

ART. XXIII.—*Excavations at Willowford*. By R. C. SHAW,
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PART I. THE TURRETS.

IN the summer of 1923 excavations were undertaken to locate the turrets on the Harrow's Scar—Poltross Burn sector of Hadrian's Wall. Following the indications of the excavation report for the years 1909-1912 (see these *Trans.* N.S. xiii) operations were commenced in field No. 23. (o.s., ed. 1900) at the site marked with a cross in Plate XXXI of the above report. A trench was opened at a point 406 ft. from the gate between fields 18 and 23, and driven for 73 feet eastwards along the south face of the Wall, which was found to be unbroken and standing 3 to 5 courses above the footing level. In the gap east of the cross referred to the greater part of the Wall has subsided over the river scar. Following the initial failure it was decided to investigate the large mound on the Wall immediately east of Willowford farm house.

WILLOWFORD WEST TURRET.

In the first (1851) Edition of Bruce's *Roman Wall*, an allusion is made to a *castellum* near this site in the following words. "Before reaching the Irthing at a farm house called Willowford, the site of another *castellum* may be discerned." This passage is omitted in the other editions. Presumably the author refers to the mounds overlying the Wall hereabouts, which determined our selection of the place. The first trench on the east side of this mound revealed the west wall of a turret which will be hereafter called Willowford West. It may be mentioned here that

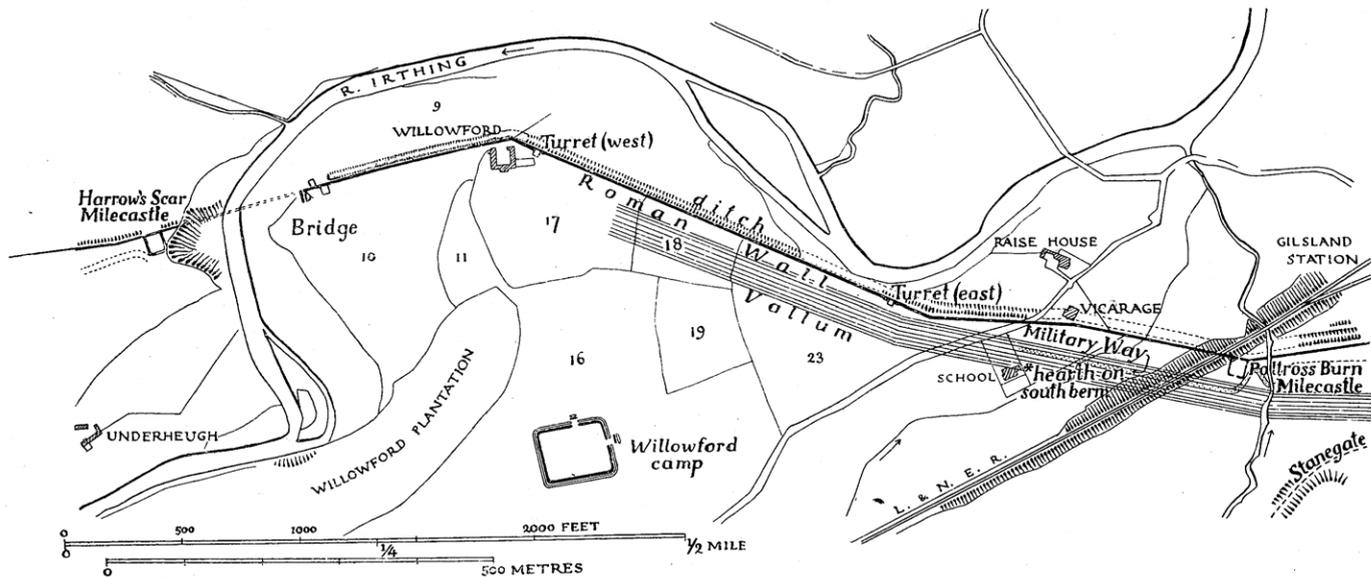


FIG. 1.—SKETCH MAP OF THE WILLOWFORD NEIGHBOURHOOD BASED ON THE O.S. MAP, WITH THE SANCTION OF THE CONTROLLER OF H.M. STATIONERY OFFICE.

the mounds proved to be due to modern excavations on the Wall for stone. The north and east walls were found in excellent preservation; the west wall was standing in good condition in the recess, beyond which it was reduced to the foundation; whilst the southern wall had been entirely removed, along with the south-west corner. The whole of the south side of the turret contained recently disturbed earth and modern potsherds.

The north wall was continuous with the Great Wall, there being no straight joint between turret and wall as at Walltown turret; the north face stood 8 courses or 4 feet $5\frac{1}{3}$ inches high above the footing, which projected $7\frac{1}{3}$ inches opposite the turret. This footing course was a peculiar feature in the construction. It converged with the Wall at a point roughly a little east of the position of the north-east internal angle and it continued westwards for at least 11 feet beyond the plane of the north west internal angle, that is to say it commenced approximately opposite the east wall of the turret and continued westwards beyond it. At the fourth course above the footing there was an offset of $4\frac{1}{4}$ inches which continued at least 15 feet east and 11 feet to the west of the turret. How far this feature was carried in the latter direction it is impossible to say owing to the fact that the Wall had been cleared out on its north side to the foundations 11 feet west of the turret, and beyond this area of disturbance it is reduced to the fourth course in height. On the inside the north wall is 13 feet $9\frac{1}{2}$ inches in length, and the footing projects 3 to 4 inches. The total width of this wall above the offset is 2 feet 9 inches. The east wall terminates in a broken extremity at a distance of 12 feet 9 inches from the north-east corner. It stands 7 courses or $3\frac{1}{2}$ feet above the footing which projects 2 to 3 inches, its width above the footing level is 2 feet 7 inches. The outer face shows an offset of 3 inches at the 4th course, similar to that on the north wall. The west wall is standing 8 courses in height.

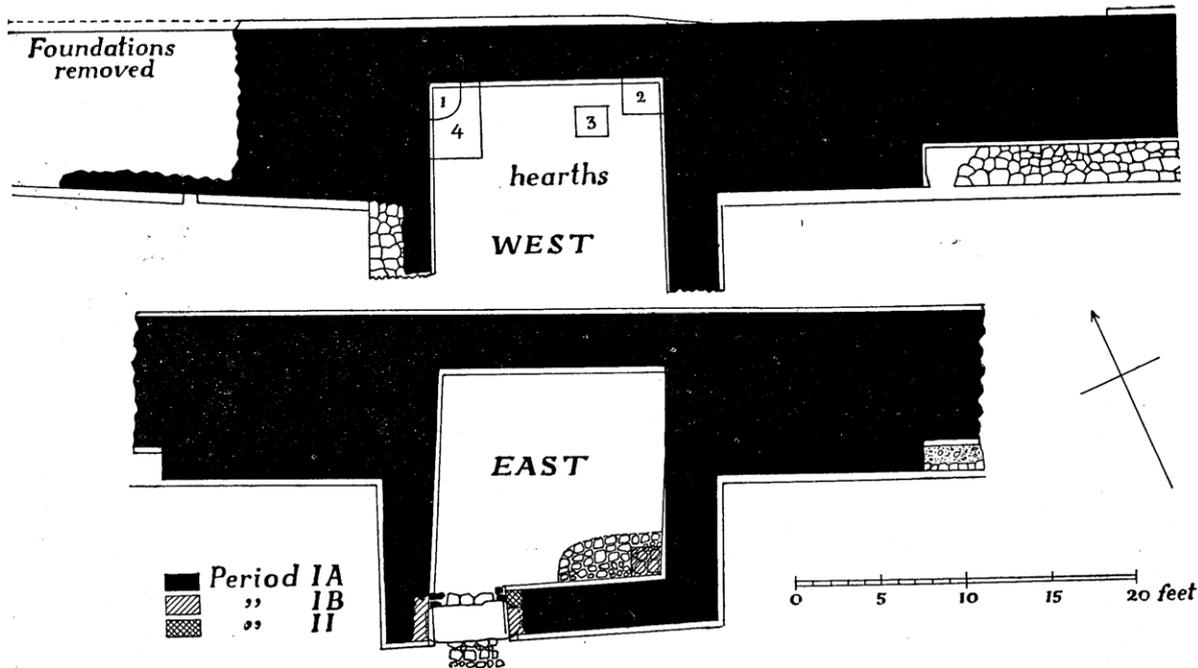


FIG. 2.—PLANS OF THE WILLOWFORD TURRETS.

in the recess beyond which four flat stones of the bottom courses and the foundations are left. The extremity of the latter is 11 feet 5 inches from the north-west internal angle: beyond this the ground has been disturbed to a deeper level. The foundation stratum, consisting of irregular blocks 6 to 9 inches thick, laid in clay, was approximately 3 feet 9 inches wide, and projected 2-3 inches internal to the stones of the first course.

The principal interest in connection with this turret lies in the buttress-like construction of the Wall on either side. It was found that the turret was recessed to the unusual depth of 7 feet, which is only approached by the Willowford East turret, to be described later.

The west side, on account of its ready accessibility, was first examined, the south face of the Wall being followed for 22 feet to the west. No break was found to occur in this façade. Close to the west side of the turret, the Wall showed a width of 10 feet above the footing, or 9 feet 8 ins. allowing for the north face offset, whilst at a distance of 39 feet west of the north-west internal angle the width was the normal 7 feet 7 inches, the whole of this increase being effected by a gradual outward deviation of the south side, whilst the north preserves a straight line. A similar widening of the wall was found at the Brunton Bank Turret, where it attains a width of about 9 feet 5 inches. It will be recalled that the north wall had an exceptionally wide footing commencing opposite the turret and continuing beyond it to the west. The continuation in the latter direction appears to have been only as far as the wall was thickened, the footing having regained the usual width of 3 inches in the trench 39 feet westwards. Unfortunately between these points the north face has been removed, so that the footing could not be exposed for the entire length. The south footing was 6-7 inches in width throughout this sector, and presents a gap 1 foot wide 10 feet west of the turret. Eastwards of the turret

no trace of a footing to the north side of the wall was found until it recommences 26 feet east of the internal north-east angle. On this side an interesting variation in this buttress construction was found. The Wall, 7 feet 4 inches wide as it approaches the turret, shows a sudden increase of 2 feet 8 inches in width at 12 feet 2 ins. east of the turret; both the south face of the normal Wall and the buttressed portion stand 7 courses high, the buttress showing an offset of 8 inches at the 4th course. Thus the total width of the Wall adjacent to the east side of the turret was about 10 feet below the offsets, which reduce it to 9 feet, the usual width of the Wall at a Mile-castle (e.g. at Poltross Burn). The footing of the buttress is 7 inches-9 inches wide and passes beneath the footing course of the east wall at their junction. The buttress stands 9 courses high near the turret or 5 feet above the footing. The return shows evidence of reconstruction. The three top courses contain well-dressed corner stones set slightly askew, whereas the fourth projects 1-2 inches; this corresponds to the offset level; whilst of the 6th course, the inner stone projects level with the footing of the south face of the wall, the outer stone being roughly broken. Lastly the flattish stones of the 7th course also project irregularly, obviously representing a broken wall (Plate I, B.). Here it will be noticed that the outer stone of this course shows a fractured extremity whilst the inner stone has a roughly dressed face; it will also be seen that most of the stones of the south face of the Wall merely abut on the inner facing stones of the return of the buttress. The top courses of the latter were removed and no continuation of the south face was found beyond.

The Wall likewise shows signs of extensive reconstruction. In the first place the footing course and first facing course of the buttress were found to continue eastwards beyond the return, thereby forming a foundation parallel



A.—WILLOWFORD WEST TURRET :
North face of Wall.



B.—WILLOWFORD WEST TURRET
South face of Wall with Buttress.

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to the Wall, consisting of a footing and a facing course and cobbles nearer the Wall. This structure was 3 feet wide near the buttress but diminished to 1 foot 4 inches further eastwards (15 feet) but at 100 feet it was 2 feet 2 inches wide. The south face of the Wall shows two footing courses, the lowest of which is above the level of the upper course of this foundation. Finally the entire absence of a footing to the north side of the Wall for a distance of 26 feet must be taken in conjunction with these points. The relative significance of these features is discussed under the Report of the Bridge excavations and those at the east turret.

The interior contained the remains of four floors preserved by the recess, beyond which lay disturbed earth containing fragments of modern glazed crocks. The strata may be described in chronological sequence following the usual period classification.

Period I a. The earliest floor consisted of a bed of gravelly clay about 10 inches in thickness, beneath which lay in places a thin stratum of dark grey material containing charcoal; but not a single potsherd was associated with this dark layer, which presumably represented the original surface. Its level corresponded to that of the foundations, whereas the surface of the clay floor was on a plane with the footing course. The site of the hearth of this occupation was in the north-west corner, as shown by the firing of the stones and a thick stratum of ash and coal.

Period I b. The floor of the preceding occupation was covered with an evenly distributed stratum of ash containing masonry débris, upon which were laid the thin flagstones of the second floor; in some places the fallen blocks of stone were used for paving. The hearth of this floor, slightly raised above the surrounding level, was placed 1 foot from the north wall and $3\frac{1}{2}$ feet from the north-east corner, being $1\frac{1}{2}$ feet above the surface of the

clay floor. It consisted of a well-fired flag bedded in clay and surrounded with a clay and stone kerb, the whole being 2 feet square; it was covered by a thick layer of peat ash.

Period II. This floor, consisting of rough flag stones and fallen masonry, lay on an average about 6 inches above that of the preceding occupation. The hearth was located in the north west corner and like that of Ib. was formed by a flagstone kerbed with a stone set in clay on the west side, the walls backing it on the north and east sides. The whole was buried under a thick layer of peat ash amongst which were found several small pieces of iron and pottery.

Period III. The floor of the last occupation consisted of large flagstones, and lay a little below the level of the top courses of the north wall. The corresponding hearth was situated in the north-west corner and was slightly raised above the general level. The large well-fired flags measured $4\frac{1}{2}$ by 3 feet over all and were 3 feet above the Ia. clay floor. The last stratum was covered by fallen masonry amongst which were some good-sized pieces of charcoal, presumably from the burnt superstructure, but no evenly distributed ash such as covered the Ia. level was noticed, which one might expect if the entire upper storey were of timber.

On the west side of the turret a trench was carried 22 feet along the south face of the Wall. This was found to be robbed of its facing stones adjacent to the turret probably when the west wall was razed, although immediately beyond 5 to 6 courses were still *in situ*; after 14 feet the face was entirely robbed down to the first course. Adjacent to the west side of the turret lay an extensive rubbish tip containing many chips of pottery, bones and ashes. This lay mostly within 6 feet of the foundations of the west wall though fragments of amphorae were found as far away as 15 feet. The lowest level of the

tip was covered by a layer of ashes and masonry débris such as intervened between floors Ia. and b. Above this lay a stratum of clay in the vicinity of the turret, again followed by masonry, bones, charcoal and potsherds.

WILLOWFORD EAST TURRET.

This turret was located 533 yards east of the preceding one and was 498 yards from the Poltross Burn mile castle, measured from centre to centre. The irregularity in spacing is readily accounted for by the physical features. The western turret was placed at the summit of the steep eastern scarp of the river valley, so as to command the passage of the river by the Wall; the eastern occupied the highest point between the western turret and the mile castle at the Poltross Burn, and in sight of both; commanding at the same time a large sweep of the valley north of the Wall.

The turret was found to be in excellent preservation. The north wall, upon which is built the modern field boundary, was standing 6 feet in height at the north-west corner, comprising 12 courses of masonry in addition to the footing. Both east and west sides were well preserved beneath the field dyke, where they stood 12 courses high; south of the protecting bank both sides were reduced to an average height of 3 feet, the top stones lying just below the field turf in the ruts of an old cart road. The east wall stood 7 courses on the inside, and the west 5 at its highest point. The latter wall had suffered more than the others from the pressure of cart-wheels which had passed outside the south-east angle but inside the south-west, thus starting the corner stones of the latter. On exposure six corner blocks were *in situ*, all thrust outwards in an overlapping manner. The southern wall was well preserved, standing at the regular height of 6 courses above the footing except near the door, which was placed at its west end.

This turret belongs to the type which were recessed into a buttressed section of the Wall, a mode of construction which was found at Steelrig, Limestone Bank, and Blackcarts Turrets, where the Great Wall was thickened by 2 to $2\frac{1}{2}$ feet for 13 or 14 feet on either side of the corresponding turrets (see Newbold, *Arch. Ael.* ser. iii, Vol. ix, p. 18). In the present instance the increase in width was 1 foot 9 inches, which continued 12 feet 2 inches to the east of the turret and approximately 13 feet to the west. The corner of the east length was faced with well squared stones in its upper courses and the masonry was bonded into that of the south face but projecting 3 feet from the reduced wall. The footing and two courses of the thick wall are continued eastwards beyond the return.

The depth of the recess was $6\frac{1}{2}$ feet, comparable to its western neighbour, but exceeding all previously known examples; that of Limestone Bank, which is 5 feet, being the nearest approach. The south face of the thickened Wall at the junction with the east side of the turret stood 7 courses of $3\frac{1}{2}$ feet above the footing, and on the west side also 7 courses. The footing of the buttressed portion projected 5 inches whilst the face showed an offset of 2 inches at the 3rd course.

In plan the general outline is somewhat irregular, like that of Limestone Bank, Brunton and Mucklebank turrets. The north wall measures 13 feet 3 inches inside, whereas the south wall measures 14 feet 4 inches. The east wall was 12 feet 8 inches long, and the west $13\frac{1}{2}$ feet, measured to a point corresponding with the inner face of the south wall. The footing course showed a similar irregularity. Along the inside of the east wall, it projected 3 inches at the south east angle, but gradually converged with the wall, coinciding with it at roughly $5\frac{1}{2}$ feet from the north wall. Likewise along the south side the footing narrowed towards the door to a width of $2\frac{1}{2}$ inches, whilst along the west wall the projection was

about 2-3 inches, and on the north 4 inches. There were two footing courses 1 foot 2 inches deep resting on clay and cobble foundation.

