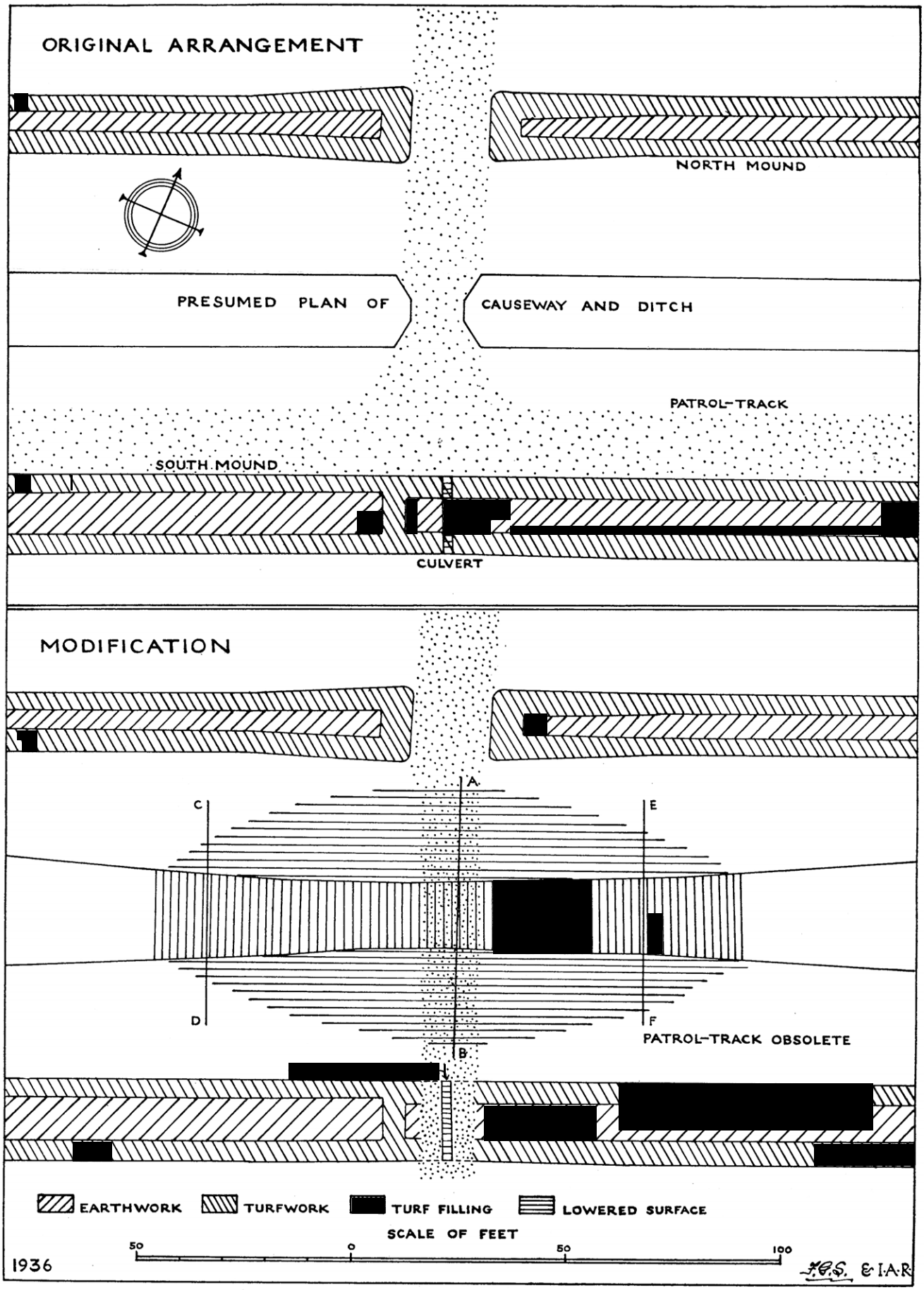

FIG. 1.—The Vallum at Wall Bowers milecastle, 51: original and modified arrangement.

ART. XX.—*Report of the Cumberland Excavation Committee for* 1936.

THE VALLUM AT MILECASTLES 51, WALL BOWERS, AND 50 TW, HIGH HOUSE.

By F. G. SIMPSON, M.A., Hon.F.S.A.Scot., *Director of the above Committee*, and
I. A. RICHMOND, M.A., F.S.A., *Co-director, Durham University Excavation Committee.*

With an appendix by A. RAISTRICK, M.A., Ph.D.

INTRODUCTION.

THE examination of the Vallum at High House Turf-Wall milecastle, 50 TW, was left unfinished in 1935; and the results presented in the report* for that year, while clear in general import, were incomplete in many respects. Thus, only an approximate scale was attached to the general plan, while details were expressed diagrammatically. Indeed, the general conclusion as to the relation of Turf Wall to Vallum seemed to require confirmation from another site before final work could be done; while the complicated modifications of the original arrangement also stood in need of support, if this could be secured. The obvious field for such an inquiry was the neighbouring milecastles. Of these, Harrow's Scar, 49, though rendered notable by a diversion† of the Vallum-ditch even more striking than that at High House, is now so near the edge of the Scar that the greater portion of the diversion has been destroyed by

* *Trans.*, N.S. XXXVI, 158.
† *Ibid.*, 168.

erosion. Our* inquiry was therefore directed to the alternative site, Wall Bowers, 51, where the Vallum runs at a distance of 110 yards behind the great Wall.

(i) THE VALLUM AT WALL BOWERS MILECASTLE, 51.

The stone milecastle at Wall Bowers has already been partly explored during recent years. The north-east internal corner, below the modern road, was examined† in 1927: the south gateway, of type III, was uncovered‡ in 1934. This year, trenching inside the milecastle showed that buildings had flanked both sides of the through road, as at milecastles§ 47 and 48; and that its south internal corners were rounded, like those of all milecastles yet examined west of the Irthing. The publication of a plan awaits further work on the north front.

The Turf-Wall milecastle was then sought below the remains of the stone structure. Definite masses of scattered turf occurred here and there; but the rock lay so near the surface as to have invited a general clearance of the earlier remains, and it was impossible to feel that the turf was necessarily in position. Outside the milecastle, however, a little ditch, some four feet wide, has long been known to exist. A detailed examination of its course soon showed that it was unrelated to the stone milecastle. Not only does it lie well outside the stone milecastle's wall, but its south angles are set out in bold curves unmatched by those of the later structure. Again, the gap at the south gate does not serve the stone gateway, uncovered in 1934. All these anomalies would,

* This season no colleague was able to join us in conducting the work for any length of time. A welcome fortnight's visit was, however, paid by Mr. John Clarke, M.A., F.S.A.Scot., the excavator of Cadder fort on the Antonine Wall; while Mrs. R. G. Collingwood and Mr. K. St.Joseph were with us for a few days. We desire to thank all for their valuable comments and help.

† *Ibid.*, N.S. xxviii, 384.

‡ *Ibid.*, N.S. xxxv, 254.

§ *Arch. Ael.*, ser. 4, xiii, 271; *Trans.*, N.S. xi, 397.

FIG. 2.—Section of south mound of Vallum at milecastle 51, looking west: showing upcast core and turf kerbs.

Facing p. 159.

however, suit admirably a Turf-Wall milecastle of the High House type. Its internal area would equal that of the stone milecastle; and the greater thickness of its ramparts—twenty feet compared with the eight-foot stone wall—would account for the berm-like space outside the existing walls and also fit the course of the ditch at the angles. In fact, the ditch may be taken to give us the external dimensions of the dismantled milecastle which it once surrounded. They work out as approximately 120 by 98 feet, comparing closely with 107 by 95 feet at 50 TW, High House.

The north mound of the Vallum was examined in detail (figs. 1, 4) both at the milecastle and for some distance east and west. Although it was found to be made, as usual, of upcast from the ditch, retained by kerbs of turf, yet in over-all width and details of the cross-section it is quite abnormal. Its over-all width is only 14 feet, compared with 24 feet at the west side of 50 TW (fig. 12); in cross-section, the core of upcast is only 5 feet wide, compared with 16 feet at 50 TW. The turf kerbs are 4 feet 6 inches wide. These conditions continue for at least 120 yards to the east and 160 yards to the west.

Opposite the south gate of the Turf-Wall milecastle, the mound is broken by an original gap, 17 feet wide, bordered by 7½-foot kerbs of turf. At the actual passage the mound is increased in width by 3 feet to 17 feet. Slight traces of a cobbled road were observed both in the opening and towards the milecastle; but most of the metalling had been eroded on the steep slope. It must be noted, however, that the remnants of the road, and the turf kerbs flanking it, were laid immediately upon undisturbed boulder-clay subsoil.

The south mound of the Vallum is larger than the north mound. The core of upcast is 10 feet wide, retained between turf kerbs 4 feet 6 inches wide giving an over-all

width of 19 feet (fig. 2). It still stands 3 feet high. A similar proportion is maintained for at least 120 yards to the east and 160 yards to the west. Though larger than the north mound, it is, nevertheless, smaller than the south mound west of the diversion at 50 TW (fig. 12).

