apt to be misled by the convenient, and perhaps unavoidable, practice of using the name of an emperor or emperors to denote the *floruit* of a potter. The limits so suggested are not absolute. The case is quite different from that of coins. A “Hadrianic” potter, for instance, merely means a man who is known to have been active in the reign of Hadrian. It does not mean a man who opened his factory on the day of Hadrian’s accession and closed it down as soon as he heard of Hadrian’s death. Elbow-room must be left at both ends of the scale. A second *caveat* is still more necessary. Sufficient allowance is not always made for “survivals.” Dishes, of course, were much more perishable than coins. That is, indeed, the characteristic to which potsherds owe their superiority as chronometers. But some vessels, which had escaped accident, must have remained in use much longer than others which had been put

upon the market at the same time.¹ There is no reason to believe that the soldiery were wont to celebrate the acclamation of each new emperor by deliberately breaking all the regimental crockery, and it is safe to assume that the baggage-train of the army which Lollius Urbicus led across the Scottish frontier, in the beginning of the reign of Pius, must have contained a fair percentage of tableware and kitchen-utensils which experts might to-day assign to the period of Hadrian, or even of Trajan. It follows that the discovery of fragments of such vessels at Mumrills would by no means justify the conclusion that the Wall of Antoninus was erected by one or other of his predecessors.

A. Samian Ware.

(a) *Decorated*.—The historical value of the evidence provided by the fragments of decorated Samian from the site lies in the convincing proof they afford of the transitory character of the Agricolan occupation. There was no trace of the carinated bowl (Dr. 29) so closely associated with first-century settlement at Newstead and elsewhere. Even the straight-sided bowl (Dr. 30), which is by no means a purely first-century type, was represented by portions of only three vessels; and one of those (No. 5)² was actually signed by the well-known Antonine potter, Cinnamus of Lezoux, while the style of the other two (Nos. 1 and 32) suggests that they were manufactured at the same place and about the same time. On the other hand, there were portions of about one hundred and seventy hemispherical bowls of the later type (Dr. 37), one set of fragments being considerable enough to admit of almost complete restoration (fig. 76). As might have been expected, the great majority of the bowls had come from the kilns of Lezoux or its immediate neighbourhood, and therefore displayed designs which it was easy to recognise as having been built up out of stamps included in Déchelette's *corpus*. Three (Nos. 2, 3, and 8) bore in raised



Fig. 76. Form Dr. 37.

¹ A striking example was noted by Dr Shaw in 1926 in the East Turret at Willowford Bridge on Hadrian's Wall, where the potsherds included two fragments of the typical first-century bowl Dr. 29. (See *Cumb. and West. Trans.* (N.S.), vol. xxvi. pp. 449 f., and Prof. Atkinson's note *apud loc.*) Even more remarkable was the presence of a piece of "egg-shell" ware, normally pre-Vespasianic, in the Hadrianic "alley-way" deposit, discovered at Birdoswald in 1929 by Mr Birley and others.

² The numbers in this paragraph refer to the illustrations in figs. 77 ff.

letters, impressed among the ornaments, the signature of the Cinnamus mentioned above, and one (No. 12) the signature of Albucius, another Antonine potter who also worked at Lezoux. A fifth¹ had CR, in raised letters and retrograde, stamped upon the plain surface just beneath the lower edge of the zone of decoration (fig. 114, No. 2). In all likelihood this is the beginning of the name of Criciro, yet another Lezoux potter of the period, whose sign-manual appears in cursive script and retrograde on No. 20.² With a single doubtful exception, the comparatively few bowls that were not manufactured in the Auvergne district would seem to have been imported from East Gaul. The exception is No. 51, which may possibly have been produced in Southern Gaul shortly before the collapse of the industry there. If that be its place of origin, its presence at Mumrills is most easily explained as a "survival."

Figs. 77, 78, 79, and 80 show every fragment that could establish a reasonable claim to be reproduced. For the benefit of anyone who may desire to study the remainder, the original notebooks, with sketches, have been deposited in the Society's Library. In the descriptions that follow, the various pieces are taken in the order of illustration.

Fig. 77.

1. Dr. 30, from Large Bath-house. Ware hard, with bright and deep-coloured glaze. Remains of four panels, divided from one another by beaded lines set vertically and having larger beads as terminals, and from the ovolo (*cf.* O.-P., Pl. xxx. 95) by a similar line lying horizontally. In second panel from l., Diana seated r. (Déch. 68). In third from l., a candelabrum (Déch. 1096). Lezoux.

2. Dr. 37, from Field No. 2106. Remains of two panels, divided from one another by beaded line. In panel to l., cabled line, set diagonally, and medallion. In panel to r., dancer l. (Déch. 372); in field beneath,³ two ornaments, for lower of which see No. 31, and in front, CIIII[AMI] upwards. Lezoux. Cinnamus is perhaps the best known of the Antonine potters. In Scotland his name appeared both at Camelon and at Newstead.

3. Dr. 37, from Field No. 2095. Remains of three panels, divided from one another by beaded lines. In panel to l., traces of doubtful ornament. In central panel, youthful Pan standing, leaning upon pedum (Déch. 331), with tree-like ornament (*cf.* Déch. 1138) on either side. In panel to r., IMAIIIIO downwards and traces of ornament. Lezoux.

¹ The fragment has not been included among the illustrations, as the only scrap of decoration that remained visible was the already too familiar erotic motif of No. 16.

² See F. Oswald in *Journ. of Roman Studies*, vol. xvii. p. 163, and Pl. vii., for four other examples of Criciro's signature in cursive script, all of them written from left to right in the ordinary way. With the Mumrills example *cf.* B.M. Cat., M. 1363. For another cursive inscription, unfortunately fragmentary, see No. 21 *infra*.

³ This seems to be a slightly elongated form of Déch. 1109, placed at an angle. On another fragment of the same bowl its upper end lies quite clear of the vertical line.

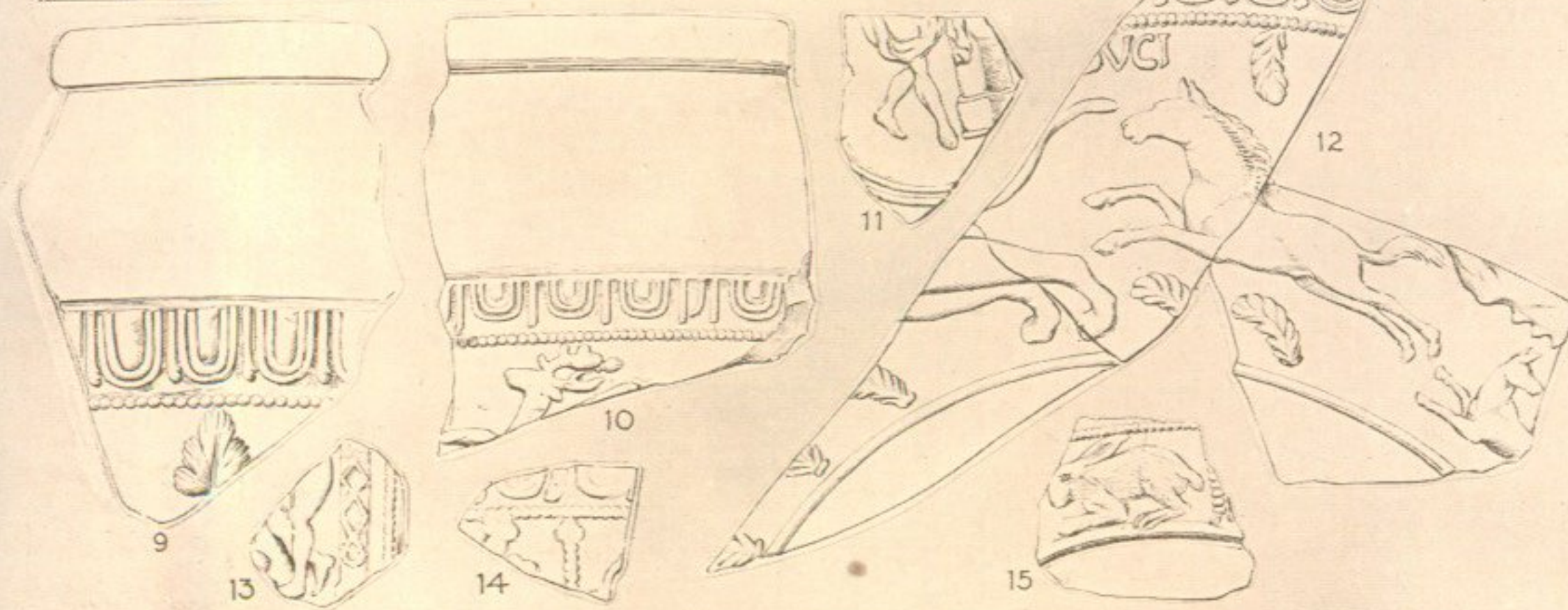
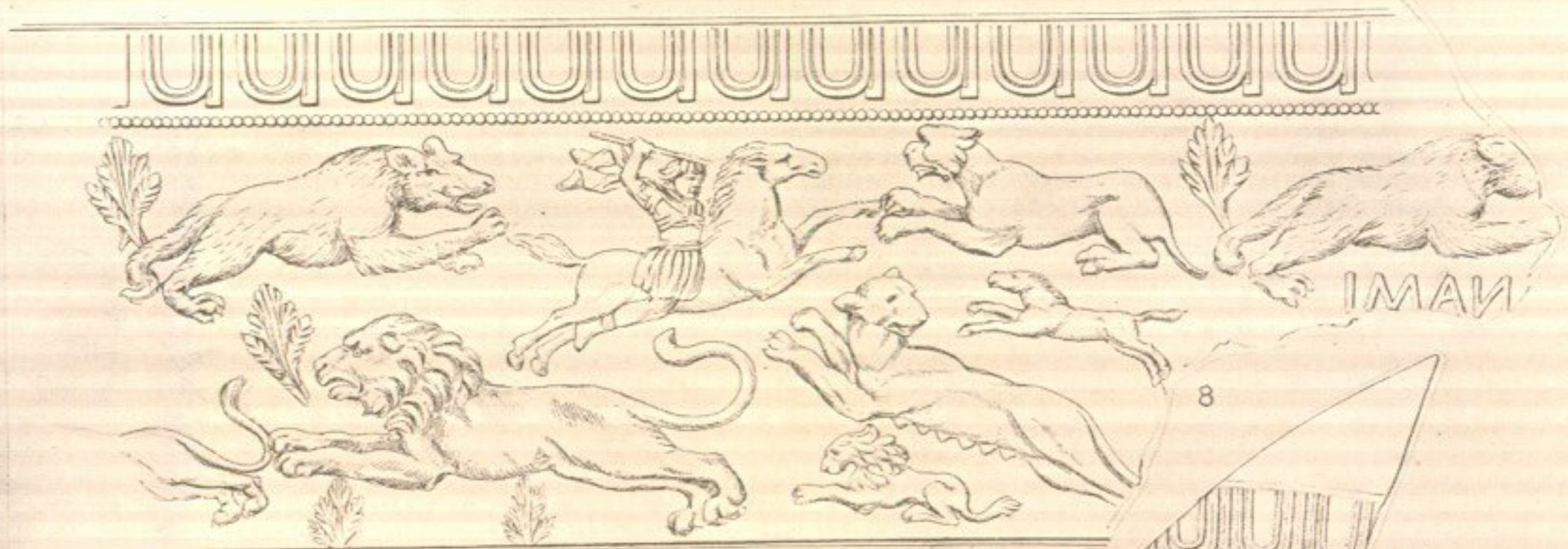
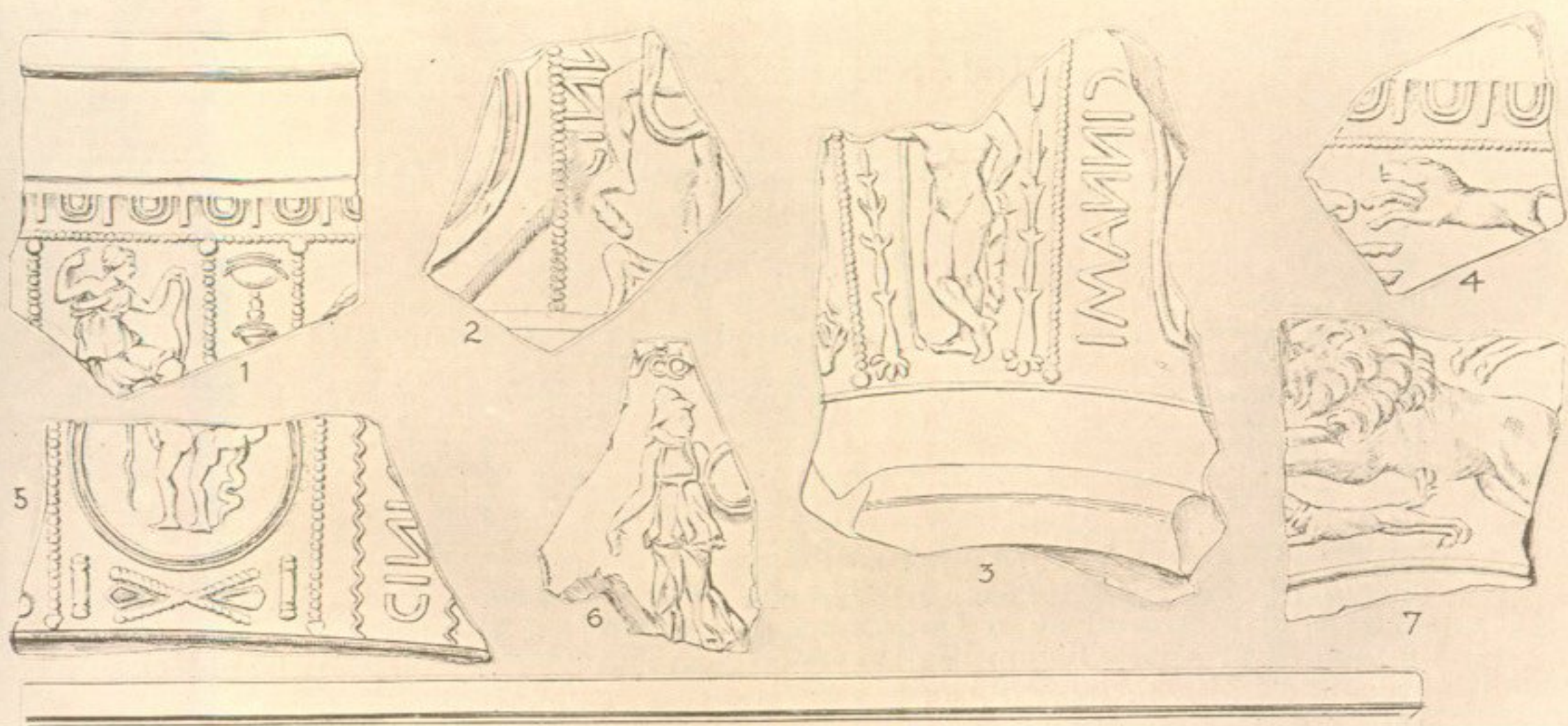


Fig. 77. Decorated Samian Ware. (Scale, $\frac{1}{2}$.)

4. Dr. 37, from Field No. 2106. Fragment of upper part of free zone with hunting-scene (*cf.* No. 8), separated by beaded line from ovolo (O.-P., Pl. xxx. 95). The animal above is Déch. 908. Lezoux.

5. Dr. 30, from Field No. 2095. Ware hard and dry-looking, with dull glaze. Remains of three panels, divided from one another by beaded lines. In central panel, medallion with erotic motif as on No. 16; in field beneath, thunderbolt ornament, flanked by two small roll-ornaments (Déch. 1111) set vertically. In panel to r., CIIII[AM] upwards, between two wavy lines. Lezoux.

6. Dr. 37, from late apse of Large Bath-house. Rather dark red ware, with hard glaze of good quality. Fragment showing Minerva standing (*cf.* Déch. 77), with row of irregular spirals in place of ovolo (*cf.* *Corbridge* (1908), fig. 43). Rheinzabern. The figure of Minerva is virtually identical with that reproduced in Ludow., v. p. 28, No. 36, from a mould with the name of Cerialis. The only difference is in the r. hand, for which, however, see *op. cit.*, ii., p. 186, Nr. 20.

7. Dr. 37, from Field No. 2106. Coarse, rough ware, with dull glaze. Fragment showing lower portion of free zone with hunting-scene (*cf.* No. 8). The two animals recognisable are Déch. 766 and 934. Probably Lezoux.

8. Dr. 37, from Level B of westmost ditch of Antonine fort. "Elevational" drawing. The ovolo (*cf.* O.-P., Pl. xxx. 92) is separated by a beaded line from a free zone with a hunting-scene. The horseman hurling a javelin is Déch. 156, and the animals are Déch. 766, 792, 793 (*bis*), 808 (*bis*), and 754. The leaves in the field may be meant to suggest a forest. To r., IMAI[IIO]. Lezoux.

9. Dr. 37, from Field No. 2095. Ware hard and good. The fragment shows an ovolo, not unlike that on No. 12, separated by a beaded line from what, to judge by the well-formed oak-leaf, was in all likelihood a free zone with a hunting-scene as on No. 8. Lezoux.

10. Dr. 37, from Field No. 2106. Dull glaze. The ovolo (*cf.* O.-P., Pl. xxx. 95) shows a curious fault, the result of miscalculation. The stag beneath the beaded line is Déch. 874. Lezoux.

11. Dr. 37, from Large Bath-house. Ware of good quality. Fragment showing portion of medallion with Venus leaning against pilaster (Déch. 184). Probably Lezoux.

12. Dr. 37, from main stoke-hole of Men's Baths. The ovolo (*cf.* O.-P., Pl. xxx. 123) is separated by a beaded line from a free zone with a hunting-scene among leaves. The animals recognisable are Déch. 793, 905, and 909. Above, [AL]BVCI. Albucius was a mid-second century potter of Lezoux, whose wares are common in Britain (*cf.* B.M. Cat., M. 1470).

13. Dr. 37, from Field No. 2106. Fragment showing part of panel and of vertical beaded line. In panel, youth standing, leaning on long staff or pedum (Déch. 332); behind him, short column, decorated with lattice-work pattern, which has probably been one of two supporting an arch (*cf.* B.M. Cat., p. 273, fig. 210). Lezoux.

14. Dr. 37, from Field No. 2106. Very imperfectly impressed ovolo, separated by beaded line from upper part of two fragmentary panels, divided by beaded line. In panel to l. are visible head and shoulders, possibly of Pan standing to front (*cf.* Déch. 413), his head impinging upon beaded line of ovolo. Probably Central Gaulish.

15. Dr. 37, from small pit in Field No. 2095. Lower subdivision of panel enclosed by beaded lines. Within, hare l. (Déch. 950). Lezoux.

Fig. 78

16. Dr. 37, from same pit as No. 15. Ovolo with trifold tongue and wavy line beneath (cf. O.-P., Pl. xxx. 67, and *Newstead*, p. 221, fig. 4). Zone decorated in subdivided panels, which are separated by Caryatids (Déch. 655a),¹ flanked by beaded lines set vertically, the inner terminating in a beaded annulet and the outer in a small roll-ornament laid horizontally (Déch. 1111). The central panel is subdivided by a single beaded line, terminating in beaded annulets, and has in upper compartment erotic motif within cable-bordered medallion, and in lower a lion l. The panels to l. and r. are subdivided by two beaded lines terminating in beaded annulets and having between them a row of seven plain annulets of larger size. In the lower compartment of each is a thunderbolt ornament, and in the upper a festoon which depends from the roll-ornaments and encloses a marine monster, in one case to r. (cf. Déch. 34) and in the other to l. (cf. Déch. 29). Lezoux. School of Divixtus.

17. Dr. 37, from Field No. 2095. Portions of three panels, divided by beaded lines set vertically. In panel to l., erotic motif within medallion having cable-border with wavy line inside; in corner beneath, dog l. (Déch. 934). In central panel, man standing as on No. 32 (Déch. 523); beneath, roll-ornament laid horizontally (Déch. 1111). In panel to r., naked man running r. (Déch. 403); beneath, traces of ornament. Lezoux.

18. Dr. 37, from main stoke-hole of Men's Baths. Portion of medallion containing tree (cf. Déch. 1141), beneath which there has in all likelihood been a crouching hare (cf. *Elslack*, Pl. xv. 31 and *Cannstatt* (1921), Pl. iv. 1). Probably Lezoux.

19. Dr. 37, from same pit as No. 16 and perhaps part of same bowl. Lower compartment of subdivided panel containing panther r. (cf. Déch. 799). Probably Lezoux.

20. Dr. 37, from Large Bath-house. Two fragments showing lower portions of two panels, divided by beaded lines, which are set vertically and terminate in rosettes. Panels have contained beaded medallions and, in lower corners, birds (cf. Déch. 1009 and 1018). On plain surface beneath, in raised letters, the name "Criciro" (see p. 504, *supra*) in cursive script and retrograde. Lezoux.

21. Dr. 37 (fig. 76), from Field No. 2095. Ware of very poor quality with much decayed glaze. "Tongues" of ovolo represented only by slight projection from lower r.-hand side of each "egg." The horizontal line beneath is wavy. Panels divided by wavy lines set vertically, terminating at each end in a rosette, and having a roll-ornament (Déch. 1111) laid across them transversely at a slight angle (cf. *Wroxeter* (1912), p. 39). In first panel from l., Silenus r., playing flute (Déch. 311). In third, Scylla (Déch. 20) seated on mushroom-shaped vase (cf. *Cannstatt* (1905), Pl. v. 1). In second and fourth, rosette in centre, and, above and beneath, large, plain annulet, enclosed within a beaded circle (Déch. 1182). On the plain band, beneath the ornament, in cursive script and retrograde, . . . nus. The quality of the

¹ In fig. 78 the artist has drawn the heads of the Caryatids as looking to r. They are much worn, and closer examination has shown that they are really looking to front as in Déch.

ware and the degraded ovolo had suggested to us a late date and possibly an East Gaulish origin. Dr Oswald, however, to whom we submitted a rubbing of the potter's signature, is inclined to regard the Mumrills bowl as the work of Arcanus, a Domitian-Trajan potter of Lezoux.

22. Dr. 37, from Field No. 2095. Portions of three panels, separated by beaded lines set vertically. In central panel, naked male figure standing to front, with drapery on l. arm (*Rottweil* (1907), Pl. xx. 4 and 15). In panel on r., short column with lattice-work decoration, which has been one of two supporting a pediment similar to that which appears in Déch. 1098. The corner of the pediment is visible, and, beneath it, the r. hand and arm of youthful Pan leaning upon pedum (Déch. 331). Lezoux. The central figure is not in Déch., but one of the Rottweil fragments bears the name of Cinnamus.

23. Dr. 37, from Field No. 2106. Lower portions of three panels which have been separated by beaded lines and have contained ornaments, those in the centre being variants of Déch. 1110. Probably Lezoux.

24. Dr. 37, from Large Bath-house. Lower portion of two panels, separated by beaded lines. In first from l., Mercury standing r., with l. foot on block of stone (Déch. 288*a*). In second from l., apparently base of tripod (*cf.* Déch. 1071). Probably Lezoux.

25. Dr. 37, from Field No. 2106. Three fragments, the smallest of which shows lower portion of subdivided panel having in lower compartment a thunderbolt ornament and in upper compartment a leaf springing from beaded annulet placed on beaded subdividing line. The other two fragments show ovolo (*cf.* O.-P., Pl. xxx. 118) above beaded line, which serves as part of framework for panels in decorative zone. Panels separated by Caryatids,¹ flanked by beaded lines set vertically and terminating in beaded annulets. That on l. is subdivided by beaded line terminating in beaded annulet, and has, in lower compartment, a thunderbolt ornament and, in upper compartment, a horseman galloping r. (Déch. 157) with leaf-ornament in corner. That on r. is not subdivided and contains satyr seated l., drinking (Déch. 361), with leaf-ornament in front. Probably Lezoux.

26. Dr. 37, from Field No. 2106. Small portion of ovolo visible above beaded framework of decorative zone, which has probably consisted of panels containing alternate medallions and demi-medallions with plain annulets in corners. The surviving medallion has Victory facing (*cf.* Déch. 474) and krater with two handles (*cf.* Déch. 1075). Probably Lezoux. The ovolo would seem to have been not unlike that on No. 4.

27. Dr. 37, from Field No. 2106. Portion of panel enclosed in framework of beaded lines and subdivided into four by beaded lines terminating in plain annulets. In the two upper compartments, on l. Abundantia seated r.,² and on r. (probably) satyr seated l., drinking (Déch. 362). In the two lower, hares l. (Déch. 944) and r. (Déch. 950). Lezoux.

¹ The Caryatid is doubtless Déch. 656, although the original is so rubbed that the artist has mistaken the mask beneath for a vase with handles.

² This is apparently Déch. 472, with the chair on which the figure is seated broken away. The same stamp with the same defect occurs on a bowl, signed by Cinnamus, at Wroxeter (1913, Pl. xiv. 24), and on another signed by Divixtus, at Corbridge (*Arch. Ael.*, 3rd series, vol. viii., fig. 13). The defective stamp was copied at Rheinzabern (Ludow., v. p. 32, Nos. 71 f.)



Fig. 78. Decorated Samian Ware. (Scale, $\frac{1}{2}$.)

28. Dr. 37, from Field No. 2106. Ovolo consists merely of lower ends of "eggs" with cruciform terminals of "tongues." In decorative zone, panels alternately narrow and wide, enclosed in framework of beaded lines, which terminate in rosettes, and having bead-and-reel border beneath. In first panel from l., Venus leaving the bath (*cf.* Déch. 181). In second panel from l., ithyphallic Pan standing r. (*cf.* Déch. 420) facing goat on its hind-legs, l. (*cf.* Déch. 893); beneath, lizard r. (*cf.* Déch. 958). It will be observed that, while the execution is good, each of the four stamps differs in some more or less important particulars from its analogue in Déch. This and the peculiar form of ovolo would seem to indicate that the bowl was not manufactured at Lezoux. O.-P. states (p. 151) that the cruciform terminal "appears to be confined to East Gaul." On the other hand, the general appearance of the piece is less suggestive of East Gaul than of Lezoux. It may perhaps be from some intermediate group of potteries.

Fig. 79

29. Dr. 37, from Field No. 2095. Ovolo (*cf.* O.-P., Pl. xxx. 117) with beaded line beneath. Portions of two panels separated by a highly conventionalised tree on a cylindrical base (Déch. 1115), flanked by two beaded lines set vertically and terminating above and below in roll-ornament placed horizontally (Déch. 1111). In l. panel, satyr seated l., drinking (Déch. 362). Lezoux.

