

II.—HADRIAN'S WALL: SOME STRUCTURAL PROBLEMS.

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In this paper I offer the results of some recent study of Hadrian's Wall and a number of its structural problems, undertaken as part of a long-term programme of research initiated by the late F. G. Simpson and supported by R. G. Collingwood (who first directed me northwards to join Simpson's team), but more specifically brought to a head by the need to prepare a special handbook for the 1959 Pilgrimage of the Wall. In that handbook it would have been inappropriate to set forth in detail my reasons for departing from views hitherto accepted; but it would have been no less inappropriate to advance new interpretations without offering, elsewhere, a fuller exposition of the reasons for them. Since they relate almost entirely to the Northumberland sectors of the Wall, I therefore offer my detailed exposition to this Society.

I premise that the basic approach, in my study, has been by careful collation of the antiquaries' accounts, perhaps the most striking dividends accruing from analysis of the stratification in successive editions of Bruce's works. It does not seem necessary to give full bibliographical references here to works well known to all students of the Wall, but I subjoin a list of the abridged references that I have found it useful to employ, and (in the case of Bruce's works) of the dates of publication also.

- AA2-4—*Archæologia Aeliana*, 2nd-4th series.
 PSAN1-4—This Society's *Proceedings*, 1st-4th series.
 CW2—*Cumberland & Westmorland Transactions*, new series.
 HN—Hodgson, *History of Northumberland*, part II, vol. iii (1840).
- Bruce: RW1—*The Roman Wall*, 1st ed., 1851.
 RW2—*The Roman Wall*, 2nd ed., 1853.
 WB—*The Wallet-Book to the Roman Wall*, 1863.
 RW3—*The Roman Wall*, 3rd ed., 1867 (citing the pagination of the quarto copies).
 HB2—*Handbook to the Roman Wall*, 2nd ed., 1884.
 HB3—*Handbook to the Roman Wall*, 3rd ed., 1885.
- Blair: HB4—*Handbook to the Roman Wall*, 4th ed., 1895.
- Collingwood: HB9—*Handbook to the Roman Wall*, 9th ed., 1933.
- Richmond: HB10—*Handbook to the Roman Wall*, 10th ed., 1947.
 HB11—*Handbook to the Roman Wall*, 11th ed., 1957.

1. *The extension to Wallsend.*

The investigations of the North of England Excavation Committee in 1929 demonstrated that the Wall eastwards from Newcastle, to its junction with the fort at Wallsend, was built to the narrow gauge, 8 ft. thick at foundation, in contrast to the "Broad Wall", 10 ft. thick at foundation, from Newcastle westwards. The Committee further demonstrated that the 8 ft. Wall and Wallsend fort were of one build and therefore presumably parts of the same plan, taken with good reason to be an addition to the original Hadrianic scheme—according to which the Wall had been intended to end at the new bridge across the Tyne at Newcastle. So far, so good; but the Committee also came to the conclusion that the first three Wall-miles, from Wallsend to M/c 3 (Ouseburn), had been divided into "three equal but abnormally short lengths", and that "Such spacing conveys the impression that this portion of the Wall was laid out from Newcastle eastwards."

When we look into the spacing question, we find that the Committee was not able to recover any structural or other

remains of the first three milecastles,¹ and that it was therefore compelled to rely on the evidence of earlier observers, of whom MacLauchlan proves to be the key witness; I quote from his *Memoir* (1858, pp. 7f.), adding the Committee's definition of the sites (NCH XIII 494f.):

M/c 1: "About half-way between Stote's Houses and Old Walker, is a small stream, and about 80 yards to the westward of it are faint traces of the first Mile Castle, which is about $6\frac{1}{2}$ furlongs from the centre of the Station at Wallsend. NCH: "about 60 yards west of Stott's Pow," 1,443 yards from the N.E. angle of Wallsend fort.

M/c 2: "the next occurs about $1\frac{1}{2}$ furlongs east of the Windmill, at Byker-hill; the faint traces of it being discernible in the ploughed ground, it will have been about 7 furlongs from the last." NCH: "66 yards west of Miller's Lane Cottages," 1,453 yards W. of M/c 1.

M/c 3: "the next we are told stood on the east side of the Ouse burn, but we could not discern any traces to be depended on, though the distance from the last may be assumed to be about $6\frac{1}{2}$ furlongs." NCH: "near the east end of Byker Bridge, at the north end of Stephen Street," about 1,420 yards W. of M/c 2.

R. G. Collingwood accepted the Committee's findings without question when he came to prepare the ninth edition of Bruce's *Handbook* (1933, p. 41), and his statement of the case, adopted with minor verbal improvements by Professor Richmond in the tenth and eleventh editions (1947, p. 44, and 1957, p. 46), has hitherto been accepted by all of us as unquestionable. Collingwood went still further, by implication at least, in his Horsley lecture of 1937 (AA4 xv 1ff.), claiming that Horsley regarded Wallsend fort as coinciding with M/c 0, noting that he allowed for M/c 4 coming close to Newcastle fort, and implying that there was no clash between Horsley's findings and those of the Committee. And yet, when we turn to Horsley, we find that he located M/c 1 only three furlongs from the end of the Wall and noted the two

¹ M/c 1 was sought in vain in 1928 (PSAN4 iii 280); excavation seems to have been impossible at the other two sites.