On the exterior the footing projects about $4\frac{3}{4}$ inches along the east wall, 4 inches along the south, where it is also stepped slightly at intervals owing to the gentle westerly slope, and 4 inches on the west, which is also stepped slightly due to the northerly fall of the ground, which amounts to about $5\frac{1}{2}$ inches along the west face between the south-west angle and the south face of the buttress.

The masonry of the corner showed alternate large and small blocks. That of the walls was generally of smaller blocks than the Wall face, whilst in the centre of the outer face of the west wall the masonry was poor and had a slight batter outwards. The north wall was 3 feet 2 inches in thickness, which may be compared to an average of 4 feet on the Birdoswald-Wallbowers sector and 4 feet 4 inches average on the Limestone Bank-Brunton Bank series; whilst the east, south and west walls averaged about 2 feet 11 inches in thickness, which is a usual average. The interior contained the remains of four distinct occupations which will be considered seriatim.

Period Ia. The floor of the first occupation was of gravelly clay, as frequently found in this phase, and was on a level with the footing course of the walls. Below this level a most interesting find was a fragment of a late first century Samian bowl, form 37, which lay midway between the door and the north wall, whilst a well-preserved denarius of Vespasian was found on the floor near the south side of the entrance. The doorway was in the south wall near its western end, and judging from the three threshold stones projecting below and on the inner side of the massive block, was probably about 3 feet in width. The side walls of this entrance have been entirely destroyed, but that on the west side was indicated by two stones laid as "throughs" projecting from the

west wall; they can be seen in the photograph, on the west side of the early threshold. In the same illustration the dressed stones on the east side of the entrance passing internal to and below the level of the large block of the later threshold indicate the position of the corresponding side wall of the early door. Excavation of the outer face similarly showed the narrower early paving projecting below the great stone. In the plan the stones indicating the position of the original jambs on the internal side are shown in black. The hearth of this period was in the centre of the floor judging by the thick deposit of peat ash thereabouts.

Period Ib. This floor was laid 8 inches above that of the preceding period, a stratum of burnt material without masonry debris intervening, and was paved with thin flagstones laid on a layer of clay sealing down the rubbish. The principal hearth was situated in the south-east corner as shewn by well-burnt flags about 1 foot 9 inches square covered by a thick layer of soot. During this occupation considerable alterations were effected in the entrance, the previous side walls being entirely removed, a massive stone laid for the new threshold and the side walls reconstructed over the ends of this, the total distance between these being 4 feet 9 inches at the outer side. The western jamb exhibited two of the outer corner stones *in situ*, all the remaining facing stones on this side having fallen: on the opposite side 4 outer corner stones were in position standing 2 feet 7 inches in height, whereas the inner corner of the same jamb showed signs of further reconstruction. The large threshold stone did not extend across the full depth of the entrance, falling short by about 1 foot of the inner side; the flagged flooring being produced to meet it. On either side there were slight sinkings crossing the stone transversly, roughly parallel to the side walls; they may be compared to the shallow slots similarly placed in the threshold stone at Limestone

Bank turret, where they terminated on the inside at post holes, but no holes were found in the present instance. Probably the spaces between sinkings and side walls were occupied by stone or wooden jambs on which the doors could be hinged. The width of the entrance, about 4 feet 3 inches between the sinkings (as compared with 3 feet 4 inches at Limestone Bank and 3 feet average elsewhere) and the presence of two slots situated close to the outer edge of the stone in the same line and roughly equidistant from the sinkings, both near the centre of the corresponding half of the stone, suggests the presence of double doors for which the latter were the bolt slots. The western one is much worn and is 8 inches from the west sinking, the eastern one measures 4 by 2 by 1 inches and is 10 inches from the east sinking.

Period II. The preceding floor was covered by a layer of masonry debris and a little ash, about 1 foot 8 inches in thickness, on which was laid a thin stratum of puddled clay and on this the flagging. Corresponding with this occupation was a large base-like structure like that at Limestone Bank, consisting of stones embedded in clay, which extended from the south-east corner for about 6 feet along the south wall with a width of about $2\frac{1}{2}$ feet. In the corner four huge rough stones were closely fitted together overlying the earlier hearth and comprising part of the base. A thick deposit of peat ash in the north east corner probably indicated the site of the hearth; amongst this was found a diagonally scored flue tile. During this phase the entrance was again raised, paved with cobble stones and the inner side of the east jamb reconstructed. The lowest corner stone on this side rests on a rough stone packing, being on a level with the third corner stone of the outer face; the raised inner bottom stone was level with the roughly cobbled threshold.

Period III. The flagstones of the fourth floor were laid like the others on a layer of puddled clay about 2

inches thick, which overlay 2 feet of debris consisting principally of fallen masonry but containing very little burnt material.

This floor sloped up towards the north and east sides of the turret, at a point a little east of the centre of the turret, the floor, here 1 foot below the surface, was fully 6 feet above the earliest floor, whereas opposite the door the difference in level was 5 feet.

In the south side of the turret this top floor has been entirely destroyed, the field wall and bank preserving it on the north side. Two hearths were found at this level. One was paved with flagstones bedded in clay so raising it above the floor and kerbed with small oblong stones set end to end. The second hearth was formed by two large flags about $2\frac{1}{2}$ feet square, and was situated in the centre of the floor, rather nearer the east wall.

At levels II and III many rectangular fragments of stone bevelled on one side were found, generally fallen endwise close to the inside of the walls. The largest piece was found embedded on edge in the debris above floor Ib., but just covered by the floor II. It had evidently belonged to phase Ib., and many smaller fragments were contemporary with it as evidenced by their position; possibly they served as a cornice projecting inwards from the walls of the tower.

In the north-west corner in the period II debris was a neatly dressed cubical block with a small slot in the centre, which is mentioned as a striking contrast to the other coarser masonry.

Certain deductions may be made from the debris found in these two turrets as to the nature of the superstructure. Both showed a dense stratum of burnt material between the floors Ia and Ib with masonry debris in one case, but not in the other; whereas in the later strata of debris masonry is much in evidence, but burnt material is comparatively scarce; suggesting that although the

destruction was just as complete as in the first instance, there was less combustible material about. A dense ash stratum overlying the earliest floor was also noted at Mucklebank, whereas on the Birdoswald sector an ash layer was noted above each floor. In the Willowford turrets I am inclined to think that the later towers following the disturbances of the mid-second century were built entirely of stone save for the necessary timber work in the roof, whereas in their earliest phase they may have had a wooden upper storey. The wooden watch towers on the German limes were replaced by stone ones about the time of Hadrian, and on the column of Marcus Aurelius both stone and timber towers are represented.

Lastly another feature must be noted, namely, the presence of many flagstones lying on edge amongst the masonry debris above the floors of period II and III. These have been seen on other sites and probably represent the flagged floor of the upper chamber, perhaps only where the rampart walk passed through the tower. It will be seen that certain problems remain to be decided, namely, the precise nature of the superstructure, the use of the platforms, the purpose of the bevelled stones and the object of the buttresses. The purpose of the turrets must be borne in mind: their *raison d'être* was probably as signalling-stations linking up the various fortifications rather than mere sentry-boxes; this is borne out from analogy of the Danubian watch-towers, as depicted on the columns of Trajan and Marcus Aurelius, where torches are seen protruding from the upper storeys and fuel stacked ready for lighting. An efficient system of rapid communication would be absolutely essential on so extended a frontier line. It is therefore merely suggested tentatively that the retention of the broad wall adjacent to the turrets might serve to provide room for fires for signalling or storing material for such a purpose, although the analogy of High Rochester, etc., might suggest ballista

platforms. The primary significance of the buttresses is fully discussed under the Bridge Report.

THE FINDS.

Stone.—Two fragments of micaceous sandstone, roughly marked out in squares; probably portions of draught-boards (east turret). Another, having a rudely-engraved row of three circles with probably a fourth circle at one end and a more angular figure at the other, in the west turret, 2nd period floor. Mr. F. G. Simpson tells me that a piece of stone bearing similar marks was found at Winshields mile-castle: in that case the board was apparently complete.

Three whetstones (W. turret); one in E. turret; a heavy stone disk with a circular soot-mark on one side (cover or stand for cooking-pot) E. turret, 1 b. Half of a small quern in the modern fence-wall above E. turret.

Both turrets were roofed with stone slabs, many fragments of which were found at all levels.

A centurial stone, > *COCCEI REGVLI*, *Eph. Epigr.*, vii, 1075, was found during the last century in the garden wall at Willowford and later removed to Naworth.

Tile.—Two fragments of a flue-tile with diagonal scoring (E. turret, hearth II). Piece of roofing-tile (W. turret, near E. wall, lowest level).

Iron.—mostly too much corroded to recognise. Several nails of various sizes (all levels). Spearhead $6\frac{1}{2}$ inches long (turret, 1 b). Socket with stumpy blade, the whole $4\frac{1}{2}$ inches long, the blade $2\frac{1}{4}$ inches wide (same site 1 a). Two bars each $2\frac{1}{2}$ inches long jointed together and looped at each end, one bearing a link (part of a bit?). Two small broad-bladed knives with tang upturned at end (near W. wall of E. turret, floor 3). Small heavy fragment pyramidal in shape (head of pilum?). Many corroded plate-like fragments in hearth 1 a, W. turret; hearth 2 contained several round lumps of fused iron.

Bronze.—E. turret: several small pieces, including a late 2nd century knee fibula with three flutings on the bow (in loose soil thrown out from between floors 1 b and 2); fragments of a pair of tweezers; folded strip of thin bronze (edge of a sheath?).

Coin.—Denarius of Vespasian.

Obv: IMP CAESAR VESPASIANVS AVG. Laureate head, r.

Rev: COS ITER TR POT. Fortuna, seated l., holding branch in r. hand and caduceus in l. (Cohen, ed. I, 8: A.D. 70).

Dr. H. H. E. Craster writes: "The coin is not greatly worn, and I should say that it is not likely to have been dropped later than the reign of Hadrian. It is quite possible that denarii of the Flavians were still circulating in considerable numbers in the reign of Pius; but it is not sufficiently worn to have been in circulation for more than half a century."

Glass.—Small melon bead (W. turret). Fragment of the base ($3\frac{1}{2}$ inches wide) of a bluish-green bottle of the reeded handle type (same level 1). No window glass.

Pottery.—The pottery from the two turrets shows a fairly representative collection of types, with a few exceptions, that are usually associated with the three occupational levels in the Wall fortifications. The modern disturbance at the west turret had fortunately left untouched the strata in the recess in which most of the pottery was found, the remainder coming from the rubbish tip on the west side, whilst at the East turret pot-sherds were relatively scanty, considering the excellent preservation of that structure, and were more evenly scattered among the debris. The pottery is compatible with a Hadrianic first occupation, but does not carry the occupation down to the fourth century. On the other hand, structural comparison with other Wall sites suggests that these turrets were not finally abandoned (as some turrets were) before the fourth century, in spite of the conspicuous absence of late pottery.

WEST TURRET.—1 a. *Mortaria*: two fragments ($8\frac{1}{2}$ inches diameter) of fine pink paste, free from coarse grit, smooth finish both surfaces. Broad flat rim, groove near lip, small internal margin. Early 2nd century. *cf. Arch. Ael.* ser. iii, ix, pl. III, fig. 1, Limestone Bank. Fig. 3, no. 1.—Fragments of base of another, buff, coarse grit.—Flat buff rim, small inner margin. *Amphorae*: several fragments representing at least two vessels and a handle of a third, 5 inches long, with stamp SER (*cf. Monte Testaccio, St. Colombe, Newstead*). The shape of this handle is early in type: *cf. Curle, Newstead*, pl. LII, fig. 11). *Bottles* (2): two bases, reddish clay, hard baked, white external engobe, which has also run on inside of one vessel. *Jars* (9): All well-baked grey ware, average $3\frac{1}{2}$ -4 inches diam. Fig. 3, nos. 3-9.—Base and side of grey ware, interior strongly ribbed.—Side with two girth-grooves an inch apart, beneath these three fainter parallel grooves (*cf. late Celtic types, e.g. May, Silchester*, pl. LXXXVI, 3, 8: also Colchester Mus. Report 1909 p. 11, pl. VI, 1757-8, 1st cent. B.C., from Lexden).—Another similar fragment, apparently from a different vessel. *Bowl*: Portion of straight-sided bowl bevelled

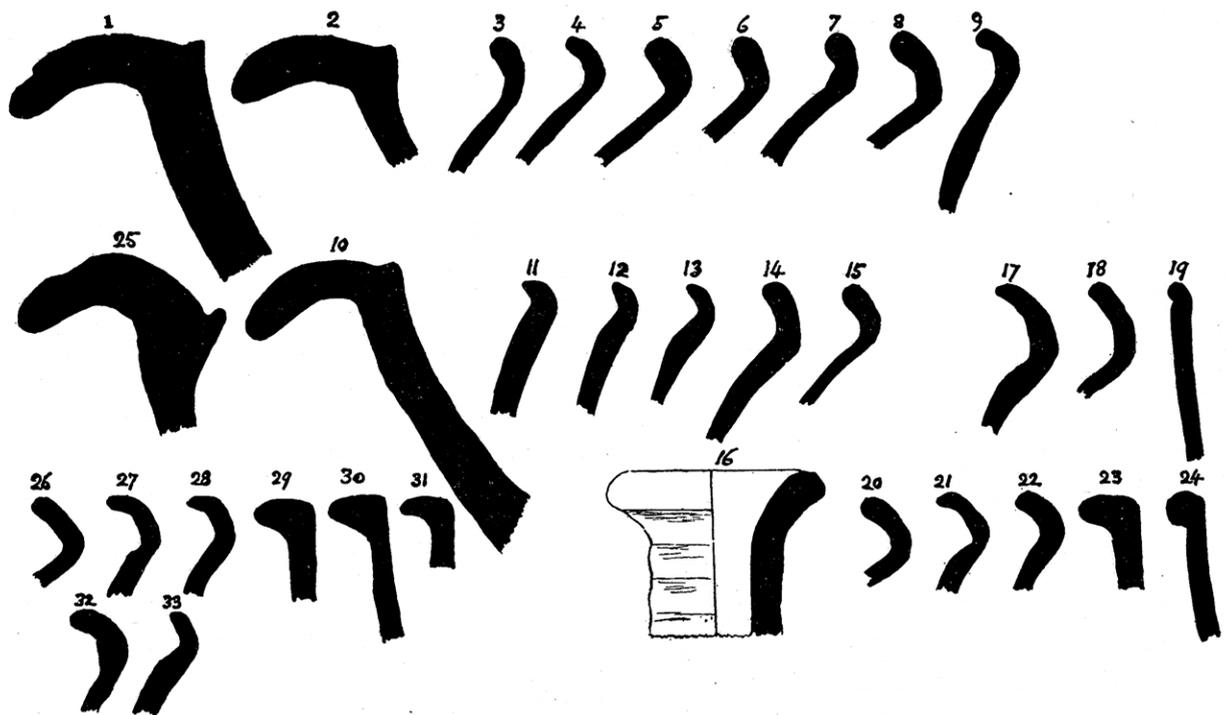


FIG. 3.—COARSE POTTERY FROM WILLOWFORD WEST TURRET (4).

at junction of base and side; the side splaying outwards towards rim. Base $10\frac{1}{4}$ inches diam. Hard grey ware. *cf.* Miller, *Balmuilty*, pl. XLVII, 6-12. *Cooking pots* (about 10): Fig. 3, nos. 8-9. Sandy black ware, lattice decoration. No. 8: diam. $5\frac{1}{2}$ inches, wavy line below rim, rare after middle of 2nd century. General type, the necked variety. No. 9: diam. $4\frac{1}{4}$ inches, wavy line, reddish brown.

1b. *Mortarium*: Fig. 3, no. 10. 9 inches diam. Buff, free from coarse grit, outer surface slightly ribbed, flat rim, inner margin. Collingwood, Hardknot type c: Miller, *Balmuilty* pl. XLI, 17 (2nd century). *Bottle*: Fig. 3, 16. Neck, from back of hearth. Reddish clay, with creamy white engobe, much worn and chipped. *Jars* (4): Fig. 3, no. 15. Thin grey ware, $3\frac{1}{2}$ inches diam. *Cooking pots* (4): Fig. 3, nos. 11-14. Nos. 12-14 burnished externally. *Samian*: part of rim and base, Dr. 31, good bright glaze.

2. *Jars* (2). Fig. 3, no. 18. Bluish grey. *Cooking pot*: reddish brown, sandy. *Mug*: Fig. 3, no. 19. Diam. $4\frac{3}{4}$ inches. Two fragments: light buff, bead rim.

3. *Jar*: Fig. 3, no. 17. Bluish-grey, 5 inches diam. Burnished externally. On floor near hearth.

Unstratified: 5 cooking pots, 2 jars (fig. 3, nos. 26-33) and side of reddish mortarium.

Rubbish tip: many fragments of cooking pots: 3 flat bowl-rims (fig. 3, nos. 29-31) in cooking pot ware, like Appletree 1 b, pl. XVII, 66, and Poltross Burn, pl. III, 31-33. From the upper layers of the tip, near top soil, many fragments of a soft pinkish bottle like that on level 3 in the east turret. *Samian*: part of base and side of a late Dr. 27: the position in the tip corresponded with level 1 b.

Trench outside north wall. *Mortarium*: large pieces of side and spout, smooth pinkish paste, with a few pieces of quartz; sooted externally. Fig. 3, no. 25. *Bottle*: reddish clay, cream engobe, base $2\frac{3}{4}$ inches diam. *Dishes or Bowls* (2): Fig. 3, 23-24. 23, light grey. 24, greyish-black, late 2nd century. *Cooking pots* (3): Fig. 3, no. 22. Sandy black, burnished externally. *Jars* (4): Fragments of side, greyish, with girth groove. Thin light-grey base. Two rims, fig. 3, 20 (brick-red), 21 (greyish, later type).