30. Dr. 37, from Field No. 2095. Ovolo (*cf.* O.-P., Pl. xxx. 95) above portion of panel, enclosed in framework of beaded lines and containing Cupid r. (*cf.* Déch. 230) with bud-ornaments in field. Lezoux.

31. Dr. 37, from Field No. 2106. Ovolo as on No. 25 with beaded line beneath. Panels separated by beaded lines set vertically, and terminating above and below in beaded annulets. In first panel from l., beaded annulet and trace of uncertain ornament. In second, naked male figure, standing r. (Déch. 344). In third, tripod with serpent (Déch. 1067), beneath which an astragalus with cabled outline and wheel-ornament in centre. In fourth, Apollo standing l. with laurel-branch (Déch. 56). Lezoux.

32. Dr. 30, from Agricolan ditch at point where it was crossed by westmost Antonine ditch. Ware soft, with poor glaze. Ovolo with "tongues" corded (*cf.* O.-P., Pl. xxx. 93). Framework of panels as on No. 31, but with large beads instead of beaded annulets. Portions of four panels visible. In first from l., fragment of medallion with plain annulet in corner. In second, male figure standing (Déch. 523). In third, Venus standing (Déch. 185). In fourth, medallion containing kneeling figure (Déch. 394), in front of which, ornament similar to those in central panel of No. 23; in corners, plain annulets. Lezoux.

33. Dr. 37, from Field No. 2106. Portions of two panels, separated by a beaded line. In panel to l., medallion, bordered by plain line within beaded line, and containing Hercules strangling serpents (Déch. 464).¹ In panel to r., trace of doubtful ornament. Lezoux.

34. Dr. 37, from Large Bath-house. Coarsely made, with dull glaze. Ovolo of ordinary type, with beaded line beneath. Portions of three

¹ So Déch. Laocoön has also been suggested.

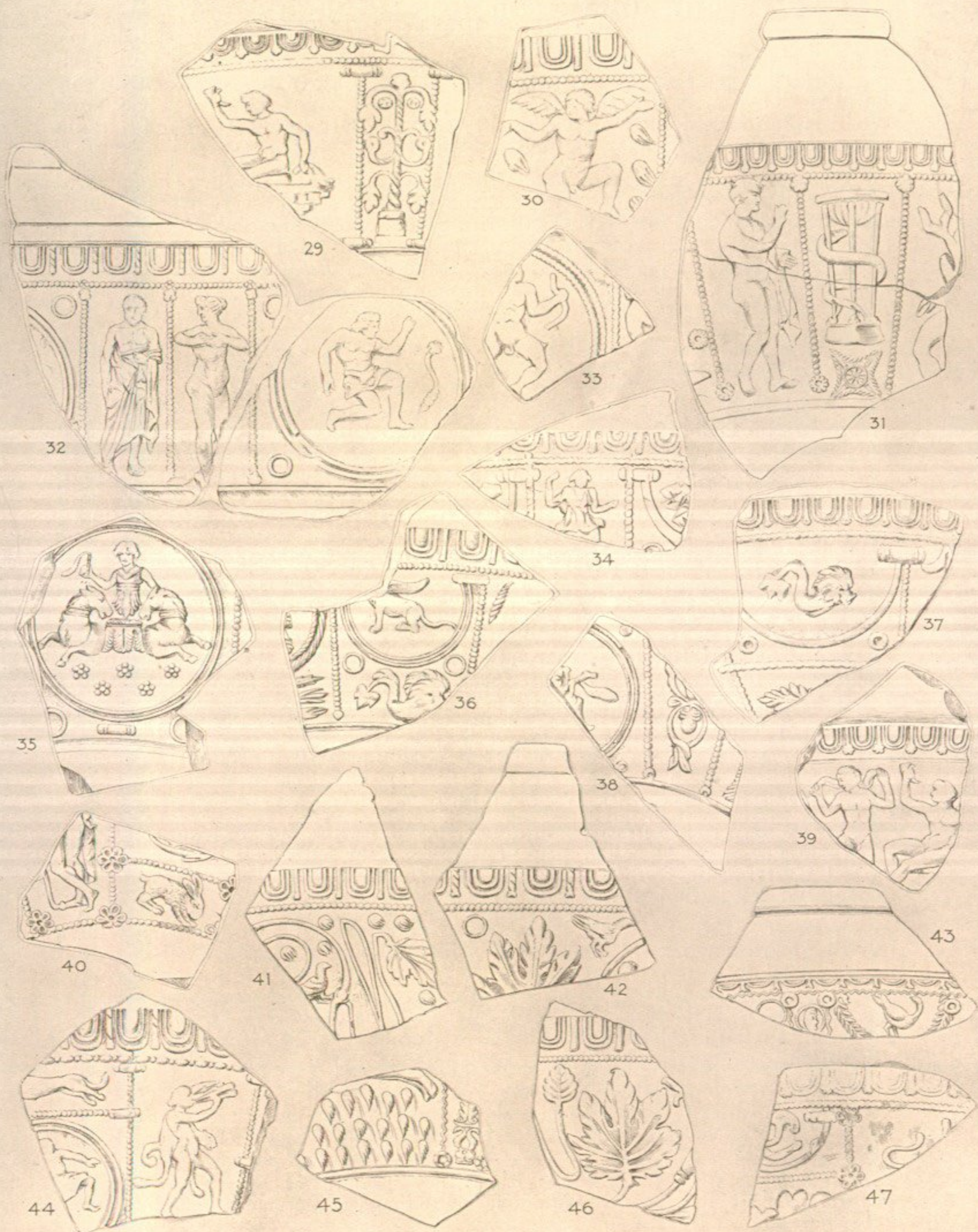


Fig. 79. Decorated Samian Ware. (Scale, $\frac{1}{2}$.)

panels, separated by beaded lines which terminate above in roll-ornaments (Déch. 1111). In central panel, female figure to front, raising r. hand. The panels to l. and r. show traces of uncertain ornaments within plain festoons which depend from roll-ornaments; in field, plain annulets. Probably East Gaulish.

35. Dr. 37, from Level B of westmost Antonine ditch. Good, hard ware. Portion of panel, with remains of beaded-line framework, which has enclosed medallion with plain annulets in corners and roll-ornament (Déch. 1111) below. Within medallion, Diana in biga to front, with five rosettes beneath horses' feet. For the type, cf. *Balmwildy*, Pl. xxxv. 66, and Déch. 73, which, however, is on a much larger scale. Another fragment of the same bowl shows an ovolo like that on No. 10. Lezoux.

36. Dr. 37, from pit in Field No. 2095, where it was associated with many other pottery fragments, including fig. 81a, No. 5, and fig. 103, No. 14. Hard, dark-coloured ware. For ovolo and beaded line beneath cf. No. 10. Portions of three panels, separated by beaded lines, terminating above in roll-ornaments. In panel to l., traces of medallion with cabled border, enclosing beaded border, and of thunderbolt ornament beneath. In central panel, plain festoon depending from roll-ornaments and containing griffin l. (Déch. 497); beneath, dolphin r. (Déch. 1050), and two plain annulets. In panel to r., traces of figure with r. hand raised, and small ornament (Déch. 1109a). Lezoux.

37. Dr. 37, from Level C of westmost Antonine ditch. Ovolo (cf. O.-P., Pl. xxx. 73), with beaded line beneath. Panel subdivided by beaded line and flanked by beaded lines which terminate above in roll-ornaments. In upper compartment, festoon depending from roll-ornament and containing dolphin r. (Déch. 1050); in corners, plain annulets. In lower compartment, traces of leaf. Lezoux.

38. Dr. 37, from Field No. 2106. Portions of three panels separated by beaded lines. In panel on l., medallion, within which traces of female seated r. (?) and fish r. (cf. Déch. 1062); in corners, small annulets. In central panel, caduceus-ornament (Déch. 1113a). In panel on r., trace of astragalus-shaped ornament as on No. 31. Lezoux.

39. Dr. 37, from Large Bath-house. Ovolo with "tongues" terminating in large rosettes. Beneath, Venus standing (cf. Déch. 174) and satyr seated l., drinking (cf. Déch. 361). The coarseness of the ware and the absence of a line beneath the ovolo¹ suggest East Gaul.

40. Dr. 37, from Large Bath-house. Portions of two panels, which have had framework of beaded lines terminating in large rosettes. For figure in panel on l. cf. No. 3. Panel on r. subdivided; in lower compartment, hare r. (cf. Déch. 944). The ware is coarse.² For the peculiar form and the position of the rosettes see *Cannstatt* (1921), Pl. ii. 3, and for the combination of these with a beaded line beneath see *Blickweiler*, 93, 3, a Heiligenberg bowl.

41. Dr. 37, from Field No. 2106. Ware of light brown tone, with very dull glaze; unlike Nos. 42 and 46, despite the superficial resemblance. For ovolo cf. No. 36. Beneath, beaded line and zone decorated with

¹ The line shown faintly in the drawing is merely the mark of the wheel.

² The workmanship, too, is poor. We are not quite confident that the artist's interpretation of the figure on the l. is justified.

vine-leaves and tendrils, among which a bird seated r. and six bud-like ornaments, for which *cf.* No. 30. Lezoux.

42. Dr. 37, from Field No. 2106. Ovolo with corded "tongues" and beaded line beneath (*cf.* No. 32). Beneath beaded line, zone decorated with vine-leaves; in field, large annulet and bird r. (*cf.* Déch. 1034). Lezoux.

43. Dr. 37, from Field No. 2095. Ovolo consisting of lower ends of "eggs" with trifid terminals as "tongues." Wavy line beneath. Portions of two panels, separated by a Caryatid flanked by wavy lines which terminate in small annulets. In l.-hand panel, only large annulet visible. In r.-hand panel, festoon depending from annulets and containing bird r. (Déch. 1009). The degraded ovolo indicates a late date. Probably East Gaulish.

44. Dr. 37, from Field No. 2106. Ovolo with corded "tongues." Beneath, line of "bead-and-reel" pattern. Portions of three panels, separated by beaded lines which terminate in horizontal roll-ornaments. Panel on l., subdivided by beaded line terminating in roll-ornament, has in the upper compartment, which is smaller, a hound l. (*cf.* Déch. 932), and in lower, a medallion enclosing warrior r. (Déch. 103). In central compartment, Silenus r., playing pipe (Déch. 314). The panel on r. has also been subdivided, but here the upper compartment has been the larger. Lezoux.

45. Dr. 37, from Large Bath-house. Lower portion of panel containing tufts of grass and animal running l. (*cf.* Déch. 885). Also lower portion of Caryatid (Déch. 655*b*), flanked by wavy lines resting upon beaded annulets. Probably Lezoux.

46. Dr. 37, from Field No. 2095. Ovolo of ordinary form as on No. 10. Beneath beaded line, zone decorated with vine-leaves and tendrils; tail and hind-leg of bird visible on r. Lezoux.

47. Dr. 37, from Field No. 2106. Has belonged to a thick, heavy bowl which has been made in a much-worn mould. Ovolo (*cf.* No. 25) faintly impressed. Upper portions of two panels, which have been enclosed in a framework of beaded lines terminating in large rosettes. The panel on the l. has been subdivided, and in the upper compartment there has been a festoon, depending from roll-ornaments that projected from the terminal rosettes. In each panel, traces of ornament. East Gaulish. For form and position of rosettes see No. 40.

Fig. 80.

48. Dr. 37, from Field No. 2095. Ovolo of somewhat degraded form, the "tongues" being represented merely by a trifid projection at the lower r.-hand corner of each "egg." Beneath a beaded line, portions of two panels, separated by a beaded line terminating above in a roll-ornament laid horizontally. The panel on the l. has been subdivided by a beaded line terminating in a roll-ornament, and has had in lower compartment a lion l. (*cf.* Déch. 769) and in upper a large rosette and a festoon, depending from roll-ornaments and containing a vine-leaf with beaded stalk. In panel on r., pillar wreathed with vine (Déch. 1092); in field, leaves. The degraded ovolo and the crowding of the design indicate a late date. Perhaps East Gaulish or late Lezoux.

49. Dr. 37, from Field No. 2106. Coarse surface, with rough glaze. Lower portions of two panels, separated by a beaded line. In panel to

r., lion r. (cf. Déch. 798), annulet, and lower portion of medallion with beaded border. Perhaps East Gaulish or late Lezoux.

50. Dr. 37, from Large Bath-house. Dark red ware, with a good glaze. For ovolo cf. No. 12, but the "tongues" encroach upon the line beneath, which is wavy. Upper portions of two panels separated by a beaded line with a roll-ornament laid horizontally across it. The panel on the l. contains a medallion having cabled border outside plain border, and enclosing panther r. (cf. Déch. 799) and two ivy leaves. The panel on r. has been subdivided by a beaded line terminating in plain annulets, and has had in upper compartment a festoon depending from the roll-ornaments and enclosing a griffin r. (cf. Déch. 496). Perhaps late Lezoux. The ware, however, is uncommonly like Rheinzabern, and the panther closely resembles Ludow., v. p. 59, No. 41.

51. Dr. 37, from Field No. 2095. "Tongues" of ovolo have square ends and adhere closely to sides of "eggs." A wavy line beneath serves as upper border of narrow zone decorated with upright leaves which spring from a second wavy line forming the lower border. Beneath, remains of what has apparently been a two-leaved straight wreath. The quality of the ware and the workmanship are poor. Mr Davies Pryce, however, who has seen the fragments, tells us that the ovolo and glaze closely resemble those on a similarly shaped bowl made by the late potters of Montaus, Attilus and Malcio, two pieces of which were recently found at Richborough. He would assign our fragments to the late first century.

52. Dr. 37, from Field No. 2095. The place of the ovolo is taken by a returning spiral, which is separated by a beaded line from a zone which has been decorated with a lattice-work of beaded lines with rosettes. The returning spiral in this position is characteristic of East Gaul (O.-P., p. 152). The lattice-work decoration with rosettes was frequently employed by the potter Janus (*Heiligenberg*, Pl. xxv.).

53. Dr. 37, from Level B of westmost Antonine ditch. Ovolo resembling that on No. 51 but coarser. Beneath, narrow zone bordered by wavy lines and containing a row of small medallions, each of which encloses a human head r. (*Cannstatt* (1905) Pl. ix. 2). Beneath this again, a broader zone having a two-leaved wreath for its lower border and containing Hercules and the Nemean lion¹ (Déch. 624), and animals running l. and r., with annulets and other ornaments in the field. Probably Heiligenberg. The two-leaved wreath occurs in the same position on a bowl signed by Ciriuna (*Rottweil*, Pl. xxv. 1B). Knorr (*op. cit.*, p. 50) mentions that it was used in the same way by Satto, Janus, and Reginus.

54. Dr. 37, from Field No. 2095. Degraded ovolo, showing only lower ends of "eggs" with projections at r.-hand corners. Beneath, beaded line and upper portions of two panels, separated by beaded line terminating in two lilies, one of which is drooping l. In panel on r., head and shoulders of bear r. (cf. Déch. 809) on its hind-legs, with small Cupid flying l. behind. Probably East Gaulish.

55. Dr. 37, from Field No. 2106. Fragmentary ovolo with beaded line beneath. The decorative zone below probably contained a hunting-scene, as is suggested by hinder part of bear running r. (Déch. 810). Beneath, warrior in action with r. hand raised and shield on l. arm (Déch. 140). Lezoux. The ovolo is identical with that used by Albucius on No. 12.

¹ So B.M. Cat., M. 1202. Déch. (*l.c.*) interprets the group as a *bestiarius* in the arena.

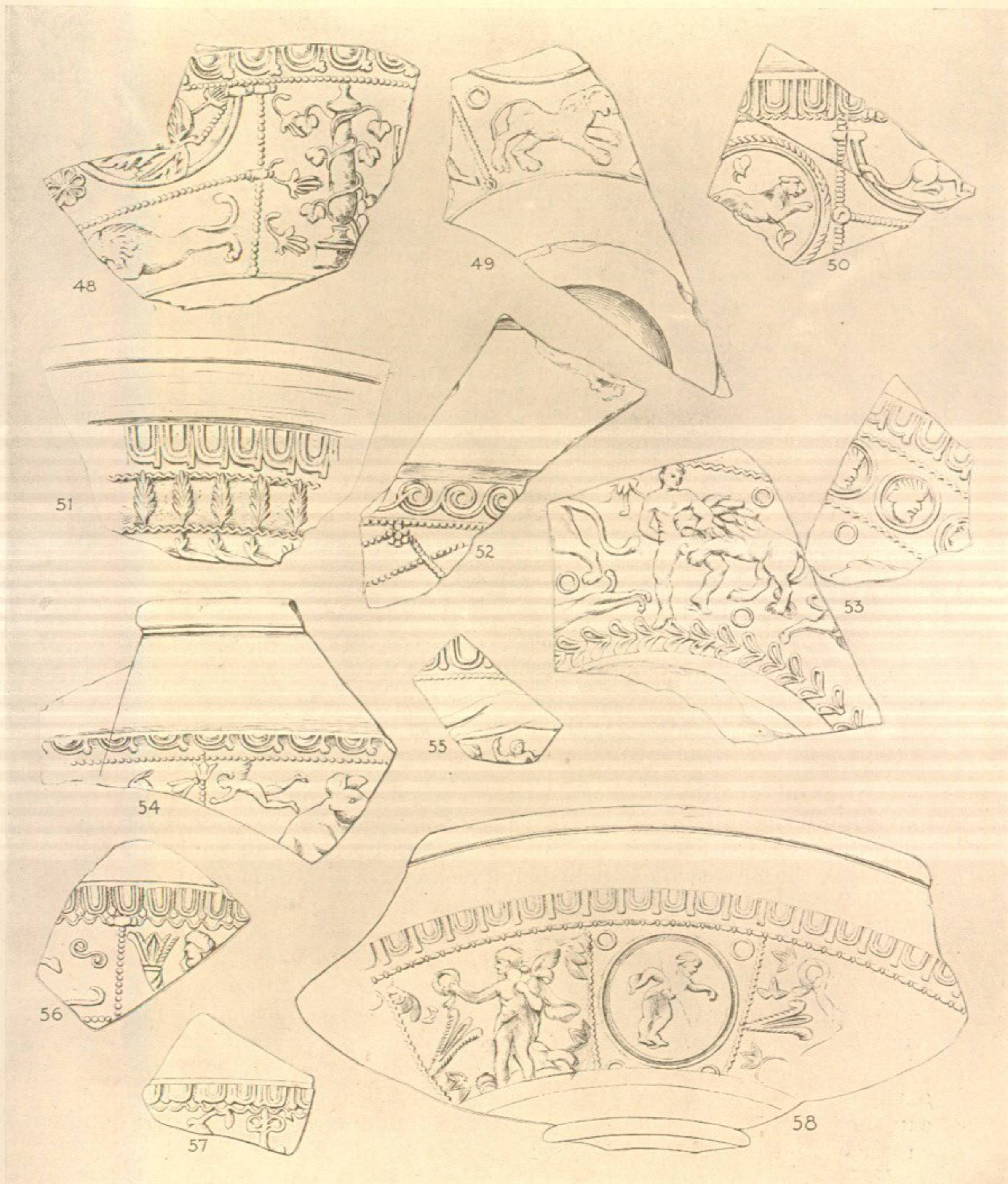


Fig. 80. Decorated Samian Ware. (Scale, $\frac{1}{2}$.)

56. Dr. 37, from Field No. 2095. Badly formed ovolo with corded "tongues," which terminate in small rosettes, and a poorly executed wavy line beneath. Upper portions of two panels, separated by beaded line which terminates in a roll-ornament horizontally laid. The panel on l. has been subdivided by a beaded line, and has had in its upper compartment an S-shaped ornament and animals running l. In panel on r., cornucopiæ (?) and human head l. (?). Probably East Gaulish.

57. Dr. 37, from Field No. 2106. Ovolo not unlike that on No. 56, with similar wavy line below. Beneath, top of caduceus-shaped ornament. Probably East Gaulish.

58. Dr. 37, from Field No. 2106. Ware coarse, with slightly granular surface. Ovolo resembling that on No. 10, with bead-and-reel border beneath. Two panels and portion of a third, separated by beaded lines. In panel on l., Victory (degraded copy of Déch. 475), with various ornaments in field. In central panel, medallion enclosing human figure r. with outstretched arms; in each of the four corners a plain annulet. In panel to r., arm holding wreath, with ornament in field. Probably East Gaulish.

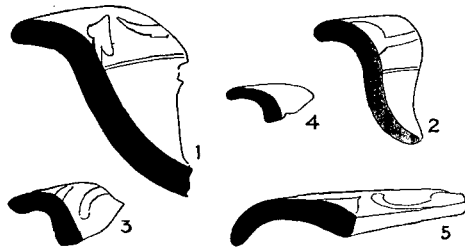


Fig. 81a. Forms Dr. 35 and 36. (Scale, $\frac{1}{2}$.)



Fig. 81b. Cf. Form Dr. 35. (Scale, $\frac{1}{2}$.)

Cups and shallow dishes having curved rims decorated with ivy leaves, laid on *en barbotine*, (Dr. 35 and 36) were represented by fragments of five distinct vessels. Fig. 81a shows sections of four of these (Nos. 1-4), the first two of them being clearly Dr. 35, while of the others too little was left to justify any expression of opinion. In all four cases the body of the vessel had been thick and the glaze of poor quality, indicating an Antonine date. It was otherwise with fig. 81a, No. 5, the glaze on which was hard and bright. The fragment is again too small to permit of certainty, but it is conceivable that it may be part of the flange of a vessel of the "sigillata-mortarium" class (O.-P., Pl. lxxi. 19), in which event it is probably a "survival" from the earlier half of the second century. Fig. 81b, although it is undecorated, can most conveniently be mentioned here. It has belonged to a small cup or bowl, the everted rim of which, though narrower and lacking the *barbotine* ornament, seems to connect it with Dr. 35. It came from Field No. 2106. We may perhaps compare *Old Kilpatrick*, Pl. xi. 13.

(b) *Plain*.—As with the decorated Samian, so with the plain. The complexion of the whole mass of fragments is overwhelmingly Antonine, with two or three obvious “survivals.” Only in one instance, to be noted presently, does an Agricolan date seem probable.

The cup with constricted curvilinear wall terminating in an everted lip (Dr. 27) was represented ten times. The fragments were usually small, the most considerable being that illustrated in fig. 82. There were portions of forty cups of the form known as Dr. 33. As a rule they had been large, with thick walls, and in the majority of cases the outer face was slightly concave (figs. 83–86). Fig. 86, which had a thin wall, was marked out from the rest by the hardness and brightness of its glaze. To judge from its superior quality, it may possibly be a “survival.”

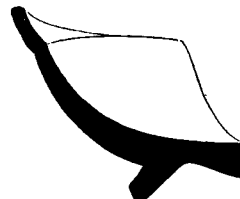


Fig. 82. Form Dr. 27.
(Scale, $\frac{1}{2}$.)

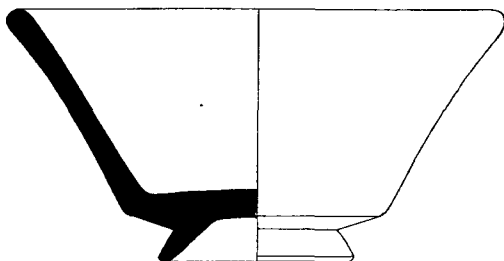


Fig. 83. Form Dr. 33. (Scale, $\frac{1}{2}$.)



Fig. 84. Form Dr. 33.
(Scale, $\frac{1}{2}$.)

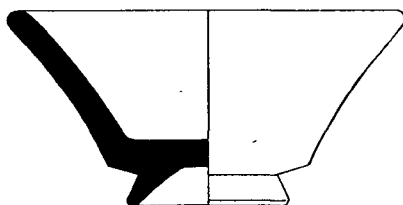


Fig. 85. Form Dr. 33. (Scale, $\frac{1}{2}$.)



Fig. 86. Form Dr. 33.
(Scale, $\frac{1}{2}$.)

It came from Level C of the westmost Antonine ditch, where it was associated with a fragment of a flanged bowl (Dr. 38). Fig. 82 and also several of the examples of Dr. 33 bore potters' stamps, details of which will be given in the list at the end of this section. There is a girth-groove round fig. 84 about $\frac{5}{8}$ inch from the top.

Of the plate with a low, more or less oblique and slightly rounded

wall, which rose to a semicircular lip (Dr. 18), there were only one or two representatives. On the other hand, the fragments of the more highly developed type with convex base, semicircular lip, and high oblique wall (Dr. 31), and of the type intermediate between the two (Dr. 18/31), were more numerous than the fragments of any other variety of undecorated Samian, the former preponderating very decidedly. One of the fragments belonging to Dr. 18 was a portion of a base, showing a slight depression in the centre. It was stamped with the name of a rather early potter, Creciro, but is best regarded as a "survival," particularly as it was found in Field No. 2106 at no great depth below the surface. A stronger case could be made out for associating fig. 87, No. 1, with the Agricolan occupation. It is a small portion of the wall of a rather shallow platter, with a hard, good, bright glaze, and having a slight rim and, on the outside, a slightly convex surface. This came from the short length of the palisade-trench, which was opened up at the north-east corner of the Early Fort, and it might easily have lain undisturbed there throughout the whole of the Antonine period. Two other examples of Dr. 18/31, which may be fairly early, are Nos. 2 and 3 in fig. 87. Both were found in searching for post-holes at the eastern end of Field No. 2095. The former has a low wall, slightly convex on its outer side, while at the junction of this with the base there is on the outside a narrow groove and on the inside a corresponding ridge. The profile of the latter approximates to the profile of Nos. 1 and 2. Its base (detached) is slightly concave and bears a potter's stamp, unfortunately imperfect. Fig. 87, No. 4, is a typical specimen of the transitional dish. It has a thick wall and a high-rising centre, in which are the remains of a potter's stamp. It was lying on Level C of the westmost Antonine ditch. Nos. 5 and 6, both from Field No. 2106, likewise belong to the stage of transition. No. 5 is Ludow. Tq.¹ No. 6 has a rather more rounded profile and a rim that is neatly formed. No. 7 (Ludow. Tq./Sb.) was found in Field No. 2095. The ware is thick, but the glaze is hard and bright, and there is a faint ridge on the inside where wall and base join. No. 8, which came from the north-west corner of Field No. 2095, is probably an early example of Dr. 18/31. It has a fairly thin wall and a well-formed lip. On the base there is the stamp of the potter Calvinus. No. 9, from Field No. 2106, has a profile which shows an almost continuous curve (Ludow. Sb.). No. 10 was associated with obviously Antonine potsherds in a pit on the east side of Field No. 2095. No. 11, which is of good quality and glaze, and No. 12, which has belonged to a shallow dish with a diameter of about 8 inches, both came from Field No. 2106.