Opposite the gap in the north mound, the north and south kerbs of the south mound are continuous. At this point, however, there are two additional features. First, opposite the middle of the gap, a culvert (figs. 1, 3, 4) of stone, ten inches wide by six inches deep and 19 feet long, passes through the mound, its floor being the original surface of the ground. The culvert has a fall of 1 in 11 from north to south. Secondly, opposite the west side of the gap, a cross-kerb 5½ feet broad (figs. 1, 3) links the north and south kerbs. The turf-work of the cross-kerb is structurally continuous with that of the north and south kerbs. The continuity of the lamination may be observed in figure 3. While the cross-kerb is therefore original it is an isolated feature, and its purpose remains for the present unexplained. The presence of the culvert and the continuous kerbs emphasise the essential difference between the two mounds at this point—the north mound broken by an original gap, the south mound unbroken.

There was, however, a secondary stage in the history of the south mound. The original culvert was first noted because its cover-slabs were embodied in the metalling of a later cobbled road, 11 feet 6 inches wide, which ran from north to south across the reduced remains of the mound at this point. To make way for the road the mound above the level of the cover-slabs had been removed. The bottoming of the road completely blocks both mouths of the culvert, reducing the kerbs to a height of some nine inches, as compared with the 2½-foot kerbs remaining only 19 yards away to the west. The fact that the mound was not completely removed recalls the normal treatment of the gaps associated with the system*

* *Trans.* N.S., xxii, 402.

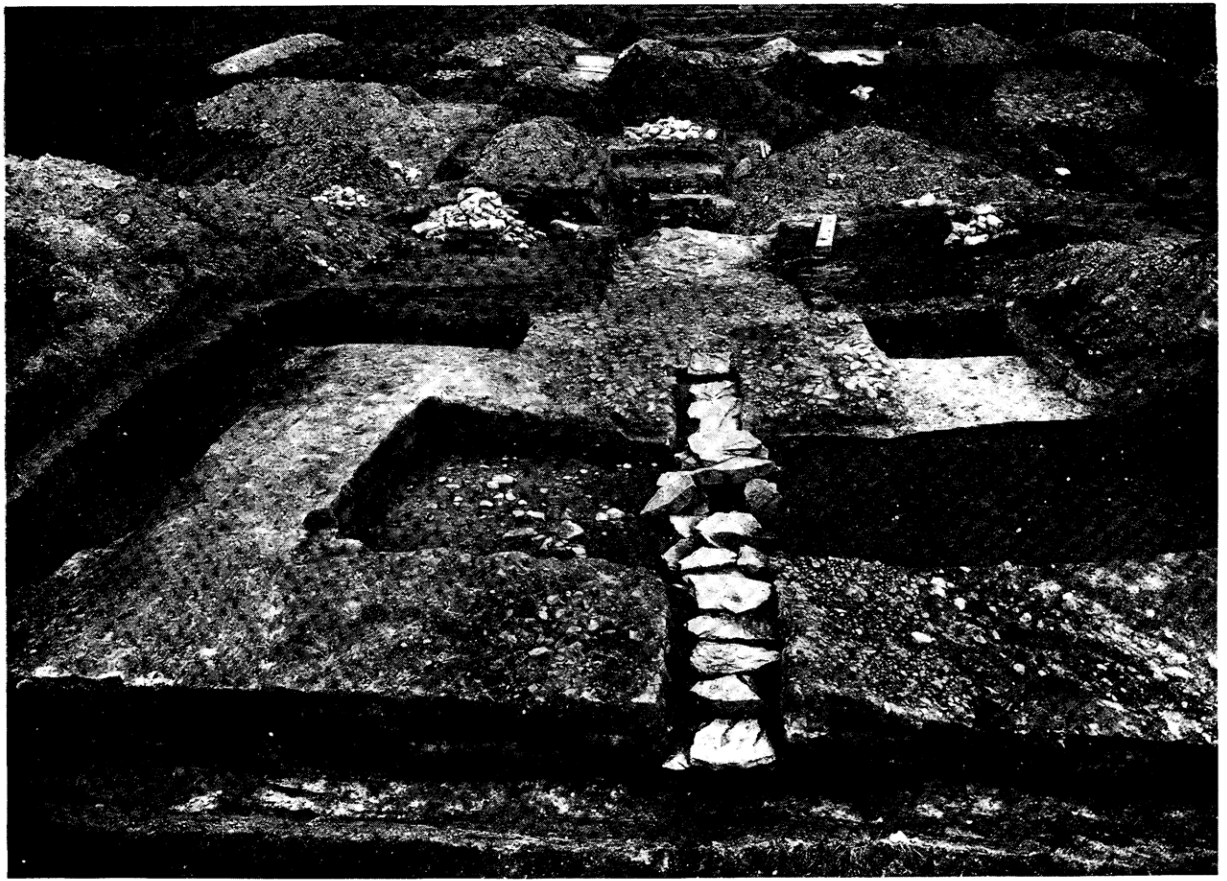

FIG. 3.—South mound of Vallum at milecastle 54, showing north-east section A-B, fig. 1: showing kerbs, cross-kerb, culvert and upcast core (removed to left of culvert); also secondary roadway crossing mound and rendering culvert obsolete.

Facing p. 160.

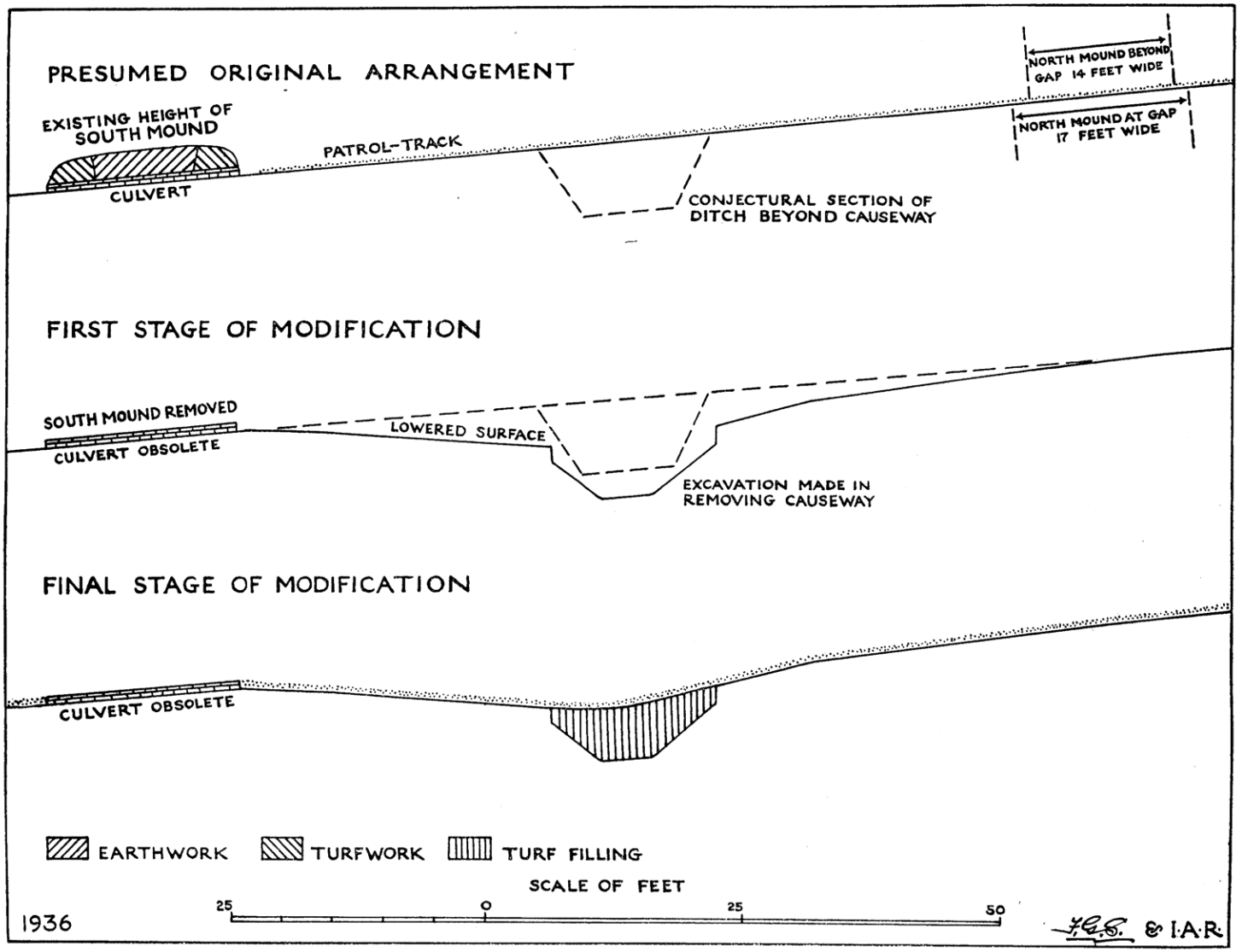

FIG. 4.—The Vallum at milecastle 51: section at A-B, fig. 1.