EAST TURRET. 1 a. *Samian*: see below. *Mortarium*: fragment of drab base, greenish grit. *Beaker*: indented side, rough-cast externally: grey clay, dark slip, well baked; *cf.* Curle, *Newstead* pl. XLVI, 31 (early period). On the continent, such vessels occur from Flavian to Antonine times. *Cf.* also Throp

and Haltwhistle Burn, 1 a, and Poltross Burn. *Bottle*: portion of neck and side: hard grey, greenish in places. Outer surface smooth on neck, rough on body which shows an offset at the bottom of the fragment. *Amphorae*: several fragments of sides, *Bowls* (3): rims, flat, late 2nd century (fig. 4, nos. 1-2). Hard smooth grey ware, average external diam. 9 inches. *Cooking pots* (6): fig. 4, nos. 3-4. One diam. $4\frac{1}{4}$ inches, wavy line round neck, reddish-brown outside; one diam. 5 inches, black, burnished externally, large lattice pattern.

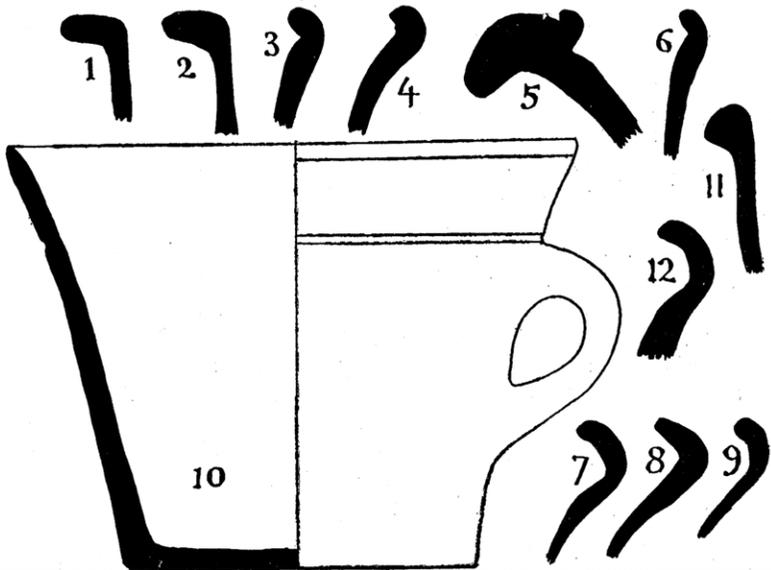


FIG. 4.—COARSE POTTERY FROM WILLOWFORD EAST TURRET (3).

1 b. *Samian*: nearly half a cup (Dr. 33) from near west wall, opposite entrance. Good glaze, paste thin and hard. Wide-spreading sides, faint groove near centre of outside, internal groove below lip. Oswald and Pryce, pl. LI, 14 (Rheinzaubern, middle 2nd century). *Mortarium*: Fig. 4, no. 5. 7 inches diam., orange, cream slip, quartz grit, rough externally. Late 2nd century: cf. May and Hope, pl. XI, 146, and Curle, *Newstead*, pl. L, 8. *Cooking pots* (2): fig. 4, nos. 7-9. *Jar*: Fig. 4, no. 6: hard grey ware, slight lustre externally, $4\frac{1}{2}$ inches diam. *Mug*: Fig. 4, no. 11. Soft buff, capacity about $1\frac{1}{2}$ pints. Complete but for three side fragments.

2.—*Samian*: Fragment from rim, Dr. 31. Thick; poor dull glaze. *Mug*: Fragment of bead-rimmed side, double groove $\frac{1}{2}$ inch below lip, darker than that in 1 b., $7\frac{1}{2}$ inches diam. *Bowl*: Fig. 4, no. 11, grey-black, diagonal lines scored externally. Regular type at Balmuildy (Miller, pl. XLVII, 10-13); cf. Limestone Bank, pl. III, 1. *Bottle*: portion of neck and side, soft, pinkish. Sharp groove at junction of neck, fainter groove below. Smooth neck. *Cooking pots* (2): fig. 4, no. 12. *Jars* (3) fragment of base (thin grey ware), 2 fragments of sides.

3.—*Bottle*: fragment of side and base, soft, pinkish. Moulded rim on base.

Samian period 1 a. Two chips of an early Dr. 27 from near the foundations of the south wall outside, associated with a fragment of the bowl described below.—A fragment of Dr. 37, floor 1 a, Hadrianic date; good bright glaze, ovolo with tongue formed of pellets and ending in a four-pellet rosette; row of pellets separate ovolo from decoration, which is undecipherable.—Six fragments of a bowl (Dr. 37) making up about one-third of the whole, found on floor 1 a, and one piece of same bowl found on the southern side of the foundation level. Mr. D. Atkinson reports on this bowl as follows:—

“Decoration: Ovolo with tongue ending in a small rosette. Below two bands of decorations separated by corded lines.

(a). Between trees, rabbits crouching, alternately to right and left. The branches of the tree (drawn freehand in the mould) vary in form and number, but each ends in an oval flower formed of six dots.

(b). Large ovolo, the festoons formed of V-shaped lines set closely together; the tassels are corded lines ending in knobs with two horizontal grooves. Within the festoons are birds with back-turned heads, facing alternately right and left. The earliest potter on whose bowls most of these types, the rabbits, flowers, festoons and birds occur is Germanus (c. 60-85); cf. Oswald and Pryce, Pl. XI, 7: Knorr, *Töpfer und Fabriken Verzierter Terra-Sigillata des Ersten Jahrhunderts*. Taf. 35 and p. 59 (last line); but some details, e.g., the ovolo and the tassel of the large ovolo are not found on Germanus bowls and this vessel was no doubt made by one of the potters who a little later used Germanus types, such as Masculus or Biracillus. Close parallels are offered by Knorr, *Cannstatt* 1905 Taf. XII, 1, and Oswald and Pryce, Pl. XIX, 5, the former with the stamp of Masculus, the latter of Biracillus. It may be regarded as certain that the bowl belongs to one of this group of the successors of Germanus, and it is probable that

Biracillus was its maker. In any case the date of its manufacture must be between A.D. 80 and 100, since the type of its decoration is by no means the latest associated with the South Gaulish potteries, whose production of decorated vases had ceased before the end of the reign of Trajan. A design similar to the upper zone of this bowl, that is to say rabbits, trees and flowers, at the ends of twisting branches, features on a bowl in the York Museum collection (see May, *Catal. Pottery York Museum*, Vol. I, Plate III, No. 9, also *cf.* Walters, *Catal.* 558-592) which is ascribed to the Rutenian Potteries.

Its presence on the Wall can only be explained by regarding it as one of the few survivals from an earlier period such as must naturally occur, and this supposition is strengthened by the fact that the bowl had been broken and repaired in Roman times with lead rivets, of which some traces remain as well as the holes in which the rivets were fixed. Parallels to this discovery may be found in the stamps of Passienus and Scottius at Carlisle (*cf.* these *Trans. N.S.*, XVII, 248) or the vessel, dating from the reign of Nero at the latest, found at Rottweil in Upper Germany, the occupation of which began at the earliest in A.D. 74. This find therefore, while notable, need cause no misgivings as to the correctness of the received dating of the stratum in which it was found, nor should it be regarded as providing evidence of an earlier occupation in the immediate vicinity."

PART II. THE BRIDGE.

The beautiful valley of the Irthing broadens into a wide holm below Willowford farm, fringed by steep wooded banks and bounded by the river on the north and western sides. Over the plain of this natural amphitheatre passes the rubble mound of the Great Wall, heading towards the ruined fragment on the brink of Harrows Scar beyond the river. The mural ridge increases considerably in size nearer the stream and terminates abruptly 90 yards from its eastern bank.

Historical account and local authority had long held that a bridge in conjunction with the Wall spanned the Irthing on this site. The earliest record is by Camden in his "Britannia" (Gibson's Ed. p. 836), where he says—

“ The Picts’ Wall passed the river Irthing by an arched bridge at a place now called Willowford.”

Whatever tradition or actual remains were then known it is clear that they were entirely forgotten after Camden’s day, until the nineteenth century, when Bruce records that when John Armstrong of Crooks was digging for stone at a place 60 yards from the river bank he came on the land-breast of the bridge standing three or four courses in height. The excavators of 1893-4 did not make any trial cuts here, but note the extremity of the mural ridge as the site of the abutment; it was here that the present excavations were commenced, resulting in the immediate exposure of what proved afterwards to be the pier in front of the latest abutment.

An interesting factor and one of considerable importance on the site is the movement of the river. The bed falls considerably in this neighbourhood; consequently the stream, always swift, comes down with great force in times of flood. The direction of the force, which is south-westerly, has only the clay and sand banks that culminate in Harrows Scar to oppose it, resulting in the course of the river steadily shifting westwards. As an example of the rapidity with which such a change may be brought about, it may be mentioned that in August 1897 the river in spate broke through the south-east corner of field No. 209 (O.S.), on Underheugh farm, shifting the width of its entire bed in the one flood. An interesting fact, showing that it had previously inundated this part, was the occurrence of plough-ridges in a stratum of dark soil covered with a layer of gravel which was stripped off by the flood. The direction of the furrows was opposite to that in which the land had been ploughed in living memory. Surface indications show an old river terrace in field No. 10 (O.S.), which can be traced nearly as far as the centre of the bridge site from the Willowford Wood. Within living memory trees were growing on this old

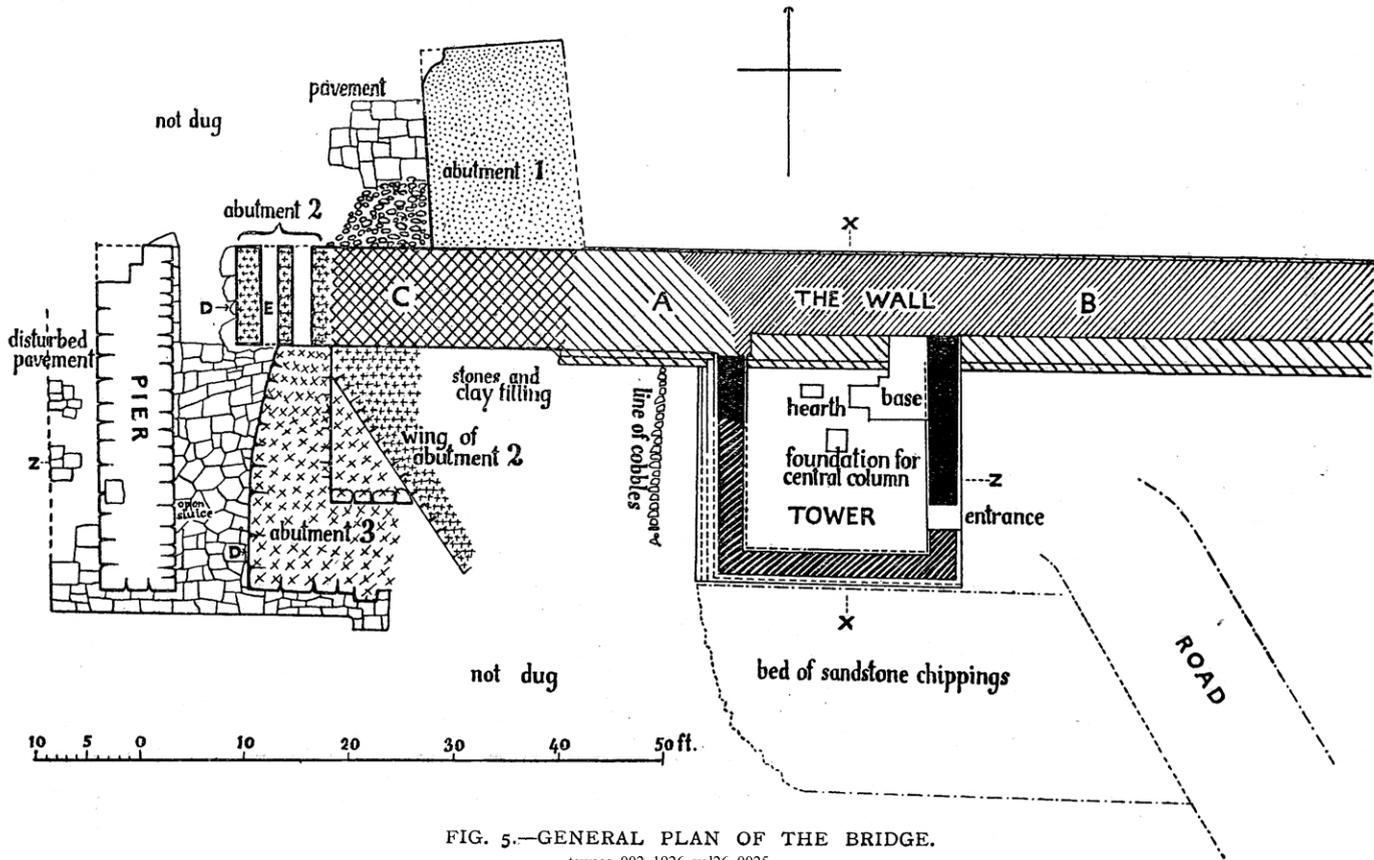


FIG. 5.—GENERAL PLAN OF THE BRIDGE.

bank. Near the bridge the soil has been spread and ploughed down, practically obliterating the line, but at the foot of the wood, southwards, it is sharply defined. A trench cut across this line and carried westwards close to the excavations revealed an old river bed which, as will be shown later, was probably the course of the stream at the earliest Roman occupation.

Another significant fact (illustrating the course of the river in the medieval period) is the parish boundary, which follows the fence between fields 10 and 206 (o.s.). Horsley (*Britannia Romana*, p. 152, published 1732) seems to hint that this process was actively progressing in his day where he says "the bank of the river Irthing on the west side is very steep and high, but it seems to have become more so of late years from the falling away of the sandy bank."

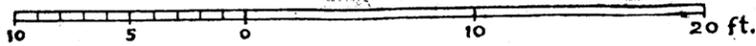
In order clearly to distinguish the different structures of the same type and avoid repetition of names, the several sections of the Wall will be denominated by the letters A, B and C, whilst the breastworks or abutments will be numbered 1, 2 and 3. The other structures will, of course, be referred to by their appropriate names such as the tower, etc. The order of letters or numbers does not imply chronological sequence, but is merely for convenience.

THE WALL.

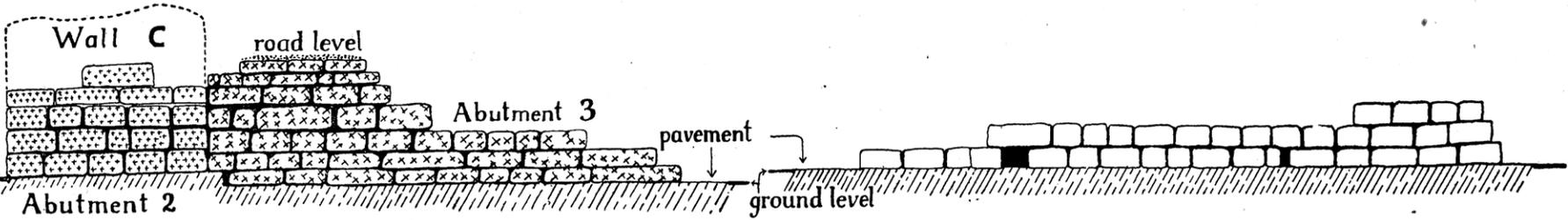
The Wall shows three distinct constructional phases, whose relations to each other can be satisfactorily determined. The earliest work appears to have been partially demolished eastwards, that is on the landward side, and to have been replaced by a thinner Wall. The third phase consists of an additional sector carried westwards from the broken extremity of the earliest Wall. The work of these three periods will be distinguished by the letters A, B and C in the sequence given above.

WALL A.—The earliest Wall is founded on a bed of cobbles and broken stones (some of these being roughly squared) about 12-15 inches in depth laid on the alluvial sand which is found everywhere beneath the top soil in the river plain. Above this stratum comes the footing course consisting of a line of roughly dressed stones; the full width of the foundations at this level being 11 feet. The face of the Wall is set back 9-10 inches on the south side and 6 inches on the north. Above this it is carried upwards for four courses, followed by a second offset 6 inches wide on the south and 2-4 inches on the north face.

In the south face, west of the tower (fig. 7, i), there are eight courses *in situ*. The first two average 6-7 inches depth, the third and fourth about 4 inches, the fifth 7 inches and the sixth, seventh and eighth 5-6 inches. The two lowest courses, containing 12 and 13 stones (west of tower) continue westwards as far as the broken face beyond which the Wall C commences; but all the rest fall short of this junction. The third and fourth courses contain 11 and 13 stones respectively, west of the tower; beyond this their line is carried on to the commencement of Wall C by some rough reconstruction. The fifth course contains eight stones and a cobble; the sixth four, and four more after an interval of 16 inches; the seventh three, and three more following a gap of 39 inches. Of the eight and last, but three stones remain in the portion of the south face west of the tower. The total height from the footing to the top of the eighth course is 4 feet 3 inches. The nature of the junction on the south face between Walls A and B requires especial description. The transition is very striking, the difference in thickness between the two works having been effected by a reduction in width of the later one on its south side only. The footing and first two courses continue eastwards past the junction without interruption;



DATUM LINE



i. ELEVATION D-D

ii. EAST FACE OF PIER

DATUM LINE

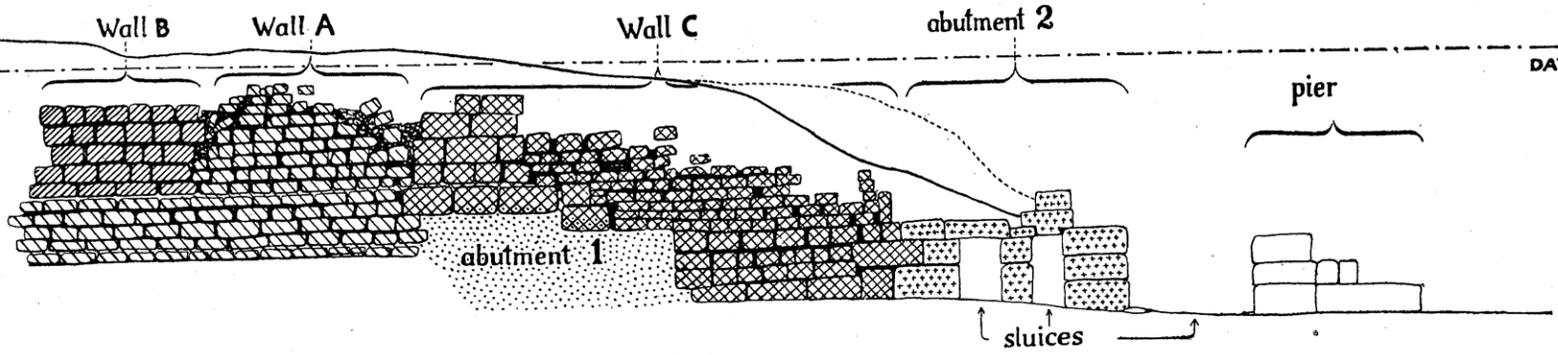


iii. ELEVATION E-D



iv. WEST FACE OF PIER

DATUM LINE



v. NORTH ELEVATION

FIG. 6. - BRIDGE ELEVATIONS,

TO FACE P. 454.