¹ See O.-P., Pl. xlv. 9.

Among miscellaneous forms of plain Samian we may mention three. The two-handed cup (Dr. 34) was represented by part of one side and

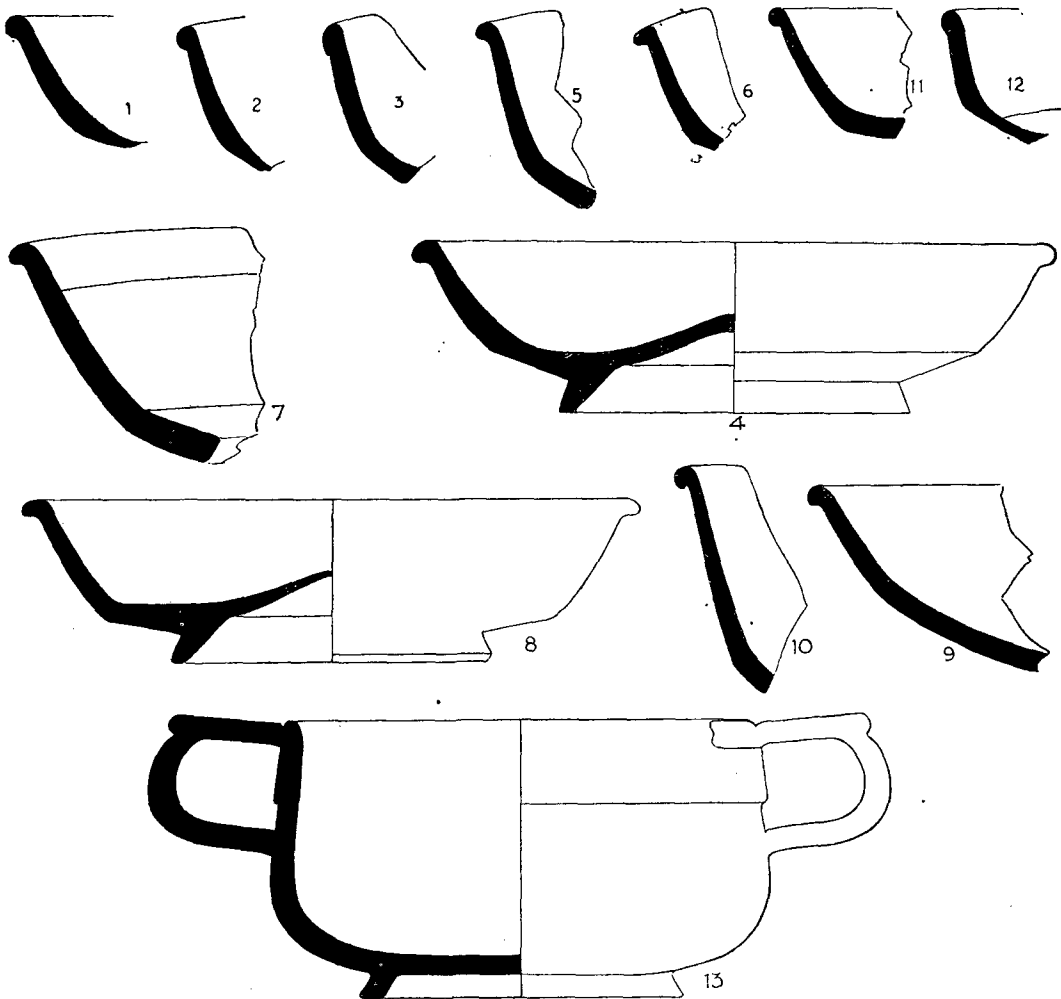


Fig. 87. Nos. 1-12, Form Dr. 18/31 and 31. No. 13, Form Dr. 34. (Scale, $\frac{1}{2}$.)

the base of the handle, found just outside the Large Bath-house. The form (fig. 87, No. 13) is somewhat uncommon, but an example was found at Newstead in association with Antonine objects. From the Large Bath-house came two pieces of the rim of a specimen of the campanulate dish (fig. 88) known as Curle 15. Finally, Level C of the westmost

Antonine ditch yielded a number of fragments of a single example of the hemispherical bowl with curved overhanging flange and high rim (Dr. 38). This is a typically second-century form (fig. 89), and seems



Fig. 88. Form, Curle 15. (Scale, $\frac{1}{4}$.)

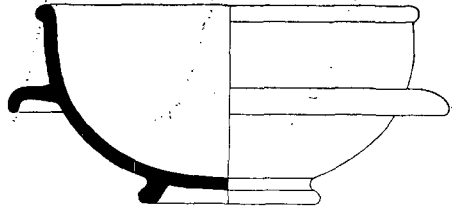


Fig. 89. Form Dr. 38. (Scale, $\frac{1}{4}$.)

sometimes to have been used as a mortarium (O.-P., p. 213), although the Mumrills example betrayed no signs of roughening or wear in the surface of the interior.

(c) *Potters' Stamps*.—The detailed description already given of the decorated Samian includes the names of three potters which were impressed in raised letters on the outside of bowls, as well as a portion of the name of a fourth. The three that are certain were Albucius, Cinnamus, and Criciro. In addition, more than twenty of the fragments of plain ware had a more or less complete maker's stamp inside on the slightly convex base. A list follows. It will be seen that the inferences of which it admits go to confirm conclusions already suggested. Lezoux was the chief source of supply for the Samian ware used at Mumrills, but East Gaul and even South Gaul also contributed their quota. Most of the South Gaulish pieces were doubtless "survivals," but the possibility that one or two of them may have come North with Agricola's troops cannot be definitely excluded.

1. AE . . . on Dr. 18/31. The third letter may be L, but its traces are too doubtful to allow of certainty. It is not the usual form of the stamp of Aelianus of Lezoux.

2. AFRICAN·M on Dr. 33 (fig. 83). The stamp of Africanus has been found in a kiln at St Bonnet, Iseure, in the Allier district (O.-P., p. 20). His name is rare in Britain, but it occurs in precisely this form at Riegel am Kaiserstuhl (Fritsch, *Terra Sigillata von R.*, p. 32) and elsewhere abroad.

3. AV . . . on a vessel of indeterminate form.

4. AV . . . on Dr. 18/31 (fig. 87, No. 4). The third letter may be E. In that case the potter may be Aventinus of Lezoux.

5. AVITI·MA on Dr. 18/31. From Field No. 2106. There were several potters of the name of Avitus (O.-P., p. 28 f.). This particular form of stamp is believed to be associated with the earliest of them, who worked at La Graufesenque (*Brecon Gaer*, p. 233). It was found on Dr. 33 at Ardoch.

6. **BORILLI·OF** on Dr. 33. Borillus was a second-century Lezoux potter. His stamp is common in Britain. In Scotland it has been found at Balmully, Birrens, Camelon, and Newstead.

7. **BRICCVS·F** on Dr. 18/31. Briccus also worked at Lezoux in the second century. A more usual form of his stamp is **BRICCI·M**. But the variety with the nominative occurs elsewhere (B.M. Cat., M. 1691).

8. **C . . .** on Dr. 18/31 (fig. 87, No. 3).

9. **CALVINI·M** on Dr. 18/31 (fig. 87, No. 8). From N.W. corner of Field No. 2095 in trenching for Agricolan ditch. Calvinus worked at La Graufesenque during the reign of Vespasian. His wares have been found in London and elsewhere in Britain (*C.I.L.*, vii. 1336, 213 f.). An example occurred at Camelon.

10. **CASS[IVS·F]** on Dr. 27 (fig. 82). Cassius is said to have worked at Heiligenberg in the first half of the second century (*Rottweil*, p. 58. Cf. *Cannstatt* (1921), Pl. iii. 23). His stamp was found at Newstead.

11. **CIRRI·M** on Dr. 33 (fig. 85). Cirrus was a Lezoux potter of the Trajan-Antonine period. The same stamp has been found in London (B.M. Cat., M. 2079), as well as two varieties with his name in the nominative (*op. cit.* M. 1859 and M. 1952).

12. **CREIRO·OFI** on Dr. 18. Field No. 2106. Creiro is believed to have worked at Banassac in South Gaul during the period from Vespasian to Trajan. The same form of stamp was found at Corbridge (*Arch. Ael.*, 3rd series, vol. xii. p. 280),¹ and apparently also in London (*C.I.L.*, vii. 308a). He is different from the Criciro whose signature has been noted above on two pieces of decorated ware.

13. [. . .] **ORC** on Dr. 33. Ware of poor quality, with an orange glaze. The name is probably that of Dronbus, a Heiligenberg potter of the Hadrianic period. The stamp is quite different in character from any of the others, the letters being heavier and larger.

14. **MATTI·M** on Dr. 33. This stamp was also found at Newstead and at Corbridge (*Arch. Ael.*, 3rd series, vol. xii. p. 282). *C.I.L.*, xiii. 10010, 1312, records examples from Moulins and from Clermont, from which it may be inferred that he worked in the district of the Allier.

15. **RII[OGENI·M]** on Dr. 31 (Ludow. Sb.) This is probably (though not certainly) the stamp of Ritogenus, an Antonine potter who worked at Lezoux. His ware is common in Britain. In Scotland his name has been found at Balmully, Birrens, Camelon, and apparently Old Kilpatrick.

16. **SVOBN[ILLI]** on Dr. 18/31. For this stamp see B.M. Cat., M. 1898 and M. 2178. It also occurs at Camelon. It might be completed **SVOBN[EDO·F]**, but considerations of spacing make the reading suggested more probable.

17. **TITI·M** on Dr. 37. Titius was an Antonine potter of Lezoux. This form of his stamp was found at Corbridge (*Arch. Ael.*, 3rd series, vol. xii. p. 286). For other varieties see *Carlisle*, p. 81.

18. [. . .] **LI·AA** on Dr. 31. This may possibly be the stamp of Marcellus, a second-century potter of Rheinzabern.

¹ The last three letters do not appear in the list as printed, but it is specially stated that the third and fourth are ligatured.

19. [. . .]JM on Dr. 27.
 20. [. . .]MELLI·M. The name is perhaps that of Gemellus, who worked at Rheinzabern in the second century.
 21. [. . .]SF on Dr. 33.
 22. [. . .]VS on Dr. 33.

B. *Amphorae*.

Out of the hundreds of potsherds there were very few indeed that had belonged to amphorae. The fragment which is shown in section in fig. 99 (No. 11) was one of the most considerable. It was of reddish-buff ware, and came from Field No. 2106. If regard be had to the extent of the area turned over by the spade, the scantiness of the traces of this variety of vessel may well seem remarkable. It was, of course, much more substantial, and therefore much less liable to accidental breakage, than any of the other classes of pottery in use among the dwellers in the fort. Should we be justified in connecting the rarity of its occurrence among the debris with the general scarcity of interesting and important relics from the site—a scarcity which presents a striking contrast to the rich harvest yielded by Newstead, and the no less rich harvest which might obviously have been garnered at Camelon had circumstances permitted of a thorough exploration there? If so, its significance can hardly be mistaken. While Newstead and Camelon were evacuated in haste, or, perhaps, carried by storm,¹ the withdrawal from Mumrills was deliberate, and was conducted in a fashion so orderly that the retreating garrison were able to take their stores with them. It is worth adding that it was not merely in size and strength that these supply and storage vessels differed from the Samian, described above, and from the rest of the coarse ware, to be dealt with presently. Instead of being manufactured in the potteries of Gaul or Britain, they were made in the country whence the products they were intended to contain, usually wine or oil, were exported overseas. Dessau long ago advanced sound reasons for believing that most of them came from Spain.² The same stamps, denoting sometimes a place name and sometimes a personal one, appear in various parts of the Empire as well as in Rome itself, notably on the Monte Testaccio. The marks observed at Mumrills were as follows (fig. 90):—

No. 1. On a handle of buff ware. When complete, the stamp must have read either **DOM** or **DOMS**, for both forms are known, and it may be assumed to indicate the personal name Domitius. It is common, having been noted, for instance, at Ardoch and at Rough Castle. Two of the several examples found in Rome can be dated by means of inscriptions

¹ See *Newstead*, pp. 113 f.

² *Ann. dell' Inst.*, 1878, pp. 118 ff. Cf. *C.I.L.*, xv. p. 492.

which they bear—one to A.D. 146, and the other to 154 (*C.I.L.*, xv. 2800a and 2800b), the very time when the Scottish Wall was garrisoned.

No. 2. Rudely incised on the same handle as No. 3. With this M may be compared a no less rudely incised X on a fragment of the mouth of an amphora of reddish-buff ware.



Fig. 90. Stamps and mark on amphorae. (Scale, $\frac{1}{2}$.)

No. 3. On a handle of buff ware. The stamp is Q·A·R·P, doubtless a personal name. It has been found in Rome (*C.I.L.*, xv. 2662e).

C. *Mortaria*.

Some seventy or eighty different mortaria were represented by portions of their rims. Sections of thirty-nine of these are shown in figs. 91, 92, and 93, the arrangement being typological. To a certain extent it may be regarded as chronological also, although on its accuracy in that respect it would be very unwise to insist in the present state of our knowledge. It will be observed that a large proportion, perhaps about one half, correspond to the earlier of the types illustrated in *Wroxeter* (1912), and that not a few of these reappear at the Antonine forts of Balmuildy and Old Kilpatrick. Of the characteristically first-century mortarium, with particles of quartz embedded in the wide, flat rim as well as in the interior, there was not a single example. Two or three of the specimens found may possibly, if hardly probably, have made their way to the site at the time of the Agricolan occupation. In general, however—and it should be understood that this is the case where nothing is said to the contrary—there is no reason to think that they had not been in use during the Antonine period. At the other end of the scale (fig. 93) is a small group of five, which are distinguished by features of a very unusual character, but which we see no reason for assigning to a different period from the others.

Fig. 91.

No. 1. Buff-coloured ware, with stamp (fig. 94, No. 3). From Field No. 2106.

No. 2. Cream-coloured ware, with stamp (fig. 94, No. 4). From Field No. 2106.



Fig. 91. Sections of rims of mortaria. (Scale, $\frac{1}{2}$.)

No. 3. Buff-coloured ware, with stamp, of which only the last letter (F) is legible. Section taken from fragment broken off in the region of the mouth. From Field No. 2095. Cf. *Newstead*, p. 264, 4, which came from the ditch of the early fort (c. A.D. 80-110). Possibly Agricolan.

No. 4. Buff-coloured ware. From Field No. 2095. At Wroxeter the type seems to belong to the first century. Cf. *Newstead*, p. 264, 1, which came from an early pit (c. A.D. 80-110). Possibly Agricolan.

No. 5. Hard, cream-coloured ware. Section taken from fragment broken off in the region of the mouth. From Field No. 2095. Cf. *Balmuildy*, Pl. xli. 6.

No. 6. Hard, cream-coloured ware. From Field No. 2095.

No. 7. Hard, buff ware. Slightly grooved on the lip near the inner edge. From westmost ditch of the Antonine fort (level unnoted). According to *Wroxeter* (1912), p. 76, "the type hardly appears to last out the second century." Cf. *Brecon Gaer*, p. 215 (c. 5). Possibly Agricolan.

No. 8. Cream-coloured ware. From Field No. 2106. Three other very similar rims were found at different points in the same field.

No. 9. Buff-coloured ware. From Field No. 2095.

No. 10. Cream-coloured ware, with stamp (fig. 94, No. 5). From Field No. 2095. Two similar rims were found in Field No. 2106.

No. 11. Red ware. From Field No. 2106. Cf. *Balmuildy*, Pl. xli. 2, and *Old Kilpatrick*, Pl. xix. 5.

No. 12. Red ware, with stamp (fig. 94, No. 1). From Field No. 2106.

No. 13. Red ware, coated with cream slip. From Field No. 2095.

No. 14. Brick-red ware, with mark of fern-frond (fig. 94, No. 11), fashioned apparently with a tool when the clay was soft. From Field No. 2106.

No. 15. Cream-coloured ware. From the Large Bath-house.

No. 16. Red ware, coated with cream slip. From Field No. 2106.

No. 17. Red ware, coated with white slip. From Field No. 2095, where it was found along with No. 24. There is a rudely incised X upon the rim.

No. 18. Buff ware. From Field No. 2106.

No. 19. Red ware, coated with cream slip, with stamp (fig. 94, No. 8). From Field No. 2106.

No. 20. Red ware, coated with buff slip, with stamp (fig. 94, No. 7). From Field No. 2106. Three similar rims were found in the same field.

No. 21. Buff ware. From Field No. 2106.

Fig. 92.

No. 22. Dull-reddish ware, with stamp (fig. 94, No. 10). Encrusted with traces of molten metal. From Field No. 2106. Three similar rims were found.

No. 23. Red ware. From Field No. 2095. Found with fragments of Castor ware above cobbling of late road shown in fig. 18.

No. 24. Cream-coloured ware. From Field No. 2095. Cf. No. 17.

No. 25. White ware, with fern-frond stamp (fig. 94, No. 13) on either side of mouth. From Field No. 2095.

No. 26. Cream-coloured ware. From Field No. 2095. Cf. *Balmuildy*, Pl. xlii. 32.

No. 27. Buff ware. From Field No. 2106.

No. 28. Cream-coloured ware, with stamp (fig. 94, No. 14).

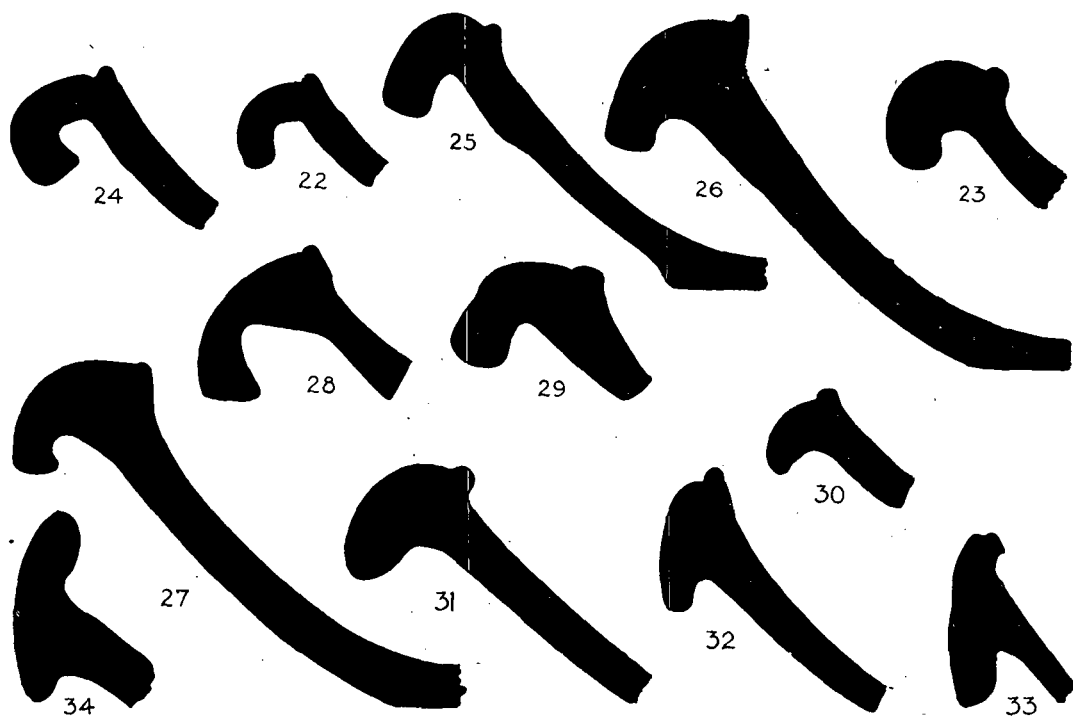


Fig. 92. Sections of rims of mortaria. (Scale, $\frac{1}{2}$.)

No. 29. Buff ware. From Field No. 2106.

No. 30. Buff ware. From beneath latest floor of Commandant's House.

No. 31. Buff ware. From Field No. 2095.

No. 32. Buff ware. From westmost ditch of Antonine fort (level unnoted).

No. 33. Cream-coloured ware. From Field No. 2095, where it was found in a pit with many other pottery fragments, including fig. 79, No. 36, fig. 81a, No. 5, and the perforated base of a "cheese-press" (fig. 103, No. 14).

No. 34. Coarse white ware. From Field No. 2095.



Fig. 93. Sections of rims of mortaria. (Scale, $\frac{1}{2}$.)

Nos. 1-5. White ware, clay well levigated. Nos. 1, 3, 4, and 5 appear to have been coated with a reddish-buff slip, now almost entirely worn off, except on No. 5. No. 2, which is of more normal form than the others and which may originally have been broader, is stamped (fig. 94, No. 11). All from Field No. 2106. For short horizontal rim with high bead cf. *Balmuilty*, Pl. xlii. 51. We have been unable to find a closer parallel. Possibly the group may represent a local variety, the peculiar shape being one of the idiosyncracies of an individual manufacturer.

The stamps on mortaria are notoriously difficult to interpret, partly because, being impressed upon curving rims, they are frequently incomplete, and partly because the lettering is, as a rule, poor. It is quite possible that some of them were "bogus," being designed merely to give an air of respectability to a rather commonplace ware.¹ However that may be, it must be more than a coincidence that, when a name is decipherable, it not seldom turns out to be identical with that of a potter who is known to have manufactured Samian dishes. B.M. Cat. alone supplies the following instances: Albinus, Aprilis, Celsianus, Doccius, Litugenus, Marinus, Matugenus, Maximus, Saturninus, and Secundus. Nor would it be difficult to lengthen the list.² In dealing with an obscure mortarium-stamp, therefore, it is always permissible, and may sometimes be helpful, to seek for a clue among the Samian potters.

At Mumrills the number of fragments of mortaria that bore stamps or other marks was less than thirty, and of these about a dozen showed only the conventional fern-frond or herring-bone ornament. Fig. 94 contains, in addition to four selected fern-fronds, the whole of the other stamps or marks, with the exception of the imperfect example described under fig. 91, No. 3, and of a rudely incised X on a rim of fig. 91, No. 17.

Fig. 94.

No. 1 is on fig. 91, No. 12. The stamp is not uncommon in Britain. In Scotland alone it has been noted at Balmuilty, Bar Hill, and Camelon. It should obviously be read *Austri ma(nu)*. Austrus³ manufactured Samian at Lezoux.

¹ See *Bar Hill*, p. 70, footnote 1.

² Since writing this we have noticed that it could be more than doubled by adding names cited in O.-P. (p. 211), where the matter is discussed from a different point of view. The 14 examples given there include only 3 of those mentioned above.

³ *C.I.L.*, xiii. 10010, 258, proves that this is the correct form of the name, rather than "Auster" as in B.M. Cat., Index.

No. 2 is on a fragment of white ware.

No. 3 is on fig. 91, No. 1, and also on another and slightly larger rim, made of the same material. Bruscius, whose name here appears retrograde, is not known as a Samian potter, nor have we met with him as a maker of coarse pottery outside of Britain. But a mortarium stamped **BRVSC·F** was found at Duntocher on the Scottish Wall in 1778,¹ and what has in all probability been a similar stamp is figured in *Newstead*, p. 266, 3. The name is also recorded from Aldborough (*C.I.L.*, vii. 1334, 18) and elsewhere.

No. 4 is on fig. 91, No. 2. Although the reading is not in doubt, its exact form presents some difficulty.² We have taken it to be *Locci pr.*, with the last two letters inverted and retrograde. The inversion of the second word seems strange, but No. 5 provides a parallel. The stamp was first published in *Balmuildy* (p. 78), where five examples are

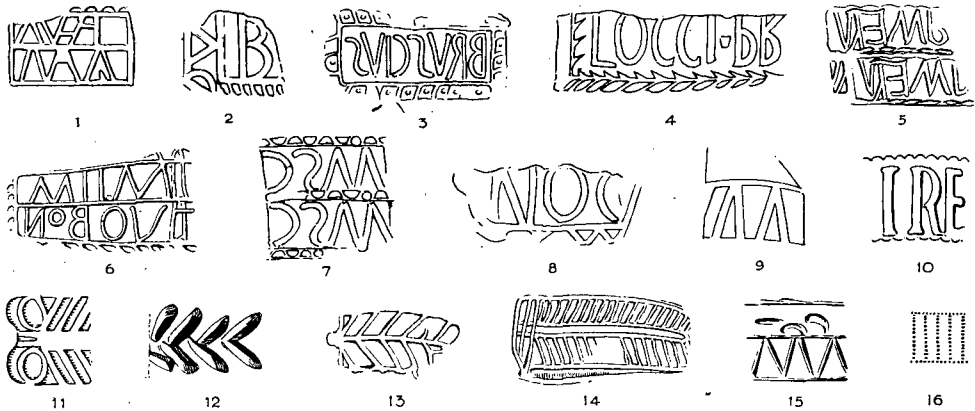


Fig. 94. Stamps and marks on rims of mortaria. (Scale, $\frac{1}{2}$.)

recorded, and it appears again in fragmentary shape in *Old Kilpatrick*, Pl. xviii. B. 7. Miller (*l.c.*) suggests that *pr.* may be for *praedia*. Samian fragments with the signature *Locco fecit* have been found in London (B.M. Cat., M. 2113) and at Nijmegen (Schuermans, *Sigles figulins (époque romaine)* 3009). But there is no certainty that the names are identical.³

¹ Gough's *Camden*, vol. iv. p. 103 (Pl. vi. 4).

² *Balmuildy*, Pl. xl. 9 and 10, should be consulted. In the latter both words are clearly retrograde. It is otherwise with the former, which can only be read in that way by admitting a serif both at the top and at the bottom of the L. Through Mr Miller's kindness we have been able to examine the original. As a result, we think that the true serif is the one which is placed at the top in the illustration. The line at the bottom is slightly curved and tapers to a point, as if it were an ornamental flourish, or possibly the impression of a flaw in the stamp. We have therefore preferred for the Mumrills example the reading given in fig. 94.

³ Mr F. N. Pryce, who has kindly looked at the London fragment for us, writes that the space between the last two letters is so well defined as to make the reading *Locco of (ficina)* impossible.

No. 5 is on fig. 91, No. 10. We read $p[r]$ *Melu*, with the first word retrograde and inverted, and the second retrograde. The signature is in duplicate. The stamp is incomplete, but what may be traces of the r are visible beyond the p . In *Wroxeter* (1912), where five examples of his stamp are inventoried, it is suggested that Melus may have been a local potter. But mortaria with his name have been found in London (B.M. Cat., M. 2791 f.) and Richborough (*Second Report*, p. 95), as well as at Camelon. There were two Samian potters called Melus, the earlier of whom worked in South Gaul (O.-P., p. 69), and the later in the second century at Trier (O.-P., p. 32).

