

## IV

## The Profile of the Ditch of Hadrian's Wall

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The study of the Ditch to the north of Hadrian's Wall has been revived in two recent papers by Humphrey Welfare. The first examines the question of the existence of causeways across the ditch at the milecastles (Welfare 2000) and the second describes variations in its form (Welfare 2004). These papers, both based upon field survey of the surviving visible earthworks, have demonstrated that there is still much to learn about the Ditch, its strategic positioning, use and form. This paper is a further contribution to this issue, and examines the accepted understanding of the profile of the Ditch as revealed by excavation. The Ditch profile has been described in successive accounts of the anatomy of the frontier: as an example the most recent edition of Breeze and Dobson's *Hadrian's Wall* (2000, 30) states that

the width of the Ditch varied from 26 to 40 feet (8–12m), usually about 27 feet (8.2m), the depth was 9 to 10 feet (2.7 to 3m), and the profile was V-shaped with a square cut drainage or cleaning-out channel at the bottom.

This paper will show that there is nowhere on the Wall where this profile has been conclusively demonstrated, and that the idea of the existence of the square channel in the base of the Ditch derives from a mistaken interpretation made during the early days of its excavation.

A survey of excavations on the Wall Ditch shows that complete sections including observations of the base of the ditch are extremely rare. It is a remarkable fact that in recent years two of the three main archaeological contractors on Hadrian's Wall (Oxford Archaeology North and the Carlisle Archaeological Unit) have never reached the bottom of the Ditch (pers comm., R. Newman, J. Zant), and the third (Tyne and Wear Museums

Service) has done so on but one site (pers comm., P. Bidwell). During a series of excavations from 1976 to the present, English Heritage archaeologists have dug complete sections of the feature only three times – at Appletree in Wall mile 50, Black Carts in Wall mile 29, and Burgh-by-Sands in Wall mile 72 (Wilmott and Bennett forthcoming; Austen 1994). The following summary runs from west to east, and includes only those places where the bottom of the Ditch has been recorded.

At Burgh-by-Sands a section made in 1986 (Austen 1994, 38, fig 4) showed a broad, deep V-shaped profile 2.5 m deep and 10 m wide. At Hadrian's Camp (Wall mile 64) it was V-sectioned, measuring 8.53 m wide and 3.5 m deep (Richardson 1972), and at Walby (Wall mile 61), where it was U-sectioned, the Ditch was 10.51 m wide 3.73 m deep (Richardson 1978). In none of these locations was a square channel in the base of the ditch observed. At Appletree (Wall mile 50), excavations in 1999 (Wilmott and Bennett forthcoming) showed that the Ditch was broadly V-shaped in profile, measuring 10.61 m wide and 2.97 m deep. Though the edges were steeper towards the base, they did not form a narrow channel. At the base of the Ditch a nineteenth-century drainage pipe was dug into the north side. Excavations at Longbyre near Greenhead (Wall mile 46; Salway 1959) revealed a Ditch with a flat base almost 3 m wide.

The Ditch was bottomed at both the east and west gates of Halton Chesters fort. The drawn sections show the Ditch profile and the elevations of the walling built down into the Ditch to act as foundations for the gate structures when the fort was inserted across the line of the Wall (Simpson and Richmond 1937, figs 2, 3). At the east gate, nine courses of foundation were built down into the Ditch. The edges of the Ditch were at approximately 45 degrees

coming to a flat base around 2.44 m in width. The photograph of the section (Simpson and Richmond 1937, pl xxii) shows this clearly, with water in a pumping sump in the centre of the flat base. The Ditch profile at the west gate was similar, but the flat base measured 3.35 m wide. In both section drawings, a basal square channel is indicated by dotted lines. In the section at the west gate a 45 degree edge is dotted in as well. It is clear that these are interpretative additions to the recorded section rather than actual observations, and that the channel was not found at this site.

Birley (1961, 79) recorded sections across the Ditch in Wall miles 23, 31 and 36 during 1931, finding that 'there was marked variation in the angles of its sides, which in every case seemed to have been cut as steep as the subsoil conditions permitted', though these interventions were not published. The basal channel was not noted. A survey near Matfen (Wall mile 18) showed that the

Wall ditch does not confirm to the standard Roman military ditch with a V-shaped section, but has a wide, U-shaped profile with relatively gently sloping sides. There was, moreover, no indication of the small square drainage channel normally associated with the base of this feature. (Miller 2000)

That Miller felt the need to mention the basal channel here, if only to show there was no sign of it, demonstrates the power of the usual interpretation. Jobey (1958) reached the bottom of the Ditch in an excavation in Wall mile 12. Here it was 10.6m wide and 2.34m in depth, with an 'unusually' wide flat base, and no basal channel. Jobey quoted a series of references to the existence of the channel, a number of which will be discussed further below (Newbold 1913, Haverfield 1897). He further quotes a section in central Newcastle, where the southern edge of the Ditch was seen in a cable trench in 1934 (Spain 1934). Again no channel seems to have existed, and none was mentioned in the text. The superimposition of an interpretative profile on the real section drawing in Spain's report does, however, give a misleading impression that it was there. In

1992 two sections were cut at Rutherford School in the west end of Newcastle. In one the ditch appeared as a shallow V-shape, in the other the ditch deepened sharply at the base into a narrow flat base.