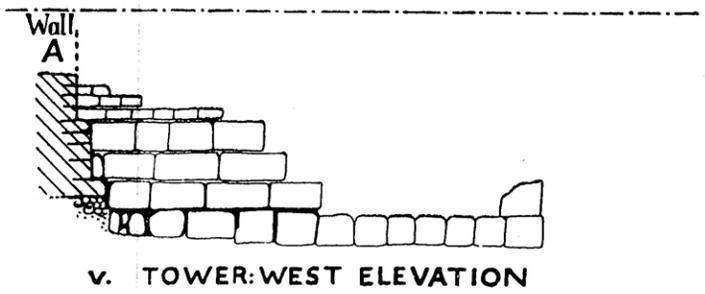
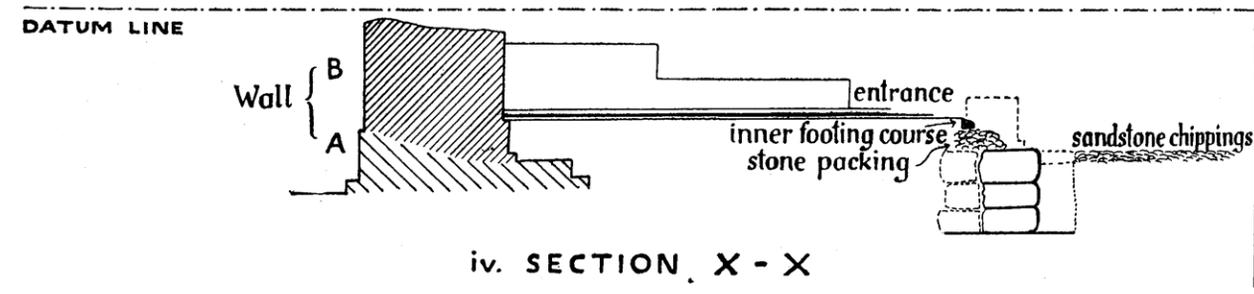
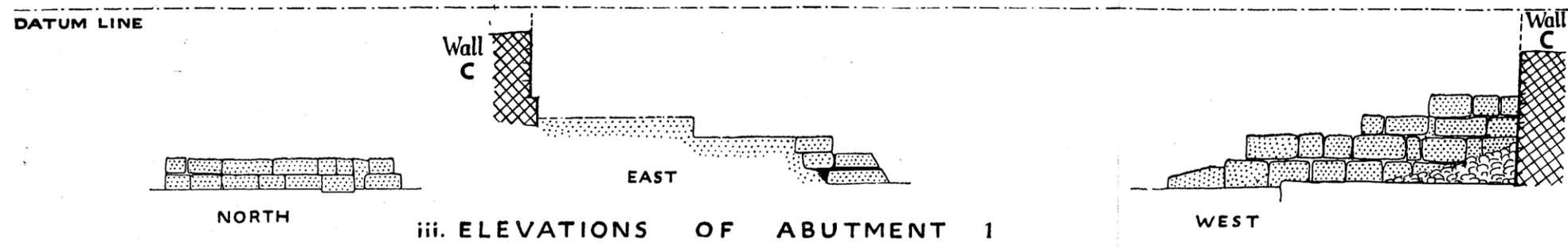
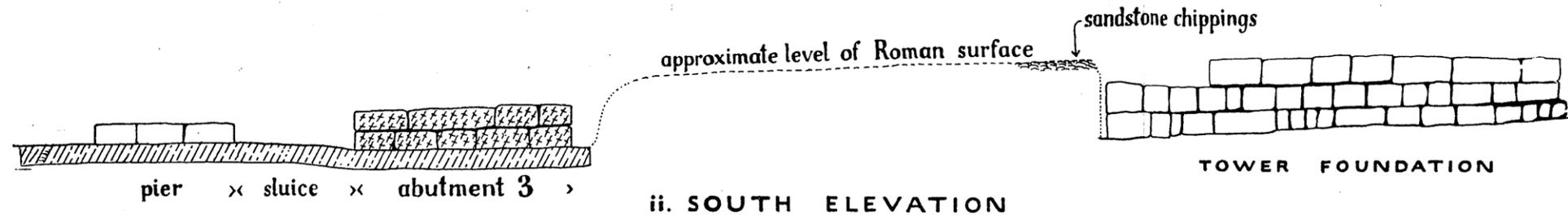
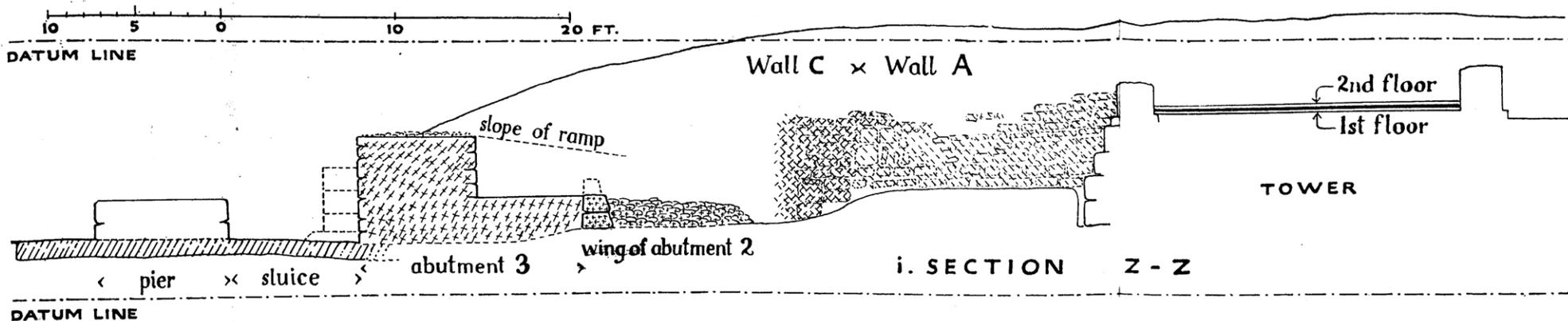


FIG. 7. BRIDGE ELEVATIONS AND SECTIONS.

but the next two, which carry the A Wall as high as the second offset, finish abruptly 6 inches west of the line of reconstruction. It is interesting to note that although the last stone in the lower of these courses shows its original return face (the east one), the upper stone has been broken across when the re-building was carried out, leaving only $4\frac{1}{2}$ inches in position. This stone was originally a normal-sized facing block, breaking joint with the course below. Above the level of the offset the stones of the new face have been bonded into the face courses of Wall A. Turning to the lower courses which continue eastwards, the second, traced from the join, shows, firstly, three stones, then a gap 12 inches wide, then another stone, followed by another break 3 feet 8 inches wide, and finally, two more stones, at which the course ceases. The first course continues unbroken, and likewise the footing, which projects 7-9 inches here as compared with 10 inches west of the tower. This remainder of Wall A projects from the south face of Wall B as a sort of plinth between 2 feet 5 inches and 2 feet 10 inches wide measured from the face of the first course to the lowest course in Wall B.

At the west end of the south face there is the junction with Wall C to describe. The latter is set back 14 inches from the extreme outer edge of Sector A. The footing and first two courses of Wall A show a broken extremity, but above this level a large chisel-dressed stone has been built into the Wall. It is set back 1 inch from the face of the course below, and overhangs the same by 13 inches and projects 11 inches from the south face of Wall C. The next stone above the large block is well squared, pick dressed and set back 5 inches from the south face of the stone below, and 3 inches from the projecting west face of the same stone; behind it is another like it. The next stone in the join above this one belongs to a course which has evidently been built in conjunction with Wall

C, since it is the first which has been carried continuously from Wall C into the A structure. The masonry in it on the last named side consists of several large well squared blocks, pick-dressed. The C Wall being set back from the face line of the earlier work, this course had to be carried obliquely from one face into the other. The next layer in the junction is represented by two flattish stones, both roughly-dressed waterside cobbles. They are laid parallel to those below, showing that from this level upwards the facing courses of Wall C were carried straight through into the older face, the set-off being only apparent near the foundations.

The stones in the face are very mixed in character; sandstones, limestones, shale and cobbles all occur within the comparatively short space of 17 feet. The shale stones are a pronounced feature of this phase, not occurring in the work of the two later periods to anything like the same degree. The variety of stone, all of these kinds being met with in out-crops along the river side, suggests this, rather than a large quarry, as the source of material. The length and depth of the face stones is likewise a variable feature; this is well exemplified in the second course east of the junction between Sectors A and B. Here the stones in question are narrower than those further west, being approximately 4 inches deep as compared with 6-7 inches. Thus in order to maintain the level, small stones and mortar have been laid on the top of the first course so as to permit the narrow stones to lie level with the deeper ones. Mere detail as this is it not only further demonstrates the irregularity of the masonry, but also tends to show that the Wall was built from the river side eastwards. The dressing of the face work is of a very indifferent type, even in the courses which must have been well above the surface level. Most of the stones appear to have been roughly fashioned with the hammer, but not pick or chisel dressed. Con-

sequently the joints are wide, but are sealed with a fairly good mortar, certainly inferior to the latest mortar, but decidedly better than that in Wall B, containing a greater amount of lime and particles of charcoal.

On the north side the A work is clearly demarcated from Wall C by a broken face, and from Wall B in its upper courses by the striking difference in the masonry; the small rough facing stones of the earlier work contrasting with the much larger and better-dressed ones in the later Wall. The highest remaining portion of the north face is standing 6 feet 5 inches or thirteen courses above the footing. As already mentioned, the first four courses are followed by a 2-4 inch offset. These courses continue eastwards uninterruptedly, there being no sign of a change in the character of the masonry or of a straight joint throughout the entire section of the north face that was exposed and which goes considerably beyond the line of junction between Walls A and B on the south side or of the same join in the upper courses on the north face, pointing to the B phase of reconstruction having been carried out in the north face from above the fourth course only; below this, Wall A was allowed to stand. The fifth, sixth and seventh courses of the A work extend for only 9 feet 3 inches eastwards from the junction between Walls A and C, after which they are replaced by the B work. The eighth, ninth and tenth courses extend from the same line 9 feet 4 inches, 8 feet 11 inches and 7 feet 9 inches respectively, showing how the upper courses of this Wall were more and more replaced by those of Wall B, until probably the entire upper reaches of the original structure had been reconstructed. The eleventh, twelfth and thirteenth courses fall short of both B and C Sectors.

Turning to the character of the masonry, one is immediately impressed with the peculiarly small size of the facing stones, which are of poor quality and badly dressed, leaving wide joints. Many of these stones measure only

4 by 5 inches on their outer faces, and some are even smaller. As in the south face, many shale stones have been utilised, especially in the fourth course. At the east side of this face of Wall A, the upper courses of that work are brought up to the much larger stones in Wall B by rough packings of pieces of broken stone and mortar. (North elevation Plate II).

At the west side there remains to mention the junction with Wall C. The latter is set back 3-4 inches from the earlier face. Ten courses and the footing of the A work reach the join, presenting an irregular broken face into which there has been no rebuilding of larger masonry as in the case of the south side, practically all the courses showing their original stones. This would imply that originally it was continued further, the courses being properly bonded with the abutment masonry in which it must have terminated. Moreover, the straight joint is a very crude one, the wide intervals being filled with small stones and mortar.

WALL B.—The succeeding phase saw the reconstruction of the Great Wall on a narrower basis with superior masonry. On the south side this was effected by removing at the least, the third, fourth and part of the second courses if not many more of the upper courses (thirteen remain of the north and eight of the south face) but above the fourth course it is difficult to prove how much has been removed of Wall A, because it must always be borne in mind that some change in the character of the Wall hereabouts might have occasioned the builders of Wall B to select this particular point for thinning the Wall instead of commencing their new work at the abutment. After all, the removal of 17 feet 3 inches of the remaining section of the thick Wall would be an insignificant matter compared with the tremendous task of constructing the thin Wall (B) from east to west of the isthmus.

As already described, the third and fourth courses show

an abrupt termination, beyond which a large stone has been inserted, and upon it a new return wall constructed coinciding with the face of Wall A (above its second offset) and making a return northwards to the plane of the new south face. The large foundation stone of this work projects unsymmetrically from the bottom of the return, the offset varying from 2-5 inches in width. This block does not rest evenly on the top surface of the second course of Wall A, but is bedded on a packing of gravel and small stones, 3 inches deep. Its north end does not pass beyond the face stones in the Wall, whilst on its west side the interval between it and the A work is roughly packed with mortar and stones up to the level of the second offset, above which the last stone of the fifth course carries that line up to the large block. The return stands eight courses high in addition to the large foundation stone; its total height measured from the bottom of the latter is 6 feet 9 inches. Above the third course of the return alternate stones have been removed from the corner in order roughly to bond the west wall of the tower. The south face of Wall B, eastwards from the angle formed by the return, exhibits an irregular footing course, projecting 5-8½ ins., above which are two face courses followed by an offset of 2 inches, above which is the unbroken face. The final width of the Wall above all offsets is 6 feet 7 inches. In the tower this face stands ten courses high, although only two stones represent the uppermost course; but within a distance of 3 feet from the east wall of the tower the south face has been destroyed down to the level of the second course for a space of 3-6 feet by the post-Roman smelting operations mentioned below (see *Tower*). The masonry of the south face of the Wall and its eastward continuation is not of equal merit to that found in many parts, the joints are wide and the dressing crude. It is, however, comparable to the general type of masonry at Poltross

Burn, and decidedly superior to that in Wall A. The stones are more uniform in size, especially in depth. The material is a sandstone similar to that worked in the Lodge quarries near Low Row, and harder than the sandstones in Wall A, which are similar to that from Lanerton quarry a short distance down the river. Lastly there is the distinct difference already mentioned in the quality of the mortar, that in Wall B containing a greater admixture of sand.

On the North face, as previously mentioned, the reconstruction appears to have commenced at the level of the fifth course, above which the masonry is comparable with that in the face just described.

Elsewhere and further west the B masonry stands out in marked contrast to the A work. Exceptionally large stones occur in the B face close to the junction with Wall A. The result of building heavy masonry on the poorer work below is shown in the crumbling away of stones in the earlier work causing the large blocks above to slip outwards; similar effects were noted on the south face. All this overhanging sector had to be entirely rebuilt with more suitable stones from the fifth course upwards, but the original face is shown on the north elevation (Fig. 6, v). Opposite the tower the north face stands twelve courses or 7 feet 1 inch above the footing. The footing here is 6 inches wide and the second offset 4 inches, the distance between the two being 2 feet 2 inches.

The break in the Wall was completely cleared out to the foundations from the south side. It was found that behind the "plinth" formed by the remainder of Wall A there lay a mass of river cobbles which continued as far as the back of the north facing stones. The entire break was rebuilt after this. In front of the north face a number of potsherds and bones were found lying in a black deposit close to the Wall and extending for about 7 feet along its face. The upper level of this stratum

coincided with the sixth course and the lower with the bottom of the fourth. Its western limit lay approximately 10 feet from the junction between Walls A and C. Below the black layer lay fairly clean sand containing very few water-worn stones. No sherds or bones were found at this level, which shows that the Roman surface corresponded with the third course. (At the Poltross Burn there were three courses between the first and second offsets in the north face, no remains being found below the level of the second offset). Above this level was a sloping bank consisting of masonry débris and mortar; there were no signs of a later deposit at a higher level.

WALL C.—The manner in which this westerly extension of the Great Wall joins the extremity of the A structure has been described. Like the work of the previous phases, it consists of a rubble and mortar core faced on either side with dressed stones; but it differs in the absence of offsets (except on a short section of the north side), the facing walls being carried vertically upwards from the bottom without any regular footing course. The mortar used is of excellent quality, hard and white.

The south face forms a very impressive piece of the original Wall standing approximately thirteen courses high; near the western extremity are three stones of the fourteenth and one, displaced, of the fifteenth course, giving a full height of 10 feet 3 inches to the top of the last-named. The full width of this extension is 10 feet. The lowest course in the south face consists of large stones, the first of which, commencing at the junction with Wall A is 16 inches below the bottom of the footing course of the older Wall, and lies somewhat askew with the face of the Wall above, projecting 7 inches at one end and 4 inches at the west side. Then follow two large stones, laid over cobbles, coinciding with the face of the Wall. Next comes a large block 19 inches deep, separated from the former by a gap of 9 inches and passing 7 inches deeper than those

stones. The line is then continued by five stones laid over cobbles, the last one of which passes out of sight behind the breastwork of abutment 2. The masonry in the face above the level is of a very heterogeneous description, many of the stones being river cobbles, others pieces of flag-stone mixed with better-dressed blocks. Throughout the face the squaring of the masonry is very poor, and the joints wide. Nearer the abutment 2, large well-dressed blocks of that structure have been bonded into the face. This occurs to the fullest extent at the level of the sixth course, where the large stones extend as far as $13\frac{1}{2}$ feet from the abutment face. At some subsequent period, the south face appears to have been repaired above the level of the sixth course and 12 feet from the face of abutment 2. Here the symmetry of the courses is broken for 4 feet; small river stones being utilized to fill uneven joints.