No. 6 is on the rim of a mortarium of soft white clay, which came from Level B of the westmost ditch of the Antonine fort and must therefore have been in use before the end of the second of the three Antonine periods. Cf. *Newstead*, p. 266, No. 24. We have no suggestion to make as to the reading.

No. 7 is on fig. 91, No. 20. For the duplication of the signature cf. No. 5. As the first two letters are ligatured, the true reading may possibly be *Masc*. *Old Kilpatrick*, Pl. xviii. B. 4, appears to be the same stamp. The well-known Samian potter Masclus worked in South Gaul in the first century, and can therefore have no connection with this signature. But there was a later potter, Mascus or Mascuus (O.-P., p. 53), as well as a Mascellio, whose kiln was at Lezoux (O.-P., p. 205).

No. 8 is on fig. 91, No. 19. Although the stamp is incomplete, it does not appear to have had more than three letters. *Noc* is found elsewhere in Britain on mortaria (e.g. *Warrington*, p. 64). A Westerndorf potter used the stamp NOCTVRAC F on Samian in the second half of the second century. One would hardly expect his wares to reach Scotland, but see *Roman Wall in Scotland*, p. 238, footnote 4.

No. 9 is on a small fragment of soft red ware. The stamp is incomplete at both ends.

No. 10 is on fig. 92, No. 22. The beginning of the stamp is wanting.

Nos. 11-14 are respectively on fig. 91, No. 14, fig. 93, No. 2, and fig. 92, Nos. 25 and 28.

No. 15 is on a fragment of reddish ware. It is doubtful whether the markings represent letters.

No. 16, a gridiron-shaped mark, made with a punch, is on the rim of a small red mortarium, which has had a cream-coloured slip.

D. Other Unglazed Ware.

No very satisfactory system of nomenclature has yet been devised for the classification of the numerous other varieties of unglazed ware normally found upon Roman sites in Britain. In cases of doubt, however, a reference to the accompanying illustrations should make clear the meaning to be attached to each of the descriptive titles under which the different groups of vessels are here discussed. The general remarks made above (p. 523) regarding the date of the mortaria apply with almost equal force to the whole of the coarse pottery that has still to be dealt with. They require to be qualified only by an intimation

of the presence of two or three sherds for which an Agricolan origin can quite definitely be claimed.

(a) *Cooking-pots*.—Two typical specimens of the vessels which we include under this heading are reproduced in figs. 95a and 95b, the former being of black ware and the latter of grey. As a rule, an encrustation of soot remained to indicate the purpose they had served. The majority of them had had the body decorated with the usual trellis-work or reticulated ornament, produced by the impression of a round-pointed tool in the soft clay before it was fired. The fragments of considerably more than two hundred rims were recovered and sections were drawn of 208. A representative selection of these is given in fig. 96, where three main types can

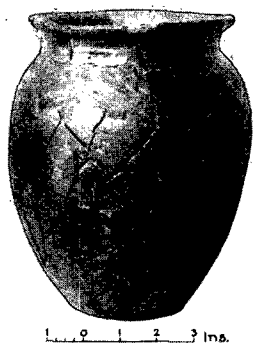


Fig. 95a. Cooking-pot.

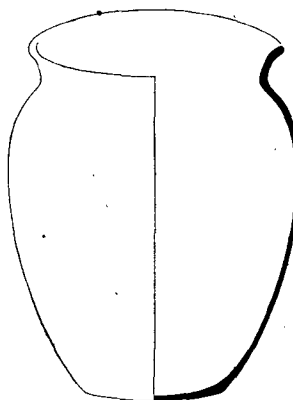


Fig. 95b. Outline of cooking-pot. (Scale $\frac{1}{2}$.)

be readily distinguished. Much the commonest type was that which shows a continuous curve from shoulder to lip (Nos. 1-7). The length of the curve varied slightly in the different examples, but most of them approximated to the form of No. 1, on which the outward inclination of the mouth is least strongly marked. In Nos. 8-14 the occurrence of an angle at the shoulder has the effect of giving a neck to the pot. This type was also common. Much less so were pots resembling Nos. 15-17, where the neck is entirely eliminated and the lip rests directly on the top of the shoulder. The details regarding the selected specimens are as follows:—

Fig. 96.

No. 1. Black. From Field No. 2095, where it was found on the cobbling of the road shown in fig. 18. Must have been in use during the last phase of the occupation.

No. 2. Reddish-brown. Of thinner, crisper ware than the other specimens of this type. From Field No. 2095.

No. 3. Black. Fine, thin burnished ware. From the Large Bath-house.

No. 4. Grey. Fine ware, coated with white slip on shoulder and lip. From western ditch of Early Fort, afterwards ditch of Antonine annexe.

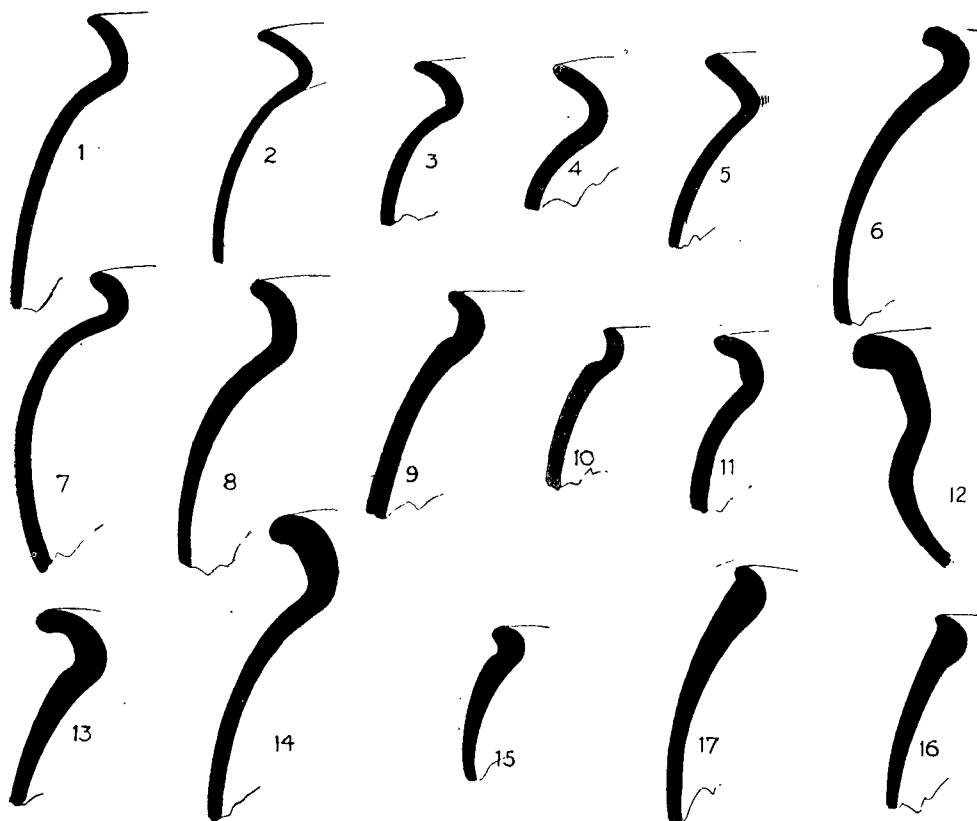


Fig. 96. Sections of rims of cooking-pots. (Scale, $\frac{1}{2}$.)

No. 5. Reddish, possibly discoloured by fire. Fine, thin burnished ware. From Field No. 2095.

No. 6. Grey. From Field No. 2106.

No. 7. Black. From Field No. 2106.

No. 8. Black. From Field No. 2095. Exactly similar specimens came from Field No. 2106.

No. 9. Black. From Field No. 2106.

No. 10. Black. From stoke-hole of Men's Baths. Probably, therefore, in use during the first or second Antonine period (see *supra*, p. 462).

No. 11. Black. From Field No. 2106, where this variety was fairly common.

No. 12. Probably originally black or dark grey, but burnt reddish. Coarse ware. Has belonged to largish pot with diameter of $7\frac{1}{2}$ inches at the mouth. From oven shown in fig. 75.

No. 13. Black. Burnished ware, with thick encrustation of soot. From Level C of westmost Antonine ditch.

No. 14. Reddish ware, burnt black. From Field No. 2095.

No. 15. Black. From Field No. 2106.

No. 16. Dark grey. From Field No. 2095, where it was found along with No. 14.

No. 17. Grey, apparently once coated on the shoulder with a band of white slip about $1\frac{1}{8}$ of an inch broad, which spreads over on to lip. From Level C of westmost ditch of Antonine fort, in association with No. 13 and other fragments.

Fig. 97 shows the section and the greater part of one side of a black cooking-pot, which has had the upper part of the body below

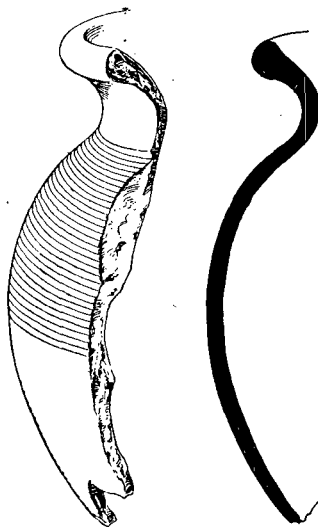


Fig. 97. Portion of cooking-pot. (Scale, $\frac{1}{2}$.)

the neck encircled with a series of fine girth-grooves. It was found in Field No. 2095 in a pit which contained, *inter alia*, a coin of Faustina Senior.

(b) *Urns*.—Fragments of urns were comparatively scarce. Sections of most of those that were found are reproduced in fig. 98, from which it will be seen that the commonest type was that having a much

everted lip and a heavy rim. With a single exception the sections are such as one would naturally expect to meet with on an Antonine site. No. 11, however, with cordons at the neck, recalls the section of a vessel illustrated in *Newstead* (Pl. xlvii., Type 36), where it is tentatively assigned to the Agricolan period. The Mumrills example was found in the westmost ditch of the Antonine fort, in close association with a

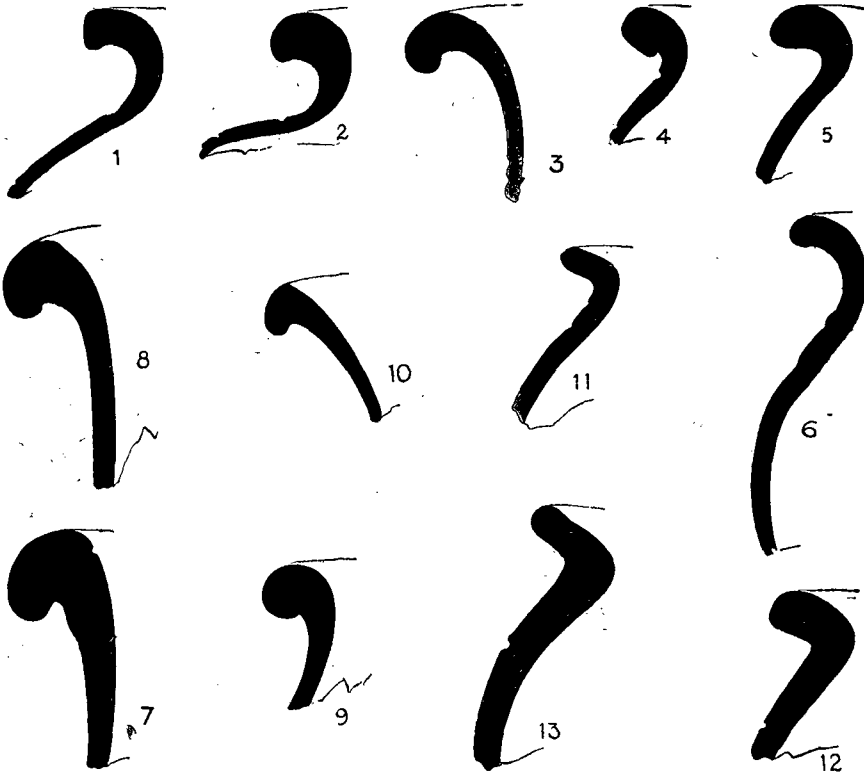


Fig. 98. Sections of rims of urns. (Scale, $\frac{1}{2}$.)

bowl of Cinnamus (fig. 77, No. 8) and other fragments of undoubtedly Antonine date.

(c) *Jars and Basins*.—Fig. 99 brings together a series of sections (Nos. 1-10) representing vessels which do not fall very readily into either of the preceding categories. No. 1 is a portion of a large, heavy grey jar found in Field No. 2095. No. 2 has belonged to a large grey vessel of coarse ware, which has had a diameter of about 1 foot. It came from the junction of drains shown in fig. 73, and may be compared

with *Balmuildy*, Pl. xlvi. 32. No. 3 is a fragment of the rim of a vessel made of a grey ware somewhat similar in character to No. 2. As it came from Level B of the westmost ditch of the Antonine fort, it must have been in use before the third Antonine period. Nos. 4 and 5 have belonged to large jars, and both have had girth-grooves at the base of the neck. The former, which is grey with a reddish tinge, came from Field No. 2095, and the latter, which is grey, from the same spot as No. 2.

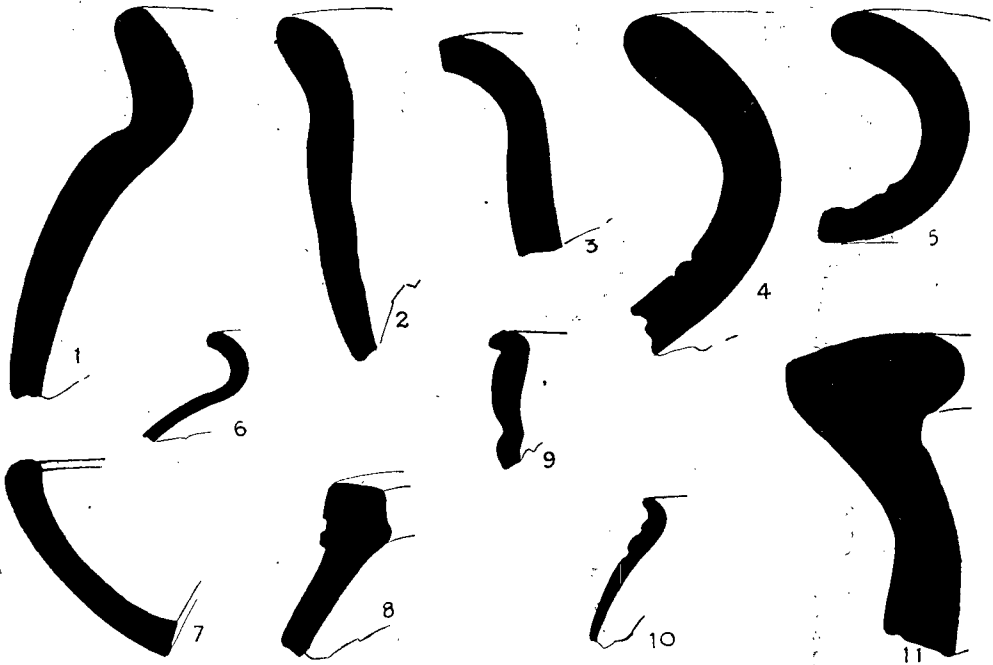


Fig. 99. Nos. 1-10, Sections of rims of jars and basins. No. 11, Section of rim of amphora (p. 522). (Scale, $\frac{1}{2}$.)

One may compare *Wroxeter* (1912), fig. 18, Nos. 33 f., but there is no reason to regard the Mumrills examples as early. No. 6, which came from Field No. 2106, is a section of the rim of a vessel of fine, red ware, having a diameter at the neck of $4\frac{1}{2}$ inches. No. 7, also from Field No. 2106, is all that was left of a basin of light red ware, which had had a diameter of about 12 inches. No. 8 is part of a coarse vessel, dark outside and red inside, with a diameter of $9\frac{1}{2}$ inches. It was found in Field No. 2095. No. 9 has belonged to a black bowl or basin of fine texture, possibly Upchurch ware, and came from Field No. 2106. It resembles Type 43 of *Newstead*, Pl. xlvi. and p. 257. No. 10 shows

the rim of a small beaker-like vessel of burnished black ware, with mouldings on the shoulder. Not improbably it was in use during the earlier part of the Antonine occupation, as it was found (in Field No.

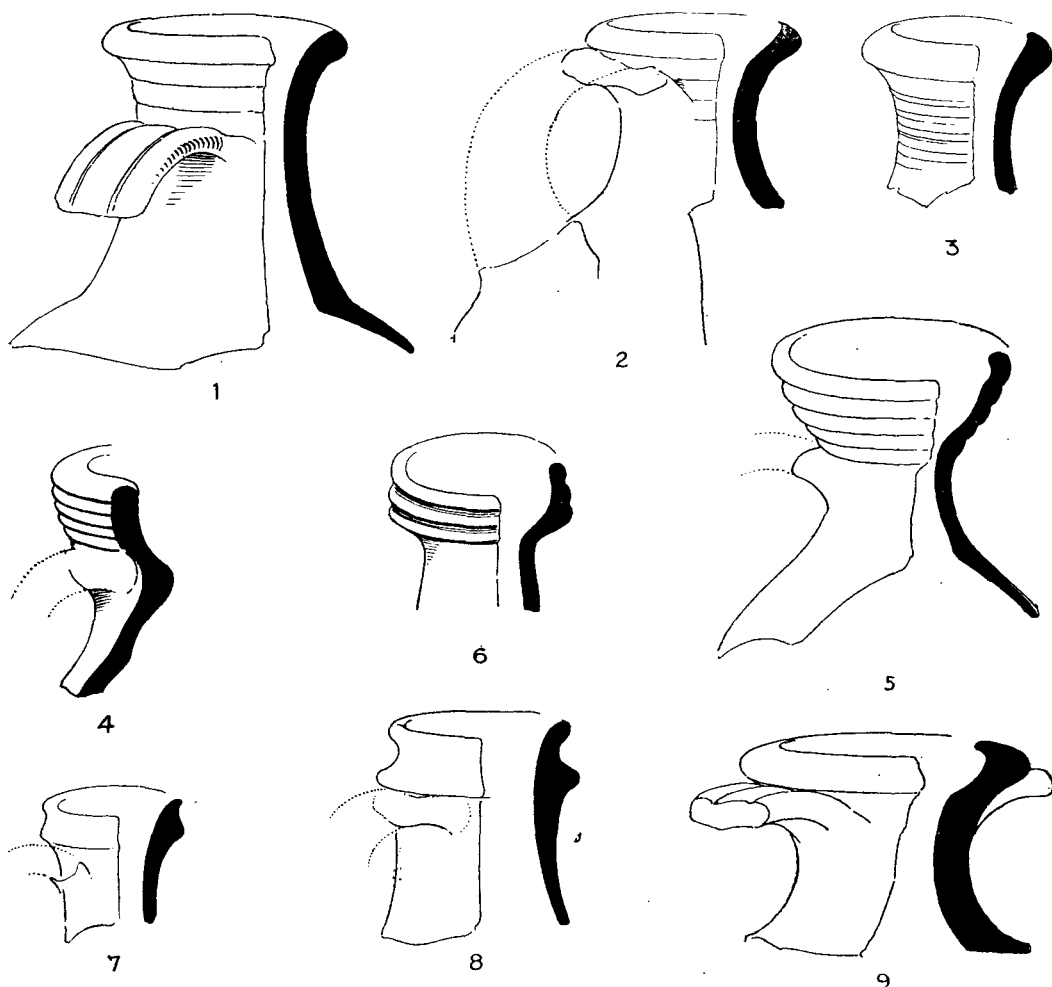


Fig. 100. Mouths and necks of jugs, with sections. (Scale, $\frac{1}{2}$.)

2095) in association with fig. 96, No. 2. It recalls *Newstead*, Pl. li., No. 5, but lacks the vertical incisions on the mouldings.

(d) *Jugs*.—The pottery fragments included the remains of a few jugs, most of which are illustrated in fig. 100. Particular interest attaches to No. 1, which we think it safe to regard as a relic of the

Agricolan occupation. The screw-neck and the sharp angle at the shoulder are characteristic of the Flavian period (see *Newstead*, pp. 261 f., and *Wroxeter* (1912), p. 69). The find-spot, too, was significant—the south ditch of the Agricolan fort, about 18 inches from the bottom. The ware is light red and unusually soft. No. 2, which is of fine, smooth, buff ware, also possesses some early features, but it differs from No. 1 in having the neck shorter and more sharply curved. Moreover, it came from a drain in Field No. 2106, so that it had probably been in use during the Antonine period. The same is true of No. 3, a piece of cream-coloured ware, which was recovered on the site of the north-east corner-tower of the Antonine fort. It departs still further from the earliest type in that the corrugations are much less conspicuous. No. 4 is of white ware, and came from Field No. 2106. It is differentiated from the three preceding examples by the cup-like shape of the mouth as well as by the more strongly marked character of the corrugations. No. 5 is not unlike No. 4, but it is of dark red ware, and the cup-like form of the mouth is much more pronounced. The fact that it was found in the stoke-hole of the Men's Baths points to its having been in use during the earlier part of the Antonine occupation. No. 6, which is a fragment of light red ware from Field No. 2106, shows almost the last phase through which the screw-neck passed before its final disappearance. It has now degenerated into a double groove, running round a ring-mouth, while *Balmuildy*, Pl. xliii. 8, has only a single groove. Nos. 7 and 8, both of red ware and both from Field No. 2106, resemble one another in having hollow ring-mouths. No. 9, also red and also from Field No. 2106, is the only fragment which showed the remains of a double handle. The very decided curve of the short neck indicates a large bulging vessel. The last three jugs are all obviously late.

(e) *Dishes and Bowls*.—Rather more than 250 dishes and bowls were represented by fragments of their rims. A series of typical sections made from these will be found in figs. 101 and 102. The majority were of black ware, usually decorated with the familiar trellis-work or reticulated ornament. Grey ware was less common. So far as could be judged from the few cases in which a complete or nearly complete profile had survived, the vessels we have included in this class had ranged from dishes whose walls were not more than $1\frac{1}{2}$ inch in height to bowls with a depth of 4 inches or thereby. The diameter was generally between 7 and 8 inches, although occasionally it had been as much as 10 inches. Four groups could be distinguished: (1) Vessels with a broad rim, corrugated on its upper surface. (2) Vessels with a rounded lip and no projecting rim. (3) Vessels with a roll-rim. (4)

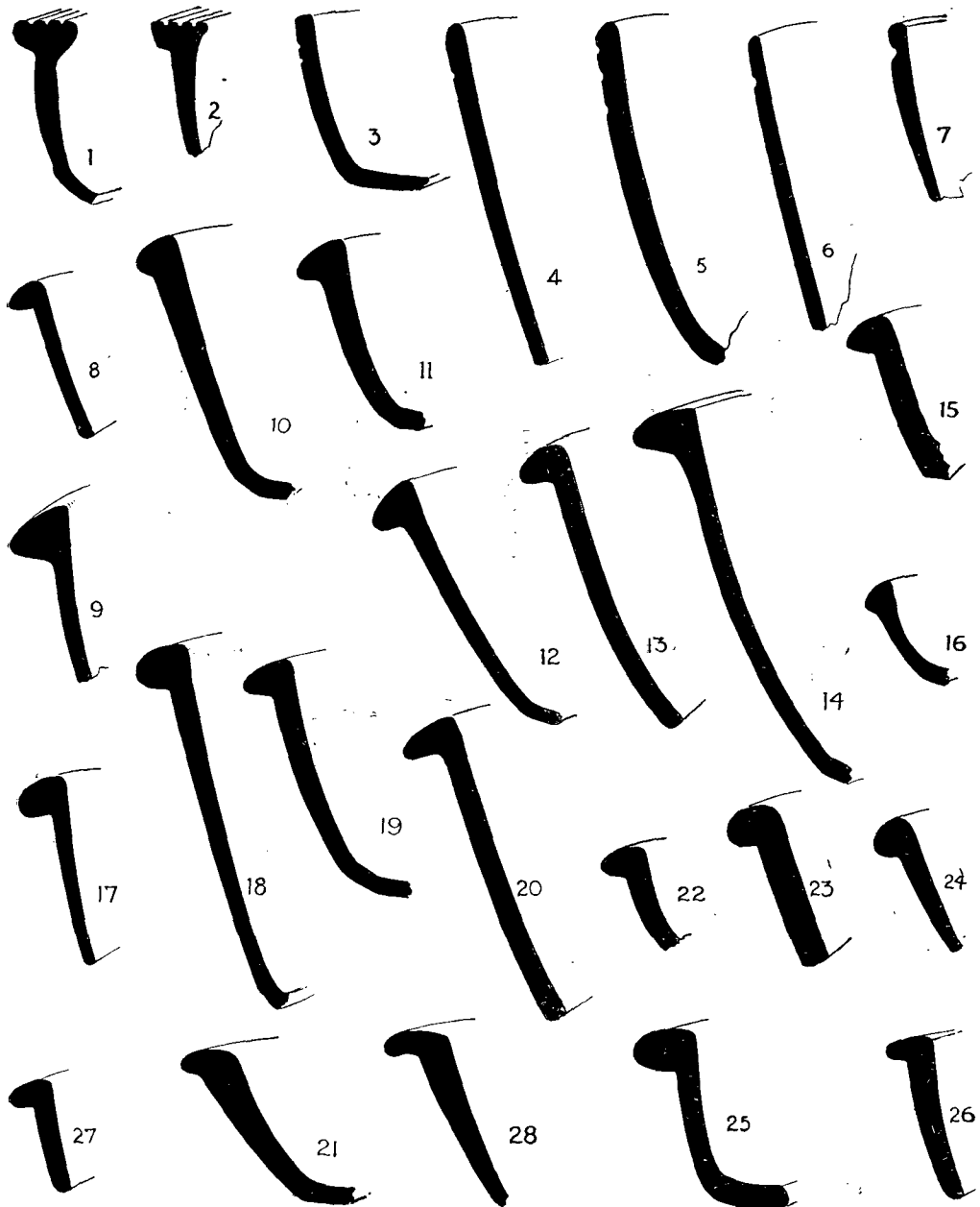


Fig. 101. Sections of rims of dishes and bowls. (Scale, $\frac{1}{2}$.)

Vessels in which the roll-rim has developed into a flat rim with a more or less considerable projection.