Wall-miles westwards from it to be not abnormally short but, by contrast, rather above the normal length. Moreover, he found all three milecastles easily visible, and his map allows us to calculate the distances with some accuracy for in it, as Collingwood himself pointed out, "From Wallsend to Housesteads, they are given with a very fair degree of exactitude." It will be well to quote Horsley's own words (p. 136):

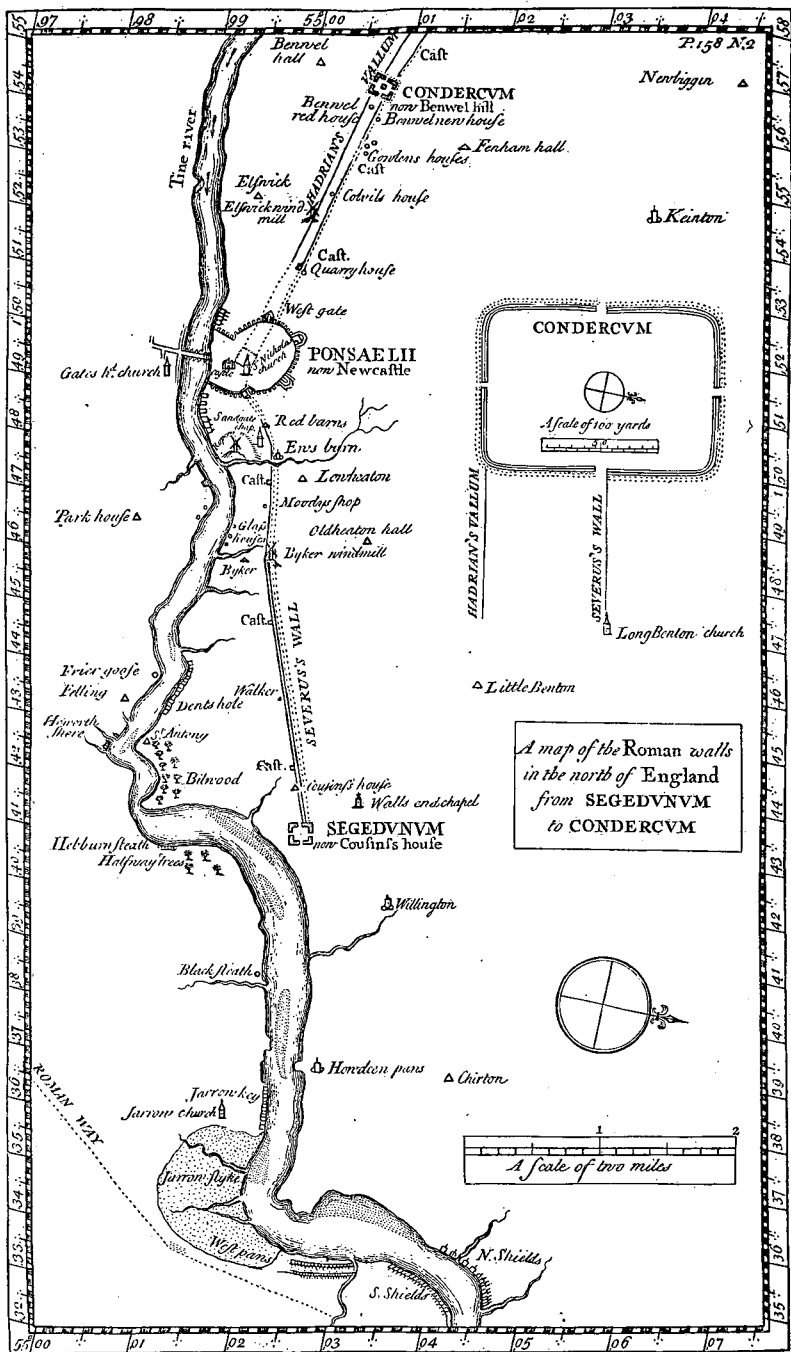
M/c 1: "A little west of these *Beehouses* has been a *castellum*, the foundation and remains of which are very visible. 'Tis twenty two yards or sixty six foot square, which appears to have been the stated measure of all these *castella*. This, which is the first of them on the east side, is about three furlongs distant from the end of the wall; and has been, like all the rest, built on or close to the wall, but wholly within it, or on the south side." His map duly marks it some 250 yards W. of *Cousin's house* (later known as Carville Hall, now demolished), and about 750 yards from the W. rampart of Wallsend fort—so that his "about three furlongs" is a slight underestimate.