Turning to the north face, the most interesting features are its mode of construction adjacent to Wall A, and its relation to abutment 1. That portion of the new Wall which crossed the abutment is built of large pick dressed stones similar to one or two blocks in the south face of Wall A at the join with Wall C; they most likely had some association with the water face of Wall A. The lowest layer consists of three large stones, the first of which overlies the first two courses of Wall A and abuts on the third and fourth. Above this level is an offset of 9 inches which continues the general level of the second offset in the north face of Wall A but at a slightly higher level; this offset ends at the west end of the large stones. The next course consists of four large stones, the third, of three similar, and the fourth and fifth courses, of two larger stones in each.

The total height from the top of the last course to the level of the offset is 3 feet 9 inches. There are no indications that the upper courses have been carried through, as

on the south side, although from analogy it seems likely. Westwards of the large masonry, smaller facing stones have been used similar to those in the south side. The character of the junction between the two types of walling can best be understood from the north elevation (Fig. 6, v.).

From the front of abutment 1 to the east side of the rear sluice in Abutment 2 is 11 feet 9 inches. The bottom course as in the corresponding layer on the south side consists of larger stones than in the upper courses with the exception of the fourth layer.

At the foot of Abutment 1 the Wall is 7 feet 8 inches, or thirteen courses in height and within 3 feet of the rear wall of the sluice (abutment 2) it is eight courses or $5\frac{1}{2}$ feet high.

The north face of Wall C has been completely destroyed, near Abutment 2 many of the facing stones were found lying in a pile near the sluices.

THE ABUTMENTS.

Although really integral parts of the Great Wall, these are described separately, to avoid the controversial points which might arise from grouping them with the different sections of the Wall.

ABUTMENT 1.—This massive structure extends northwards from the face of the Wall, its rear or landward side practically coinciding with the line of junction between measuring 20 feet 2 inches along the west face and 13 feet 5 inches on its north side. The structure consists of a core composed of large blocks of stone and chippings, faced on the north and west sides with large dressed stones. On the east it abuts on the land, the north face only making a short return; at the south side the masonry continues into the Great Wall (C) which has been carried over it.

In the west face there are three courses *in situ*. The lowest, consisting of seven stones, ends 4 feet 4 inches from the face of the Wall. The interval between the last stone and the Wall is occupied by the cobble packing described under Abutment 2. All the stones rest on a gravel bed and were covered by clean water-washed sand. The last stone near the Wall bears a cramp hole on its upper surface.

The second course is set back $8\frac{1}{2}$ -10 inches and contains four large stones which terminate $6\frac{1}{2}$ feet short of the Wall and 4 feet 5 inches from the north-west corner of the abutment. The surfaces are roughly chisel dressed. At the same level as these stones but set back (eastwards) $2\frac{1}{2}$ feet from their face and occupying the interval between the end of the first two courses and the Wall are three large stones dressed on their west faces, the last of them next to the Wall passing into that structure. Above the latter stone is another large block making the total depth of the face here $2\frac{1}{2}$ feet. It is set in line with the face below and does not pass into the Wall.

In front of this face was a heavy pavement, the west limit of which was not reached during the excavations.

The north face stands two courses high, both of which are chamfered. The angle of the chamfer carries the face 9 inches forwards in 18 inches. The lowest course consists of five stones varying in depth from 12 inches at the east end to 18 inches at the west. They are founded on gravel and were covered with clean sand. The second course contains four stones varying in depth from 9 inches at the east end to 10 inches at the west. On the upper surfaces of the second, third and fourth, from the east end, are two pairs of cramp holes. The corner stone at the north west angle shows a splayed surface; this may be due to fracture. Both these courses on the north face show chisel dressings. At the north-east corner a short return is made southward consisting of the east faces of the two

corner stones followed by one well dressed block and one rough stone above it. The upper corner stone bears a curious slot near its upper edge resembling in some respects a cramp hole; it is certainly an artefact.

Although the remains of this abutment are continued into the Wall, no trace of a similar structure appears on the south side. There is, however, a line of cobbles laid at right angles to the south face of Wall A, meeting it at a distance of 7 feet 4 inches west of the tower and extending southwards for 13 feet. Their general level corresponds to the footing and foundation courses of the Wall. East of these stones there is a deep stratum of soft sand, whilst westwards are many stones embedded in the sand. Mr. D. Atkinson made the suggestion that they might possibly represent the remains of a cobble backing to an abutment similar to the one just described, in other words, a southern wing of that structure which has been removed at a subsequent date.

Abutment 2.

The extension of the Great Wall westwards by Wall C necessitated the erection of a new water front. This structure consists of a strong rectangular abutment fronting the end of the Wall, pierced by a pair of small sluices, and a breastwork on its south side which abuts on the Wall to the rear of the landward sluice.

The heavy masonry abutment coincides in width with the Great Wall, and is therefore 10 feet long. The front of this structure formed a plinth projecting eastwards from the Wall face so as to carry the main uprights of the bridge. The core of the Wall comes as far as the rear of the front sluice, and its water face must have been carried vertically upwards over the cover-stones of that sluice. The plinth contains three courses of large stones. In the uppermost layer are five stones, all of which bear dovetail cramp holes (v. plan, fig. 8). The first stone at

the north end bears on that portion of its upper surface which is exposed beyond the cover stones a mortice hole approximately $11\frac{1}{2}$ by 11 inches and $2\frac{1}{2}$ inches deep. The inner corner of this hole is continuous with a dovetail cramp hole. The dressing on its face shows pick and chisel marks. The surface treatment of the second stone is interesting as typifying most of the masonry in this structure; the greater part of the face has been carefully chisel dressed, but one corner has been sliced away and the surface roughly re-dressed with a pick. This dual dressing occurs in several of these stones, and taken in association with the presence of cramp holes in useless positions is a clear indication that the stones have been re-used. Possibly many of the stones were merely advanced from the termination of Wall A on Abutment 1. I am indebted to Mr. Parker Brewis for drawing my attention to this feature. The fourth stone was taken out when excavated and similar cramp holes were found in the stones of the course beneath it, but they were empty. The fifth stone, besides showing two normal cramp holes, carries the remains of a similar one near its south-west corner in the front face, showing that it has not only been re-used, but that its position relatively to the other stones is altered, that is to say, the abutment has not been moved forward *en bloc* to the present position, but reconstructed in a different form. Its upper surface carried a mortice hole, $14\frac{1}{2}$ by 10 inches and $1\frac{1}{2}$ inches deep, corresponding to that at the north-west corner. One side of the sinking (the north) is shallower than the remainder, the deeper portion being $9\frac{1}{2}$ inches wide; this suggests that the first intention was to make a mortice about $9\frac{1}{2}$ to 10 inches square, and that it was altered to suit a larger tenon. All the stones show a faint marginal check on the upper surface at their front side.

The second or middle and the base course each contain five stones. Beneath this level is a foundation of larger

boulders which project $1\frac{1}{2}$ to 2 feet from the face. There is, however, a gap of 3 feet in this line, and here the lowest stone rests on small cobbles. The front sluice is 1 foot $5\frac{1}{2}$ inches wide and 2 feet 10 inches high, and the rear one $1\frac{1}{2}$ feet wide and 2 feet 7 inches high (approximate). The partition between them is one stone thick, and consists of two deep courses and one shallow; each deep course contains four massive stones, diagonally pick broached.

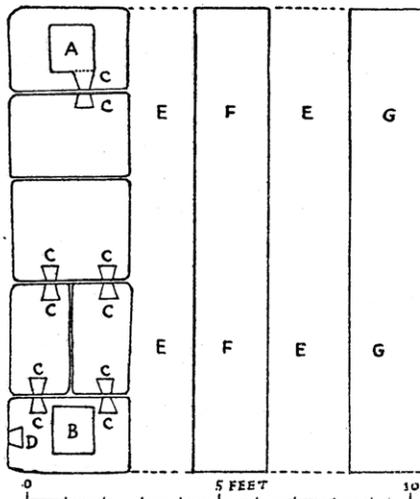


FIG. 8.—PLAN OF ABUTMENT 2.

A.—SINKING 2" DEEP. B.—SINKING $2\frac{3}{4}$ " DEEP. C., C.—CRAMP HOLES.
 D.—CRAMP HOLE WITHOUT FELLOW. E., E.—SLUICES. F.—PARTITION
 BETWEEN SLUICES. G.—THE WALL.

The cover course of the front sluice is made of a row of four large stones which have checks cut in their lower sides so as to permit the side walls of the sluice to lock them in position. The checks are $4\frac{1}{2}$ and 6 inches wide measured from the east and west faces of the stones respectively, leaving a projecting face 2 inches deep. Upon this cover rests one remaining stone of the next course which aligns with the face below. Its upper surface, though uneven,

is caked with the remains of an excellent mortar. This fact together with the presence of the rubble and mortar core of the Great Wall immediately to the rear shows that the west or water face has been built along this line.

The covers for the rear sluice, which lies entirely beneath the core of the Wall, consists of large flat stones, with wide joints between them. The outermost corner-stone is 8 inches deep, and is not checked; perhaps because the downward and outward thrust of the wall face upon the front covers would not occur over the rear sluice.

The north entrance to this sluice when first exposed was carefully blocked with a large tightly-fitting stone and another smaller one, the wider joints laterally being packed with clay and small stones. When these were removed it was found that the sluice contained about 12 inches of silt, leaving only about 6 inches empty passage. The silt was river sand similar to that which lay outside the abutment and suggested that this passage was becoming obstructed before the north aperture was closed. The southern opening is blocked by the large abutment 3, and as far as can be seen by creeping into the passage it has been also walled up with flattish stones. The building-up of the entrance would probably be carried out when the abutments were added to the south side; otherwise a heavy flood pouring into the sluice would undermine the foundations of the later structures. In the front sluice very little sand had been deposited, about 6 or 8 inches at the most.

The construction of these two sluices in the abutment at the end of Wall C can only be accounted for by the presence of water at this point; but whether this was the normal water of the river, or only that of a mill race is difficult to say. If the former, then the pressure during a spate would be very considerable in so confined a space, not to mention the liability of a serious obstruction from wreckage. These dangers would certainly be mitigated

if they received a limited flow of water, in which case the whole abutment would be high on the river shore. Such points as these are of considerable importance in relation to the north face of the Wall between abutment 1 and the rear sluice. This is 11 feet 9 inches long and falls only a few inches to the west. If at the normal river level water traversed the sluices, it must have washed the lowest courses of this section of the Wall, which without the protection of any cut-water would in time of flood be in danger of being undermined. If, however, only water from a mill-race washed these structures, a more crude method of protection might suffice. This is what we meet with in the form of a mass of cobbles and clay, laid against the lower courses of the Great Wall beyond the point where the abutment masonry finishes. The cobble "penning" extends for about 8 feet from the Wall face. An important find amongst these stones was a sesterce of Commodus, covered by cobbles and nearly 2 feet of clean sand, 7 feet out from the Wall and $2\frac{1}{2}$ feet from the lowest course of Abutment No. 1.

On the south side the Wall (C) was supported by a breastwork consisting of a mass of stones and clay, with an ashlar face 24 feet 10 inches long and originally at least three courses high, making an angle of 58 degrees with the southern face of the Great Wall, which it meets just behind the rear sluice. One stone of the third course, eight stones 16 feet 10 inches long of the second, and the base course, remain. The first stone of the second course adjoining the Great Wall is splayed so as to fit the angle between this line and the Wall, with which it makes a straight joint. The third and fourth stones are burnt on their upper surfaces, over which lay a dark layer of sooty matter containing a fragment of green glazed ware (Elizabethan). The fifth stone has a cramp hole in one end, showing that it has been re-used, whilst the last stone shows a circular hole conical in section, its aperture

having a diameter of 5 inches and so much worn so that only $\frac{1}{2}$ inch of stone remains between it and the south face of the block. The solitary stone belonging to the third course is obviously *in situ* as shown by its alignment with the face. On its top surface are two shallow concave grooves and a narrow longitudinal furrow, all suggesting its use as a grind-stone. The proximity of post-Roman remains affords a possible explanation.

The mass of clay and cobbles lying behind this structure was about 5 feet broad near the Wall, beyond which occurs a jumbled mass of stone extending as far as the junction between Walls A and C, and rising as high as the fifth or sixth course of the south face. Southwards it was not encountered at a distance of 10 feet from the Wall. Above this again is a sloping bank of about 3 feet of disturbed soil containing many small river cobbles similar to those found on the road surface. Amongst the clay and cobbles backing was found the fragment of a Samian dish *Dr.* 31. (fig. 12, No. 49). The entire abutment was buried by the later works.

The bridge carried by this abutment could only be of footbridge size, i.e. a continuation of the rampart walk on top of the Great Wall. Its predecessor which commenced over abutment 1 must have been similar, because Wall A, as we have seen, terminated actually on top of the land breast, allowing no space for the passage of a cart road between the front of the abutment and its face. The earliest bridge at Chollerford was evidently similar, if we may judge from the size of the water pier embedded in the masonry of the later east abutment. The drum of this structure measures 10 feet, which would allow of a foot-bridge equal in width to that at Willowford; and its stones were bound together by iron cramps leaded into dove-tailed cramp holes, as compared with the long gutter-like cramp grooves which received the iron cramps in the later masonry. Thus both at Chollerford and

Willowford the earlier bridges were for pedestrians only, and in both the dovetail iron cramps were used. Hodgson (Hist. Northumberland part II vol. III, p. 207) records the occurrence of similar cramp holes, containing iron cramps 11 inches long, in one of the foundation courses of the west rampart at Birdoswald. They are also present in the foundation stones of the guard-chambers at Balmuildy (Miller, *Balmuildy*, pl. VI).

Abutment 3.

This structure consisted of three parts: (1) a massive base two courses high, to the rear or landward side of which was a backing of cobble and clay, also two layers deep; (2) a vertical wall erected on the river side of the base consisting of a cobble and mortar core faced with masonry on either side; (3) against the rear of this was built a sloping ramp of earth and stones up which the military road was conveyed to the level of the bridge. (1) The southern side of the base is $12\frac{1}{2}$ feet long and two courses high, separated by a 5 inch offset. At its eastern end it terminates in two large stones, one bearing a gutter-like groove. (2) The water face of the wall is 24 feet long and stands 6 feet 9 inches or seven courses in height near the Wall, and this appears to have been its original height, because its top stones were covered by remains of a gravel and cobble road. It is curved in such a manner that although its southern end is in alignment with the face of Abutment 2, its northern extremity abuts on the partition between the two sluices, the curve commencing 14 feet from the southern end. The landward face of the same wall is straight, so that its thickness is 5 feet 3 inches adjacent to the Great Wall and 7 feet 4 inches at a distance of $10\frac{1}{2}$ feet further south. The masonry of the water face is of a mixed character, the largest stones being in the base courses and narrower blocks in the upper layer; one stone shows a feather broaching. The landward face has been

extensively robbed, but the full height of four courses remains near Wall C, that is, it is level with the water face here. Its lowest course, which contains a channel-like stone, rests on the cobble and clay of the base; the southernmost stone of this course is partly founded on a well-dressed stone laid on the base, and lies level with a row of four stones running at right angles to this wall, between it and the oblique face of abutment 2, presenting a definite face to the south, and lying upon the clay and cobbles which form the backing to the base. From their position these stones must have been buried in the heart of abutment 3, beneath the ramp, but whether they previously served an independent purpose is an unsolved problem. Perhaps it was merely a convenient way of packing the squarest stones together to strengthen the abutment. One has a chamfered surface and bears a cramp hole which on first exposure contained traces of iron oxide. It is obviously a re-used stone, like most of the other masonry. In the triangular area formed by this row of stones, the wall of abutment 3 and the oblique face of Abutment 2 was a solid packing of clay and small cobbles. (3) The ramp was represented by a great mass of earth which lay against the landward face of the abutment wall, around which were piles of small river cobbles and gravel. It had, however, been much disturbed in post-Roman times, both near the Great Wall over the oblique face of abutment 2, and at the south side of abutment 3.

The Pier.

In front of the west face of Abutment 3, and separated from it by an open sluice, was a narrow rectangular pier, consisting of a core of clay and rubble faced with massive dressed stones. This structure extends northwards as far as the north side of the abutment 2, and southwards, it is roughly in line with the south side of abutment 3.

When first found it was covered by a huge mound of loose stones which had been roughly retained with a dry wall. This wall had been fiercely burnt from end to end and quite a quantity of charcoal was found in its interstices. That this mound was merely the result of digging for stone, was proved by the discovery of a cartridge lying about a yard from the face of the retaining wall, and buried under nearly five feet of stones.

The east face of the pier is 34 feet 2 inches in length and stands three courses or $3\frac{1}{2}$ feet in height at the north end. The lowest courses contain 17 stones, most of which show broken corners. About 7 feet 9 inches from the south end there is a gap 14 inches long between the stones of this layer, roofed by a stone of the next course; it was filled with loose gravel and sand, and may have led into a small culvert through the pier, since there is an irregular break corresponding to it on the west side. In the second course are fourteen stones, and only three remain in the third course. At the southern side of the pier the bottom course is left, 7 feet 11 inches in length. The west side has been considerably disturbed by stonemongers; at the northern extremity they had removed all the facing stones, and a shallow depression lay all along the side where their trench had been. There are, however, eleven stones of the lowest course *in situ*, the total length of this remnant being 24 feet 3 inches from the south end, but there is a gap 2 feet $2\frac{1}{2}$ inches wide where a stone is missing just before the last two northerly blocks. The second course is represented by a solitary stone which is *in situ* and is set back 9 inches from the face.