Group (1) consisted of two vessels only, both carinated. The first had been a bowl of buff ware, hard and good in quality, with a diameter of about $7\frac{1}{2}$ inches. The type is early, and at Newstead, where it was met with frequently, it was "never associated with later second-century finds" (*Newstead*, p. 249). On the other hand, one of the Mumrills fragments (fig. 101, No. 1) came from Level B of the west-most ditch of the Antonine fort. Similarly its companion (fig. 101,

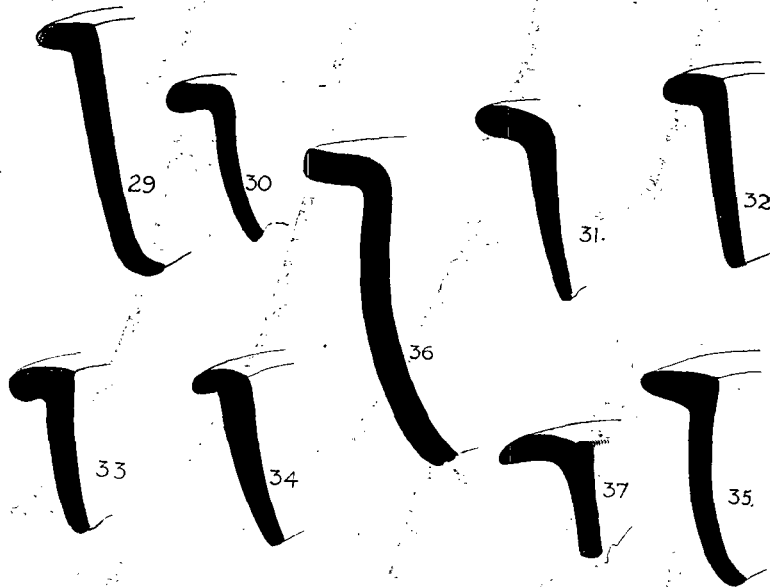


Fig. 102. Sections of rims of dishes and bowls. (Scale, $\frac{1}{2}$.)

No. 2), which resembles the Newstead specimens even more closely, and which seems also to have been originally of buff ware, although it had been completely blackened by burning, was lying on the Roman surface-level in the part of Field No. 2095 into which the Antonine fort had extended. It may be presumed, therefore, that the type had survived into Antonine times, and the presumption is made a certainty by *Balmuildy* (p. 90), where two other examples are recorded. Group (2), for which see fig. 101, Nos. 3-7, contained fragments of about twenty different bowls. One was dark grey; but all the others were of black fumed ware. It will be observed that some of them show one or more cavetto mouldings below the lip. In a few instances the walls bore the lattice-work or reticulated ornament, but the decoration was

more usually restricted to a single wavy line encircling the vessel about midway between top and bottom. That the form had been in use at the very beginning of the Antonine occupation is proved by the fact that two examples of No. 7 were recovered from pits contemporary with the wooden building which served as the earliest Commandant's House (see *supra*, p. 437). Group (3) was considerably larger than any of the others. As will be seen from fig. 101, the roll-rim, which characterised it, had many varieties, the extremes being No. 8, where the section is triangular, and No. 24, where it is completely round. Among these, the varieties most often met with were Nos. 8, 9, and 10. Fragments were scattered all over the excavated area, so that vessels of this type had evidently been in general use for many years. So, too, had vessels belonging to the fourth group (fig. 101, Nos. 25-28, and all in fig. 102). Although it was smaller than Group (3), this group cannot be regarded as specifically late, since an example was actually found associated with an example of Group (2) in one of the early pits referred to above. No. 37, which was of black ware, was remarkable for its profile which resembles that of an early mortarium, as well as for an almost metallic lustre on its inner surface. It came from Field No. 2095. We may compare *Balmuildy*, Pl. xlviii. 27.

(f) *Miscellaneous*.—All the miscellaneous fragments to which any sort of interest seemed to attach have been brought together in figs. 103-106. Such notable features as they may present can most conveniently be touched upon in the descriptions of the individual pieces.

Fig. 103

No. 1. Portion of mouth and shoulder of beaker of fine grey ware, coated with white slip outside as well as to a depth of $\frac{1}{2}$ to $\frac{3}{4}$ of an inch inside. Raised moulding round neck, beneath which are rows of spots in black engobe. Cf. *Old Kilpatrick*, Pl. xxi. 18, where an early date for this type is suggested. The Mumrills fragment may possibly be a relic of the Agricolan occupation, as it was found near the centre of Field No. 2095, 4 feet 8 inches below the surface, in a pit which lay beneath what seemed to be cobbling.

No. 2. Portion of mouth and shoulder of pipkin of fine red ware, including base of handle. Wall thin, and rim delicately moulded. Body decorated with lattice-work ornament, faintly impressed. Found in Field No. 2106 near the base of the stone pier shown in fig. 71.

No. 3. Portion of mouth and shoulder of small pipkin of fine grey ware, covered with white slip, encircled by girth-groove above surviving base of handle. Very faint lattice-work decoration. From Field No. 2106.

No. 4. Two fragments of vessel of dark grey ware. Girth-groove at shoulder, beneath which the body is decorated with small irregular lumps of applied clay. Cf. *Wroxeter* (1913), fig. 18, No. 52, for somewhat similar vessel from a deposit of c. A.D. 80-120. *Op. cit.* mentions (p. 49 f.) that this

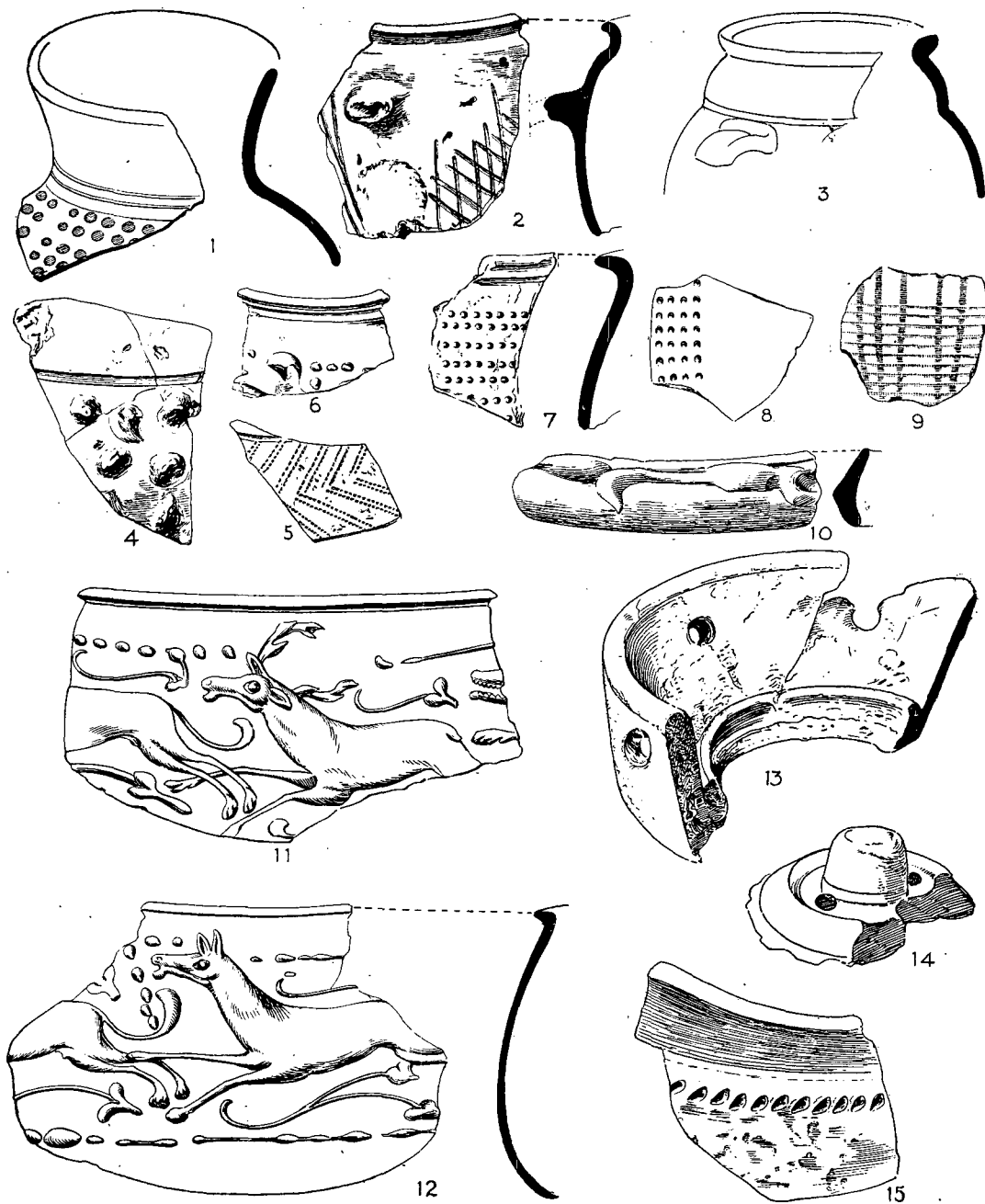


Fig. 103. Fragments of miscellaneous ware. (Scale, $\frac{1}{2}$.)

ware "up to the present has not been found in any well-stratified deposit belonging to the middle of the second century." But the Mumrills fragment (which is less rough than the first-century "rustic ware" from Newstead) is certainly Antonine. It was found in Field No. 2106 a little way beneath the modern surface.

No. 5. Fragment of a vessel of finely levigated greyish clay, coated outside and inside with a black slip. Decorated with a zone of chevrons, formed by double comb-impressions. From site of south-east corner-tower of the Antonine fort.

No. 6. Fragment of beaker of Castor ware, which has been similarly decorated to Nos. 11 and 12, but has been of lighter colour. The metallic lustre on the glaze is peculiarly bright. Find-spot not noted.

No. 7. Fragment of upper portion of beaker of brown fumed-ware, thin and of fine quality, having the rim delicately moulded and the body decorated with parallel rows of small brown dots in engobe. Found in south-east corner of the main furnace-room of the Large Bath-house, along with other sherds and a bronze fibula (see *infra*, pp. 553 ff.). The deposit may be earlier than the intrusion of the Baths into the Commandant's House (see *supra*, p. 469).

No. 8. Probably a fragment of the lower portion of the same vessel as No. 7. The find-spot was the same.

No. 9. Fragment of very thin ware, black outside and red inside, with part of surface slightly ribbed. Decorated with lightly impressed vertical lines. Same find-spot as No. 5.

No. 10. Portion of rim of dish of coarse light red ware. Overhanging lip decorated with a plant motif in engobe. For Samian prototypes cf. *supra*, fig. 80a. From Field No. 2095.

Nos. 11 and 12. Portions of two different beakers of Castor ware, with the usual type of decoration. No. 11 has had a mouth-diameter of $3\frac{1}{2}$ inches, and No. 12 one of 4 inches. Both came from Field No. 2106.

No. 13. Portion of rough hand-made vessel of soft grey ware (fig. 104).

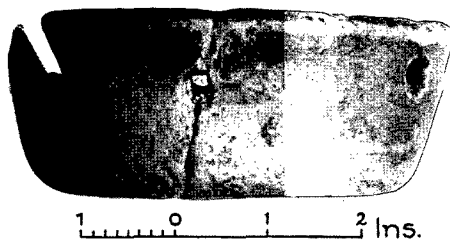


Fig. 104. Strainer.

Three perforations in the sides, and two in the bottom in the narrow space between the interior wall and a raised moulding, with traces of two, corresponding to these, in the portion of the bottom which the moulding has enclosed. From Level A of the westmost ditch of the Antonine fort.

Level C produced a portion of the side of a similar but rather smaller vessel of reddish ware, a single perforation being still visible. These vessels, which must have been used as strainers, are sometimes called "cheese-presses." *Balmuildy*, Pl. xxxviii. 3, had two concentric raised mouldings in the bottom, while an example from Castlecary (*Proc.*, vol. xxxvii (1902-3), p. 335, fig. 34) had a flat bottom with no fewer than ten perforations, and had its interior wall divided into panels by perpendicular indentations.

No. 14. Apparently part of the bottom of a vessel not unlike No. 13, showing raised moulding, two perforations, and a central protuberance, resembling that of a modern lemon-squeezer. Traces of three perforations between the wall and the moulding. For find-spot see *supra*, p. 526, No. 33.

No. 15. Fragment of a large jar of grey ware, having a series of oblique markings impressed upon the shoulder. From Field No. 2106.

Fig. 105.

No. 1. Portion of a large dish of light red ware, probably imitation of Samian. From Field No. 2095.

No. 2. Fragment of the rim of a large dish or platter of yellowish-brown ware, which has had a diameter of about 1 foot. Found in the oven shown in fig. 75.

No. 3. Fragment of a beaker of Castor ware, which has had a diameter of about $3\frac{1}{2}$ inches. Body red, coated with a black slip, and rough-cast from about 1 inch below the lip. Found in Field No. 2106.

No. 4. Fragment of a pot of fine light red ware, with surface slightly rough-cast. Found in pit underlying drain that ran east from the north-east corner of Area No. 6 in Commandant's House. Earlier, therefore, than the first reconstruction of the Stone Building.

No. 5. Section of fragment of grey ware of finely levigated clay, with well-formed rim and clearly defined girth-groove. Found in Field No. 2095.

No. 6. Small fragment of beaker of Castor ware, rough-cast beneath the neck. Found in Field No. 2106.

No. 7. Larger portion of a small pot of red ware, coated with a buff slip and decorated on the body with incised rings. From Field No. 2106.

No. 8. Fragment of vessel of buff ware, showing conical protuberance above horizontally ribbed portion of surface. From Level B of westmost ditch of Antonine fort.

No. 9. Larger portion of a miniature amphora of buff ware decorated with a series of girth-grooves in the form of an ascending spiral. Found in Field No. 2106. Such vessels were probably in use over a long period (cf. *Newstead*, p. 252).

No. 10. Portion of base of vessel similar to No. 9, but of coarse, thick red ware. Find-spot unnoted.

No. 11. Fragment from the bulge of a carinated beaker of dark grey Belgic ware with a brownish tinge. Found at Level C in westmost ditch

of the Antonine fort. Cf. *Silchester*, Pl. lxxii. 169, and pp. 172 f., where the type "is said to be in prevalent use about the middle of the first century, but to hold on, mostly in thick-sided and less carefully worked examples, into the last third of the century." The Mumrills fragment is

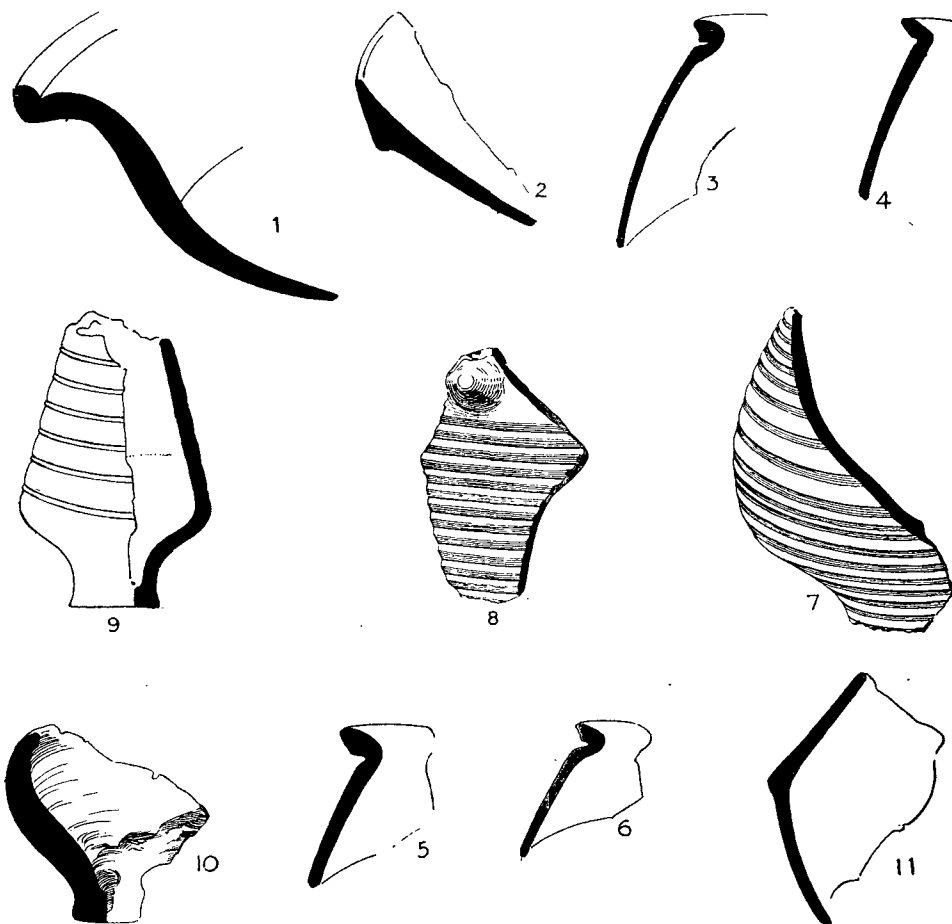


Fig. 105. Fragments of miscellaneous ware. (Scale, $\frac{1}{2}$.)

therefore certainly early. At the first glance the find-spot would seem to indicate that it is a "survival." On the other hand, it is possibly significant that among the associated sherds there were numerous fragments of another early vessel, Curle, Type 31 (*Newstead*, p. 248). If an Agricolan deposit were disturbed during the operations connected with the reoccupation of the site at the beginning of the third Antonine period, the debris might very easily have found a resting-place exactly where these pieces were lying (cf. *supra*, p. 502).

More remarkable than any of the preceding was a large carinated jug with a pouring mouth. The reddish buff ware of which it is made is rather friable, but enough of the vessel survived to put its original shape beyond doubt (fig. 106).¹ It had stood about $9\frac{1}{4}$ inches high, with

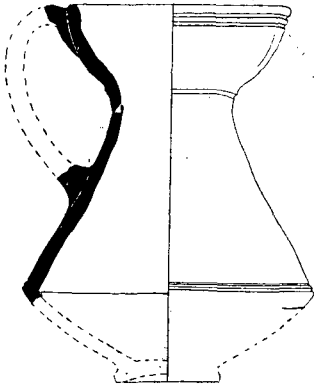


Fig. 106. Carinated jug with pouring mouth. (Scale, $\frac{1}{2}$.)

a diameter of some $5\frac{1}{2}$ inches at the top. The carination on the lower portion and the bowl-like form which the upper portion assumes are its main distinguishing features. It is the largest specimen we have met with of what is undoubtedly an extremely rare class. A very similar jug of cream-coloured ware, $6\frac{1}{4}$ inches high, was found many years ago at Colchester and is now in the British Museum. The Colchester Museum possesses another and slightly smaller example (6 inches high), of pale buff clay, which is described by Mr T. May in his forthcoming catalogue of the Roman pottery there (p. 369, Pl. lxvi. 313). Unfortunately in

neither of the two Colchester cases does there seem to be any record of the circumstances of the discovery, such as would be useful for dating purposes.² But Mr May, whom we have to thank for the reference to his still unpublished book, tells us that a smaller example in the Museum at Cologne is attributed to the 1st-2nd century. We are inclined to believe that the Mumrills jug is early, and that in its fragments we have a relic of the Agricolan occupation. It was found 7 feet below the surface in the outer of the two ditches on the west front of the Agricolan fort.

(g) *Native Wares*.—Native, as distinct from Roman or Romano-British wares, were sparsely represented. Fig. 107 shows a fragment of coarse hand-made pottery, decorated with tool-made impressions, which may well be much older than the Roman invasion. The fragment illustrated in section in fig. 108 is equally coarse. It has been the bottom of a pot, the upper part of which is broken away. Fig. 109, though it is also hand-made, is somewhat less primitive, and almost suggests a native attempt to copy a Roman dish. The large globular vessel whose upper portion appears in fig. 110 is of reddish-brown ware and wheel-turned. It has had a diameter of some 10 inches at the bulge, and is decorated at the shoulder with an incised

¹ We are indebted to Mr E. B. Birley for the reconstruction and the drawing.

² The same is true of a jug from Lincoln, which is in some respects analogous, although the differences are quite well marked. It is worth noting that both Colchester and Lincoln were occupied before the middle of the first century. The Lincoln jug is also in the British Museum.

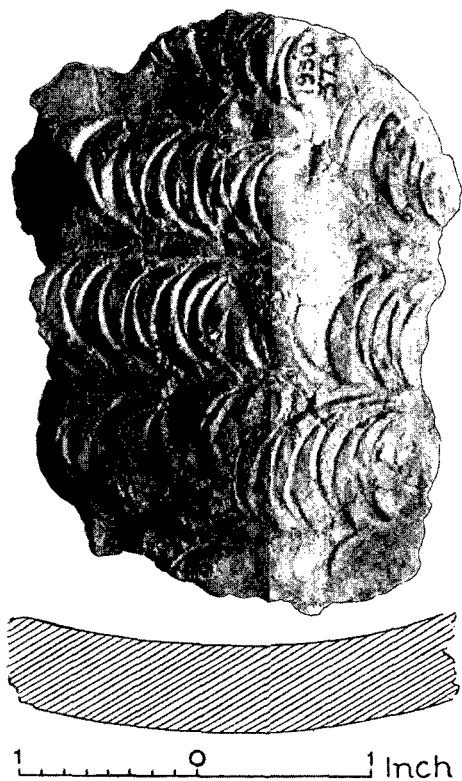


Fig. 107. Fragment of native ware.

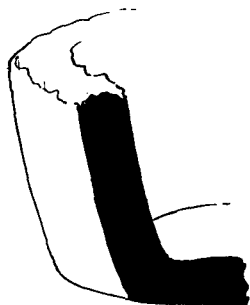


Fig. 108. Fragment of native ware. (Scale, $\frac{1}{2}$.)



Fig. 109. Fragment of native ware. (Scale, $\frac{1}{2}$.)

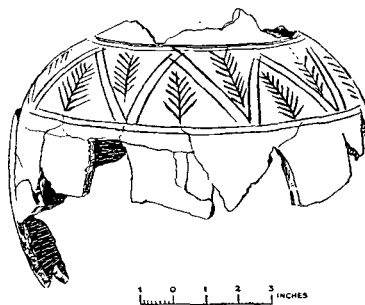


Fig. 110. Upper portion of globular vessel of native ware.

row of fern-fronds, placed alternately within and without incised chevrons which fill the zone formed by two girth-grooves about $2\frac{1}{2}$ inches apart. The fragments were found lying, piled up in three layers, in the bottom of the built oven opened up in Field No. 2106

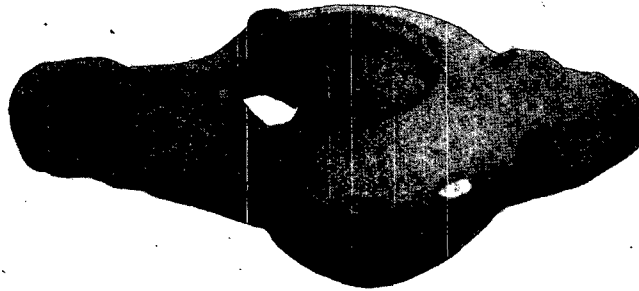


Fig. 111. Lamp of clay. (Actual size.)

(fig. 75), as if they had been used for flooring. Vessels of this type are very uncommon, but there are three in the National Museum—all of them, oddly enough, from northern brochs. The largest of these is illustrated by Lord Abercromby in his *Bronze Age Pottery* (vol. ii. Pl. cii. 537), where its *provenance* is stated (*l.c.*, p. 123) to be the Broch of Lingrow, Scapa, Orkney.



Fig. 112. Brick with impression of animal's feet.

(h) *Lamps*.—The collection of pottery includes two lamps. One, which had been at least $4\frac{1}{2}$ inches long, was of a realistically phallic character. The other (fig. 111) was of the usual shape, and red. Both came from Field No. 2095.

(i) *Bricks and Tiles*.—Bricks and tiles, many of them broken, were fairly numerous, particularly in and about the Large Bath-house. That they had often, if not always, been manufactured on the spot is a reasonable inference from the existence of the kiln which was discovered in 1913.¹ In this connection some interest attaches to the square brick from the Large Bath-house, a photograph of which is reproduced in fig. 112. As Dr Ritchie will explain below (p. 571), the animal which has

¹ *Proc.*, vol. xlix. pp. 124 ff.

left the impress of its feet in the upper left-hand corner has been a wild cat. The flue-tiles were generally scored deeply on the outside face with lines, the purpose of which was to provide a hold for the wall plaster. Sometimes this "keying" was worked into a pattern, as in the six examples shown in fig. 113, all of which came from the built

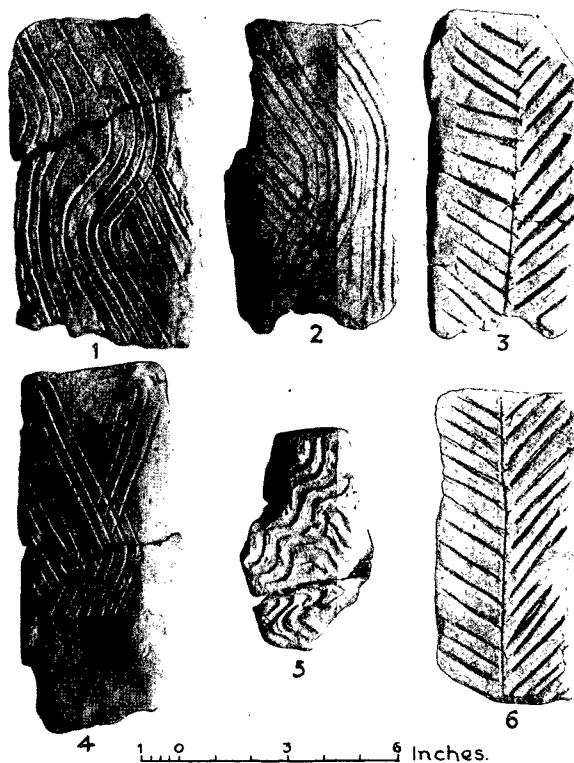


Fig. 113. Flue-tiles, keyed for holding plaster.

oven in Field No. 2106 (fig. 75), where they were being used as an interior facing. This is perhaps the most appropriate point at which to interpolate a reference to the fragments of plaster which were mentioned in our description of the Large Bath-house.¹ There were about a dozen pieces, none of them very large. The background had sometimes been white and sometimes yellow, and the decoration, so far as it remained visible, had consisted of strips of black or red, broad as a

¹ See *supra*, p. 467.

rule, but occasionally narrow. In one case there were traces of a patch of green or blue.