M/c 2: "Between *Walker* and *Byker* hill, upon an easy ascent, are the visible remains of another *castellum*, of the common stated dimensions. The distance between this and the last is about an *English* measured mile and half a furlong, which is somewhat more than the usual distance." I make the distance shown on his map to be almost exactly a mile and half a furlong.

M/c 3: "At the head of *Ewsburn* bank, that is the bank on the east side of the village, is the visible foundation of another *castellum*, conveniently situated for prospect, as well as the last. And the distance between these two is exactly the same as before." His map makes the distance a little more than one mile.

Instead, therefore, of the three short "miles" postulated by the Committee, with Wallsend fort occupying the position of M/c 0, Horsley offers us two "miles" of rather more than the usual length westward of M/c 1, and an incomplete "mile" eastward to Wallsend fort and the end of the Wall. Other things being equal, Horsley's evidence must take precedence over MacLauchlan's; but let us see what other witnesses have to add.

M/c 3 is manifestly the surest starting-point. Stukeley visited it on his northern tour in 1725 (*Iter Boreale*, 1776,



pp. 66f.), and described it in terms which carry immediate conviction:

The Wall "passes a very deep valley at Euxburn, so ascends the opposite western hill very steep; a rivulet running now in the ditch. Having mounted the hill, a coal-shaft is sunk in the very ditch, and here is a square fort left upon the Wall: some of the foundation of the wall of the fort, and of the Picts Wall, is visible. This is upon an eminence, and sees from Newcastle one way beside Benwell hill beyond it, where was another fort; and to Baker-mill hill the other way, where no doubt was another; but a mill and some farm-houses, standing thereon, have obliterated it." Later, he visits Benwell fort and notes its fine all-round views: "I doubt not but they could see hence to the next *castrum* westward; to the east, over Newcastle to the late-mentioned little fort beyond Euxborn (*sic*) . . ."

Brand's *Newcastle* (1789, i 138) adds further testimony:

"At the head of the bank, over-looking Ouse-Burn, was a castellum or exploratory tower, out of the foundations of which I saw many Roman stones taken, not many years ago, to build an adjoining house."

If we add Bruce's report (RW1 119, RW2 93) that the site has yielded two stones "which, I am persuaded, formed part of the entrance gateway" of this milecastle, and note that the inscribed altar, EE VII 1007, was found in 1884 at or close to it,² M/c 3 (Ouseburn) surely needs no further confirmation.

M/c 2 is a very different matter. No Roman finds have been reported from MacLauchlan's position, less than a quarter of a mile east of the summit of Byker Hill; all that Bruce could add (WB 43 = RW3 96 = HB2 40) was:

"In the second field from Byker Hill, Mr. MacLauchlan, aided by his measuring chain, lays down the position of the second

² Bruce's account of its discovery, PSAN2 i 357ff., is less precise than one could have wished: "ninety or a hundred feet to the south of the recently-built Byker Bridge, and in the line taken by the Wall"—but it was found during the making of a new road from the east end of the bridge, approximately at the point where the milecastle seems to have been.

mile-castle. It is seven furlongs from the last. The attentive observer will detect it by its gently swelling surface." In HB3 42 this last sentence becomes: "A little while ago the attentive observer might possibly detect it by its gently swelling surface, but it is now covered by a brick-kiln," and in HB4 42 Robert Blair notes, "but it is now nearly or quite obliterated."

Horsley's position is shown on his map a full half-mile east of the windmill which once crowned the summit of Byker Hill; there is no evidence that Bruce ever examined the site, nor that MacLauchlan took Horsley's evidence into account at this stage in his survey. I cannot find that the Committee ever remedied his omission.

As to M/c 1, located by Horsley "a little west of" Beehouses, Brand (i 605) gives us a useful bearing:

"The foss of Severus' Wall is still faintly yet plainly discernible, as it runs westward from this station of Segedunum, through the offices or out-houses of Carville to Bees-Houses, now called Stotes-Houses, almost adjoining on that mansion."

He records a mutilated inscription built up at the end of a stable at Stott's House (to use the modern name), and the digging up of a lettered stone "a little before, in making the waggon-way that intersects the wall a little to the west of these houses"—the same location as he gives for the mile-castle:

"A little to the west of Bees-Houses, or Stotes-Houses, there has been a castellum."

Richard Abbatt noted the milecastle site on the first day of the 1849 Pilgrimage, "One hundred yards west of Stotes houses" (*The Picts or Romano-British Wall*, p. 15); and Bruce's first two editions accepted the location (RW1 117, RW2 91), noting as if in confirmation, "The tenant of the farm told me that he had got a great quantity of stones from it." But then came MacLauchlan's measuring-chain and his selection of a site 600 yards west of Stott's House, of which all that Bruce could ever claim (WB 42, RW3 95,

HB2 40) was that "its slightly elevated surface, and the number of small stones which are sprinkled over it [*this item omitted from HB2*], distinguish it from the rest of the field." Not one scrap of Roman material has ever been recorded from MacLauchlan's position. As to Horsley's, it now seems likely to be the site of a discovery mentioned in the account of the 1886 Pilgrimage (PSAN2 ii 190):

"At Stotes House the Expounder [*Dr. Bruce*] stopped to explain that not long ago in erecting the house here on the south side the remains of the WALL were come upon. There was something like a square tower or castle in it, and one came to the conclusion that there had been here a Turret . . ."