The northern extremity of the pier has been so much disturbed that it is difficult to be able to form an accurate conception as to how it originally was built. The last stone of the first course in the east face is set back roughly 1 foot 7 inches from the extremity of an irregular foundation block. The last stone of the second course of the

same side is set back 3 inches from the north face of the former, and both these stones shows pick dressing on both east and west faces; in the case of the upper one, the pick broaching of the west face does not appear to have been carried quite as far as the back face of the stone. These points suggest that the two stones in question have projected as a sort of buttress from the end of the pier. Although they would be less efficient as a cut-water than a V shaped extremity, they would serve better than a straight face such as the southern end.

A number of stones noteworthy for special dressing, etc., were found in the vicinity of this pier, and deserve particular mention. One of these has a square hole cut through the centre. It may have been used for the socket of one of the timber uprights of the pier, and would appear to have been originally embedded in the top surface of that structure. It was found lying tilted end-up opposite the west face and about 2 feet from it, roughly in line with the second course stone. A number of chamfered stones were found lying in front of the west side; of these two were well dressed, showing chisel marks, two roughly fashioned, and two were represented by fragments. One has a V-shaped slot about $4\frac{1}{2}$ inches long cut in its side. A large stone found near the east face of the pier, in front of abutment 2, has a double set of dovetail cramp holes at corresponding levels on either side. This must have been laid on its narrow side if the two principal surfaces were cramped; a possible suggestion is that it was built into the parapet at the end of the rampart walk. Close to where it was found were two large blocks on which checks had been cut on one surface, similar to those that covered the front sluice, suggesting the continuation of the sluices at some previous period.

Between the pier and abutments 2 and 3 was a waterway which varies in width, on account of the curve of abutment 3, from 5 feet 7 inches opposite the front of

abutment 2 to 10 feet 1 inch opposite the north end of abutment 3. This waterway is floored with a pavement which passes beneath both the bordering structures. On the north this pavement terminates at the south edge of a large stone forming the foundation for the south-west corner of abutment 2; but north-west of this it continues as a foundation beneath the east side of the pier, and terminates at the stones already described as projecting from the north end of that structure. The space between these stones and the cobble foundation of abutment 2 is not paved, but filled with cobbles and loose gravel at least 5 feet deep. It suggests that there has been originally a pit or depression between the two that has been later filled in; otherwise it is difficult to see how even an exceptionally heavy flood would displace large and tightly jointed stones such as pave the rest of the waterway. The pavement continues 2 feet 3 inches beyond the south ends of the pier and of abutment 3 and 4 feet 1 inch beyond the west side of the pier; but along the west face the stones are much disturbed and have sunk forwards, undermined by the river.

In the last phase this water-way was completely filled up with gravel and stones to about the level of the top of the third course of the pier; above this was a layer of mortar, covered in turn by a thin black stratum, which was more or less disturbed near the pier, but well defined near the abutment. At the north end several large stones had been wedged between the pier and abutment, so as effectively to bar the opening. Amongst the filling was found the rim of the late cooking pot ware, which lay about 6 inches beneath the surface of the mortar stratum. (fig. 12 No. 47), and the base of a Castor vessel (fig. 12 No. 48), was found in the "dump" from here. Above the level of the dark layer lay a great mass of fallen masonry and lime, presumably from the Great Wall.

Search was made in the field west of this pier for other

piers or the west abutment. Two trenches were carried forward in the line of the Wall as far as a point 83 feet west of the pier. They were 3 feet wide and 3-4 feet deep, and were sounded another 3 feet. Only sand and gravel were encountered. If when future investigation is attempted trenches were carried further and deeper, some remains should be found. This, however, I had not time to do, the autumn being far advanced before we completed the work.

The pier is too close to abutment 3 to be an ordinary water pier. The water-ways at the Chollerford bridge were 34 feet wide and all were of equal dimensions. Moreover the narrow water channel would be in great danger of becoming blocked by floating wreckage; its whole design is very unsuitable for one of the principal waterways of the bridge. Again there are two curious architectural points to bear in mind, firstly, it is carried beyond the north extremity of the road abutment, unnecessarily far if it merely served to carry the road directly from the latter: it is carefully aligned with the north face of the Wall. Secondly, the face wall of abutment 3 is curved inwards so as to permit the outer of the two sluices in abutment 2 to remain open. May we not infer that the use of the pier was not solely to carry the road, but that the presence of the water was utilized in the intervening space between pier and abutment? Prof. R. C. Bosanquet as well as Mr. Donald Atkinson suggested that the pier might have served as a point where access could be obtained to the bridge, not only from the road, but also from the rampart walk, which would account for the building of this structure as far as the north face of the Wall; and as regards the narrow waterway it is suggested that the force of the water was employed to operate some machinery, such as a mill or apparatus in connection with the bridge. This, of course, is purely theoretical, no suggestive stones or other evidence being found comparable

with the barrel shaped "counterpoise" at Chollerford. It must, however, be remembered that this waterway had been purposely filled in and any such apparatus would naturally be removed. Had the interval between the pier and abutment 2, which was loosely filled with cobbles, any connection with an under-shot water-wheel, for which a relief channel was provided by the remaining sluice?*

The discovery of a water mill on the Halt-whistle Burn at Aesica, and the presence of the covered channel at Chollerford Bridge are certainly suggestive evidence for a mill at Willowford.

The Foundation beneath the Tower.

This massive structure deserves special description apart from the walls of the tower, as being one of the most perplexing features of the site. It is L-shaped. Its western limb, 20 feet 7 inches long, abuts on the Great Wall at the line of junction between the A and B phases; its southern, 26 feet 3 inches long, tapers away eastwards. The north side is closed in by the Great Wall, and the east is open. The west face is standing four courses or 5 feet high. The foundation course is roughly constructed near the Wall, where its line is carried up to the foundation packing beneath the footing course of that structure by several large cobbles, but south of these the stones are firmly bedded in the gravel, with their short sides outwards their long sides passing inwards 3 feet all of them chisel dressed and fairly well finished. The second course immediately overlies the lowest. The first stone at its

* The old theory of Mr. Sheriton Holmes for the Chollerford counterpoise stone, namely its association with a drawbridge does not seem to stand application where the road was in conjunction with a continuous frontier such as the Wall; though a drawbridge might be useful in the case of a road passing out of a Roman province across the "limes." On the other hand, apparatus to work a grille, something after the principle of a water heck, would be of paramount importance. Otherwise the waterways of these bridges would provide ideal passages across the frontier on a dark night, with the rushing of the stream to drown all sounds.

north end lies within 4 inches of the footing course of Wall A, and its top is approximately level with that course. The interval between it and the Wall was packed with river cobbles. The second stone, like the first, is well dressed; the third is an irregular hammered stone which in order to level it with the adjacent blocks has been packed up with a few small cobbles. The fourth stone is again chisel dressed, after which the stones have been robbed except the corner one, which shows a chamfered extremity corresponding precisely with those in the north side of abutment A, and probably belonging to the southern wing of the same structure. The first stone of the wall end of the third course leaves an interval of 13 inches between it and the second course of Wall A, which was filled with an ill fitting long narrow stone. Only three stones of this course remain *in situ*: these are set back $5\frac{1}{2}$ inches from the face of the second course. In the fourth course the excellent chisel dressed stones are well laid, the joints being much closer than in the courses below them. The first stone abuts on the second, third and fourth courses of Wall A, and its upper surface is level with the second offset. There is an offset of about $7\frac{1}{2}$ inches between this face and that of the third course. Viewing the west face as a whole, one notices the greater solidity of the work nearer the south west corner; approaching the Wall from this point the joints become wider and rough cobble packing is utilised, until the join with the wall is of a very weak character, obviously quite unsuitable to withstand exposure to the actual river. This suggests that the south-west corner alone was exposed to the river. The south face is standing three courses high, the first two extending the full length of this side, whilst the third has been robbed for a distance of 6 feet 9 inches from the south-west corner. In the foundation course, which like that on the west side, has been laid on the gravel, the general depth of the first four stones from the corner is

15 inches and then 12 inches, after which the course dwindles away into a shallow line of cobbles 5 inches deep at the extreme east end. Most of the masonry in this course shows marks of having been chisel dressed. In the second course there are fifteen stones and in the top course seven stones *in situ*. Both these courses show variation in the method of treating the stones, good and bad dressing occurring side by side. These facts, and the presence of isolated dovetailed cramp holes in two stones, show that the masonry has been utilised elsewhere and rebuilt into the present foundation. Behind the two masonry faces was a substantial backing of large blocks of hewn stone, and behind these in turn the clean sand, which forms a stratum about 18 to 24 inches deep overlying the gravel. The stone which forms the backing behind the last stone of the third course has originally been a facing block, as shown by its squared and dressed surface.

Within the enclosure formed by the foundation, a layer of sandstone chippings was laid down over the top of the sand. These are exceptionally clean and about 6 inches deep; no trace of any occupational level overlay them. They correspond in level to the stones forming the backing to the facing blocks of the third course, and, consequently, are considerably below the upper surface of the fourth course. Laterally the chippings extend as far as the front face of the first course of the remains of Wall A as it passes through the north side of the tower, and on the south side as far as the backing to the south face. Outside the west face this layer again occurs at the same level, but is only about 1-2 inches thick, and fades away 6 feet westwards where it meets the line of cobbles (laid at a lower level) which marks the limit of the stone filling.

The fact that this layer of chippings corresponds in level, both inside and outside the facing walls, and definitely touches the intervening stones, is a strong indication of the contemporaneity of its two sections. The sand west of the

tower must therefore have been high and dry when the chippings were scattered. This agrees with the character of the masonry already noted, in showing that the structure was not a water frontage. Again, the chippings were probably laid down after dressing the stones, and would be spread on the existing surface, which (as shewn by the level of the stratum) came to the top of the third course of the face wall, or the lower part of the second course above the footing of Wall A. In that case the rough join between the third course of the foundation and the Wall, and likewise the rough cobbles packing in the face below, would be concealed; only the well-jointed masonry of the fourth course would show above ground level.

Within the enclosure formed by the foundation, the sandstone chippings are covered by a stratum of sandy gravel containing many water-worn stones. This layer is about 12 inches average depth, but varies considerably and has been laid over the projecting remains of Wall A as it crosses the north side of the tower. Its upper level corresponds with the top of the backing of the fourth course and again with the lower part of the second course of Wall B. It is overlaid by the clay floor of the tower. At Balmuildy a loose clean bed of chippings was found immediately inside the north wall, the appearance of which was, that it had been covered over as soon as deposited. It is suggested that it serves as a bottom for a rampart backing. (Miller, *Balmuildy*, pp. 10, 43). Mr. Miller points out that such a layer would facilitate drainage of moisture soaking downwards; similarly at Willowford such a bottom would keep the superimposed level dry.

The Tower.

This site has unfortunately been very much disturbed in post-Roman times, first by the working of a bloomery in the north-east side of the tower, and secondly by diggers

for stone. The workers of the former had pulled down the Great Wall as low as the second course above the footing on the south side, and in the north several of the upper courses had been removed. From the east side of this gap a low wall built of rubble and facing stones and about 18 inches wide was carried directly southwards for 3 feet. It lay over the debris covering the second Roman floor-level, but near the hole in the Great Wall a drift had been sloped downwards, in which lay about $2\frac{1}{2}$ feet of soot containing lumps of iron scoriae and one or two fragments of coarse green-glazed ware (Elizabethan). The soot from the furnace had been spread out south and westwards, extending beyond the south wall of the tower, but was not found on the east side. It lay immediately beneath the grass, and its average depth over the south-east side of the tower was 9 to 12 inches. All the stones adjacent to the hole in the Wall showed signs of burning. The diggers for stone had made a drift inwards over the south-west side, removing the entire corner of the tower and several of the large foundation blocks as low as the bottom course, together with the greater part of the west wall and nearly all the south wall with the exception of a solitary string of facing stones belonging to the footing course of the inner face. These operations had entirely destroyed the Roman strata on this south west quarter, the soil everywhere being loose and sooty; a work of destruction completed by the tangled roots of a large oak tree growing over this part of the interior. Consequently the only undisturbed positions were the extreme north east corner, and the north west quarter beyond the bloomery. The north side has already been described under Wall B. The east side is fairly well preserved, measuring $20\frac{1}{2}$ feet from the face of the north Wall along its inner side to the point when the face line of the south side would meet it if produced. It is 2 feet 6 inches wide and makes a straight joint with the south face of the Great Wall. From

the north-east corner seven courses and a footing are *in situ* for $8\frac{1}{2}$ feet; thereafter three courses and the footing continue as far as the north jamb of the doorway, beyond which the side is represented only by the footing course. The offset is 4 inches wide on the exterior, and $3\frac{1}{2}$ inches on the interior. The footing course merges with the face above it where the east wall crosses the projecting foundation of Wall A. The stones in this face are chisel dressed.

The entrance is situated at the south end of this side; the north jamb only remains, being three courses in height. Two levels are represented in the threshold. The first consists of a stratum of gravelly sand 5 inches deep overlying the foundation stones, which are a continuation of the footing courses, whilst the sand could be traced without interruption to the lowest floor level. The second threshold is represented by a flat stone $2\frac{1}{2}$ inches deep laid 4 inches above the sand level. This threshold was continued inwards by two flagstones which were much displaced, beyond them the stratum had been completely destroyed by the smelting operations. The precise width of the entrance is difficult to determine in the absence of the south jamb, the sand stratum of the first threshold was confined to a width of 2 feet 6 inches. On the outside the direct line of the footing course is interrupted by two narrow stones which are set forwards 13 inches, followed by a larger stone 2 feet 6 inches in length, which would serve as a heavy foundation to prevent slipping at the angle; it has a luis hole on its upper surface.

The south wall is represented by part of the rubble and mortar core resting on the upper surface of the third course of large stones on this side and of the line of six face stones belonging to the inner footing course. They rest in a packing of broken stones and lie 6-9 inches above the top of the foundation stones.

The west wall meets the Great Wall at the line of



A.—NORTH FACE OF THE WALL AT THE BRIDGE:
Junction of Walls B (left) and A (right).



B.—THE TOWER:
Junction of its West wall with the Great Wall

junction between the A and B sections, that is to say its outer face abuts on the former, and the inner partly abuts in its lower four courses and is partly bonded with Wall B meeting the latter at the south face of the return but $4\frac{1}{2}$ to $5\frac{1}{2}$ inches without the line of the east face of the same. The photograph (Plate II, B) shows the footing and first three courses abutting on the Great Wall, whereas above that alternate stones are missing from the Wall and the facing stones of the west face have been carried into the cavities. The extreme length of the remnant of the West Wall from the face of the Great Wall (B) beyond the return is 9 feet 10 inches and its width above the offset $2\frac{1}{2}$ feet.

The inner face shows seven courses above the offset next the Wall, beyond which it is reduced to one course and the footing, and finally the footing only. The offset is $2\frac{1}{2}$ inches wide. The footing course is founded near the Wall on a stratum of mortar laid in the uneven top surface of the stone backing behind the fourth course of the foundation; further west they rest on gravelly sand covering in turn the stone backing. The outer face shows two courses and the footing adjacent to the Wall.

The interior contained the remains of two distinct floors, a roughly square base in the centre, and a paved foundation in the north east corner. The base appears to have been the foundation of some central support of the ceiling (see fig. 5). It rests on a clay and cobble foundation and shows a rude footing corresponding to the first floor level on two sides, above which there are one or two courses together $8\frac{1}{2}$ to $11\frac{1}{2}$ inches high. The footing is present only on the west and south sides, where are offsets of $2\frac{1}{2}$ inches and $4\frac{1}{2}$ inches respectively.

The earliest floor consists of worked clay about 1 to 3 inches thick, which on the north side passes up the level of the second offset in the Great Wall and the first offset of the West Wall. Southwards it shows a slight fall.

The hearth corresponding to this level consists of a much fired flagstone set in clay and situated 5 feet from the north wall and $5\frac{1}{2}$ from the east. In the north-west corner a layer of coal covered the floor. About 6 feet from this side and 4 feet from the Wall were found the two coins and most of the potsherds, embedded in the clay. The earliest occupational level was covered by 2 to 3 inches of débris consisting of dark material and a few stones. The second floor was of sand about 4 inches thick. In the north-east corner the level was represented by a flagstone and masonry foundation. A line of five dressed stones had been laid from the face of the Great Wall southwards and on them again rested the outer or west edge of a pavement of heavy flagstones. Perhaps it may be compared to the base-like structures found in the turrets. The second floor was covered with many fragments of coal in the north west corner which appears to have been the usual storage place for the fuel. This level was again covered by 5 to 6 inches of dark material containing some masonry débris, and a bevelled flagstone; also a few fragments of stone slates. Above this, close to the wall was about 3 feet of soil containing near the surface some mortar, a few bones and a chip of green-glazed ware, but there was no trace of any later Roman occupational level. The evenness with which the east wall, both face and core appears to have been reduced indicates a purposeful demolition rather than the work of stone-seekers, who would naturally dig down from the surface and take only the best stones.

Coins.—Two denarii on the first floor as above. They were submitted to Mr. Donald Atkinson, M.A., who kindly deciphered them.

I. *Obv.* IMP TITVS CAES VESPASIAN AVG P.M. Laureated head; Legend reading from right to left.

Rev. TR.P. IX IMP XV. COS VIII PP. Elephant to left. Denarius of Titus, A.D. 80, Cohen ed. 2, 303.

2. *Obv.* IMP TRAIANO AVG GER DAC PM TR P. Laureated head.
Rev. COS V PP SPQR OPTIMO PRINC. Peace standing l. holding caduceus and cornucopiae. Denarius of Trajan, A.D. 104-110; Cohen ed. 2, 82.

The denarius of Trajan is in fairly good preservation, that of Titus a little more worn; both might have been lost in the first half of the second century.