(j) *Graffiti*.—The rim of a black dish had VI incised upon it deeply, and the remains of a beaker of reddish ware, burnt black, bore traces of one *graffito* on the bottom and of another above the shoulder. Drawings of the remaining *graffiti* are reproduced in fig. 114. They

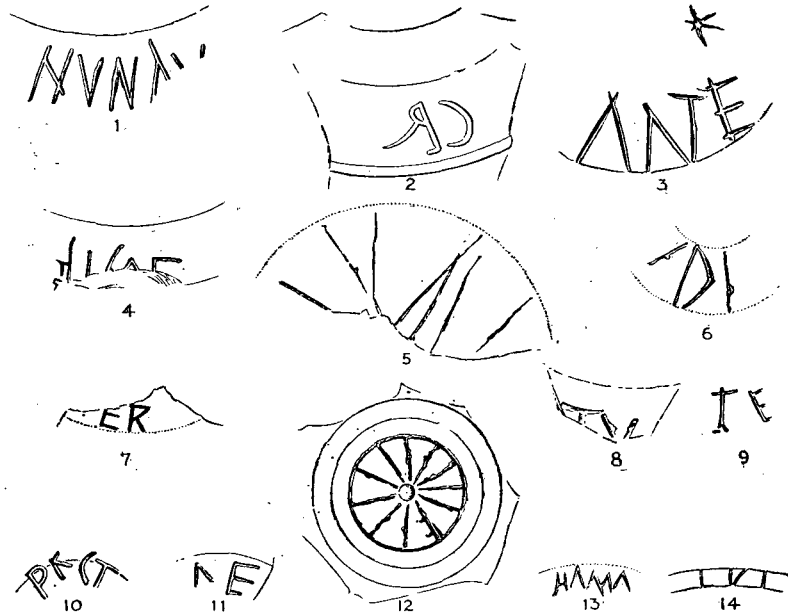


Fig. 114. *Graffiti* and stamp (No. 2: see p. 504) on potsherds. (Scale, $\frac{1}{2}$.)

do not appear to call for comment, as even those of them which are legible have lost all meaning now. For the most part they are doubtless owners' names. All are on fragments of Samian ware.

VII. GLASS.

The pieces of glass found were comparatively few in number, and none of them were in any way important. A fragment of window-glass came from the western extremity of Field No. 2095, and various others from within the limits of the Antonine fort. We have already mentioned the Men's Bath-house as one of the "find-spots."¹ We may now add the Headquarters Building, the Commandant's House, and

¹ *Supra*, p. 454.

the Large Bath-house. The Commandant's House seems to have had glass windows even when it was built of timber, for one or two of the fragments came from the pits which underlay the foundations of the later structure of stone. Pieces of handled jars or square bottles were picked up here and there inside the Antonine fort, but none of the ten different "find-spots" had any special significance. Of three delicate fragments, belonging presumably to phials, two came from the Large Bath-house and the third from a pit. Part of a bead of greenish glass with inlaid spirals was found near the Large Bath-house. The melon-shaped beads, so common on Roman sites, were conspicuous by their absence. So, too, were the no less common "playing men" of vitreous paste. The solitary "playing man" recovered had been made from a fragment of Samian ware.

VIII. COINS.

Of the 28 coins here catalogued, one (No. 4) was picked up in Field No. 2095 before the excavations began, and another (No. 8) in a garden in Laurieston, a little way to the west of the area of Roman occupation, shortly after the work was finished. A third (No. 28) came from the garden of the villa called Fort Knowe, which stands in what was formerly the south-west corner of Field No. 2106. The rest were all brought to the surface by the spades of our own workmen, one or two of them being recovered during the process of filling in. In no single instance was the precise "find-spot" of any value in determining stratification, so that it is only here and there that it has seemed worth while to record it. That the pieces should, as a rule, be in poor condition¹ will hardly seem surprising in view of what we have more than once said regarding the character of the soil. In addition, however, several of them had suffered severely from the action of fire. In the circumstances, the only historical inferences of which the list admits are of the most general kind. If the coins that are doubtfully assigned to Claudius (Nos. 9 and 26) be correctly attributed, they may be regarded as additional evidence in favour of an Agricolan occupation, since it is in the last degree unlikely that his money would be in circulation a century after his death. At the other end of the scale, the absence of any issue later than the reign of Antoninus Pius is significant, as suggesting that the withdrawal from Scotland took place early in the reign of Commodus rather than towards its close.

¹ We have to thank Dr G. F. Hill and Mr H. Mattingly of the British Museum for valuable help in cases where identification was specially difficult.

DENARII.

MARK ANTONY.

1. *Obv.* Worn perfectly smooth.
Rev. Traces of legionary eagle.
Cohen², i. p. 41, Nos. 26 f. Found in Field No. 2095.

VITELLIUS: A.D. 69.

2. *Obv.* A VITELLIVS GERMAN IMP TR P. Head r., laureate.
Rev. Concordia seated l., holding patera and cornucopiæ; around,
[CONCORDIA P R].
Cohen², i. p. 357, No. 20. Found in Field No. 2106.

TRAJAN: A.D. 98-117.

3. *Obv.* IMP CAES NER TRAIAN OPTIM AVG GERM DAC. Bust r., laureate.
Rev. PARTHICO P M TR P COS VI P P SPQR. Mars advancing r., carrying
spear and trophy.
Cf. Cohen², ii. pp. 38 f., No. 190. Struck in A.D. 116. Found in Field
No. 2106.
4. *Obv.* Inscr. illegible. Bust r., laureate.
Rev. Figure, naked to waist, standing three-quarter face towards l.,
holding patera over altar (?) and cornucopiæ.
Much worn. Found in Field No. 2095.

ANTONINUS PIUS: A.D. 138-161.

5. *Obv.* ANTONINVS AVG PIVS P P. Head r., laureate.
Rev. COS IIII. Equity standing three-quarter face towards l., holding
pair of scales and sceptre.
Cohen², ii. p. 295, No. 228. Struck in A.D. 145 or later. Found in Field
No. 2106.
6. *Obv.* Similar to No. 5.
Rev. COS IIII. Two hands clasped, holding caduceus and two ears of
corn.
Cohen², ii. p. 304, No. 344. Struck in A.D. 145 or later. Found in Field
No. 2106.
7. *Obv.* Inscr. illegible. Head r., laureate.
Rev. No trace of inscr. Female figure standing three-quarter face
towards l., holding cornucopiæ and sceptre.
Found in Field No. 2106.

UNCERTAIN.

8. Indecipherable.
Found near Laurieston, but completely defaced by unskilful attempts
at cleaning.

BRASS OR COPPER.

? CLAUDIUS : A.D. 41-54.

9. *Obv.* Nothing visible except the faint outline of a head r.
Rev. Worn smooth.
 "Second Brass." Condition extremely fragile. The suggestion that the head may be that of Claudius is put forward after consultation with Dr Hill and Mr Mattingly. Found in Field No. 2095. See also No. 26.

VESPASIAN OR TITUS : A.D. 69-81.

10. *Obv.* Inscr. illegible. Head of Vespasian or Titus r.
Rev. Worn smooth.
 "Second Brass." Found in the stoke-hole of the Sudatorium of the Men's Baths. In poor condition when lost.

DOMITIAN : A.D. 81-96.

11. *Obv.* CAESAR AVG F DOMITIAN COS. . . . Head r., laureate.
Rev. Equity standing three-quarter face towards l. with scales and sceptre; around, [AEQVITAS AVGVSTI]; in field, S C.
 "Second Brass." Cf. Cohen², i. p. 470, Nos. 1 and 3. Struck in A.D. 73 or 74. Found in pit in Field No. 2106. Much corroded, but not greatly worn when lost.

TRAJAN : A.D. 98-117.

12. *Obv.* IMP [CAES NER]VAE TRAIANO AVG GER DAC P M. . . . Head r., laureate.
Rev. SPQR OPTIMO PRINCIPI. Abundantia standing three-quarter face towards l., holding ears of corn and cornucopiæ; at her feet, a child; in exergue, ALIM ITAL, in field, [S C].
 "First Brass." Cf. Cohen², ii. p. 18, Nos. 7 and 10. Struck after A.D. 104. Found in Field No. 2095.
13. *Obv.* IMP CAES NERVAE TR[AIANO AVG GER DAC P M TR P] COS[V P P].
 Bust r., laureate.
Rev. [SPQR]OP[TIMO PRINCIPI]. Abundantia standing three-quarter face towards l., holding ears of corn and cornucopiæ; to l., a modius; to r., a ship; in field, [S C].
 "First Brass." Cohen², ii. p. 65, No. 469. Struck A.D. 104-110. Found near hypocaust of Men's Baths. Rev. almost destroyed by action of fire.
14. *Obv.* [IMP CAES NER TRAIANO OPTIMO AVG] GER DAC PAR[THICO P M TR P COS VI P P]. Head r., radiate.
Rev. Providence standing three-quarter face towards l., with sceptre, leaning on a column and pointing with her r. hand to a globe at her feet; around, [PROVIDENTIA AVGVSTI] SPQR; in field, S C.
 "Second Brass." Cohen², ii. p. 51, No. 321. Struck in A.D. 116. Lying on foundation of West Granary. In worn condition.

15. *Obv.* Inscr. illegible. Head r., laureate.
Rev. Indecipherable.
 "Second Brass." Found in the stoke-hole of the Large Bath-house.
 Much worn.

HADRIAN: A.D. 117-138.

16. *Obv.* IMP CAESAR TRAIANVS HADRIANVS AVG P M [TR P CO]S III. Head r., laureate.
Rev. Hadrian standing three-quarter face towards l., grasping a roll and raising from her knees a woman with turreted head-dress, who holds a globe; around, [RESTITVTORI ORBIS T]ERRARVM; in exergue, S C.
 "First Brass." Cohen², ii. pp. 213 f., No. 1285. Struck between A.D. 119 and 128. Found in Commandant's House. Much corroded, but in very fair condition when lost.
17. *Obv.* . . . DRIA . . . Head r., laureate.
Rev. Indecipherable.
 "First Brass." Mr Mattingly thinks the portrait is later than A.D. 134. Found in stoke-hole of Sudatorium of the Men's Baths. Much disfigured by burning.
18. *Obv.* . . . IAN HADR . . . Bust r., laureate.
Rev. Indecipherable.
 "Second Brass." Found in same place as No. 17, lying close to No. 22. Much corroded.
19. *Obv.* Inscr. illegible. Head r., laureate.
Rev. Indecipherable.
 "Second Brass." Found in Field No. 2095.
20. As No. 19.
 "Second Brass." Found in Field No. 2106.

SABINA.

21. *Obv.* SABINA AVGVSTA HADRIANI AVG. Bust r., wearing diadem and high head-dress.
Rev. Ceres, veiled, seated l., holding ears of corn and a lighted torch; in field, S C.
 "Second Brass." Cohen², ii. p. 253, No. 71. Found in Field No. 2106.
22. Probably similar to No. 21.
 "Second Brass." For "find-spot" see No. 18. Much corroded.

ANTONINUS PIUS: A.D. 138-161.

23. *Obv.* ANTONINVS AVG PIVS P P TR P COS III. Head r., laureate.
Rev. Health standing three-quarter face towards l., with sceptre, feeding serpent twined round altar; around, SALVS AVG; in field, S C.
 "First Brass." Cohen², ii. p. 341, No. 711. Found near Nos. 17, 18, and 22, but in good condition. Struck between A.D. 140 and 143.
24. *Obv.* Inscr. illegible. Head r., laureate.
Rev. Inscr. illegible. Abundantia seated l., holding ears of corn and cornucopiae; in front, modius with ears of corn.
 "Second Brass." Cohen², ii. p. 275, No. 49. Struck in A.D. 151. Found in Field No. 2095.

FAUSTINA SENIOR.

25. *Obv.* DIVA AVGVSTA FAVSTINA. Head r., veiled.
Rev. Eagle bearing aloft Faustina, who holds a sceptre and raises her veil; around, CONSECRATIO; beneath, S C.
 "First Brass." Cohen², ii. p. 427, No. 182. Struck after Faustina's death in A.D. 141. Found in Field No. 2095. Condition good.

UNCERTAIN.

26. Indecipherable.
 "First Brass." Possibly early first century (? Claudius or Antonia). Found in Field No. 2106.
27. Indecipherable.
 "First Brass." Found in Field No. 2106. Much burnt.
28. Indecipherable.
 "First Brass." Found in the garden of Fort Knowe.

IX. OTHER OBJECTS OF METAL.

We have already remarked upon the paucity of the finds made at Mumrills and have suggested an historical explanation (*supra*, p. 522). But there was another reason for the smallness of their number. The quality of the soil, to which we have referred in speaking of the pits (*supra*, p. 434), must account for the disappearance of all wood save the merest handful of tiny fragments, as well as for the fact that there were only three scraps of leather to set against the three or four hundred specimens of footgear which lent such a human touch to the excavations at Bar Hill. Metal, too, had suffered severely. This was particularly the case with articles made of iron. When recovered, they were generally, to all appearance, mere shapeless masses of rust. It speaks volumes for the skill and care of Mr A. J. H. Edwards, the Assistant-Keeper of the Museum, that so many of them should have been restored to something like their original form.

(a) *Bronze*.—Fig. 115 shows sixteen objects of bronze, drawn to their actual sizes. In the brief descriptions that follow, the find-spot will be recorded only in the very few cases in which it seems to have any significance. No. 1 is a finely preserved fibula of the harp-shaped type, familiar in Scotland through its occurrence at Camelon, Newstead, Traprain Law, and other sites. It has a floriated knob in the middle of the bow and a cup-shaped terminal at the foot. The pin works on a spiral spring, the axial wire of which is curved round behind the head to form a loop caught in by a collar. This was the most important of a group of objects found in the main furnace-room of the Large

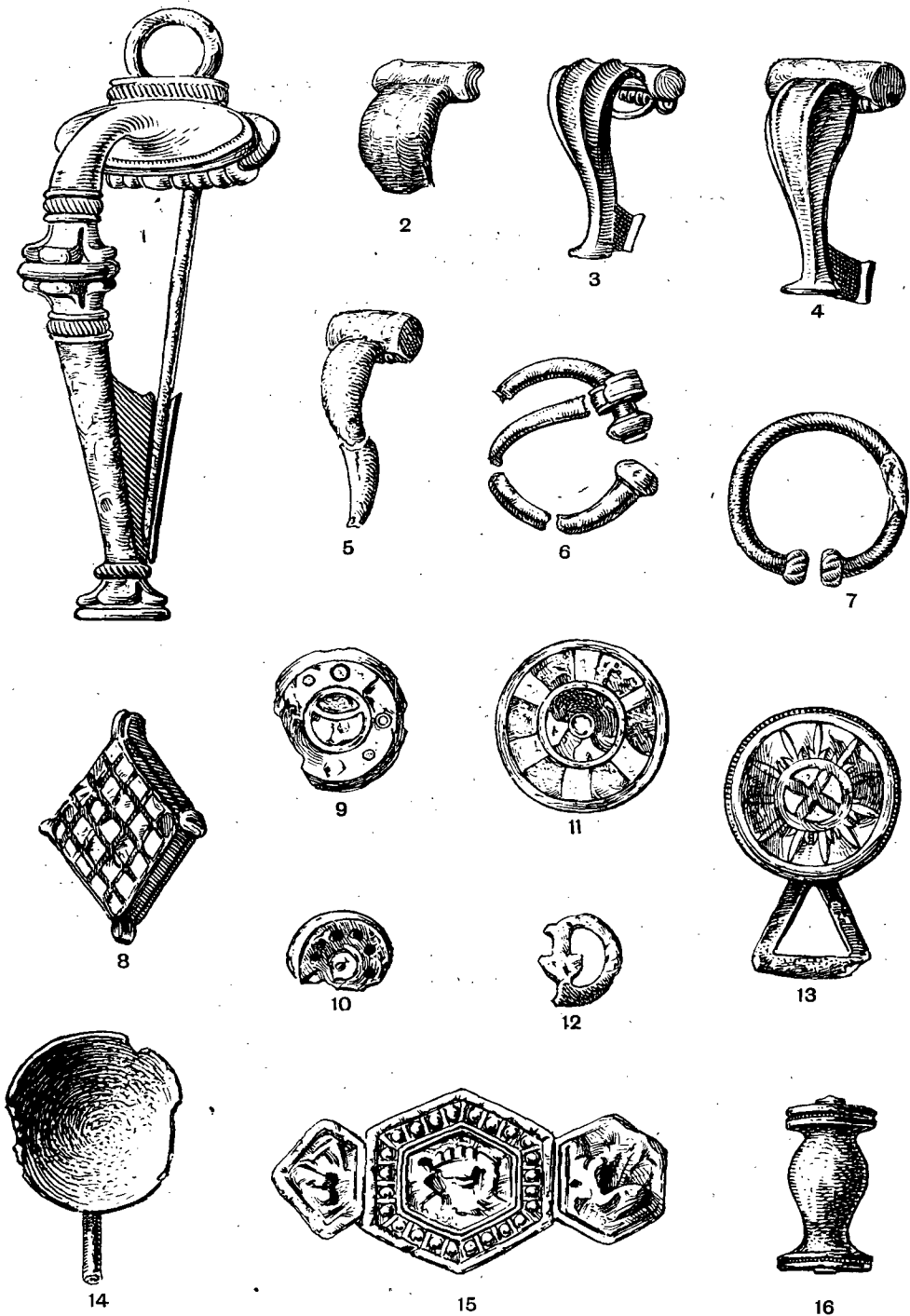


Fig. 115. Fibulae, seal-box, enamelled studs, and other objects, all of bronze. (Actual size.)

Bath-house, when the inner face of the east wall was being cleared. On p. 469 (*supra*) we have drawn attention to the bearing which the *locus* of this discovery may possibly have on the history of the Commandant's House. Nos. 2-5 are more or less complete examples of a common second-century type of fibula, the pin of which—missing in all four cases—has worked on a spring. Nos. 2 and 5 show a plain bow, and Nos. 3 and 4 a bow decorated with three flutings. Nos. 6 and 7 are incomplete specimens of penannular brooches with knob-shaped terminals. No. 7, the smaller of the two, lacks only the pin, which (as will be seen from the fragments of No. 6) was hinged by the simple process of winding its end round the ring. No. 8 is a seal-box, for the manner of using which see *Newstead*, p. 308. In the bottom (*i.e.* at the back) there are four circular holes for the studs, and the lid, the upper surface of which is decorated with chequers of green and red enamel, works upon a hinge at the top, while the sides are perforated at each of the outer angles for the passage of the thread or string.

Nos. 9-11 are circular enamelled studs, each of which has, or has had, a pin projecting from the back. The following are the details of the decoration. On No. 9 a parti-coloured disc of red, yellow, and black (or brown), surrounded by a ring of bronze, is set in a pale-blue field, which is studded alternately with red spots and with small rings, now black and now yellow, each of them enclosing a white spot. On No. 10 an orange-yellow disc, with a black spot in the centre, is set in a field of pale blue, studded with black spots. On No. 11 a small central disc of green lies within a larger disc, which has been coloured alternately red and black, and which is in its turn bordered by a series of panels, coloured alternately pale blue and brown. No. 12 is a fragment of a mounting. No. 13 is a circular enamelled stud, with a triangular loop for attachment. A disc of pale blue, having a cruciform ornament in the centre, is surrounded by a ring of bronze, fringed by a series of trifoliate projections, also of bronze, each having the central leaf prolonged into a spike which reaches the outer border of the whole. The panels formed by the spikes are filled with enamel, alternately red and yellow. No. 14 is the head and part of the handle of a small spoon or *ligula* of a familiar type.¹ It has been coated with tin. No. 15 is a mounting, consisting of a central panel flanked r. and l. by smaller panels which are respectively hexagonal and pentagonal. The central panel, which is hexagonal, has a beaded border enclosing a device which is no longer recognisable. Three pins project behind—two from the panel on the r. and one from the panel on the l. No. 16 is a small baluster-shaped object, which has had a tenon projecting from each end.

¹ Cf. L. Jacobi, *Das Römerkastell Saalburg*, p. 440 and Pl. Ixii. 4.

These were the most noteworthy among the bronze articles recovered. But there are still a few that appear to deserve mention and illustration. They are all drawn to actual size, so that it is not necessary to give their dimensions. Fig. 116 is a long pin with a baluster-head. It was found not far from fig. 115, No. 1. The small cup-shaped object in fig. 117 was found, as it is shown, adhering firmly to a piece of stone. Fig. 118, No. 2, is a "header" from a mould—that is, the superfluous piece of metal that has been left in the neck after a casting has been made. No. 3 in the same fig. is a portion of a small handle, which seems to have been coated with tin. Nos. 4 and 5 are portions of oblong mountings, retaining traces of enamel in the grooves on their upper surface. They have pins for attachment on the back. No. 7 is a bow-shaped handle of quadrangular section, having its baluster-shaped terminals reverted so as to provide attachment for two rings which must have been used for suspension. No. 8 is a small ring of quadrangular section. The finds included a similar ring of almost the same size, as well as one of circular section which was considerably larger:



Fig. 116. Bronze pin. (Actual size.)

(b) *Lead*.—A few fragments of sheet-lead were picked up, and also a small oval-shaped lump of the same metal. Otherwise lead was unrepresented, save for the small conical whorl, which is reproduced as No. 6 in fig. 118.

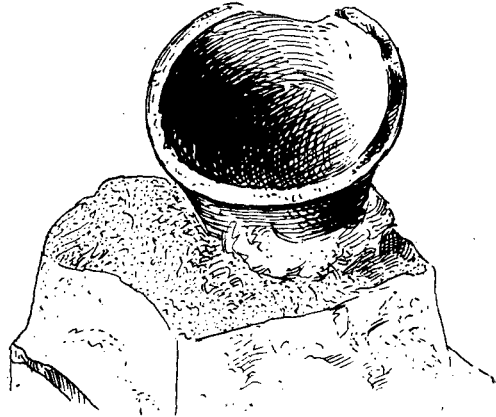


Fig. 117. Cup-shaped object of bronze. (Actual size.)

(c) *Iron*.—We have already spoken of the miserable condition to which the iron objects had, without exception, been reduced. Despite the careful treatment they have received, there are not a few whose precise character it is now quite impossible to determine. We shall begin by describing those in regard to which there is no manner of doubt. Fig. 118, No. 1, is an iron finger-ring which has lost its bezel.

As an off-set, there is a bezel from which the iron ring has been almost completely eaten away by rust (fig. 119). The intaglio, an impression

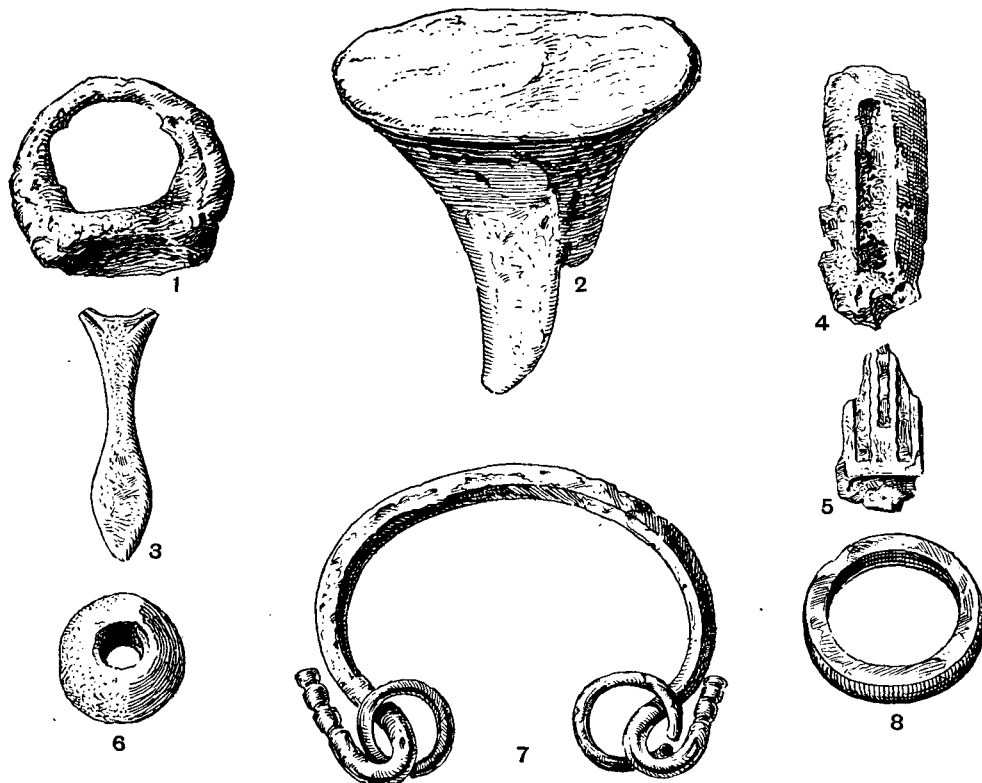


Fig. 118. Objects of bronze (Nos. 2, 3, 4, 5, 7, and 8), iron (No. 1), and lead (No. 6). Actual size.

from which is shown in the illustration immediately beneath it, is cut in a cornelian and obviously represents a sacrifice. Equally unmistakable were four horse-shoes and a fragment of a fifth, the antiquity of which was vouched for by the closeness with which they approximated to one or other of the types of Roman horse-shoe discovered at the Saalburg and elsewhere.¹ That they should be somewhat smaller than the modern horse-shoe is exactly what was to be expected. Dr Ritchie's examination of the scanty animal remains shows that the horses at Mumrills were of the Celtic or "plateau" type, so well repre-

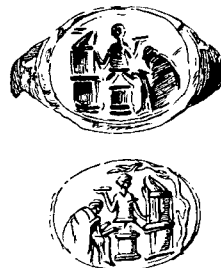


Fig. 119. Bezel of iron finger-ring. (Actual size.)

¹ See Jacobi, *Das Römerkastell Saalburg*, p. 528, fig. 87.