To face p. 161.

of temporary crossings. The roadway was considerably worn and had been re-surfaced at least once, as is further described below (see p. 163, fig. 11).

The original level of the ground between the gap in the north mound and the culvert in the south mound must next be considered (fig. 4). At present, both berms slope downwards towards the ditch. As already noted, however, the culvert has a southward fall of 1 in 11, that is, in an opposite direction to the slope of the south berm. Thus, the slope of the berm must have been altered after the culvert was made, since otherwise the culvert could not have functioned. The north and south mounds at this point, however, both lie on a uniform southward slope of 1 in 11, the gradient of the culvert itself. Accordingly, it is not unreasonable to assume that the cross-section of the whole earthwork once sloped at this gradient, as in fact it does to-day only 30 yards east and west of the culvert. It would then follow that there had been a lowering of the berms between the gap and the culvert, similar to that at High House (fig. 13). Such a reconstruction (fig. 4) is strongly supported by the fact that the existing slopes represent an equal lowering of the surface of both berms from the presumed original surface. No other gradient will give this symmetrical effect. At the centre-line of the ditch, the lowering would amount to 3 feet 6 inches, compared with 3 feet 9 inches at High House. The lowering extended about 25 yards east and west of section A-B (fig. 1), becoming gradually shallower until it merged with the original surface.

A cross-section (A-B, fig. 1) on the line of the ditch at this point revealed an excavation quite unlike the ditch of the Vallum. It was 15 feet 6 inches wide at the top and 6 feet deep. The sides (fig. 5) were vertical for a depth of about 20 inches, and then sloped at an angle of about 40 degrees towards a flat bottom* about 4 feet

* The bottom was strewn with cobbles and broken stone, as if to afford the excavators foothold in the soft clay.

6 inches wide. As this excavation continued east and west from this point its width increased, its depth from the presumed original surface decreased, the vertical portion of the sides gradually merged with the slopes and the flat bottom became rounded (figs. 6, 7). Finally, in both directions, the excavation merged with the normal ditch of the Vallum, approximately where the lowering of the berms began.

Throughout its length, the bottom of this excavation was nearly horizontal. As already stated, the bottom at section A-B (fig. 4) was 9 feet 6 inches* below the presumed original surface. Where the excavation merged with the Vallum-ditch, the depth was only about 7 feet. Originally, therefore, the ground along the line of the ditch must have had an upward slope from both east and west to a crest at, or about, section A-B. Consequently, as the excavation proceeded horizontally, the original ditch and any feature in its line—a causeway, for example—must have been entirely removed within the limits of the lowered surface. An original causeway is, however, the logical complement of the gap in the north mound; and the provision of such a causeway is supported by the analogy at High House.

The section of the excavation shows also that it did not remain open for any length of time: the vertical sides could not have stood open to the weather. It was, in fact, filled with turfwork (fig. 8), which still reached the lips, but had shrunk to a curved cross-section (figs. 8, 11) in the middle. The turfwork was covered by a paved roadway (fig. 9), continuing that which crosses the south mound. To east and west, the height of turfwork was gradually reduced, so as to form the gently sloping sides of a causeway about 140 feet in total breadth, though the effective top of the structure was probably not more than

* That is, the surface lowered 3 feet 6 inches added to the present depth of 6 feet.

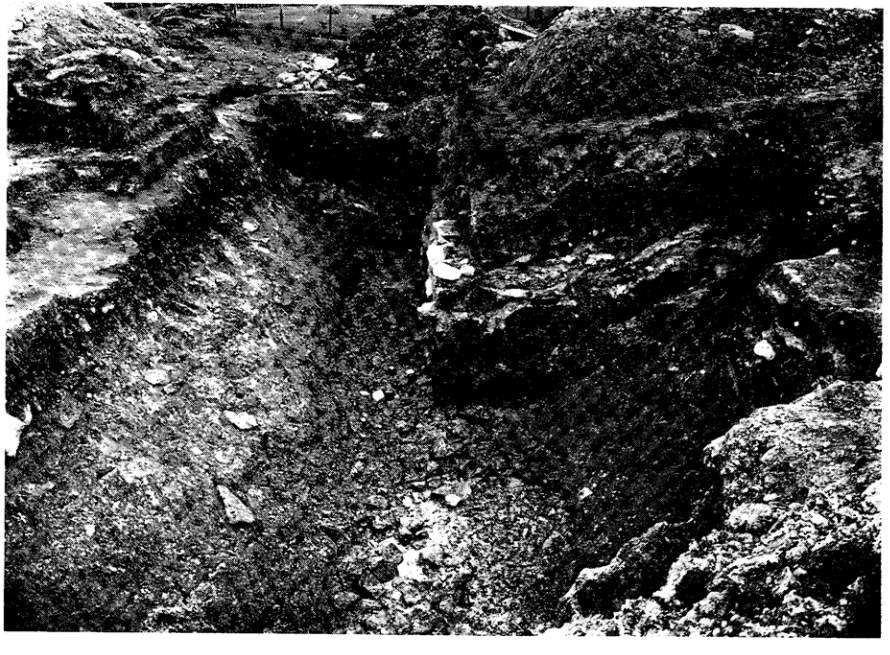

FIG. 5.—Milecastle 51, excavation replacing Vallum-ditch, looking west: rubble mass of secondary causeway removed, showing sides vertical above slopes and stone surfacing of bottom.

Facing p. 162.

Fig. 6.—Milecastle 51, excavation replacing Vallum-ditch: section at C-D, fig. 1, looking west; showing mud blocks below turf filling.

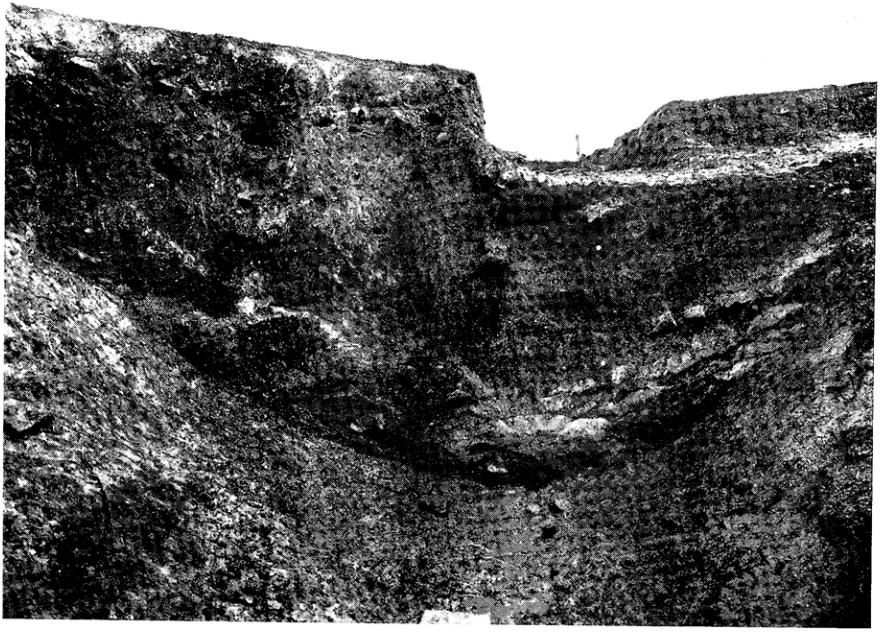

Fig. 7.—Milecastle 51, excavation replacing Vallum-ditch: section at E-F, fig. 1, looking east; showing mud blocks below turf filling.

Facing p. 163.

17 feet wide, the width of the gap, or 11½ feet, that of the roadway. Turf was not the only material employed in the filling (figs. 6—9). At the bottom of each section cut blocks of mud appeared (Appendix: 1); while east of the axis, a little clay, mixed with large blocks of rubble, had been thrown in from the south: again, to west, the turf-work was itself mingled with a very much larger mass of rubble (fig. 10), strikingly like that from the demolished causeway at High House, and mixed with turf just as the

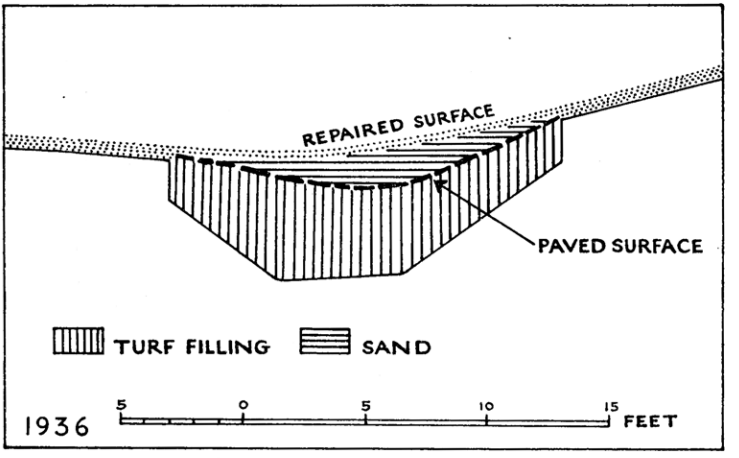

FIG. 11.—Milecastle 51, section of secondary causeway: showing subsidence of roadway due to shrinkage of turf.