Iron.—A number of very much corroded pieces on the first floor, mainly representing about 33 nails from 2 to 5 inches long; a thin and narrow bar $5\frac{1}{2}$ inches long, terminating in an expanded head pierced with a hole; possibly a strap off a box; a rectangular plate $3\frac{1}{2}$ by $4\frac{1}{4}$ inches with overlapping edges on one side as if a wooden haft had been slotted into it, perhaps a hoe; an iron ring; some thick lumps, one possibly a cramp. The others are too much corroded to determine their use.

Bronze.—A piece of bent metal which probably belongs to the edge of a sheath. A fragment of a buckle. A button or stud, probably off a leather tunic. A lozenge-shaped lid off a seal box, inlaid with champlevé enamel in the form of small lozenge-shaped panels.

Stone.—Two discs with soot marks, stands or covers for cooking-pots. A stone found near abutment 1 bearing a rudely incised figure 13 inches in length and 5 inches wide. The left hand is held up and there are two vertical strokes above the head. It closely resembles the rude Mercury now in the Black Gate Museum, found at Aesica in 1898 (*Arch. Ael.* ser. III, XXIV, p. 64). Two fragments of millstones of Andernach lava, found in the open sluice, one of granite, nearer the surface level over the tower.

The Roads.

The military way was discovered approaching the site from a south-easterly direction, coming diagonally across the field and making a direct course for the eastern side of the tower. It lies only 6 to 9 inches beneath the surface and has suffered considerable damage from the plough. Near the tower it has a gravel surface and a cobble foundation, but the kerbs are missing on both sides. A few large stones at intervals distinguished the east side from a stratum of natural gravel whilst the western is well defined from the soft sandy subsoil. The extreme

width is between 13 to 14 feet. Trenches cut across the line 83 feet from the north-west end of the first section revealed a hard bed of sandstone chippings about 9 feet wide which were traced for 17 feet further in a south-easterly direction, when they terminated abruptly in the soft sandy subsoil. A ring of trenches around this extremity failed to locate any trace of this track, nor was it found in two further trenches along its general line where it is making for a point about 20 feet west of the place where the farm road passes through the gate into field No. 10 o.s. It has probably been destroyed by ploughing, since only 4 to 5 inches of soil cover the last traces. Without doubt the course of the road up the east side of the valley is represented by the present cart track, any other gradient being far too steep. At a point 22 feet from the south-east corner of the tower foundation, a branch road passes westwards from the old track at right angles and sweeps round the south side of the tower. This track differs strikingly from the road metal of the former one, consisting entirely of a bed of sandstone chippings about 6 to 9 inches deep and about 20 feet in width, laid on the clean sandy subsoil without kerbstones. Opposite the tower a fragment of the side of an amphora was lying on the surface of the track. Close to the tower a few cobbles and some gravel were mixed with the chippings, but generally speaking the difference from the narrower road is very decided. In character it may be compared to the bed of chippings in the field, described above. In order to make certain there were no other tracks leading to the site, a trench was carried at right angles to the Wall a little further eastwards across a broad bank which lies on its south side. This was found to consist of fallen masonry covering reddish soil, and a little gravel overlying sand. Another trench carried in the same direction, but a little further outwards from the wall and nearer the military way, showed that beneath the

top soil lay a loose stratum of fine gravel overlying the sand but no trace of a road. A trench on the west side of the military way and about 32 feet from it, was carried 53 feet in a westerly direction. This revealed at its east end soft sand below the top soil for about 6 feet after which was an irregular mass of river cobbles and sand lying very unevenly, rising and dipping, which extended throughout the trench, that is to a point beyond the face line of abutment 3. It was decidedly the old river bed, the east bank of which lay a little to the south of the plan of the junction between Walls A and C, showing that the river had curved in a south-easterly course after passing the bridge, in fact towards the old terrain half way across field 10 (o.s. 1900).

It is impossible to define any made road in the ground west of the tower and east of the tapering land breast of abutment 2. Immediately above the mass of stone packing there are 2 or 3 feet of disturbed top soil containing cobbles and gravel, but no definitely recognisable roadway. No section was cut to determine if the track ran straight forwards towards the river bed and crossed at a ford. This area lay under soil and stone dumps which could not be moved until after the excavations closed down for the winter.

The Fosse.

A complete section was carried across the great ditch at a point $11\frac{1}{2}$ feet east of the east wall of the tower. The ditch has here a full width of *c.* 30 feet. As will be seen from the sectional view the south berm is narrower than usual being only 17 feet 4 inches as compared with 24 feet at Poltross. The scarp is steep and apparently to avoid subsidence has been carefully banked with hewn stone. The bottom of the ditch is 5 feet below the surface and was filled with a black deposit consisting of fragments of wood. Only small pieces could be recovered and it was impossible

to determine if they lay in any particular position such as would indicate wooden stakes. The counter scarp is sloped more gradually. A trench was carried westwards along the line of the scarp, by which the ditch was traced in that direction, gradually becoming shallower until it ceased altogether at a point nearly opposite the east wall of the tower. The remains of black deposit were found to this limit.

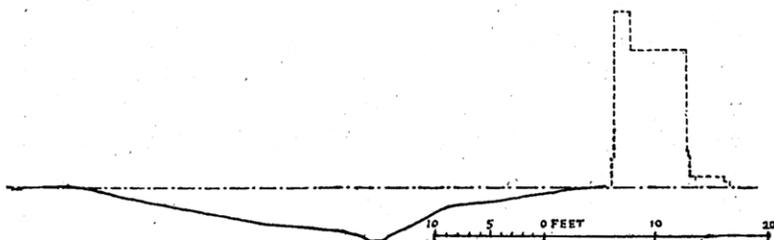


FIG. 9.—SECTION OF FOSSE.

Conclusions.

The site is an extremely complicated one, and the task of arranging the different structures in a chronological sequence is rendered difficult by the paucity of dateable materials. These are, firstly, the denarii from the first floor of the tower, and secondly, the pottery from the two floor levels of that structure and from outside the North Wall. Both denarii are early, Trajan and Titus, and the former is in fair preservation, compatible with its loss in the reign of Hadrian or the early part of Antoninus Pius. Coins of the reign of Trajan and Nerva have been found in the first occupational stratum of a room in the forum at Wroxeter which was built in A.D. 130 and which occupation ceased by A.D. 160-170. The potsherds from the first floor contained pieces characteristic of the first occupation in excavated Wall sites, whilst among those from the second floor were types common to that and the second or 1b stratum, but not found in the Period 2

deposits (e.g. flat-rimmed bowls, *cf.* these *Trans.* N.S. xi, p. 447, Pl. III). The two floor levels have yielded material tallying with the two divisions of the first mural occupation ra and rb, dated respectively from c. 122-124 to c. 158-160 and from the latter date to c. 180. The spacing of the two floor-levels and the character of the intervening debris (which is small in quantity and consists almost entirely of burnt material without fallen masonry) agree with the features held by Mr. F. G. Simpson to characterise the ra and b strata. The two floor levels of the tower thus correspond with the ra and rb periods. The lower level, however, has yielded no sherds characteristic of the earliest part of the Hadrianic period, such as the reeded rim bowls or "rustic" ware which occur at Poltross; consequently, the first occupation need not necessarily be as early as the ra level on the adjacent sites, and might fall in the Antonine era. The east wall of the tower abuts on the Wall and so do the outer and the lowest four courses of the inner face of the west wall, whilst the stones above that level are roughly bonded; the inner face as a whole not being aligned with the return face of the Wall but being set outwards several inches. The tower might either be contemporary with or later than the Great Wall. If contemporary, it might be argued that when the wall was first built, alternate facing stones in the corner of the return were left out for the bonding of the tower wall; and with respect to the straight joints, this mode of junction between a heavy and a lighter wall is now considered a satisfactory procedure, to prevent any settlement of the heavier structure being communicated to the lighter. Again there is the presence of a recess made by the return face, suggesting that the wall was purposely thinned at this point preliminary to the construction of a tower. On the other hand, all the turrets and mile-castles so far excavated are definitely bonded into the Great Wall, and the straight joints between Wall and forts

have been accepted as an indication of difference in date. Again the fact that the inner face of the west wall is not in alignment with that of the return, and that the other facing stones partly abut, and partly bond, militate against a common plan of Wall and tower. There is also a very suggestive difference in the character of the mortar in the tower and the Wall. Admittedly the mortar in the Wall varies considerably in its quality, but such dissimilarity in the two adjacent structures is a weighty point against contemporary work. Nor is it likely that the Wall, complete with milecastles and turrets, was erected first, and this tower added after its completion, if part of the original plan. Lastly, the suggestion that the Great Wall was thinned at this point with a view to the construction of a tower, thereby providing a sort of recess like those of the turrets, loses force when tested by a more strict comparison with the recessed structures. They were recessed into the *thinned* Wall, whereas the whole $7\frac{1}{2}$ feet of that structure serve as the north wall to the Willowford tower. If the plan of recesses had been adopted here, as at the neighbouring turret, the north wall would have been only 3 to 4 feet thick. It is more likely that the point where the Great Wall was reduced in width suggested itself as a convenient site to build the tower. It is to be noted that the dressing of the facing stones of the tower is superior to that of the similar masonry in the two Willowford Turrets.

This brings us to the date of the Great Wall. If contemporary with the tower, it must date at the latest to the Antonine period. On general grounds, which are sufficiently obvious, this Wall must belong to the same period as the work at Poltross Burn, to which it is very similar in general constructional features; and, further, it is strictly comparable with the works further eastwards, in all of which the testimony on pottery, coins and dedication slabs by Platorius Nepos points to their erection

in Hadrian's reign. This being the case, it follows that the Wall and tower if contemporary are Hadrianic. If they are not contemporary the tower could easily be a later Hadrianic or early Antonine erection, added to an earlier Hadrianic Wall.

Now comes a more difficult and controversial subject, namely, Wall A. It is definitely earlier than Wall B, at least six to nine courses having been destroyed when the later wall was erected. This is also illustrated by the very striking difference in the size and quality of the facing stones and in the mortar. The two Walls also differ in width and in the position and character of the offsets. Wall A projects quite independently from the south face of Wall B, the footing course of the latter sometimes resting on the stones of A, and sometimes on a cobble packing, suggesting that the A foundation was not designed as a special plinth to the later Wall. This is further emphasised by the large stone forming the foundation of the return, resting not on the remains of the A work, but on a cobble and gravel packing.

On the east side of the west Willowford turret, the buttress on the south side of the Great Wall exhibits similar features; above the broad footing course the first four courses of the Wall are followed by a second broad offset; the lowest courses of the return face show broken extremities as compared with the properly squared corner stones in the upper courses. Beyond the return the footing and first course continue eastwards independently of the south face of the thinner Wall, just as at the bridge. At the Willowford east turret the footing course and two lowest courses of the buttress are continued eastwards projecting 3 feet from the south face of the reduced Wall, whilst an odd stone of the third course projects independently beyond the buttress return. Again, in Gilsland Vicarage garden, below the footing of the south face is a projecting course 23 inches wide followed by another layer

of stones serving as a footing to it, an arrangement precisely similar to the ones already noted. Excavations at Brunstock and Lanercost (these *Trans.*, o.s. xiii, pp. 459, 466 and 467) revealed a similar structure in association with the south face of the Wall. At Lanercost "close to the Wall was a flagstone pavement as it seemed 28 inches wide"; at Brunstock "the Wall itself though much ruined shewed an interesting feature: 9 feet south from its front we found 30 inches down a rough platform nearly 3 feet wide. This re-appeared in a section 250 yards west, and in the sections at Lanercost and Gilsland." Mrs. Hodgson refers to this section in her notes on these excavations (*Trans.* o.s. xiv, p. 401) as revealing a pavement ". . . about 20 inches wide, at least 5 feet south of the mass of concrete which was all that was left of the Wall. . . . it is impossible to say exactly where the south face was." Again, (p. 402) mention is made of some stones at Bleatarn as bearing a resemblance to this structure. The report of 1893-4 compares both the Lanercost and Brunstock "pavements" to the projecting courses in the Vicarage garden at Gilsland. The excavations of Poltross Burn showed a broad footing $2\frac{1}{2}$ feet wide, running along the south face of the Wall in continuation of the foundation layer of the east buttress. This foundation was also traced on the east side of the Poltross Burn. It corresponds without doubt to the lowest course noted at Willowford and elsewhere (*Trans.* n.s. xi, p. 404, Fig. 6). In Mr. Newbold's report on his excavations at Limestone Bank turret (*Arch. Ael.* ser. III, ix; fig. 3), the photograph of the buttress on the south face of the Wall near the tower depicts two of the foundation stones running beyond the return of that structure as in the instances given above.

Several of the previous historians of the Wall note the variability in its width. Hodgson states that a portion of the Wall near Denton Burn is 9 feet broad above the

ground, and that just west of Portgate the foundations in the turnpike road are scarcely 7 feet wide, but opposite a plantation a little further west they are $10\frac{1}{2}$ feet wide. (*Hist. of Northumberland* Part II, Vol. III, p. 276). Warburton's map of the Wall bears an inset showing a sectional view of the Wall near St. Oswald's, headed "Profile of the Remains of Severus' Wall as it now appears on Wall Fell near St. Oswald's when cleared of the rubbish," and showing the north face standing nine courses with a small offset above the second whilst the south face shows a very broad offset above the fourth course, very suggestive of the projecting courses described previously. A similar profile of the murus near Portgate is depicted in a sectional view of the "Works"; on the same plate here its full breadth at the level of the projecting courses is stated as $10\frac{1}{2}$ feet. These variations are readily explicable in the light of the projecting foundation courses found at Brunstock, Lanercost, Willowford and Gilsland, thus in some parts the foundation level alone is left exposed in the modern roads, consequently, if these "footings" were present, the width instead of being 7 to 8 feet would be 9 to $10\frac{1}{2}$ feet. One thing is clear, namely, the urgent necessity for a series of sections exposing the faces of the Wall at intervals throughout its entire course and going down well below the foundation levels. Lastly before discussing these features it may be recalled that a turret on Walltown Crags was not bonded into the Great Wall but the latter merely abutted on its east and west sides.

The difference in materials and architecture from Wall B strongly suggests the work of a different body of men, and it will be seen that this feature is widely distributed along the mural line. Dateable evidence in association with it there is none, but it is at any rate relatively certain that Wall B is Hadrianic, and was built during the period of office of Platorius Nepos, about A.D. 122 to 126. If this be correct, the earlier work may

belong either to the commencement of the period of mural construction or to a date anterior to the arrival of Hadrian, either in the earliest years of his reign when Falco was legate, or, still earlier at the close of Trajan's reign when Scotland had been abandoned and a new frontier consolidated across the lower isthmus. As against the latter suggestion, Hadrian was, so far as we know, the first to inaugurate the policy of frontier delimitation by continuous barriers; the typical Trajanic *limes* is the Stanegate line, a series of small forts linked by a road. Wherever we look on the other confines of the empire, the barrier system commenced in Hadrian's reign, and, moreover, it was in his reign and that of Antoninus Pius that stone defences gradually supplanted wooden and earthen structures in the case of forts, towers, etc.

The discovery of the turf wall led to the supposition that Hadrian's Wall was of turf and that the stone *mur* belonged to the Severan period. Excavations at the Poltross Burn mile-castle proved that the lowest occupational stratum contained pottery and coins dateable to the first half of the second century and probably to the Hadrianic period. This stratum was continuous with the lowest level at the north gate, proving that structure to belong to the same period. The turf wall advocates then suggested that the milecastle gates might have been built in stone in conjunction with a turf wall and, therefore, the Hadrianic and presumed turf wall occupation level, were a relic of the earliest type of mile-castle. But the lowest step of the rampart stairs, and the lowest oven, both contemporary with the first road level, overlay the projecting footing course of the milecastle wall; and outside the milecastle the continuation of the footing course of the wide foundation was not held to indicate a reconstruction of the Great Wall beyond the buttress return. A careful study of the photograph of this structure will show that although the return is faced with well square

corner stones down to the footing level, the first three courses behind them, which carry the buttress as high as the broad off-set, are very rough masonry, inferior to those above. Now comparison with the bridge and turret sites shows that the foundation stratum at Poltross is indubitably the same as the broad foundation of Wall A at these sites, and, whereas the return at the Willowford sites has in two cases been carried down to the third and second course level of the thick foundation, and in one to the footing level of that structure, the corner stones of the return have only been commenced in the lowest instance above the second course, while at Poltross Burn the return has been built up from the foundation level of the A structure.

Again, just as at the Willowford sites, the masonry of the return and of the south face of the reduced wall and the buttress appear to be contemporary. That is, the alteration was made above the level of the second broad offset of the A structure; hence the upper courses of turrets or milecastles are bonded with the great Wall. Then arises the question, what type of wall was built above the wide foundation, and why the reduction in width? It would seem highly improbable that the Romans would demolish an existing 10 foot wall to reduce it to 7 feet. The suggestion that the 11 foot foundation was an original plan for the Wall, abandoned at the outset, is untenable in view of the existing portion of that structure actually standing 8-13 courses high at Willowford. Now why was the reduction at Willowford effected not at the abutment but at least 18 feet eastwards? It is probable that a change in the character of the Wall A was effected here; that whereas the section on the river bank was faced with masonry for security, the continuation eastwards may have been of earth with a facing or of turf, built on the 10-foot plinth composed of the footing and first four courses of Wall A as high as the broad offsets. It is a significant

fact that the core of Wall A at the bridge contains only earth and small stones, even near the top level, whereas Wall B contains mortar and large stones from the base course upward.