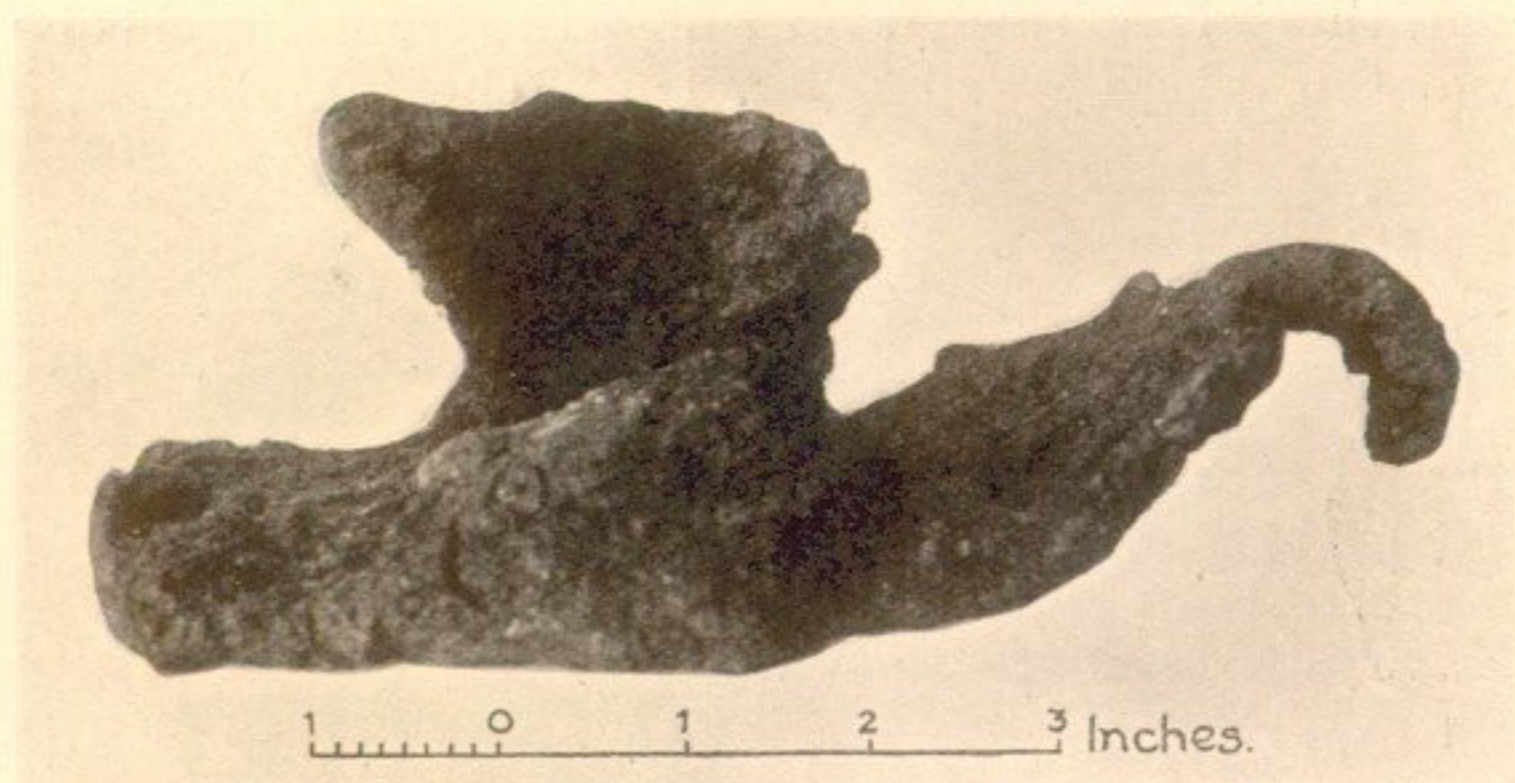


Fig. 120. Hippo-sandal of iron.

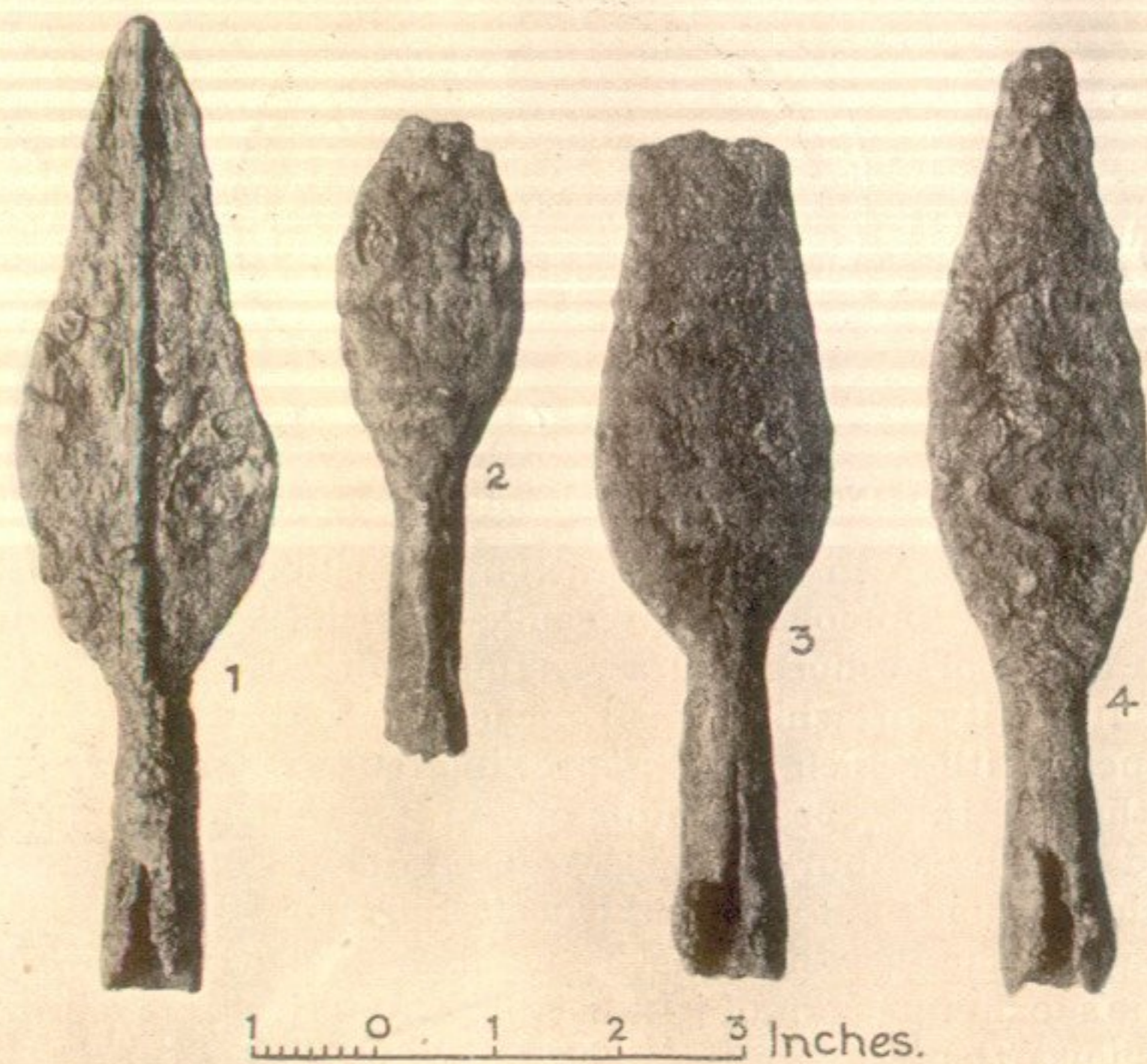


Fig. 121. Spear-heads of iron.

sented at Newstead. In addition to the ordinary horse-shoes, there was an example of the so-called "hippo-sandal," commonly believed to have been used for protecting a broken or injured hoof (fig. 120). These objects have recently been carefully studied by M. Xavier Aubert in the *Revue des Musées*. The Mumrills specimen is imperfect, but it



Fig. 122. Iron knife-blades.

probably belongs to class F in his 1st Series.¹ We may add that, of the three specimens recovered at Newstead and now in the National Museum, two belong to his 1st Series, one certainly to class A and the other possibly to class C, while the third belongs to class I in his 2nd Series.

There were eight spear-heads or portions of spear-heads. Four of these are illustrated in fig. 121. All have been more or less leaf-shaped

¹ *Op. cit.*, No. 21, 1929, p. 77.

in form. No. 1, which came from Field No. 2095, is remarkable for its well-defined midrib, clearly a perpetuation of the Bronze Age tradition. Similar examples have been found at Newstead and in the lowest level at Traprain Law,¹ and are generally presumed to be native. The split socket, a feature which the Mumrills specimen shares with Nos. 3 and 4 in the same fig., seems to be rather unusual in spear-heads of this particular type. Comparison with *Newstead*, Pl. xxxvii., makes it probable that Nos. 2, 3, and 4, as well as the fragments that have not been reproduced, are all Roman, although the abnormally broad base of No. 3

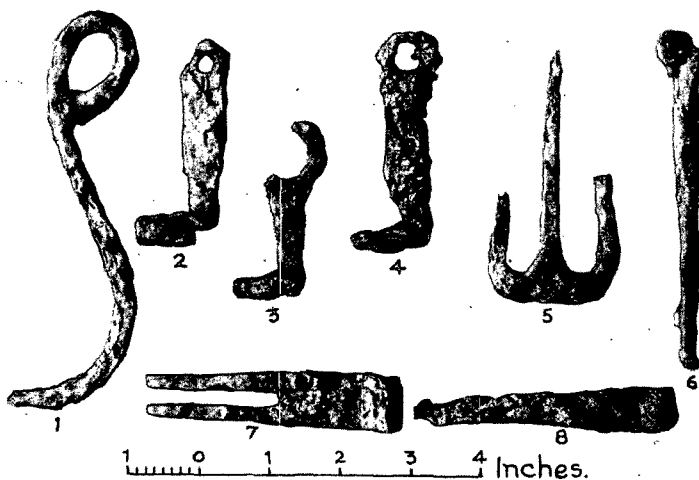


Fig. 123. Locks and keys.

is a little suggestive of Celtic affinities. Fig. 122 exhibits a series of knife-blades of the ordinary Romano-British forms (cf. *Newstead*, Pl. lx.). The most noteworthy are two belonging to the cleaver type (Nos. 2 and 7). The objects grouped together in fig. 123 have also a certain homogeneity. No. 1 is possibly a sickle-shaped key with the point amissing. Although corrosion has destroyed the projecting studs, with which we may suppose the lower side of the horizontal arm to have been furnished, there need be little hesitation in classing Nos. 2, 3, and 4 with the bronze keys illustrated and described in *Newstead*, Pl. lxxviii. and p. 306. No. 5, again, is certainly a latch-key, while No. 6, an imperfect object with a loop at one end, appears to be the shank of something of the same sort. Nos. 7 and 8 are probably the bolts of padlocks.

¹ See *Proc.*, vol. xlix. p. 183, and references there.

Fig. 124 contains a somewhat miscellaneous assortment of articles. No. 1 is a flat spike, the upper end of which is bent over so as to form

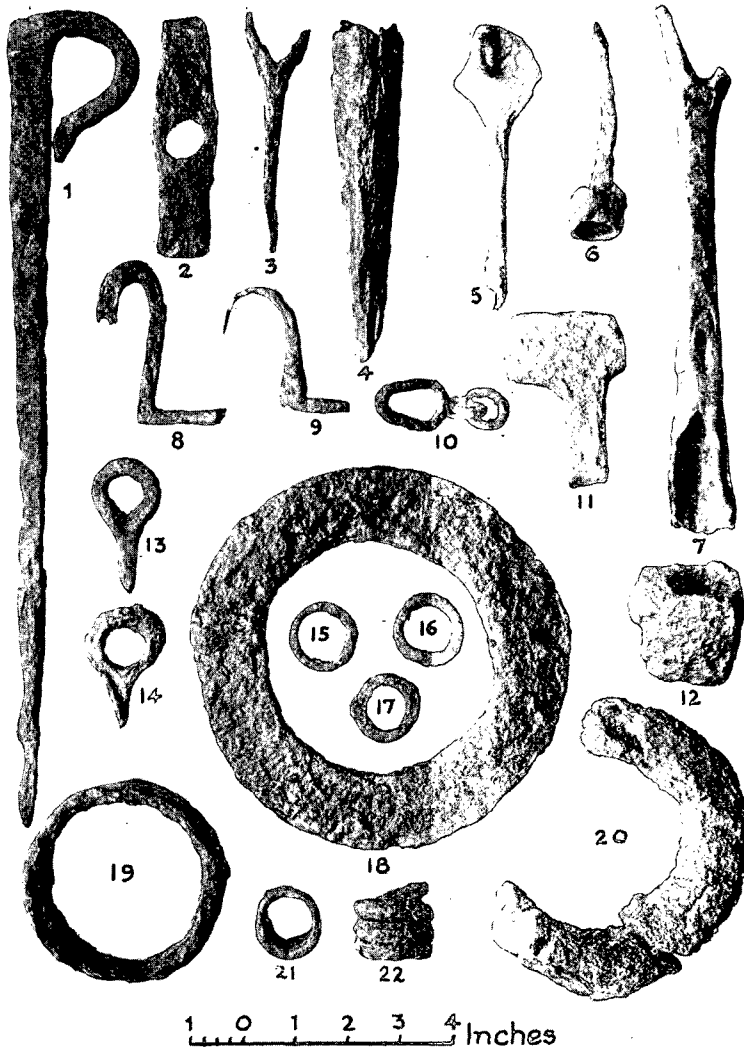


Fig. 124. Miscellaneous objects of iron.

a side-loop. In the description of a similar object of somewhat smaller size, found at Theilenhofen on the German Limes, the suggestion is put

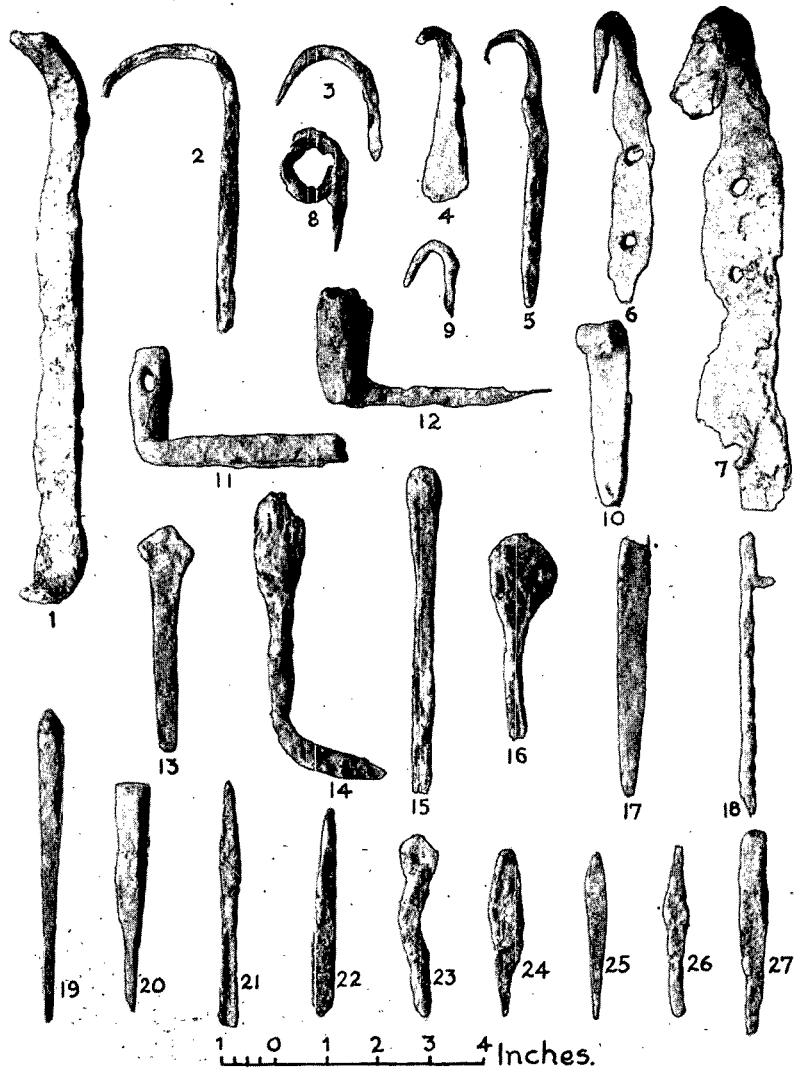


Fig. 125. Miscellaneous objects of iron.

forward that it may have been used for tethering horses;¹ but it seems doubtful whether it is substantial enough to have served such a purpose. No. 2 is a narrow, slightly curved plate of metal, with a

¹ *O.R.L.*, Nr. 71a (Lief. 24), p. 15, Nr. 18.

hole in the centre and a cutting edge at one end; it is too thin to have been a hammer. No. 3, which is imperfect, presents the appearance

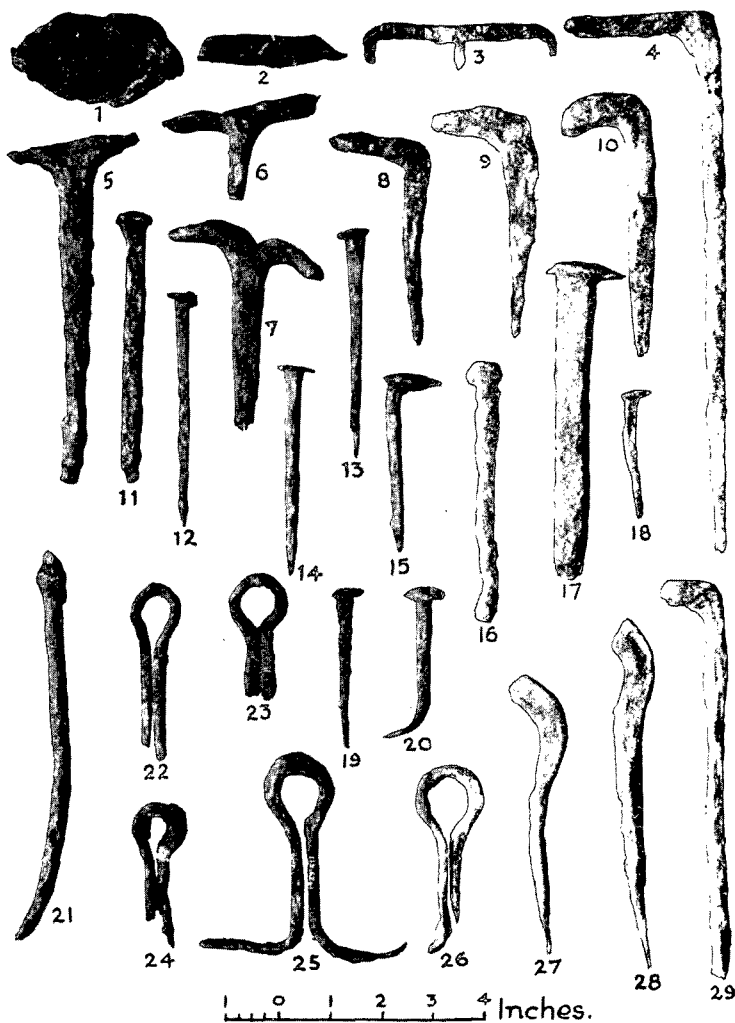


Fig. 126. Hooks, loops, cleats, and nails of iron.

of a spike with a forked head, such as might have been designed as a support. No. 4 is a heavy socket for a pole. No. 5 is a linch-pin

(cf. *Newstead*, Pl. lxx. 6, and p. 294). No. 6, which is the more complete of two examples found at Mumrills, has been plausibly explained as an ox-goad (cf. *Proc.*, vol. xlix. p. 189, and references there). No. 7, when complete, probably bore a close resemblance to a boat-hook, but it cannot have been employed as such at an inland site like Mumrills; we may compare *Newstead*, Pl. lxvi. 8, and p. 288. Nos. 8 and 9 are small hooks with an arm for insertion into a wall or into wood. No. 10 is an oval loop with a neck, to the end of which a ring is attached. No. 11 is a wedge-shaped object, the thick end of which seems to have been burred with a hammer; the shank attached to it is broken off short. No. 12 is a heavy, square socket which has probably belonged to some adze-shaped tool. Nos. 13 and 14 are ring-headed staples. Nos. 15-21 are rings of various sizes, and No. 22 is a portion of a coiled spring.

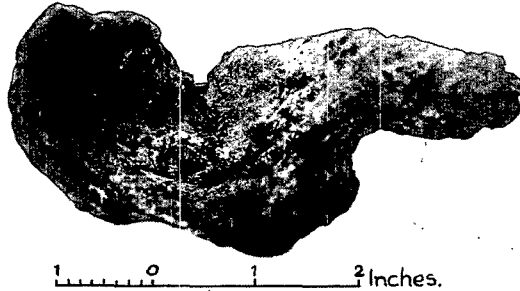


Fig. 127. Ladle or skillet of iron.

There is little that is definite to say about the majority of the objects which appear in fig. 125. No. 1 is a bar of metal, bent inwards at both ends. Nos. 2-7 and No. 9 are hooks for insertion into, or attachment to, wood-work. No. 8 is a loop-head which may possibly have been similarly used. No. 10 is a tapered strip of metal, bent round at one end. Nos. 13-17 are indeterminate. No. 18 is the stem of an iron lamp or "crusie," with part of the hook for suspension attached (cf. *Newstead*, Pl. lxxix. 6 and 7, and p. 307). No. 19 looks like a broach or boring-bit. It is quadrangular in section and tapers to a fine point. No. 20 is a heavy punch. No. 21 has been an auger. No. 22 is formed on a slight ogee curve, not evident in the photograph, and may possibly have been the blade of a plane (cf. *Newstead*, Pl. lix. 2, and p. 281). No. 23 has been a bent pin with a ring-head. No. 24 is a small punch, precisely similar to one found at Bar Hill. Nos. 25 and 26 are tapered bolt-heads, which have conceivably belonged to javelins. No. 27 is indeterminate.

The objects shown in fig. 126 lend themselves even less readily to verbal description. It must suffice to say that they are a typical selection from the mass of hooks, loops, cleats, and nails of various kinds that were recovered. Finally, the somewhat amorphous piece of corroded iron in fig. 127 may once have done duty as a ladle or a skillet.

X. OBJECTS OF STONE.

In previous sections (*supra*, pp. 522 and 553) we have mentioned two causes that had combined to make Mumrills a less fruitful field for excavation than might have been hoped for. The exiguous number of the objects of stone that have now to be catalogued is convincing proof of the operation of a third. During the centuries that have elapsed since the Romans quitted the scene, the site has been plundered with a systematic thoroughness which is fortunately rather rare. Almost every stone that rose above the Roman level had been carried away, and here and there even the Roman surface had been broken into in the search for building material. In the circumstances it is hardly matter for surprise that we should have found no vestige of an inscription. For information of the character that inscriptions generally give, we have to rely upon two that have long been known. The first, which was found in the immediate neighbourhood of the fort, has been in the National Museum for very nearly a century. It is the tombstone of a young Brigantian, Nectovelius by name, who died at the age of thirty after serving for nine years in the Second Cohort of Thracians.¹ There is therefore a presumption that this regiment of auxiliaries had once formed the garrison. Like its fellow, the second inscription is now in the National Museum. Its connection with Mumrills is, however, less certain, as the spot where it was discovered in 1841 lies about a mile to the south. It is an altar dedicated to Hercules Magusanus by Valerius Nigrinus, a non-commissioned officer of the Tungrian Horse.² If the current view that it is associated with the fort be accepted, we may suppose that the Tungrians had also been in garrison there, doubtless at a different period.

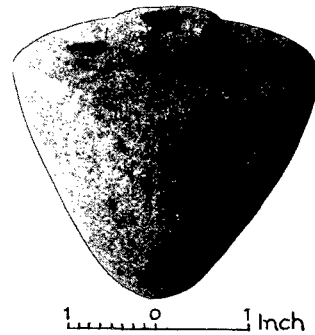


Fig. 128. Stone plummet.

¹ *C.I.L.*, vii. 1091, and *Roman Wall in Scotland*, Pl. xxxiv. 2, and p. 352.

² *C.I.L.*, vii. 1090, and *Roman Wall in Scotland*, Pl. xlvi. 4, and p. 348.

The more noteworthy of the architectural fragments brought to light during the excavation have already been illustrated and described (see *supra*, p. 414, fig. 11). Several portions of querns were also picked up, as well as a whetstone, a much-worn mould, and what might have been the corner of a small altar. Besides these, there were only three objects of stone that seem to deserve mention. Fig. 128 is a

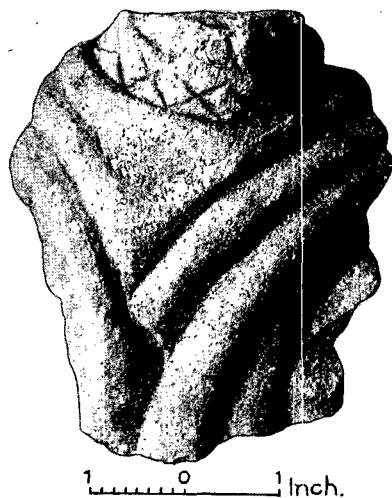


Fig. 129. Fragment of stone statue.



Fig. 130. Stone with palm-branch. (Scale, $\frac{1}{4}$.)

plummet such as would be used by a mason. Fig. 129 is part of a statue of sandstone, showing apparently the base of a neck with the folds of a garment crossed on the breast. Fig. 130, which is about 14 inches long by about $7\frac{1}{2}$ inches broad, is built into a wall on the south side of the Linlithgow road about a quarter of a mile south-east of the fort. It may be compared with the very similar stone illustrated in *Gellygaer*, p. 90, fig. 21. The latter had also been built into a modern roadside wall. For yet another analogy see *Camelon*, p. 413, fig. 53.

XI. ANIMAL REMAINS.

The animal remains, which consisted chiefly of fragments of bone and horn, have been very carefully examined for us by Dr James Ritchie, F.R.S.E., of the Royal Scottish Museum. Besides being comparatively few in number, they were in the worst possible condition,

an inevitable consequence of the alternate drenchings and dryings to which they had been subjected in the sandy soil in which they had lain; the bones, in particular, were friable and much decayed, the tendency to disintegration being specially marked in those which had

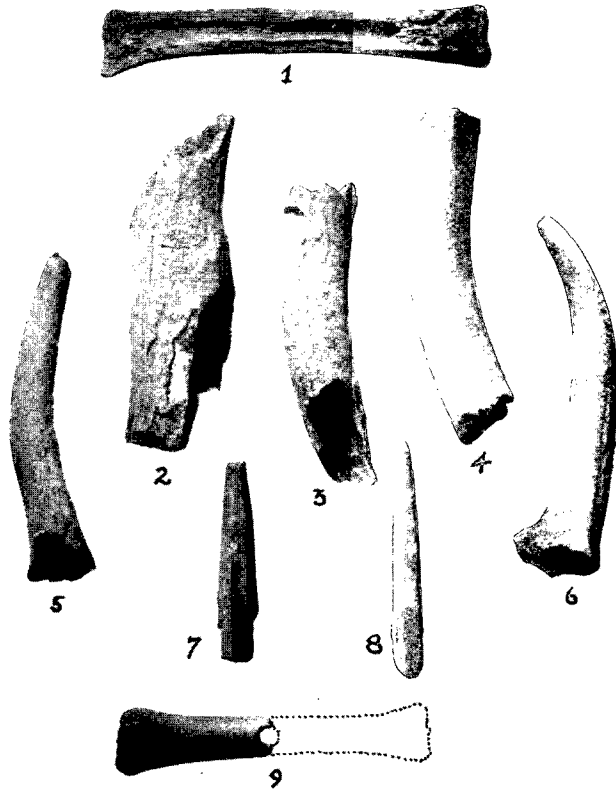


Fig. 131. Fragments of bone and horn. (Scale, $\frac{1}{2}$.)

been smashed in order to extract the marrow. The information which Dr Ritchie has been able to supply is, therefore, somewhat meagre, though not without certain quite definite points of interest. Before quoting his report we shall deal with a small handful of artefacts of a very simple character, which he has detected among the material sent him.