Robert Blair added further details in HB4 41:

"While digging for the foundations of 'The Grange' the remains of the *Murus* were come upon, and what the workmen called a cellar, a square building, probably a turret."

Canon Fowler, as I pointed out many years ago, seems to have been the first observer to note this structure, in 1877:³

"Just E. of the ponds is a really good bit of F. [*i.e., fosse*] and ridge of wall and near the ponds I fancied I discerned traces of a turret."

When I came upon Fowler's MS. note, I assumed without question that it was in fact the remains of Turret 0b (on Collingwood's numeration) which he had noted at the Grange; but in view of Horsley's evidence, as discussed above, it now seems necessary to suppose that Fowler really saw part of the gateway of M/c 1—perhaps walled up in Roman times, like the north gateway of M/c 22, where also in 1877 he took the remains seen in the surface of the road to be the "recess of a turret"; it was not until 1930 that excavation revealed the true explanation of what he had noticed "Immediately west of 2 gates one field E. of Port-gate": see the excavation-report, AA4 viii 317ff.

³ *Durham University Journal* xxix 27 (December 1934).

The moral has already been told in Collingwood's Horsley lecture. Through neglecting to consult Horsley's work, "recent archæologists have had to rediscover for themselves, over and over again, things which stand in black and white on the pages of his book." MacLauchlan deserves full credit as the first investigator to take serious and constructive note of Horsley's primary study of the milecastle system; further west, he paid constant attention to Horsley's text, using it as a basis for his own fieldwork. But in the easternmost sector of the Wall, it is now evident, he had not begun to pay proper attention to Horsley. He assumed without question that the first "Wall-mile" was measured from Wallsend fort, took his measuring-chain instead of Horsley's evidence as his guide, and so involved Bruce and all later writers on the Wall in an incorrect location of the first two milecastle-positions. It is perhaps poetic justice that MacLauchlan reverted to the correct position at M/c 3, where for the first time he could not satisfy himself that there was any dependable trace of the structure, and therefore had to content himself with accepting the traditional site—a footnote now citing Horsley's description.

What still remains to be elucidated is the relationship of the easternmost length of Wall to the milecastle and turret system. There is room for turret 0b some 540 yards east of M/c 1 and 250 yards west of Wallsend fort; but from there to the end of the wing-Wall southwards from the south-east angle of the fort the total distance cannot have been much more than 400 yards, making an extra short interval to turret 0a. On this view, M/c 0 vanishes completely from the scene—unless, indeed, it was on the south bank of the river, the first "mile-fortlet" in a series continuing the chain of control eastwards to South Shields, thus matching the well-known westward extension of regularly spaced mile-fortlets and watch-towers beyond the west end of the Wall at Bowness on Solway.

That possibility cannot be discussed further in the present paper. But we may conclude this section by reverting to one

of the points made by the Committee, that the spacing of milecastles in this eastern sector conveys the impression that it was laid out from Newcastle eastwards. We have seen reason to reject the Committee's locations of two milecastles and its conclusions about the lengths of the easternmost three "Wall-miles"; but Horsley himself may be adduced in support of an eastward lay-out. In his preliminary discussion of the milecastle system he makes the general point (p. 118) that

"The intervals between these castles are not always exactly the same, but, excepting two or three at the east end of the wall, always less than a mile . . ."

Before long, however, he turns to consider the question, from which end of the line the different elements of the frontier were laid out, concluding (as far as the stone Wall is concerned) that it was from the west,

(p. 124) "which is much confirmed by the situation of the *castella*, that are at a regular distance, if we begin our reckoning from the west; but if we begin to reckon from the east end of the wall, the first *castellum* appears within less than three furlongs of the station there."

The point is elaborated, as far as the west end of the Wall is concerned, towards the end of his topographical account (p. 157):

M/c 78 "is fourteen furlongs from *Boulness*; so that there has been another between this and the station, which has supplied the place of the last. If the wall was begun at *Boulness*, then the *castellum* has been built just at a proper distance."

The question is perhaps more complicated, now that we have the Committee's clear case for supposing that the original eastern end of the (Broad) Wall was Hadrian's Bridge at Newcastle; it may even be that two parties of surveyors went to work, one westwards from *Pons Aelius* and the other eastwards from *Bowness*. But the spacing of mile-

castles, as we have recovered it from Horsley and other antiquaries of the pre-MacLauchlan period, surely only reinforces the most important single conclusion reached as a result of the patient researches of the North of England Excavation Committee in 1928 and 1929.

2. *Milecastle ditches.*

In 1927 F. G. Simpson did some preliminary trenching at M/c 51 (Wall Bowers), primarily to test the surface indications of "a ditch circumscribing the site south of the Wall (a unique feature)." He found (CW2 xxviii 384) that

"The ditch proved to have been only half dug. It appears to be coeval, not with an earlier isolated building of the Pike Hill type as I had suspected, but with the milecastle."