Then arises the question of the size of wall that could be erected on such a base. The accompanying diagram will help to explain the presumed dimensions. Allowing

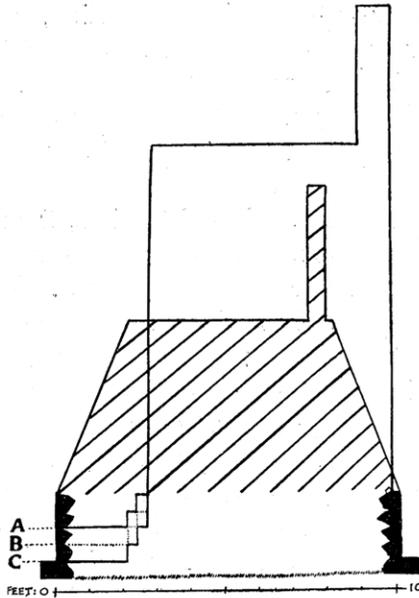


FIG. 10.—SECTION OF THE WALL, SHOWING A.—THE EARLY FOUNDATION AT THE BRIDGE AND THE EAST TURRET. B.—THE SAME AT THE WEST TURRET. C.—THE SAME AT POLTROSS BURN MILECASTLE.

for a batter of 1 foot in $2\frac{1}{2}$ feet, a reasonably safe slope for such a structure, and providing for a width of 6 feet on the top, following the Vitruvian precept, a height of 5 feet could be obtained, which if we add 1 foot for the average height of the base above ground and 4 feet for a breast-work would give 10 feet as the effective height of the

barrier. Compare this with the Aluta *limes* built about A.D. 140. The earthen wall was 3 metres broad and 2 metres high with a palisaded summit; evidently the batter was steeper, and the above dimensions are therefore liberal.

Two interesting features may be noted at this juncture. All along the south side of the Wall at Willowford as it crosses the plain is a distinctly defined low bank. Sections across this showed it to consist only of reddish soil and cobbles. Is this the remains of the earth from the original work? Again, along the south side of the broad foundation near the bridge was a dark stratum 12 inches wide, traceable for 21 feet and $\frac{1}{4}$ to 1 inch deep. The material was submitted to Professor Lang, F.R.S., of the Victoria University, who pronounced it to consist of small particles of wood, probably ash; have we here traces of a timber breastwork on Wall A?

Applying the earth wall theory to the Poltross mile-castle, the difficulties can be explained if we suppose that the original walls are represented by the broad foundation as high as the second offset which, as shown above, was certainly the reconstruction level. The dateable evidence of the bridge places both A and B Walls in the first half of the second century (period 1a), hence the association of the earliest oven and the rampart stairs at Poltross Burn with the 1a level. The stairs would only be constructed after a vertical wall face came into existence, and as for the oven, it could readily have been first built in the north-west corner after the alteration of the barrier, yet still in period 1a. Alternatively since the remains of this oven were far more disturbed than those of its successors, it may have existed first and been disturbed when the walls were altered. The inscriptions of Platorius Nepos may well have belonged to the earth wall phase, like the distance slabs on the Antonine Wall.

Lastly, there is the point in connection with the north

face of the Great Wall at Poltross Burn. Here the construction continues uniformly, as at Willowford, by comparison with which it would seem that the B work began at the level of the second offset. Why then was the south face reconstructed from the footing level, and why at different levels on the Willowford sites? A suggested explanation is that on the north side the B face was carried upwards almost vertically above the A face but on the south side the reduction in width brought the new base course well within the face work of Wall A, behind which was only a mass of soil and loose stones. In that case the engineers, having removed the earth superstructure, would level the base on the south face until a firm bottom was reached before laying the new footing course; thus local variations in the solidity of this structure would determine the depth to which they cleared away the A base. This point would be of special significance on a steep slope as at Poltross Burn. When the reconstruction was effected at the turrets and milecastle, the new Wall was carried up the full width of the A structure, presumably to serve as a buttress, and in the case of the turrets to provide additional space on the adjacent rampart.

The working hypothesis may now be stated: that the original Hadrianic barrier was an earth or turf wall on an earth and cobble plinth faced with masonry; supported by small forts, milecastles and turrets linked by a road, constructed during the governorship of Platorius Nepos and replaced by a masonry structure either later in the same reign or in that of Antoninus Pius, at least prior to the rising in A.D. 158; judging from the coin evidence at Willowford the earlier rather than the later part of this period is indicated.

Such an hypothesis explains why the tower at Willowford was a later addition. The first Hadrianic bridge must have possessed some form of tower on the south side of Wall A, which if it were only a wooden structure might

have occasioned the need for a stone one when the ' murus ' was built; otherwise, why move the tower at all, and there was certainly no earlier occupational level in the existing one?

The abutment 1 must have been in conjunction with the Wall A, the masonry of Wall C obviously passing over to end in abutment 2. The broken west end of Wall A finished immediately to the rear of this structure, which is what one would expect if the wall terminated in a water face of heavy masonry built on the abutment. Nor is it likely that abutment 1 replaced a still earlier structure; at least, we have no evidence for this. The stones certainly do not appear to be re-used material, with the possible exception of the slot cut in the stone of the east return. That a southern wing once existed appears to be proved by the presence of re-used stones in the foundation beneath the tower, more especially of chamfered stones resembling blocks on the north side of this abutment. The cobble line south of Wall A confirms this evidence.

That the Wall extension C, abutment 2, and the breast-work on its southern side, are later than Wall A and abutment 1 is beyond dispute; that they are later than Wall B is clearly shown by the totally different character both of construction and of materials. If the foregoing reasoning is correct, this phase of the Wall and bridge is probably later than period 1a, in which case these structures might have been built in Period 1b, or 2, that is, either c. 160-180, or at the restoration of the frontier by Severus. Later than this date is not probable in view of the subsequent changes in the site. A sesterce of Commodus, found beneath the cobble packing on the north side of Wall C, where no modern disturbance could have placed it, helps to fix this date. The packing is either contemporary with or (less probably) later than Wall C. The coin was submitted to Mr. Donald Atkinson who deciphered it as follows:—

Obv. M. COMM[OD ANT P] FE[LIX AV]G B[RI]T PP.
Laureated head, r.

Rev. Female figure standing l. with sceptre and ? patera
s.c. Legend undecipherable.

Cohen, 2nd ed., 46. A.D. 185-192. Between the disaster of A.D. 181 and the advent of Severus in A.D. 207 there was considerable building activity throughout the north of the Province, a period which agrees very well with the date of the coin. There is no definite proof that Wall C was not built during period 1b, followed by the laying down of the packing in the second period, but it is more probable that the two are contemporary.

The third or road abutment contains a distinctly cruder masonry than the preceding, with the exception of re-used stones. As no dateable remains were discovered, we have to rely on the dating of the preceding phase in order to date this. If we suppose the cobble packing and Wall C to be contemporary and date them to Severus, the beginning of the period III, about the close of the third century, suggests itself as a likely time for the erection of this abutment. It will be seen that if this chronological sequence be correct, every mural phase is represented on the bridge site. Walls A and B, abutment 1, and the tower, represent Period 1: Wall C and abutment 2, Period 2: and abutment 3, Period 3. The date of the pier is also doubtful. Its foundation on the same pavement as abutment 3 suggests contemporary design, which as said above is also suggested by their relative position. Lastly, there is the question of the dating of the roads. It has been suggested that the discovery of only one cart bridge, and that a late one in the sequence of structures, favours a late date for the military road. This view is discountenanced by the line of the military way making directly for the east side of the tower. A direct alignment to the bridge (abutment 3) would have been the obvious course of the road were it only constructed at this time; indeed the tower shows no sign of a late occupation, and

consequently there seems no reason to alter the view expressed by Mr. Simpson and myself, when discussing the purpose and date of the Vallum, that the military way followed the erection of the Hadrianic Wall after the cleansing out of the Vallum ditch and removal of the causeways.

THE POTTERY.

By D. ATKINSON, M.A.

A. *From original level of Tower.*

1 and 2. Fragments of two carinated bowls of soft red clay. The rims resemble those of the shallow dishes of black ware with lattice patterns which became common about the second or third decade of the second century (*cf. Slack Rep. Yorks. Arch. Journ.* XXVI, Pl. XXIV, nos. 65 f.), but are noticeably flat on the upper surface. These bowls are presumably later native imitations of the carinated bowls of hard grey ware common on Flavian sites (*Corb. Rep.* 1911, types 4-7). A bowl of exactly the same type and material was found on the earliest level in the Poltross Burn Milecastle (these *Trans.* N.S. xi, p. 447).

3. Mortarium of coarse white clay with illegible stamp. Its type resembles *High House Milecastle*, Pl. XVIII, no. 96.

4. Mortarium of cream-coloured clay. The type is that of *Poltross Burn*, Pl. IV, no. 3.

5, 6 and 7. Rims of cooking pots of black ware with greyish surface. All three are varieties of the black ware cooking-pots usually with polished surfaces and lattice pattern, which first appear about 120. The material of which such vessels are made is subject to considerable variation. Parallels to these rims occur at *Slack (Rep., Pl. XXIII, nos. 1-7)*.

8. Similar but of black polished ware.

9. Globular beaker of ware similar to 8. A parallel at *Wroxeter* is dated 160-170 A.D.

10. Small beaker, ware as last. *Cf. Slack Rep., Pl. XXIII, nos. 8-12.*

11 and 12. Two small fragments of decorated Samian bowl shape 37. Only the egg and tongue motive is preserved. It is identifiable as that used by *Albucius* and *Paternus* (*Oswald and Pryce Terra Sigillata*, Pl. XXX, no. 90).

13-16. Bases of black ware cooking-pots agreeing in form and material with the rims nos. 5-8 above (not figured).

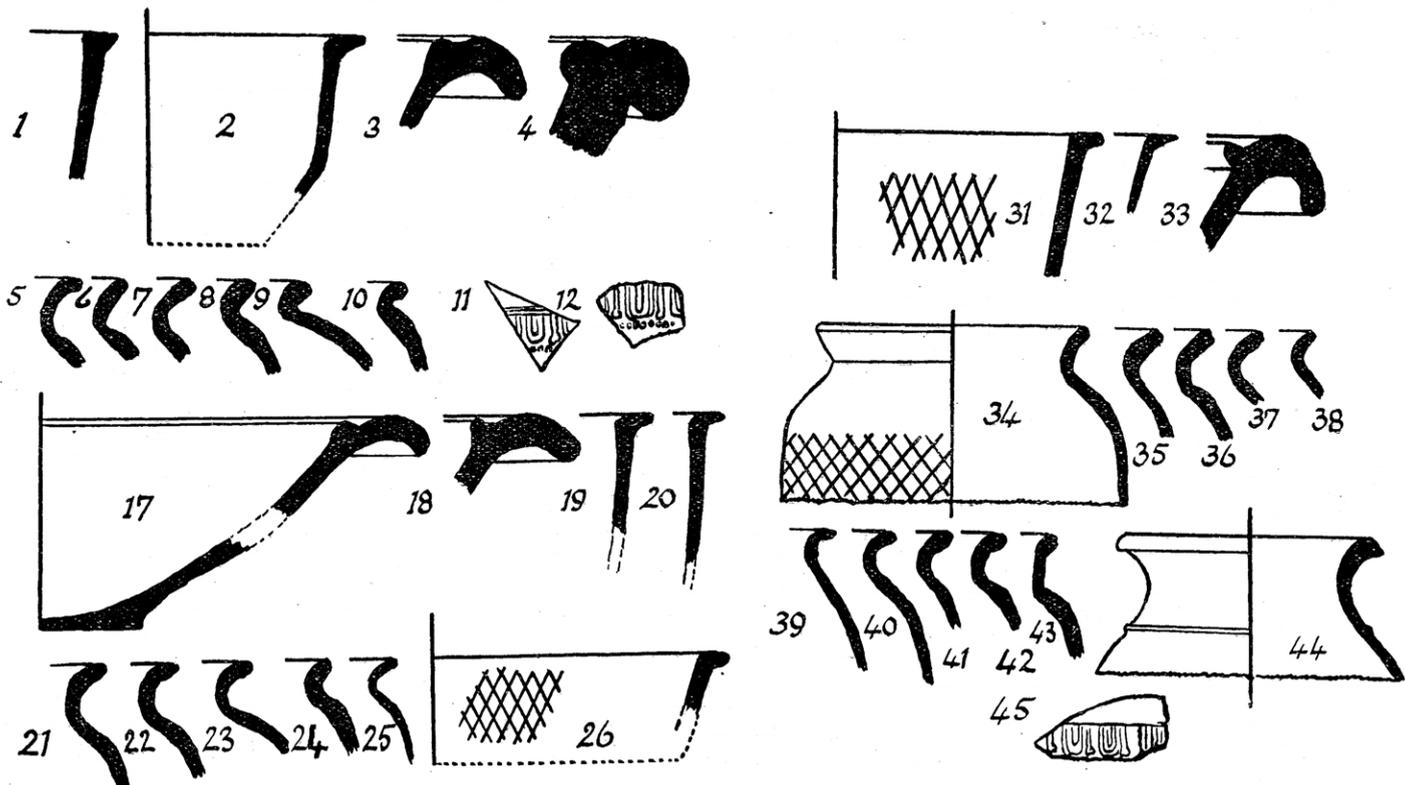


FIG. 11.—POTTERY FROM THE BRIDGE TOWER (♯).

Of the fragments in this group to which a date can be assigned none would naturally fall much later than the middle of the second century.

B. *Found on the upper floor in the tower.*

17. Mortarium of white clay, *cf. Balmuidy Rep.*, Pl. 41-2, nos. 19 and 28.

18. Mortarium, red Clay. *Newstead* fig. 34, no. 11.

19 and 20. Bowls similar to nos. 1 and 2 above.

21-24. Cooking-pots of black polished ware of the same type as nos. 5-8 above.

25. Small pot of coarse grey ware.

26. Shallow flat-rimmed dish of polished black ware: *Poltross Burn*, Pl. III, nos. 31-33.

27-29. Bases of brown ware jars (not figured).

30. Base of small beaker of soft grey clay with black polished surface (not figured).

The dateable pieces in the group fall within the limits of the second century.

C. *Found North of the wall East of the Abutment lying on or just above the natural soil.*

31 and 32. Flat rimmed dish of polished black ware like no. 26 above but deeper.

32. Flat rimmed dish of thin drab ware, *cf. Balmuidy Rep.*, Pl. 47, no. 5.

33. Mortarium of cream clay, *cf. Poltross Burn*, Pl. IV, no. 5. The parallel is not exact but from the profile it is probable that both belong to the second century.

34-43. Cooking-pots; no. 36 is of soft grey clay of a texture much finer than the rest, which show most of the common varieties of the polished black ware vessels. No. 43 has a wavy line scored on the under side of the rim, a feature rarely found after the middle of the second century. To judge from the profiles all should fall within the second century.

44. Narrow necked jar of brown ware, *cf. Balmuidy Rep.*, Pl. 44, no. 1.

45. Small fragment of decorated Samian bowl, shape 37; only the egg and tongue motive is preserved, and this is not identifiable. Antonine period.

46. Amphora neck of the globular type; *Newstead*, Pl. 52, no. 1.

D. *Miscellaneous.*

47. Found in mortar layer above gravel filling of sluice. Black gritted ware cooking pot, *cf. Poltross Burn*, Pl. V, no. 6-17. The

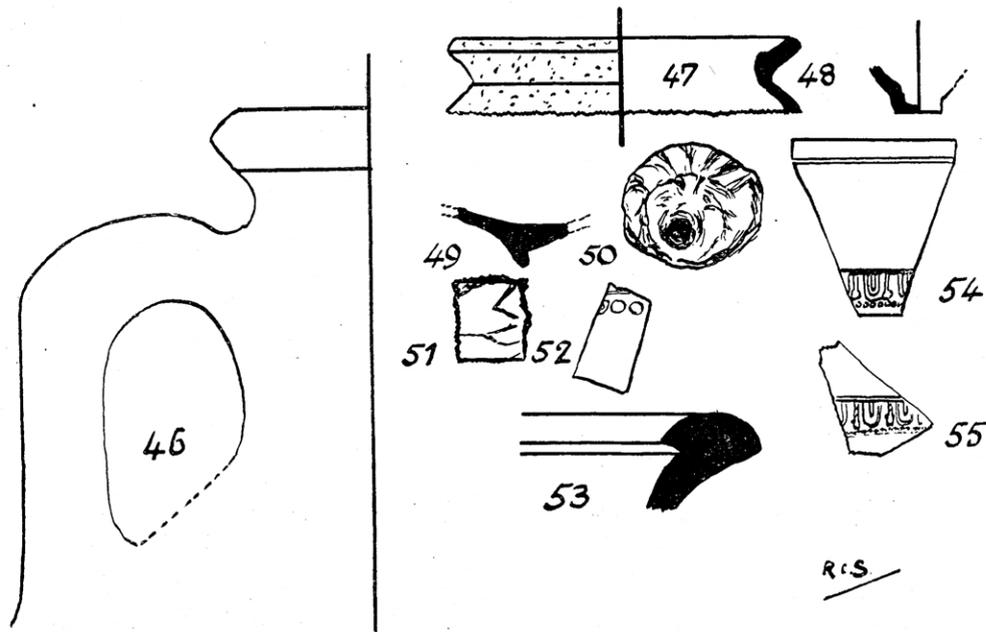


FIG. 12.—POTTERY FROM THE BRIDGE TOWER (½).

characteristic groove on the inner side of the rim is present. On the date of Poltross Burn, p. 45-3. Late third or fourth century.

48. Base of small Castor Ware vase of white clay with dark slip. Found in gravel filling of sluice. Third or fourth century.

49. Found at foundation level behind Abutment 2 south side. Fragment of Samian, shape 31. Second century.

50. Found in mixed soil above Abutment 1. Lion head spout of Samian Mortarium, Shape 45. Second half of second century.

51 and 52. Found in mixed soil above upper floor in tower. Two fragments of same vessel of soft brown ware with polished brown surface. The decoration is apparently the hind legs of an animal moving left on no. 51 (which is wrongly placed in the drawing), and a series of raised dots on no. 52, in barbotine technique. The material is quite unlike Castor or Rhenish ware and its date and provenance are alike unknown.

53. Fragment of rim of amphora, type as no. 46 above.

54 and 55. Fragments of two decorated Samian Bowls. Shape 37. Antonine period. Found in mixed soil east of tower.

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The finds will be deposited in Tullie House Museum, Carlisle.