Fig. 131, Nos. 3 and 4, are short sections of the tines of antlers.

They are from 5 to $5\frac{1}{2}$ inches long and have been partially hollowed through the centre, possibly for use as the hafts of knives. Fig. 131, Nos. 5 and 6, are small but complete tines from $5\frac{1}{2}$ to $6\frac{1}{2}$ inches long. They show signs of abrasion at the point, but whether they have served as borers or whether they are portions of deer-horn picks it is hardly possible to say. Although fig. 131, No. 7, is more highly finished, its precise purpose is at least equally obscure. It is an eight-sided peg or pin, $3\frac{1}{8}$ inches long, neatly formed from the tine of a deer's antler, each of the sides having been cut by a succession of shearing blows. It has a diameter of about $\frac{5}{8}$ of an inch at the head, which is shaped like a low pyramid, and tapers down thence to a diameter of slightly more than $\frac{1}{4}$ of an inch at the tip, where it has been deliberately truncated. A second pin-like object (fig. 131, No. 8) is made of much-weathered but very close and dense bone, probably, Dr Ritchie tells us, ivory. It is $3\frac{3}{4}$ inches long, with a breadth of $\frac{1}{2}$ of an inch near the head, and a maximum thickness of $\frac{3}{8}$ of an inch. Originally it tapered to a point, while each of the four sides was highly smoothed and polished. Unfortunately most of the polished surface has disappeared. On what is left on one of the sides, however, Dr Ritchie's trained eye observed markings which the magnifying glass showed to be the remains either of an inscription or of a somewhat elaborate ornament. Whether the markings are really letters or whether they are merely decorative, they seem to be quite clearly medieval rather than Roman, and accordingly we do not propose to discuss them here. The last artefact we have to notice (fig. 131, No. 9) is fashioned from the "cannon bone" of a sheep. Although it is now badly broken, enough remains to indicate that a circular hole has been drilled from the outside into the natural central cavity of the bone, about midway between the ends, apparently for the passage of a cord. There are already five similar objects in the National Museum, but no satisfactory explanation of their purpose has yet been forthcoming.

We proceed to quote Dr Ritchie's "Note":—

"In the following paragraphs I propose first to enumerate the different species of animals represented in and about the fort, and then to draw attention to some general conclusions which seem to be suggested by the remains, especially when compared with those from Newstead.

A. Domesticated Animals.

1. SHORT-HORNED CELTIC OX (*Bos taurus brachyceros*).—The bones of cattle were by far the most numerous of the animal remains, and amongst these there was a distinct predominance of certain types of bones. No complete skull was found, but the fragments included many portions of jaws with teeth, as well as half a dozen portions of the forehead bearing horn-cores. Although all of them

were imperfect, these skull fragments are important, since they clearly define the character of their owners. The short horn-cores lie below the level of the frontal eminence, and project slightly downwards and forwards. Their circumference at the base varied from 180 mm., in an exceptionally large specimen, to 115 mm., while the longest measurable core was about 130 mm. in length along the curve. The horn-cores and the formation of the upper part of the forehead are typical of the primitive domestic race of cattle—the Celtic Shorthorn (*Bos taurus brachyceros* or *longifrons*). This evidence of the cattle having belonged to a small race was confirmed by the limb-bones, for a ‘cannon bone’ from a hind limb (metatarsal) measured only 200 mm. in length and 11·5 mm. in diameter, as against 220–245 mm. and 28·8–32·5 mm. in an ordinary domestic ox of the present day.

Practically all of the limb-bones had been deliberately broken. Even vertebrae and lower jaws, neither of which could have yielded marrow, showed the shearing marks of a sharp and heavy edged-implement. To extract the marrow from the long bones of the limbs two different methods were employed. Sometimes, as in the case of humerus, femur, metatarsals, and metacarpals, the stout ends of the bones had been smashed off with ragged edges, leaving the marrow to be scooped from the hollow end of the bone. Usually, however, the ‘cannon bones’ were cleanly split along the junction line of the individual metatarsals or metacarpals, so that the central hollow, with its marrow, was exposed from end to end (fig. 131, No. 1).

The size and development of the limb-bones and the character of the teeth in the jaw fragments prove that almost all of the cattle were adult. This is in striking contrast with the remains of early kitchen-middens, where young animals almost invariably form a large proportion of the food material. Nor can the conditions of preservation be held responsible, since the jaws, teeth, and limb-bones, even of young animals, could scarcely have disappeared so completely.

2. SHEEP (*Ovis aries palustris*).—There are remarkably few remains of sheep, and such as there are represent a light, fine-boned race corresponding to the type of the Peat or Turbary Sheep. Here again the bones are those of adults, for, although several of the limb-bones are those of animals in which the epiphyses had not yet fused with the shaft, even these bones are well grown. Most of the bones are broken or chewed at the end. The only adult bone that was complete, a metacarpal, measured 113 mm. in length by 12·2 mm. in diameter at the middle, measurements very similar to those of the corresponding bone in a skeleton of the small race of Shetland sheep now in the Royal Scottish Museum, where the corresponding dimensions are 115·5 mm. and 12·6 mm.

3. PIG (*Sus scrofa*).—The relics of the Domestic Pig, like those of the sheep, are very few—five fragments of jaws with teeth, six fragments of limb-bones, and three portions of tusks, the longest of which might have measured about 110 mm. when complete. Once more all the bones were those of adult animals, the worn teeth in one of the jaws being those of an aged individual.

4. HORSE (*Equus agilis*).—The horse is represented by only three rather insignificant fragments—an incisor tooth, a premolar tooth from a lower jaw, and one ‘cannon bone’ from a fore limb. Fortunately this limb-bone, according to Professor J. Cossar Ewart, is of value in determining equine races. Its dimensions—237 mm. in length by 34 mm. in diameter at the middle, giving a proportion of 6·97 of length to breadth—suggest that it has belonged to a sturdy individual of the Celtic Pony or ‘Plateau’ type. In size the bone agrees exactly with some of the metacarpal bones of horses from the Roman fort at Newstead, which are now in the Royal Scottish Museum.

5. DOMESTIC FOWL.—The last of the series of domesticated creatures is the Domestic Fowl, which is represented only by a single wing-bone—the humerus.

B. Wild Animals.

1. RED DEER (*Cervus elaphus*).—Almost all of the few remains of wild creatures had belonged to the Red Deer. The single limb-bone recovered, the proximal end of a 'cannon bone' (metatarsal) had been split for the extraction of the marrow. The rest were pieces of antlers, some of them sections broken or cut from the beam, the others whole or incomplete tines also deliberately separated from the antler. Of the beam sections the most remarkable is

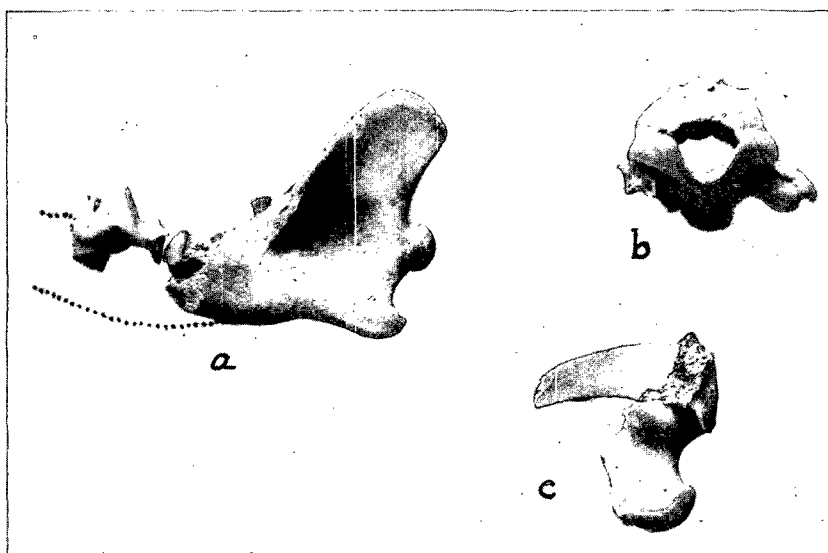


Fig. 132. Portions of skull of Wolf. (Scale, about $\frac{1}{2}$.)

12 $\frac{1}{2}$ inches long and has been taken from a right antler just below the crown (fig. 131, No. 2). The circumference, even so far from the base, is 5 $\frac{1}{8}$ inches. The deer which bore such an antler must have far exceeded the average size of modern Scottish Red Deer, and would have been well worthy of a place in the list of outstanding British heads (see Rowland Ward's *Records of Big Game*, London, 9th ed., 1928, p. 4). Although the section itself can hardly have been used as an implement, since it showed no signs of wear at the part by which it would naturally have been grasped, it had nevertheless received rough treatment from human hands. The rear end has been separated from the rest of the beam by repeated blows of a sharp-edged metal tool, and one of the crown points has been similarly detached, while a second crown point seems to have been sawn off.

2. WOLF (*Canis lupus*).—Some fragments of the skull of an adult Wolf were found. They are the back portion of the left half of a lower jaw, with the first (carnassial) and last molar teeth (fig. 132, a); the occipital condyles

(fig. 132, *b*); and the articulating process of the right half of a lower jaw, with the corresponding zygomatic process of the squamosal (fig. 132, *c*). The dimensions show that the creature was at least as large as the average modern adult Wolf of Northern Europe (*Canis l. lupus*). It may be of interest to compare such measurements as can be made with the corresponding measurements of a Russian wolf, now in the Royal Scottish Museum. They are as follows:—*Lower Jaw*—Greatest height from angle to summit of coronoid process, 70·7 mm. as against 72 mm.; length of molar row, 50 mm. as against 45·5 mm.; length of carnassial tooth, 28·2 mm. as against 27·2 mm.; breadth of carnassial tooth, 11 mm. as against 11·3 mm. *Skull*—Greatest width of occipital condyles, 42·5 mm. as against 45·5 mm.; horizontal diameter of foramen magnum, 20 mm. as against 22 mm. In each case the earlier of the two figures refers to the Mumrills specimen.

3. WILD CAT (*Felis sylvestris*).—Although no other species of animal is represented by osseous remains, a very interesting record is preserved upon a brick. Two deep impressions have been left by a leaping animal on the soft clay and have subsequently been made permanent by the process of firing. One is very perfect (fig. 133), and shows the foot-pads of a Wild Cat as well as the claw-marks of its retractile claws, which were extruded in action. The foot measures 45 mm. across, while the foot of an ordinary well-grown tom-cat of to-day measures only 35 mm., and shows a clearer definition of the area of the posterior pad (fig. 134, *a*). As a rule, a simple distinction between the foot-prints of a dog and of a cat is the presence in the former of claw-marks (fig. 134, *b* and *c*), the retractile claws of a cat being generally withdrawn, so that only impressions of the pads remain (fig. 134, *a*). In this case, however, the claws were fully extruded, even to the level of the surface of the pads, indicating that the animal was in the act of springing, and a comparison of fig. 133 with fig. 134, *b* and *c*, will show them to be much more prominent, and to lie closer to the pads than those of a dog. It is clear from the other footmark



Fig. 133. Footprints of Wild Cat on Roman brick. (Scale, about $\frac{1}{2}$.)

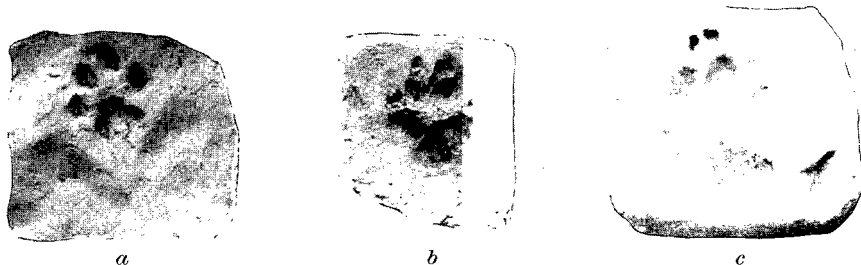


Fig. 134. Foot-prints, taken in clay, of (*a*) Domestic Cat, (*b*) small Dog (Pomeranian), and (*c*) medium-sized Dog (Airedale). (Scale, about $\frac{1}{2}$.)

on the brick that the soft clay must have been squared up *after* the Wild Cat had left its marks, for the impression of the pads has been distorted in the course of squaring.

C. Molluscan Shell-fish.

Only two species of molluscs were found, both marine and both common to-day in the Firth of Forth. The OYSTER (*Ostrea edulis*) was represented by many shells of well-grown individuals, which had obviously been used for food. In all probability they were gathered from the oyster-beds of the Firth, and in this connexion it is significant that the drill-like borings of a sponge (*Cliona*), which is very frequently found associated with Forth oyster-shells, were present in abundance on one specimen. There was also a single shell of the COMMON WHELK (*Buccinum undatum*) or 'Buckie.' This is still used for food in some parts of England, and it was doubtless brought to the fort for the same purpose.

D. General Remarks.

(a) It is clear that, so far as animal food is concerned, the main source of supply had been cattle. Other domestic animals, such as sheep and pigs, were also used, but their remains are scanty. This is in marked contrast to the evidence yielded by the kitchen-middens of prehistoric sites in Scotland, where the bones of sheep are generally the chief constituents. As Professor Cossar Ewart notes that very few bones of sheep were found at Newstead (*Newstead*, p. 131), it looks as if sheep were not favoured in Scotland as a Roman diet. The alternative possibility that sheep were then somewhat scarce in this part of the country, I regard as unlikely. It is right to add that on at least one Roman site the disproportion was much less marked (*Bar Hill*, pp. 126 f.).

(b) There is some evidence which might be held to justify the suggestion that Mumrills was a less well-established and less 'settled' place than Newstead. In the first place, all the remains of cattle from Mumrills are those of the Short-horned Celtic Ox, a primitive domestic race, whereas at Newstead there were unmistakable indications of the presence of improved breeds, produced by crossing this primitive race with imported cattle. In the second place, all the bones of cattle, sheep, and pigs from Mumrills were those of adult and well-grown animals. This again, as in (a), presents a striking contrast to what is found in most early kitchen-middens, where the food material invariably contains a large proportion of young domestic animals, whatever the kind, distinguishable by the smallness of their bones, the absence of ankylosed epiphyses on the ends of the long bones, and the presence of milk teeth. Even at Newstead Professor Cossar Ewart (*op. cit.*, p. 374) observed that 'many of the oxen bones belong to quite young animals, which had doubtless served as food.' Do these two considerations, taken together, indicate that the Roman garrison here had never acquired or developed its own flocks and herds, that, instead, it was dependent on the domestic animals of the native tribesmen in the neighbourhood, whose herds belonged to the unimproved breeds, and who supplied the Roman butcher only with well-grown and often aged animals?

(c) At Newstead Professor Cossar Ewart found little evidence that either marrow or brains had formed part of the diet of the garrison (*Newstead*, p. 362). At Mumrills, on the other hand, the marrow had almost invariably been extracted from the bones by the primitive method. Among the limb-bones of cattle there was scarcely one which had been left unsplit or unsmashed.

(d) Besides cattle and (much more rarely) sheep and pigs, red deer were eaten as occasion offered, and the diet was varied by shell-fish, such as oysters

and whelks, from the Firth of Forth. There were few remains of domestic animals other than those used for food, but their scantiness may be significant. The few relics of the horse, compared with the variety of breeds found at Newstead, seems to suggest that there were not many horses about the fort. The domestic fowl, represented here, as at Newstead, by a single bone, can scarcely have been used as food, for otherwise its remains would have been more abundant. The probability is that in both places it was kept solely for the pastime of gaming. At Newstead several different breeds of domestic dogs were found, and at Bar Hill two, each represented by a single skull. No bone of any dog was found at Mumrills, and comparatively few of the bones of the food-animals had the chewed ends which are so characteristic an indication of the presence of dogs about the kitchen refuse-heap.

(e) Although few wild animals could be expected to find their way into the precincts of the fort, the traces of such as did occur point to conditions in the Forth Valley very different from those which prevail to-day. Not one of the three animals identified is now to be found in the district. The Wolf has long been extinct in Scotland, but it still thrived in this particular area for many centuries after the Roman invasion. In 1283 King Alexander III. made an allowance to his Treasurer for payment of 'one hunter of wolves at Stirling,' and in 1491 a reward of 5s. was given 'to a fellow that brought the King [James IV.] two wolves in Linlithgow.' While the Wild Cat has been less ruthlessly hunted out than the Wolf, it too has ceased to be a denizen of the Forth Valley, although its disappearance is comparatively recent. In 1842 it was already extinct in most of the parishes in Stirlingshire, but still lived in Strathblane. Nowadays its nearest haunt is probably in Eastern Perthshire. Owing to the protection it has received, the Red Deer is still a common Scottish animal, but necessity has driven it from the low ground to the mountains. The nearest 'forest' to the isthmus is now that of Loch Sloy in Arrochar, Dumbartonshire, but the Deer may well have lingered on in the Campsie Fells until the Middle Ages. The presence of these three animals points very definitely to one great change which has taken place in the countryside round Mumrills since the Roman occupation. Wolf, Wild Cat, and Red Deer are by nature creatures of the woodland, and their united testimony is to the presence of forest, and probably extensive forest, in the near neighbourhood of the fort, the fringe of that '*sylva Calidonia*' described more than a thousand years later by Hector Boece as extending 'frome the Callendar and Caldir Wod evin to Lochquhaber.'

XII. SUMMARY OF RESULTS.

We conclude with a very brief summary of the results of the excavations:—

1. Mumrills was the site of one of the *praesidia* established on the line of the isthmus by Agricola in A.D. 80 or 81. The fortified enclosure, which was defended by a wooden palisade and a single ditch, was exceptionally large. The occupation, however, was a short one, covering perhaps not more than a single winter. Unlike Newstead and Camelton, the fort had no place in the system by which the Roman hold on Agricola's northern conquests was to be maintained.

2. In or about A.D. 142, when an attempt was made to regain some of the ground that had been lost in the interval and to push the frontier forward from the Tyne and Solway to the Forth and Clyde,

Mumrills again became important. It was selected as the site of what was, so far as is known, much the largest of the *castella* on the line of the Antonine Wall. Both now and in the Agricolan period, therefore, it may have been the station of the officer in general command of the frontier.

3. Of the other Wall forts that have been excavated, three had ramparts of sods and two had ramparts of stone. Mumrills had ramparts of clay. These showed unmistakable signs of reconstruction, while one of the ditches furnished clear proof that the fort had been twice abandoned and twice reconstructed before it was finally given up towards the end of the second century. This is in complete accord with the now generally accepted view as to the history of the Forth and Clyde frontier.

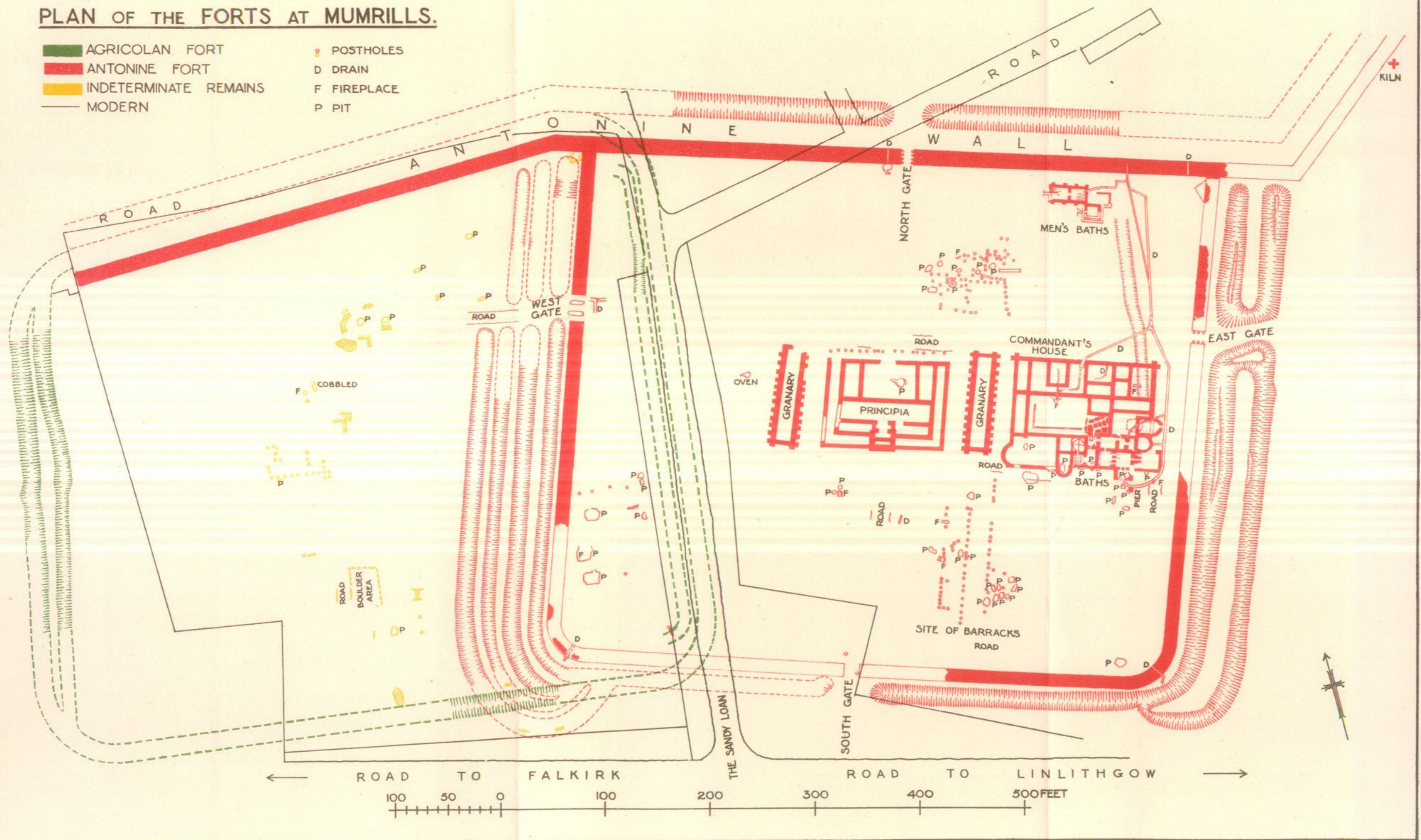
4. The Headquarters Building, which was among the largest in Britain, presented one or two unusual, though not entirely novel, architectural features. Like the Granaries, it was of stone. Although hardly any of it had survived save the foundations, its story could be read with tolerable certainty. It had passed through three phases, corresponding to the three successive occupations, and at each rebuilding it had undergone a more or less appreciable reduction in size. As in the other forts on the isthmus, the Barracks for the men had been of wood. Their walls had been of wattle and daub, and there is no doubt but that they had been destroyed by fire.

5. The Commandant's House was even larger than might have been expected from the size of the fort. Originally it had been of wood, like the Barracks. Burnt down, probably accidentally, during the first occupation, it was rebuilt on a more elaborate scale in stone. By and by it was found that some of the accommodation it provided was superfluous, and accordingly part of it was demolished to make way for the Baths, which had previously (we may suppose) stood outside the gates, as was commonly the case. Since the Baths had been thrice reconstructed, once apparently with a drastic change of plan, the remains of the Commandant's House were much confused. Architecturally, the most interesting point about them was the method employed for heating one of the rooms.

6. There were two sets of Baths within the ramparts. The smaller, which was obviously intended for the rank and file, and which had been in use during the first two periods of occupation only, was remarkable in having no cold bath, the place of the cold bath being apparently taken by douching. The larger, which had been the regular Bath-house of the fort, was sufficiently well preserved to admit of a fairly exhaustive and highly instructive examination. There were indications that

PLAN OF THE FORTS AT MUMRILLS.

- | | |
|---|---|
| AGRICOLAN FORT | POSTHOLES |
| ANTONINE FORT | D DRAIN |
| INDETERMINATE REMAINS | F FIREPLACE |
| MODERN | P PIT |



it had at first been laid out on normal lines ("Reihentyp"), but had afterwards been reconstructed on a less usual but more compact plan ("Blocktyp"). What seems to have been an ingenious device for introducing fresh air into the Caldarium and Tepidarium throws new light on appearances that have been noted by excavators elsewhere. In both sets of Baths the Sudatorium was provided with a channel-hypocaust which had been fuelled with charcoal, not with wood like the ordinary pillar-hypocausts. This probably means that the Sudatoria were warmed, not by radiation from the floor and walls, but by the direct admission of heated air.

7. It seems unlikely that there was any well in the fort. It may, therefore, be assumed that the water-supply, which must have been abundant, was introduced either by an aqueduct or by pumping from the stream below.

8. The number of the pottery fragments, though relatively small in view of the size of the fort and the length of time during which it was occupied, was absolutely very considerable. Only a very small handful of them could be assigned with any confidence to the Agri-colan period. The remainder furnish a useful conspectus both of the Samian and of the coarse ware which may be looked for on characteristically Antonine sites in North Britain.

9. There were no coins of any Emperor later than Antoninus Pius, which suggests that the final abandonment took place in the earlier rather than in the later years of the reign of Commodus.

10. The harvest of relics was disappointing, the contrast with Newstead and Camelon being very striking, so striking as to make it probable that at Mumrills the evacuation was an orderly one, but that at Newstead and Camelon it was carried out in haste and confusion. If so, however, that is only part of the explanation. The sandy character of the soil must have exercised a potent influence in hastening the decay of such perishable objects as had been lost or thrown aside. Great caution is therefore necessary in drawing inferences from the "finds." In so far as they are based on positive evidence—that is, on the presence of certain articles or features—such inferences may very well be justifiable. On the other hand, inferences from negative evidence might, in the circumstances, be highly dangerous. The discovery of a few Roman horse-shoes and a hippo-sandal, for instance, makes it quite safe to say that there were horses in or about the fort, but the entire absence of any trace of human footgear cannot possibly mean that men, women, and children habitually went unshod.