High House rubble was mixed with peat (fig. 15). Yet another point of similarity was the disposition of the stones. At both High House and Wall Bowers, they had been thrown into the ditch from the south side, so that hardly any appeared north of the centre-line. Again, the stones themselves were of the same character at both sites; but more squared blocks were left at High House than at Wall Bowers, where only one was noted.

A later stage in the history of the crossing is represented by the re-surfacing of the flagged roadway (fig. 11). This seems to have occurred when the natural shrinkage

of the turfwork in the ditch had reduced the height of the causeway by about 4 feet. The flagging was then capped by a mass of sandy soil, 3 feet thick, on which was bedded the new surface of coarse stones. This repaired surface then continued southwards for some distance across the berm, until it merged with the secondary road crossing the south mound. The repair is not matched at High House, and is doubtless due entirely to the local condition of shrinking turfwork. At High House the peat-blocks did not shrink.

It is now evident that at Wall Bowers the modification of the ditch opposite the milecastle is strikingly like that at High House. The surface of the berms has been similarly lowered; the normal ditch is likewise replaced by an abnormal excavation, filled, as at High House, partly with discarded rubble and partly with blocks of turf corresponding to the High House peat-blocks. At High House, it is certain that these operations were connected with the removal of an original causeway, of which the culvert-bottoming and southern stump (figs. 12, 13, 15) still remain to denote its form. At Wall Bowers, while the removal of an original causeway is thus not difficult to infer, the drastic character of the removal makes the recovery of structural detail finally impossible.

The section of the original ditch now claims attention. That it was below the normal size is proved by the relatively small amount of upcast from it present in the core of the mounds. It is further clear that in this sector the ditch had not been re-cut, since the marginal mound, the spoil-heap* from such re-cutting, is absent. It is therefore necessary to conclude that the present width of 25 feet from lip to lip is due to weathering and cultivation, and that the ditch in its original state was considerably narrower at the top. At the bottom, however, weathering produced a very different result, for

* *Proc. Soc. Ant. Newcastle*, ser. 3, ix, 283; *Trans.* N.S. xxii, 415.

FIG. 8.—Milecastle 51, excavation replacing Vallum-ditch and presumed original causeway: section of shrunken turf filling with mud blocks below at A-B, fig. 1, looking south-west. Repaired road-surface at top left-hand corner of photograph.

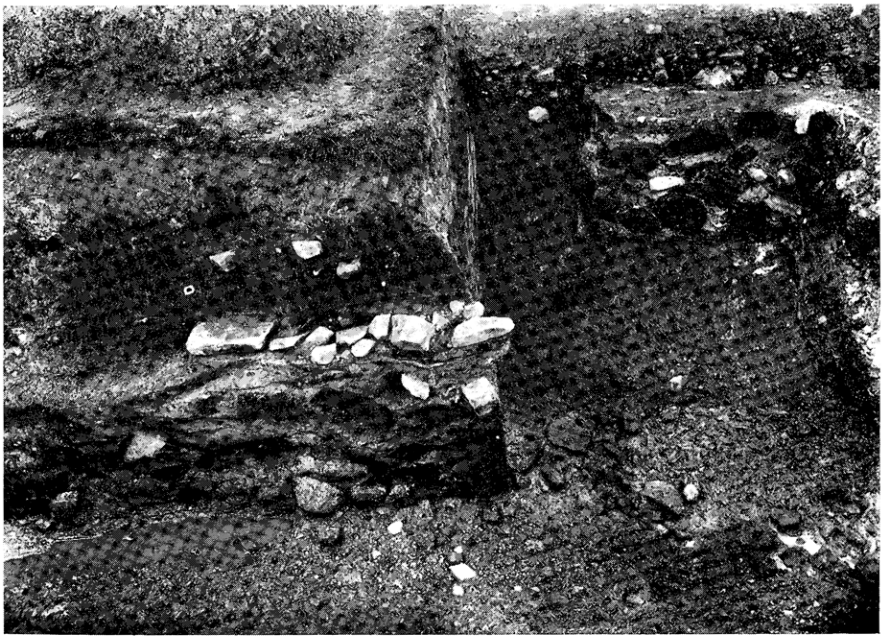

FIG. 9.—Milecastle 51, excavation replacing Vallum-ditch, looking north, at 6 feet west of A-B, fig. 1; showing west half of paved surface of secondary causeway.

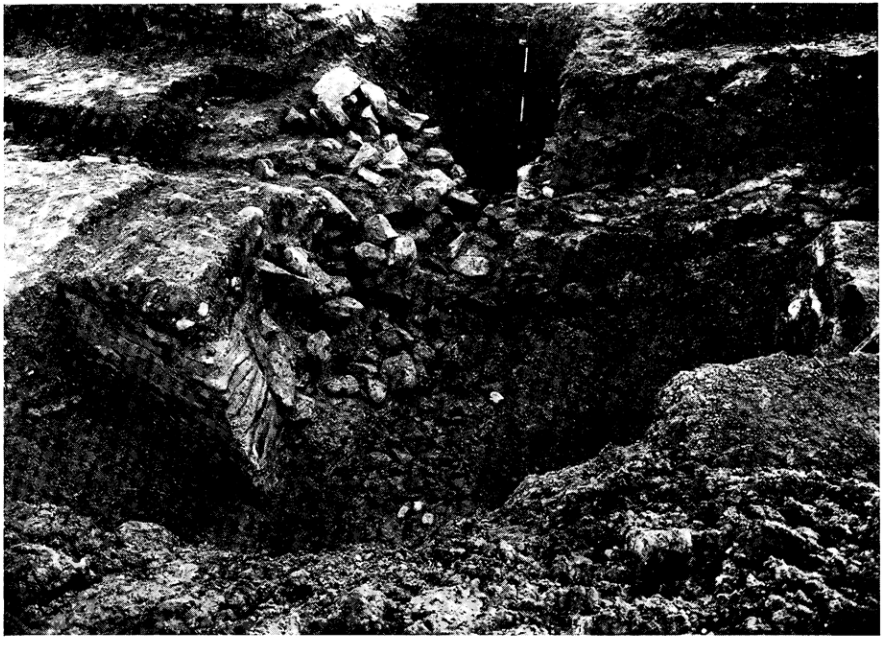

FIG. 10.—Milecastle 51, excavation replacing Vallum-ditch: secondary causeway, from the east; rubble mass to left of centre-line, turf and upcast to right, with paved surface above and mud blocks below.

Facing p. 165.

it preserved the bottom by covering it with the material eroded from the sides. A section outside the lowered area showed an original width of about nine feet. That abundant weathering had in fact taken place is confirmed by the analysis of the eroded material by Dr. Raistrick (Appendix: 2). The conclusion is thus inevitable that the original sides of the ditch were much steeper than at present. There is, however, as yet little evidence in support of such a conclusion, since in so many sectors the ditch has been re-cut, as the presence of the marginal mound attests. Nevertheless, the following significant instances may be recalled. At the causeways* of Benwell and Birdoswald, the shape of the masonry revetment proves the sides of the ditch into which it was built to have been so steep (60-65 degrees) that they would have collapsed without artificial retaining. At Poltross Burn,† where the ditch descends sharply to the stream, the sides are actually retained in stone, at an angle of about 60 degrees. If, then, at Wall Bowers we assume a slope of 60 degrees for the sides, as at Poltross Burn, with the ascertained width of 9 feet at the bottom and a depth of 7 feet, the width at the surface would be about 17 feet. A ditch of this size would fit (fig. 4) within the excavation with room to spare, and would yield enough upcast to raise the existing mounds to a height of at least six feet.

An attempt may now be made to reconstruct the original arrangement of the Vallum at Wall Bowers. The treatment of the mounds is clear. The north mound was provided with a 17-foot turf-kerbed gap, giving access to the Vallum from the milecastle. The south mound was uninterrupted. The south berm, at this time evidently sloping towards the south mound, was drained by a culvert. The logical complement of the gap in the north mound is that the ditch was interrupted at this

* Benwell, *Arch. Ael.*, ser. 4, xi, 176; Birdoswald, *Trans.*, N.S. xxxiii, 247.
† *Ibid.*, N.S. xiii, 393.

point by a causeway of undisturbed subsoil. By analogy from High House, the discarded rubble is from this causeway and shows that it had been revetted in stone. The presence of the culvert in the south mound is now explicable. The gap in the north mound, at the foot of a steep slope, offered a concentrated passage for surface water, which eventually wore a gully in the road. Much of this water would flow across the causeway on to the south berm, and be removed by the culvert. This view implies that there was no gateway* on the causeway. It is now evident that no gateway was needed; for the unbroken south mound proves that there was no public crossing of the Vallum at a milecastle. The Vallum was accessible only from the milecastle. The causeway must be explained as intended to facilitate the patrolling of the south berm by the milecastle-garrison, attesting an originally intimate connexion between Wall and Vallum.