Further work, undertaken in partnership with I. A. Richmond in 1936, showed that the ditch is not related directly to the stone milecastle, but suits admirably a Turf-Wall milecastle such as M/c 50 TW (CW2 xxxvii 158f.). As yet, no other milecastle in the Turf Wall sector—from M/c 49 to the far end of the Wall at Bowness on Solway—has been found to have a ditch around it, and the apparent anomaly at M/c 51 remains unexplained. But from surface indications Professor Richmond has adduced two or three cases of milecastle ditches east of North Tyne: at M/cs 23 (HB10 73 = HB11 78), 24 (HB10 180, presumably however a misprint) and 25 (HB10 73 = HB11 78). Without excavation it will not be possible to say whether these ditches, like that at M/c 51, were only partly dug, or to produce a certain explanation for them; there can of course be no question, in the eastern sector, of ditches laid out in relation to an original Turf-Wall milecastle.

It seems worth while to cite one further instance, west of North Tyne, where there are even more striking surface indications of a ditch, referred to by Bruce in the first two editions of his book, but otherwise unnoticed—not surprisingly, perhaps, since its site is now overgrown with bracken, which

makes inspection of it far from easy. I refer to M/c 29 and I subjoin extracts from my dossier to illustrate, in its case, how there may be real profit to be won from careful collation of the antiquaries' accounts. All editions of the *Handbook*, from Robert Blair's version in HB4 121, have noted that this milecastle's walls have been robbed, but none refer to the ditch or to the other evidence to be cited presently; and Bruce himself (WB 100, HB2 108 and HB3 119) started the fashion of neglecting even his own previous observations, contenting himself with:

"Proceeding onwards, we find, on the right, the remains of a mile-castle very distinctly marked."

Gordon mentions this milecastle but gives no details worth extracting; Horsley and Hodgson, Bruce and Albert Way are the main witnesses:

Horsley, p. 145: A little west of Tower Tye "are large remains of a *castellum*, detached about a yard from the wall, the reason for which is not very obvious." See also his preface, pp. ixf.: "I have taken notice, that I had not been able to discover any passes through the wall at the milliary *castella*, though this was what I expected. Dr. Hunter has since told me, that in the next *castellum* west from *Walwick*, there was a gate through the wall, and that some of the iron belonging to it was found by Mr. Wilson of *Walwick*; but this did not occur to me. I take the *castellum* intended, to be that which is a little disjoined from the wall; though not so much as to leave a sufficient passage for a single man."

Hodgson, HN 279 footnote: "The *castellum* next west of Tower Tay was in the inside 63 feet north and south, and 58 feet east and west, its foundations of large blocks of freestone, and its south-east and south-west corners rounded off."

Bruce, RW1 195: "At a short distance, further in advance, the ruins of a mile-castle are seen on the right. The whole of the facing-stones are gone, as is usually the case, and the place where it stood is chiefly marked by the vacuity occasioned by their removal. This *castellum* measures, inside, fifty-four feet from east to west, and sixty-one from north to south; it has been protected by a fosse." (RW2 163 is unchanged, except that the account begins: "Descending the Tower Tay, the ruins" &c.)

A. Way in MacLauchlan, *Memoir*, pp. 95f.: "The remains of the Mile Castle in question . . . have been long since demolished, and low banks covered with turf were left to indicate where its walls had been. Horsley again mentions the remarkable fact that this *Castellum* was detached about a yard from the wall, of which five or six regular courses of the facing stones at that time existed. (Brit. R. p. 145.) Very recently (Sept. 1857) excavations have been made by Mr. Clayton, with the purpose of bringing to light any traces of the singular separation of this mile castle from the Wall, thus recorded by Horsley; but the vestiges of the foundation walls were insufficient to supply decisive evidence."

Bruce, RW3 166f.: "Horsley thought that this *castellum* was 'detached about a yard from the Wall'; but Mr. Clayton has recently ascertained, by excavation, that this was not the case."

On the evidence thus set forth, we may claim M/c 29 as the first milecastle to have yielded evidence of a north gateway, some years before 1732. Bruce's measurements differ somewhat from Hodgson's, but both agree that it was a long-axis milecastle—as indeed surface inspection seemed to me to show;⁴ and comparison of their two accounts implies that Hodgson was there while stone-robbing was still in progress, Bruce following after the process had been completed. Hodgson's reference to "large blocks of freestone" reminds us of the structures assignable to the Twentieth Legion at M/c 9 and M/c 27 (AA4 vii 152ff. and xxxi 165ff.), though we must await excavation to ascertain its gateway-type before we can claim positively that M/c 29 was built by *leg. XX V. V.*

The surface indications which Horsley took to show that the milecastle was detached from the Wall, may no doubt be explained as the result of selective stone-robbing—even if Clayton's excavation in September 1857 did not settle the point, as Bruce evidently believed. Way has misread

⁴ Mr. C. E. Stevens thought that the milecastle was probably a short-axis one, though noting that "Surface examination must be very imperfect here" (AA4 xxvi 37, footnote 40, citing RW2 163 and noting that RW3 omits the measurements); he had only been able to visit the site when the bracken was full-grown, making such examination exceptionally difficult.