(ii) The Vallum at High House Turf-Wall Milecastle, 50 TW.

The discoveries at Wall Bowers revealed two facts which were out of harmony with the inferences drawn at High House in 1935. The examination of the culvert in the south mound at Wall Bowers had shown that this mound had originally continued unbroken, only later to be crossed by the secondary road. At High House, the secondary roadway, having crossed the filled ditch, had been assumed to merge with a primary road passing through the south mound and turf-kerbed on each side. Secondly, all the rubble in the ditch at Wall Bowers had been found to be placed there together with the secondary turfwork. At High House, it was assumed that the stonework, while clearly ruined and disturbed, was

* In 1935, such a gateway was added conjecturally at High House, when it was thought there was an original gap in the south mound. *Ibid.*, N.S. **xxxvi**, 161, fig. 3.

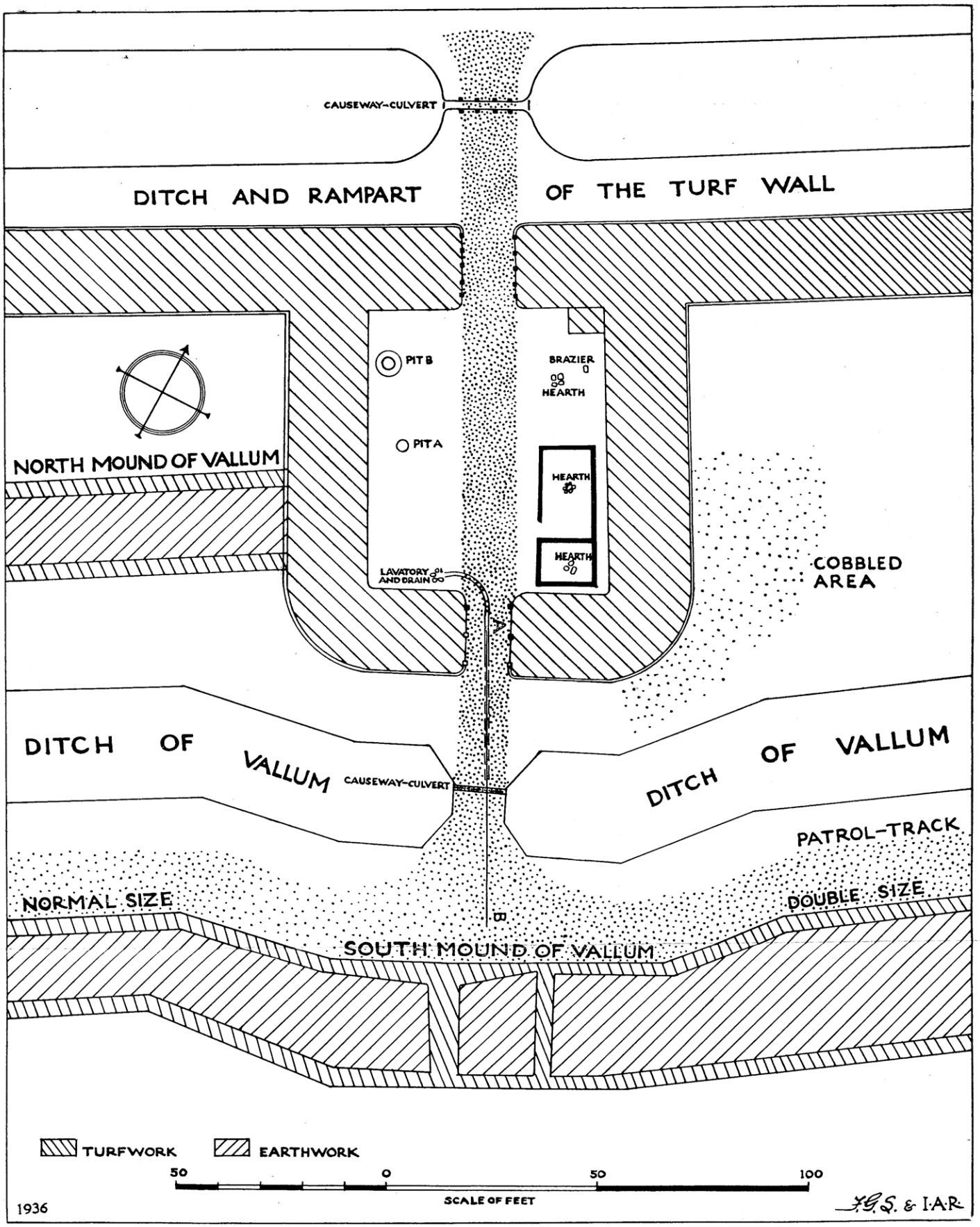

FIG. 12.—The Vallum at High House Turf-Wall milecastle, 50 TW: plan of original arrangement.

To face p. 166.

partly at least in position, forming the core of the original causeway.

On the completion of the work at Wall Bowers, a return was made to High House (figs. 12, 13). The turf kerbing of the south mound was re-examined; the west arm of the diversion was defined afresh, and the west kerb, 7 feet wide, bordering the roadway passing through the mound, was uncovered. At the outset, however, it was noted that some of the road-metalling at the south-west end of the kerb overlay the kerbing. The east kerb was found to be only 4 feet wide, and to extend further southwards than had been noted in 1935. Both kerbs were also found to be standing higher than had been suspected; indeed, four courses of turf were visible in the west kerb. The edges of the kerbs next to the roadway retained, however, not metalling but boulder-clay. They were also linked at both ends by continuations of the normal north and south kerbs, which ran right across the opening, below the metalling of the road. Thus, there was no doubt that the mound had originally continued uninterrupted, though furnished with two cross-kerbs instead of the single example discovered at Wall Bowers. That these cross-kerbs were not closely recurrent was shown by trenching 50 yards in either direction without discovering another.

A further point, namely the composition of the kerbs, may now be noted. The four courses of turfwork still in position in the west cross-kerb were highly exceptional in their definition. Elsewhere in this area, the kerbs were composed of material which, while normally bleached, lacked the familiar lines of carbonised vegetation. Though akin to turf, this material appeared to be rather the humus underlying the actual turf, as if the turf itself had already been stripped. This view is amply confirmed by Dr. Raistrick's report on a sample (Appendix: 6). Closely connected with this point is the fact that no clear

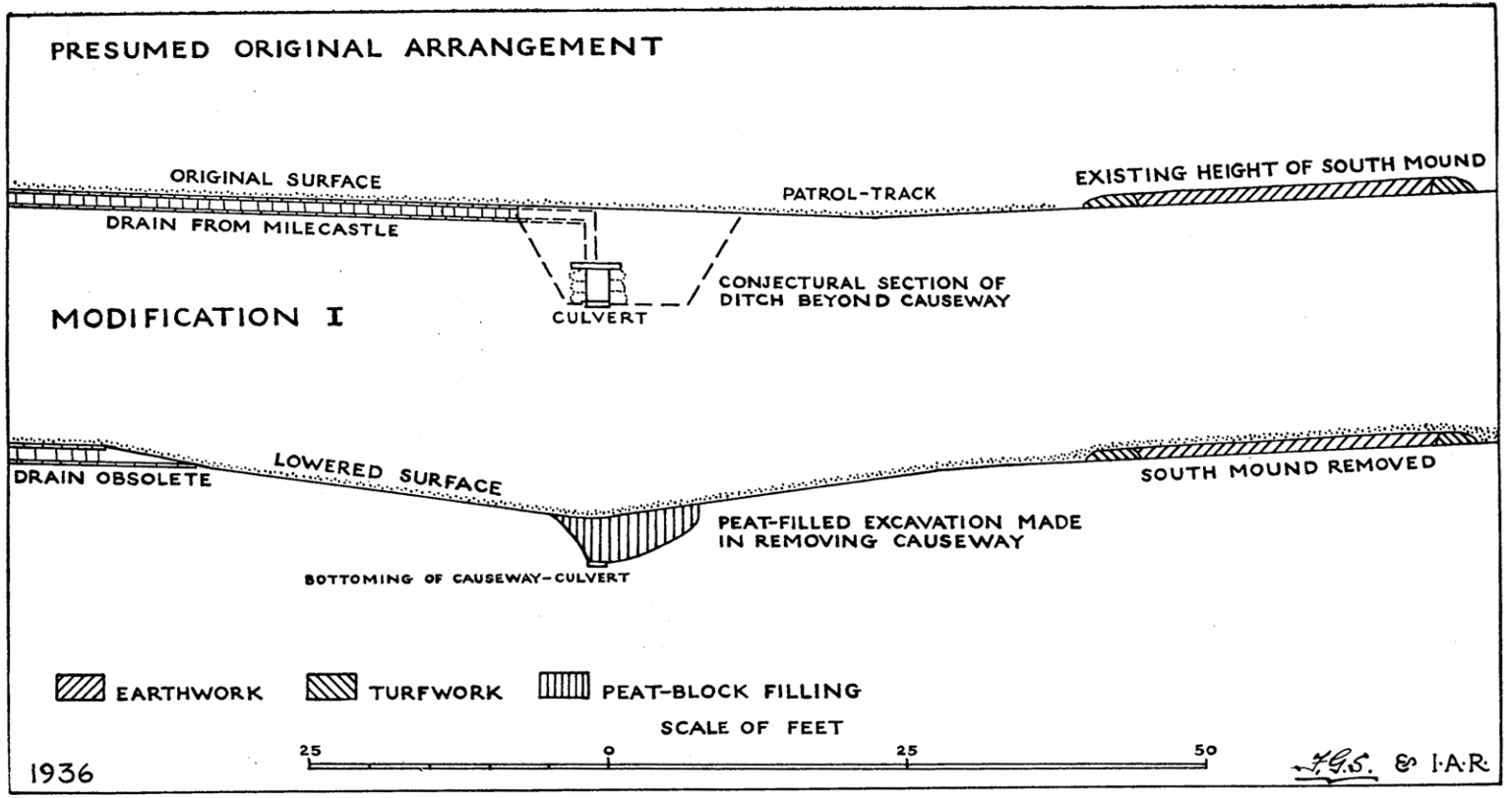

FIG. 13.—The Vallum at milecastle 50 T.W.: section at causeway, A–B, fig. 12, continued across south mound.

line of old surface-growth here separates the clay of the mound from the subsoil. It will also be recalled that the same old surface line was sought in vain between the Vallum and the Turf Wall east of the milecastle, in 1935. It thus seems evident that the whole space behind the Turf Wall was already devoid of turf when the Vallum was constructed, and that the makers of the Vallum-mounds ran short of turf to build their kerbs. Now that the relative order of Turf Wall and Vallum is clear, the reason for the disappearance of the turf is plain. All good turf near the Turf Wall had already been used in its building.

The rubble mass on the south side of the Vallum-ditch, opposite the south gate of the milecastle, was next examined, to determine whether it was in its original position. It soon became evident that the stonework was so mixed with peat as to be demonstrably part of the secondary peat filling. As its removal proceeded, however, the projecting stump of a causeway of undisturbed subsoil appeared (fig. 14). Both splays of this stump were next fully cleared of secondary accretions, together with half of the projecting face. The same vertical trimming of the face as at Wall Bowers then became clearly visible (fig. 15). The remains of the stump were 20 feet wide at the back, and 12 feet 6 inches wide at the front, obviously fitting the causeway-culvert 12 feet 6 inches long, discovered in the ditch in 1935. The stump projected* 2 feet 6 inches. On the north side of the ditch, the corresponding stump was already known to have been removed.

If the discoveries at Wall Bowers thus led to the amplification of our knowledge at High House, it may now be observed that the High House discoveries here

* The extent of the projection, even after the lowering of the surface, is shown by the mason's line on fig. 15, set out along the line of the lowered ditch-lip.

recorded illuminate in turn those at Wall Bowers. At High House, the bottoming of the causeway-culvert in the ditch and the stump of undisturbed subsoil define the form of the original causeway. At Wall Bowers, the causeway was totally removed and a culvert never existed. It may then be repeated that when the south mound contemporary with the causeway is shown to have been continuous, there is no need to assume the existence of a gateway on the causeway. These gateways were intended to control Vallum-crossings open to the public. It is now evident that the milecastle-causeways were not for public use, but were of service to the milecastle-garrison in patrolling the south berm of the Vallum.

(iii) The Patrol-Track on the Vallum.

The berms of the Vallum were now examined for traces of a patrol-track. At High House, it was clear (fig. 12) that for some 40 yards east of the causeway the south berm had been surfaced with gravel, from the mound northwards for about 15 feet. Beyond that point, towards the drier summit of the hill, only isolated patches of surfacing appeared. On the north berm, the gravel appeared only near the milecastle. In no case, however, was any bottoming comparable with that of the later Military Way discovered. Towards the west, the berms were trenched* in the High House paddock (field no. 231, C. xii, 12),† where the Vallum has never been ploughed. Here the ground is sandy, and heavy road-bottoming, at least 18 feet wide, was discovered; while the south mound had also been revetted in stone, six courses of the clay-built walling remaining in position. This treatment of the south berm is so far unique, and will undoubtedly repay further study. The north berm, on the other hand, revealed no surfacing; while the north mound was kerbed

* The trenches were cut at 75 yards and 110 yards west of the east fence of the paddock.

† Ordnance Survey Map of Cumberland, 25-inch scale, edition 1925-6.

FIG. 14.—Milecastle 50 TW, south side of Vallum-ditch at causeway, looking south-east: showing rubble mass of secondary causeway with metalling of roadway above, and peat-block filling of ditch behind ranging-pole (modification i). Embankment (modification ii) overlies vegetation-line covering roadway.

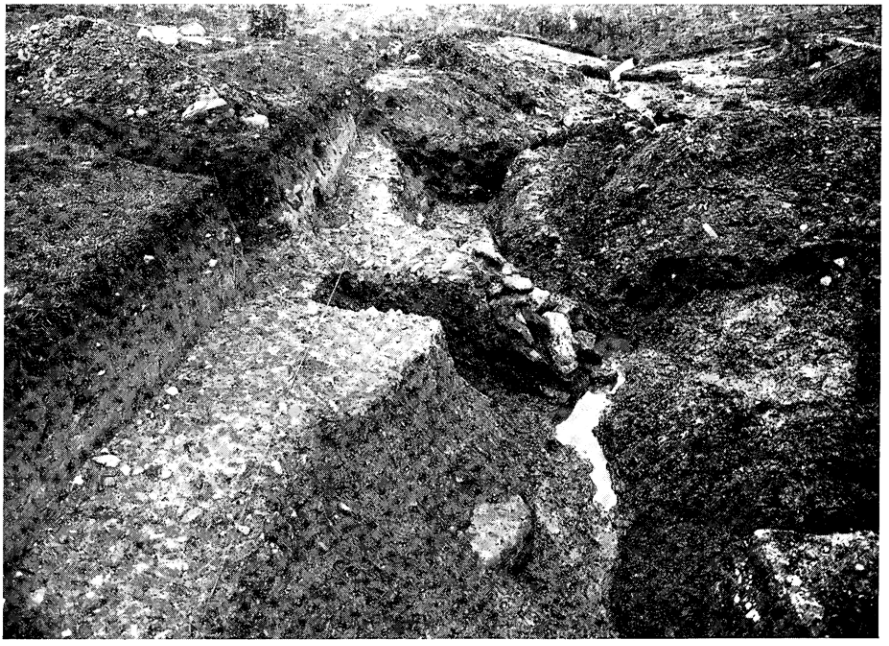

FIG. 15.—Milecastle 50 TW, south side of Vallum-ditch at causeway, looking west: showing stump of original causeway (projection defined by mason's line), with rubble of secondary causeway upon peat-blocks beyond cross-trench.

Facing p. 170.

with humus. It is thus clear that for patrol-work the emphasis was laid upon the south berm, since a track there received sporadic surfacing. It is equally plain, however, that the track was on the whole intended to be a "green road," perhaps unsurfaced except where likely to become impassable in bad weather.

The discovery of this patrol-track, coupled with the new information that at milecastles the Vallum was originally crossed by a service-causeway inaccessible to the public, is of real importance for the interpretation of the work. It is now evident that the Vallum barred out the provincials from the military zone of the Wall and its works; and that between the forts the south berm of the Vallum was patrolled by the milecastle-garrisons, who gained access to it by the causeways.

(iv) The Vallum between High House and Birdoswald (fig. 16).