Horsley, incidentally: it was not at the milecastle, but two or three hundred yards further east, that he found the Wall standing five or six courses high. Further excavation is needed, in any case, to show whether the junction of the side walls with the south face of the Wall was similar to that found by Mr. Gillam at M/c 27, where the north wall of the milecastle—i.e., the Wall—was built before the side walls (AA4 xxxi 166), and whether the side walls were of the same broad gauge as the Wall, as at M/cs 9 and 27, or were narrow like those of M/c 30 (Limestone Corner), examined by Simpson in April 1927.⁵

As to the ditch, for which Bruce is our only antiquarian witness, that is still clearly visible, in spite of the bracken, especially round the south-west corner of the milecastle; on the east side there are indications of it but they are nothing like so striking. One is inclined to wonder whether in this case, at least, the ditch may not have had a purely practical function, to guard the milecastle from the risk of damage from surface water; it stands towards the foot of a very steep slope, and one could imagine that a violent rain-storm might have constituted a serious risk but for the digging of a ditch to intercept the flood-water. Such an explanation, however, seems hardly appropriate for M/c 23 (Stanley) or M/c 25 (Codlawhill), both standing on slopes too gentle to have suggested a comparable risk of flood damage.

3. *The structure of the "Broad Wall"*.

During the Centenary Pilgrimage, in 1949, Professor Richmond first hinted at a new theory about the Wall's structural history. Describing turret 26b, at Brunton, he

⁵ It will be remembered that in 1951 Dr. Swinbank found the Wall on either side of M/c 30 to be "Narrow Wall on Broad Foundation" (JRS xlii 89); the north front of the milecastle and its gateway-type remain to be examined. Abbatt's dimensions (*op. cit.*, p. 25), repeated by Bruce in RW1 195 = RW2 164 only, make it 57 ft. by 54 ft.—too nearly square to be convincing (the measurements given for M/c 19 in AA4 xiii 259 and repeated in HB10 65 and HB11 69 seem to be based on a misreading of Mr. Hepple's notebook: the N.-S. dimension seems really to have been 65 ft. 6 in., not 56 ft. 3 in.); surface indications certainly indicate that it had a long axis.

reported that the Broad Wall abutting on it from the west, which had recently been consolidated by the Ministry of Works, proved to have its rubble core set in clay. From that he proceeded to the conclusion that such had been the regular practice in the building of the Broad Wall, and that the change from Broad to Narrow had been the direct result of a decision to set the core in mortar instead of clay; compare his brief exposition in "Hadrian's Wall, 1939-1949" (JRS xl, 1950, 43):

"The building of the Broad Wall with clay and rubble as opposed to mortar and rubble entirely accounts for its curious proportions, 10 ft. thick to a calculated height of 15 ft., a ratio of 2:3. To make it thinner was to run risks with its stability, and even as it was the tendency to creep on steep inclines certainly manifested itself. It may be suggested that the hills and cliffs west of the North Tyne were in themselves a sufficient reason for the change-over to the rubble-and-mortar core associated with the narrow Wall, while the change in thickness follows automatically upon the change in material; one may compare the change in thickness as between Stone and Turf Walls, dictated by analogous considerations."

In the 1957 edition of the *Handbook* Professor Richmond plumps for this explanation, giving a new text-figure to illustrate the Turf, Broad and Narrow Walls, the last two defined respectively as "rubble core set in puddled clay, face set in lime mortar" and "rubble core and face set in lime mortar", whilst his text gives the following assessment (p. 16):

"As originally designed the Stone Wall was to be ten Roman feet wide, built with coursed ashlar faces, set in mortar, and a rubble core set in puddled clay. Foundations to carry a wall of this width were laid from Newcastle to the river Irthing, a distance of 45 Roman miles. The superstructure, begun from the east, had been carried for about half that distance when it was abruptly decided to set the core in lime mortar. The reason for this was probably that the wall with clay core was found to be unstable upon steep hills."

In his "Local Description" there are only three references to note: one to turret 26b itself (p. 82), one (p. 69) noting that turret 19b, examined in 1932 (AA4 x 98) was found to be largely built with clay instead of mortar, and one (p. 60) to the length of Broad Wall at Heddon-on-the-Wall, presented to this Society by Sir James Knott in 1924, of which he writes:

"The stones are now all re-set in mortar, to preserve the work; when first examined, the core was set in tough puddled clay."

This last point, Professor Richmond tells me, he owed to the late H. L. Honeyman—but it finds no support in the account by Parker Brewis and F. G. Simpson of their examination of the Heddon length in 1927 (AA4 iv 118-121); and Mr. W. Percy Hedley, who watched the work in progress, informs me that he has a clear recollection of the core being mortared and not set in clay. But, in any case, there is a good deal of clear evidence for the Broad Wall having a mortared core.