The excavations of 1935 at High House left one further point unsettled. It was then discovered that for some 100 yards east of the milecastle the north mound of the Vallum was missing. It was thought that it had been later removed. This year, an attempt was made to learn where it began again. A section was cut 260 yards east of the milecastle, where Turf Wall and Vallum are about 148 feet apart over their ditch-centres, leaving a space of about 40 feet between the works. About 400 yards further east, this space is reduced to about 20 feet. The trenching revealed an unexpected condition. There was still no north mound. The meagre remains of the Turf Wall had been ploughed back over an uninterruptedly flat surface covered by an exceptionally thin vegetation-line, doubtless representing the growth which had established itself after the original turf had been used to build the Turf Wall, as further west. The south mound of the Vallum, on the other hand, was well defined, with

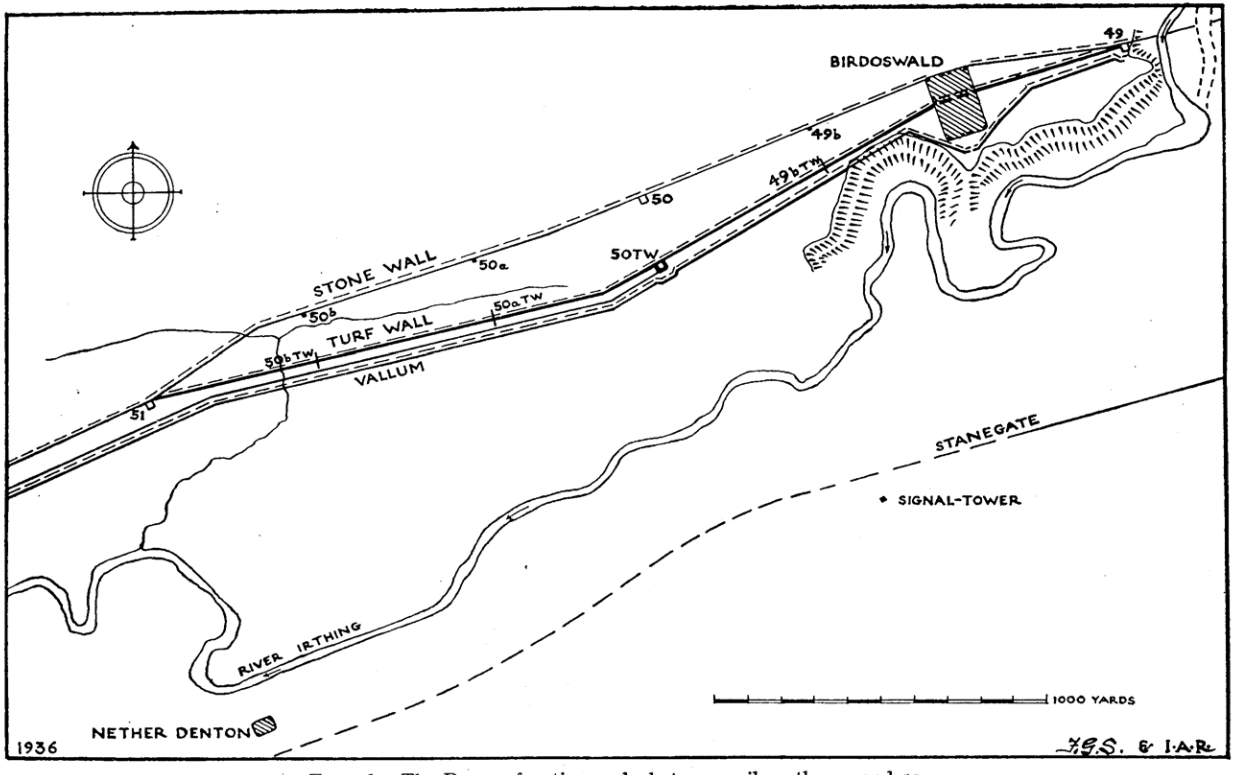

FIG. 16.—The Roman frontier works between milecastles 49 and 51.

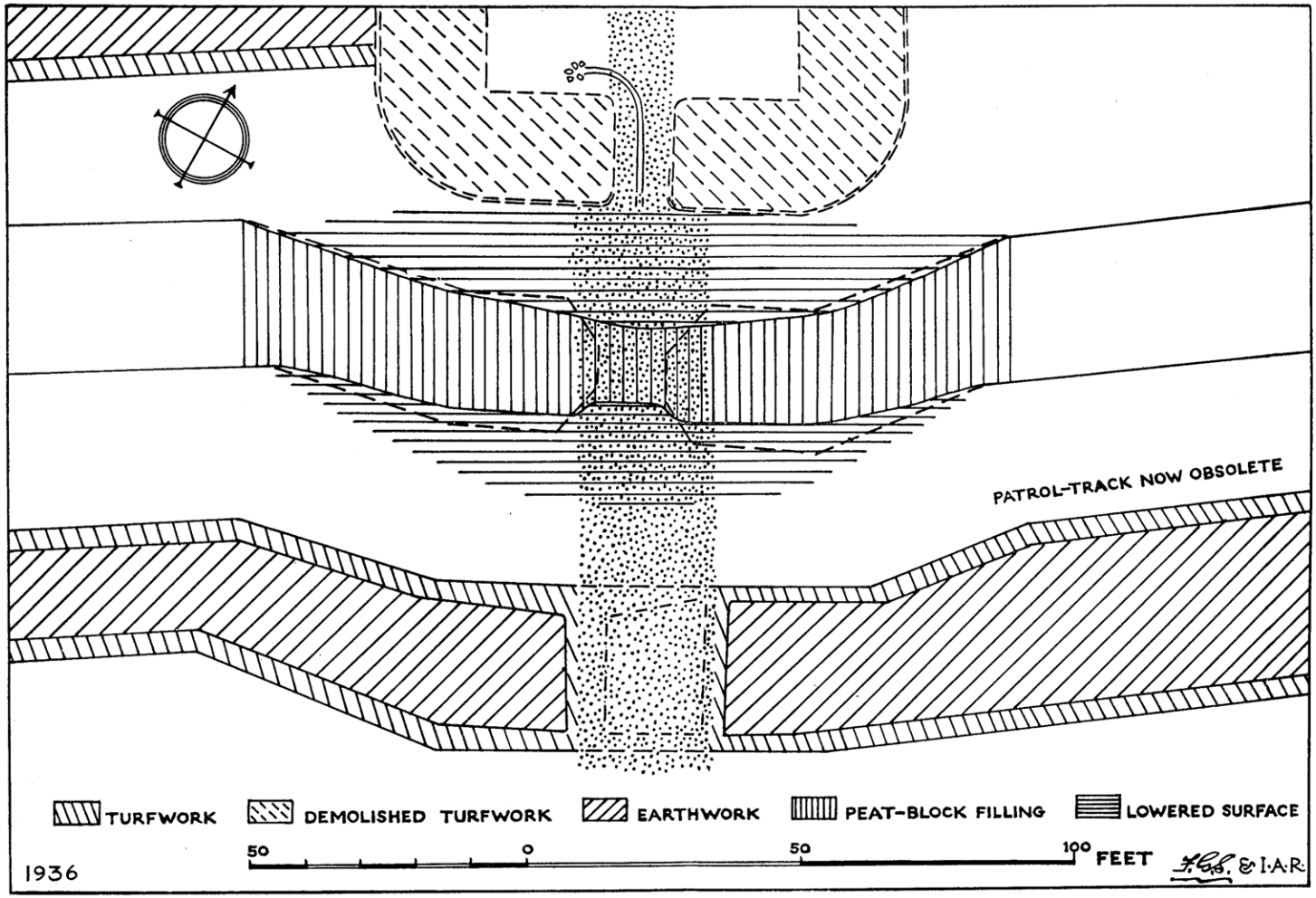

FIG. 17.—The Vallum at milecastle 50 TW: plan of modification i.

To face p. 172.

clear kerbs of turf and humus. These kerbs were, however, 31 feet apart, and contained twice the normal amount of yellow clay upcast between them. This condition was found to continue in three trenches westwards, as far as the east arm of the diversion at the milecastle. Towards the east, the exceptionally large mound visibly continues in field no. 191 (C. xii, 12), until it is eroded at the Irthing Scar, some 280 yards west of Birdoswald fort. It is thus evident that in this sector, where the Vallum approaches the Turf Wall more closely than at any other point in their course as travelling works, the north mound of the Vallum was omitted so as to provide space, while the upcast from the ditch was disposed in a south mound of double the normal size. In defining the relation of the two works, this fact is conclusive. There can no longer be any doubt that in the High House sector the Vallum followed the Turf Wall, since its plan was modified to fit it.

(v) Modifications in the Vallum at High House.

In 1935, first steps were taken in studying the modifications of the original planning of the Vallum at High House milecastle, 50 TW. It was discovered (fig. 17) that a causeway, of which the original construction was not fully ascertained, had been largely removed, that the lips of the ditch had been lowered to reduce its depth; that the rubble from the revetted sides of the causeway had been thrown back into the excavation made by the two previous operations, and mixed with a filling of cut blocks of peat; that the filling of cut peat was made to carry a cobbled road about 12 feet wide, and, finally, that this filling extended, covered with rougher cobbling, for the whole limit of the diversion in the ditch. All these closely connected operations are defined as modification i. In 1936, it became clear, as already described (see p. 167),

that the southward continuation of the roadway across the ditch also belonged to this modification, since it runs through a gap in the originally unbroken south mound. Further digging also showed that no part of the rubble mass filling the ditch was in its original position, and that all had been thrown back only after removal. Thus, as at Wall Bowers, the effect of modification i was to demolish an original causeway, substituting for it a much wider one carrying a made road, which crossed the south mound hitherto forming an unbroken barrier.