The earliest witness is Dr. Bruce, in a paper read to this Society in September 1864 (AA2 vi 220-224), reporting on various matters "of mural interest" which had come to his notice during the previous month. The most interesting event had been the uncovering of a long strip of the Wall east of Walbottle Dene (between M/c 10 and turret 10a); the modern road, laid out in 1751 over the remains of the Wall, was being lowered in order to produce an easier gradient to a new bridge across the dene, and in the process some 140 yards of the Wall had to be removed. Bruce gives an exceptionally careful description of the structure (he supported it at the meeting with a drawing made by W. H. D. Longstaffe), the relevant portion being as follows:

"The Wall was found to be nine feet in width; this probably in the lower courses. In one place it was standing four and a half feet high. The section of the wall presented the following

appearances: First, there was the natural substratum, consisting of the usual clay of the district; next, there were a few inches (four or five) of soil, which was blackened by the vegetation of the pre-Romanic period, and which no doubt represent the surface as the builders of the Wall found it. The foundation of the Wall consists of a mass of clay puddling, varying in thickness, according as the stones press upon it, of from one to three inches. On this the superstructure was laid. Usually the foundation course of stones is large and flat, but no regularity prevails. The facing stones of the lower courses are large. In one instance, of which Mr. Longstaffe has prepared for us a drawing, the three lower courses measure in height respectively twelve, nine, and ten inches. In this instance the lower course stands out beyond the second, the second beyond the third course. The stones of the interior of the Wall consist of rubble thrown in promiscuously. For some inches above the clay puddling of the foundation these rubble stones seem to be imbedded in clay, but above that they are bonded together by the usual tenacious mortar of the Romans, of which I produce a specimen . . .”

This primary description of the Broad Wall's core, as observed during the demolition of a long stretch of it, was reinforced in 1926 by Parker Brewis's observations (AA4 iv 109ff.): the short length of wall on Denton Bank, east of turret 7b, had a concrete core, and so had the length of over sixty yards, removed during the lowering of the Military Road over Great Hill (between turret 11b and M/c 12):

“It was of the usual Roman type, consisting of a concrete core between two comparatively thin masonry faces, formed of sandstone blocks.” There follow details of foundation-trench and construction, a specific account of the mortared core, and a note that it was of such high quality and strength that, to remove it, blasting had to be resorted to (AA4 iv 115, cf. NCH XIII 534).

At Heddon-on-the-Wall, as has been noted above, Brewis and Simpson found similar conditions; and in 1928 the North of England Committee, taking a section through the Broad Wall close to turret 7b, found—I quote Colonel Spain's account (PSAN4 iii 278f.)—the Wall foundation

"10 feet 9 inches wide, bedded in clay and composed of flat sandstone slabs 3 inches thick. Above these slabs were massive sandstone blocks, some of which were as much as 1 foot 2 inches in height and weighing more than a quarter of a ton each; these blocks were bedded in clay. The Wall was built on these foundations in mortar and was 9 feet 9 inches wide from north to south with one course of stone still in position on the north side. A tough concrete core standing well above the masonry filled the centre of the Wall."

Within the Wall-miles 7-12, therefore, the excavators' evidence is in every case clear that the Broad Wall's core was mortared and not set in clay, except for a few inches upwards from the foundation. Across the Cumberland border there is another case that seems deserving of mention: in the vicarage garden at Gilsland (between M/c 48 and turret 48a) the Narrow Wall is to be seen standing, not merely on broad foundation but on two or three courses of Broad Wall; in 1927 Simpson dug a complete cross-section there, and found (CW2 xxviii 385) "the core of the narrow Wall and that of the foundation below to be a homogeneous mass of mortared rubble". Something of the same kind, moreover, is to be seen in Nathaniel Hill's map of 1749 (for which, see Colonel Spain's paper, AA4 xiv 17ff.): he gives a section of extra-narrow Wall standing on four courses of Broad Wall, somewhere in the Wall-miles 23-25,⁶ and in the accompanying legend notes:

"What is under ground is laid in clay, the rest is done in mortar (*sic*)."

That, on present evidence, was surely the standard usage in the construction of the Broad Wall: clay was normally used in effect as a damp-course, but only exceptionally was it substituted for mortar in the superstructure. In other words, the clay and rubble core found downhill from turret 26b

⁶ "On Wall Fell near St. Oswald's" suggests a position west of M/c 24 (Wall Fell) rather than east of it.

seems to represent a departure from normal and *not* the planned method of construction. Can an explanation for it be found? One possibility which has occurred to me seems to deserve mention.