Modification ii represents an attempt to define once more the obliterated ditch of the Vallum at the diversion. This was done (fig. 18) by raising on its margin embankments of stones and yellow loam. These embankments were carried straight across the re-entrant angles of the diversion, thus masking the original angularity of plan. In 1936, their extent was determined by further cross-sections cut towards east and west. They were found to continue for about 11 yards beyond the outer angles of the diversion, gradually tapering off from the point where the filling of the ditch ceased. We had thought that, at the roadway across the Vallum-ditch, each embankment was broken by a 12-foot gap, later closed with a blocking-mound of earth and stone. Further examination of the features showed that this was not so. The yellow loam of the south embankment continued uninterrupted right across the roadway. The stones may therefore be interpreted as the remains of a frontal revetment, giving the embankment sharper definition. On the north embankment similar revetting was noted not only at the supposed gap but also outside the south-west corner of the milecastle. The modification which introduced the embanking thus falls into line with the marginal mound which occurs so commonly on the running line of the Vallum. It should be noted that the yellow loam of which the embankments are composed strikingly resembles

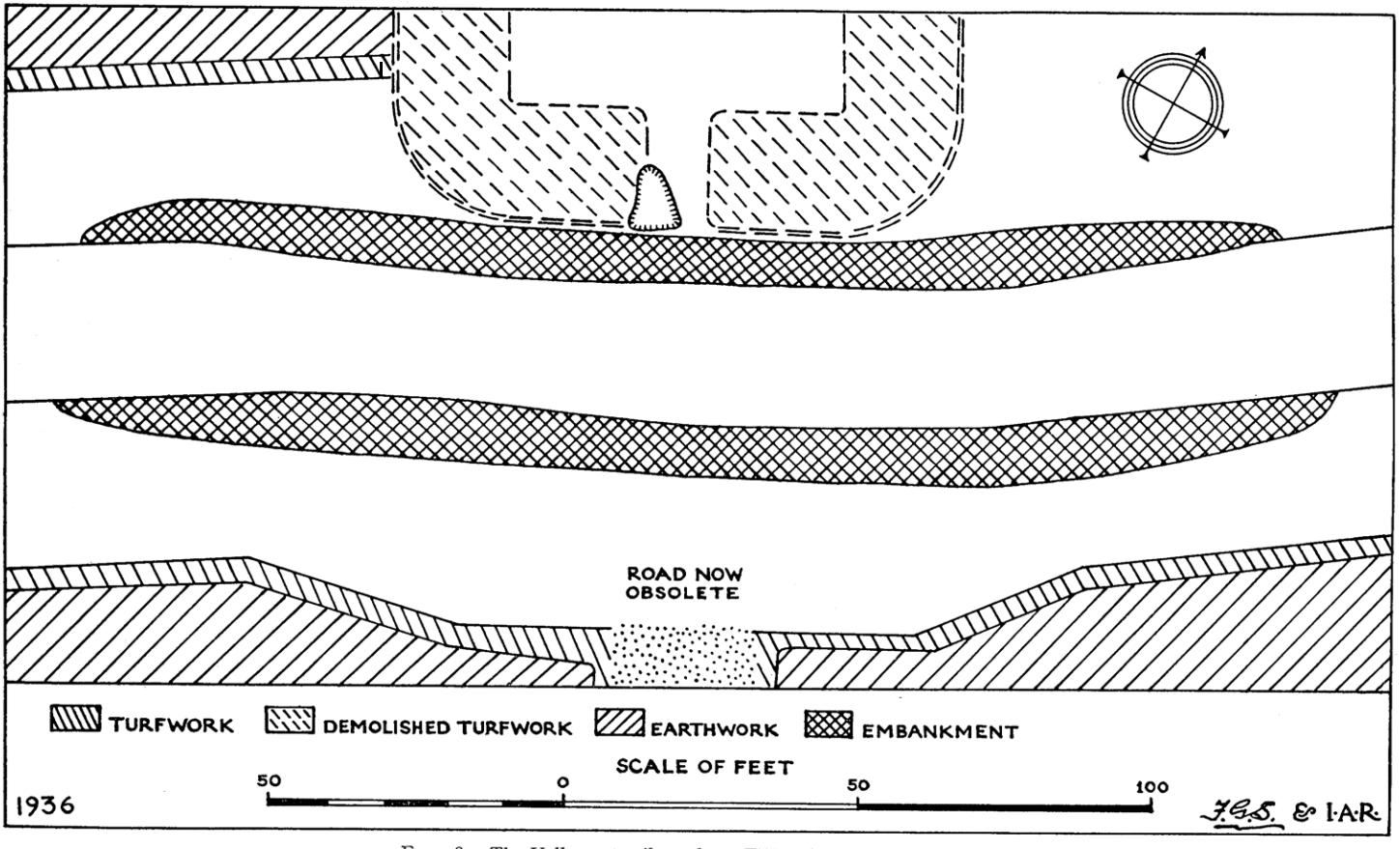

FIG. 18.—The Vallum at milecastle 50 TW: plan of modification ii.

To face p. 174.

the content of the marginal mound at Appletree, as recorded* in colour by Mrs. Hodgson in 1895. Further, Dr. Raistrick's report (Appendix: 8) defining it as a 'fairly rich subsoil loam,' leaves little doubt that it is derived from the same source, namely from cleaning out and re-cutting the ditch. It would seem as if these two operations of strikingly similar purpose, one defining afresh the open ditch by re-cutting it, and the other marking its obliterated course by embankments, were in fact undertaken simultaneously. Proof of the matter will come, if at all, from further exploration of other sites.

It must be noted also that the making of the embankments did not quickly follow modification i. There had been time for a rich growth of grass to become established on the road-surface, forming below itself two or three inches of humus. The humus was noted as a dark band, underlying the yellow loam of the mound and covering the cobbling of modification i. Dr. Raistrick's report, confirming the nature of this material by analysis, suggests that its topmost turf had been "skimmed off in thin sods" (Appendix: 9). While it is impossible to attach exact time-values to such evidence, no one will deny that the very presence of such material implies a considerable interval of time between the first and second modifications.

A final point may here be added. The irregular delving in the south gateway of the demolished milecastle must surely be distinguished from the careful and systematic lowering of the ditch-lips associated with modification i both at High House and Wall Bowers. It seems clear that this operation was undertaken in connexion with modification ii, perhaps to supply some of the clay for binding the stones of the revetment.

* The original coloured drawing is in this Society's collection at Tullie House, Carlisle. A line-block based upon it was reproduced in *Trans.* o.s., xiv, plate 2, facing p. 186.

The warmest thanks of the Committee are offered to the landowners, the Lady Cecilia Roberts and Mr. Charles Roberts, and to their tenants, for permission to excavate; also to Mr. S. Walton, Agent for the Boothby Estate.

Special thanks are also offered to Dr. A. Raistrick, for the lengthy and minute work which has gone to the preparation of his invaluable appendix.

APPENDIX.

Report upon Geological Samples, by A. Raistrick, M.A., Ph.D.

A. WALL BOWERS.

1. *Section C–D, blocks from below turf filling, at the bottom of the ditch.*

These blocks consist of mixed material, a layer of muddy silt on a leached clay silt, with a few traces of moss layer. This seems to be shallow pond-bottom clay, covered by silt and mud infilling, with frequent periods of moss-growth. The blocks were evidently cut from a swampy area.

2. *Section C–D, sample from upper part of section, covering the turf filling.*

This is almost pure sandy silt, from which the clay fragment has been washed, probably in course of deposition. Neither humus nor clay is present.

3. *Sample from five yards west of section A-B; bleached material from behind rubble mass mixed with turf filling.*

This is sandy loam with a small clay fraction, retaining traces of iron oxide and rootlets, perhaps of heather. It is a subsoil nearly exhausted.

4. *Section A-B. Material between paved and repaired surfaces* (*p.* 163, *fig.* 11).

This is leached sandy soil, without traces of clay.

B. HIGH HOUSE.

6. *Sample from south kerb of south mound, centre of diversion.*

A leached soil consisting of sandy loam with rootlets, very little clay, and no lime; it may be a turf subsoil.

7. *Sample from north kerb of south mound, High House paddock.*

A very fine and nearly pure sand, with very heavy leaching of the iron content. Slight traces of rootlets. Could have been leached by prolonged percolation from a humus layer. No humus is separable, and there is practically no clay or fine soil content. It might well represent a fairly clean sandy silt.

8. *Material from embankment, modification ii.*

This is a fairly rich subsoil loam, well weathered and broken up, though not by plants. It has a small clay content and a little humus, with abundant grass rootlets; also pebbles from the boulder-clay. It is iron-stained throughout.

9. *Dark material from below the embankment of modification ii.*

This is a true loamy soil, with roots of grasses all through it. It is the top layer of a rich soil from immediately below the turf. The turf has probably been skimmed off in thin sods.