Mr. C. E. Stevens, in his Horsley lecture of 1947 (AA4 xxvi 1-46), noted that the cohorts which "sign" their work on the curtain of the Wall are normally i, iii, v, vi, viii and x. He might have added, by reference to Vegetius,⁷ that these are precisely the cohorts which in the legion's line of battle needed to contain the most highly trained and efficient soldiers; by implication, cohorts ii, iv, vii and ix would include recruits and men less well trained. Now one of the very rare centurial stones recording a coh. ix comes from this very length: Clayton records its discovery in March 1880 (AA2 ix 22), "within thirty yards" of turret 26b, when the south face of the Wall was being cleared; and as the whole of Clayton's clearance was westward of the turret, we get *coh. IX 7 Pav. Apri* firmly linked with Broad Wall core set in clay instead of mortar. May it not mean simply that the recruits of the ninth cohort were not yet well enough trained to be trusted with working in mortar?

It will be remembered, incidentally, that Mr. Gillam found clay used instead of mortar in the core of the walls of M/c 27 (AA4 xxxi 165ff.), so that we may take it that the whole length from turret 26b to North Tyne was treated in this way. The milecastle's gateway-type has allowed it to be assigned with probability to the Twentieth Legion; the clay core provides contingent confirmation of what Mr. Stevens inferred in his Horsley lecture, that this ninth cohort belonged to that legion.⁸

If I am right, a different explanation will have to be found for the change from Broad to Narrow Wall. Professor Richmond, as we have seen, has drawn attention to the fact that the Broad Wall's proportions are "10 ft. thick to a calculated

⁷ *Epitome rei militaris*, ii, 6.

⁸ The milecastle was excavated in 1952, five years after Mr. Stevens gave his Horsley lecture.

height of 15 ft., a ratio of 2:3". Now the earliest recorded measurements of the Wall, furnished by the Venerable Bede and unquestionably based on autopsy of the Narrow Wall between Newcastle and Wallsend, are 8 ft. thick and 12 ft. high, giving the same ratio of 2:3. May it not be that this gives us a clue to the significance of the change in thickness, allowing us to amplify the point made by Colonel Spain, writing in consultation with Simpson and Collingwood, in the *Northumberland County History* (XIII 536):

"The structural evidence as a whole speaks clearly of an original scheme of uniform construction that has been modified during the progress of the work by a decision to reduce the thickness of the Great Wall by 25 per cent."

If we accept Bede's measurements, the change of plan involved a reduction of three feet in height as well as two feet in thickness, effecting a saving of something more than one third in bulk while retaining the same ratio of thickness to height. And that, in its turn, might suggest that the narrowest Wall of all, along the crags in the sector between North Tyne and Irthing, where breadths of 6 ft. or less have been recorded on various occasions, may have been no more than 9 feet high.

The earliest record is due to Robert Smith of Durham, made on his tour of the Wall in 1708 and included in his "Observations on the Picts Wall", first printed in the 1722 edition of Camden;⁹ he noted (ii 1058) that "upon those steep and ragged hills in the Wastes" the Wall "was little above five feet, or however not full six, thick". Horsley gives no measurements in that sector, but he has a shrewd observation to offer (p. 147):

"As such steep rocks are a sufficient fence of themselves, I am inclined to think the wall has not in these parts had either strength or thickness, equal to what it has had in other parts. For

⁹ Cf. R. C. Bosanquet's posthumous study, CW2 1v 154ff.

the remains here are not so considerable, tho' it seems very improbable that any of the stones, especially in some places, could have been removed."

Hodgson clearly had this passage in mind when, writing about the Wall-miles 36-38, he noted (HN 288) that

"from the great quantity of rubbish that laid close to its north side, it is plain that the original height of the murus must have been very considerable."

He had himself measured it, 6 ft. thick east of M/c 38 and 6 ft. 2 in. between M/c 37 and Housesteads fort (HN 276). Bruce quotes Horsley's first sentence only to reject it (RW1 201, RW2 168, omitted from RW3):

"Present appearances give us no reason to suppose that the Wall on the crags was in any respect inferior to what it was in the low grounds."

But, despite Bruce's confident dictum, there is surely good sense in Horsley's view that the narrower Wall on the crags was probably less high than the Wall elsewhere; and it seems not unreasonable to conclude that the successive reductions in width were regularly matched by reductions in height, primarily no doubt for reasons of economy—fortified by the realization that Hadrian's original plan called for a higher Wall than experience proved to be necessary.

It remains to be added that Simpson's work in the Wall-miles 38-40, and that by Mr. C. E. Stevens for the Durham University Excavation Committee in the longer sector 33-46, have shown that the extra-narrow Wall on the line of the crags represents very drastic Severan rebuilding. It is still uncertain, however (as we have recently been reminded by Professor Richmond, HB11 81), what were the date and significance of the 6 ft. Wall found intermittently eastwards of turret 26b as far (at least) as the Wall-mile 23-24, where Lingard in 1807 observed the foundations of the Wall "in

great perfection forming part of the road for 130 yards", and alternating in thickness between 6 ft. and 10 ft. (AA4 vi 146). But the whole subject of the variations in thickness observed *per lineam Valli* calls for more detailed discussion than can be accorded to it in the present paper.