This brief survey shows that complete sections, which penetrate to the bottom of the ditch are extraordinarily few and far between. The profile generally varies from U- to V-shaped, sometimes is flat bottomed, but appears *never* to have a square-cut channel in the bottom (one of the Rutherford School sections is the closest). This being the case, what is the origin of the assumption, and how has it been propagated through time?

The first mention of the idea was a result of excavations carried out in 1912 by Philip Newbold on Limestone Bank (Wall mile 29). During this work he made a small examination of the ditch, describing it as follows:

a cut in the bottom of the fosse, immediately north of Limestone Bank turret [T29b] revealed a feature which, I believe, has not been previously observed in connexion with this ditch. As is well known the ditch is V-shaped; but in this instance the two sides did not meet at a point, but fell away, so as to form a shallow gully (about 1ft [390mm] deep and 3ft [1.17m] wide) with vertical sides. The same thing occurs in the ditch of the Turf Wall at Appletree and of the Antonine Wall. (Newbold 1913, 63).

Limestone Bank lies to the east of and downhill from Teppermoor Hill, the point also known as Limestone Corner. It has long been appreciated that at this point the Ditch was excavated from west to east. At the summit of Teppermoor Hill the natural dolerite bedrock forms an outcrop, occurring very close to the surface. The hardness of the rock caused the Ditch diggers to cease excavating to any depth, leaving the well-known and impressive unfinished rock-cut Ditch, where the halt can be graphically seen. On the downhill slope (where the dolerite is still close to the surface), the line of the Ditch was continued, and it was in this sector that Newbold's excavation took place. In 1997 this area was excavated again under the direction of the present writer (Wilmott and Bennett forthcoming). A

complete section was excavated to bedrock through the Wall, Ditch, and Counterscarp. The Ditch itself was found to measure only 2 m wide and 800 mm deep, with a stepped profile formed by the splitting out of naturally angular dolerite blocks along horizontal bedding planes and vertical fissures. It was made to appear more formidable by the construction of a narrow, quite high, built, dry-stone counterscarp bank on its northern lip (Wilmott 1999). The base of the Ditch was a narrow gully as described by Newbold, but this was due entirely to the way in which the dolerite was removed to form the Ditch. The appearance of a squared channel in the base of the Ditch was thus a function not of a general design, but of a pragmatic response to localised ground conditions. The misinterpretation was due to Newbold's making 'a cut in the bottom of the fosse' and not a complete section.

Newbold's basal channel was probably seen by F. G. Simpson, who referred to it in the report on his contemporary excavations west of Birdoswald:

A section of the ditch made by Mr P. Newbold near Limestone Bank Turret, in 1912, proves that instead of being sharply V-shaped at the bottom, it was deepened to form a flat bottomed channel. The Turf Wall ditch is similarly shaped, as also is that of the Antonine Wall. (Simpson 1913, 315).

Acceptance of the existence of the slot was immediate and this is shown by its appearance in reconstructed ditch profiles. Two years previously, in a similar reconstructed section of the Ditch profile at Poltross Burn, Gibson and Simpson (1911) had shown a V shape in dashed lines with no slot. Simpson's 1913 report contains two plates which suggest the ditch profile: pl vii shows a section at Appletree turret, including a reconstructed ditch profile in dashed lines with a square slot at the bottom, while pl xv, a section at milecastle 50 (High House) has the same reconstructed ditch section. Both slots are shown to be 3 feet (1.17 m) wide and 1 foot (390 mm) deep, exactly as recorded by Newbold. There is no evidence in the latter plate to suggest that the ditch had

been excavated and, though Simpson mentions (*ibid*) that

A trench was recently dug near the milecastle, which confirms Mr Newbold's discovery, and makes the conclusion very probable that this is the shape of the ditch of the Wall generally,

no graphic or photographic evidence for this appears to exist.

Newbold's references to the channel in the base of the turf Wall Ditch and the Antonine Wall Ditch were to Haverfield's work at Appletree (Haverfield 1897, 188) and to Sir George Macdonald's *The Roman Wall in Scotland* (Macdonald 1934) respectively. Examination of Haverfield's drawn section (Haverfield 1897, 188) shows no drainage channel, but a slight change of profile about half way down the depth of the Ditch (2.97m). Haverfield described the profile thus: 'the Wall Ditch was roughly V-shaped, but the sides were steeper at the bottom than the top and the bottom itself was nearly 20 inches [508mm] wide'. This profile was confirmed during excavations on the same site in 1999 (Wilmott and Bennett forthcoming). In the second edition of his work on the Antonine Wall (Macdonald 1934, 90–91), the author mentions an exposure of the Ditch profile at Kirkintilloch; 'a foot or two from the lowest part, scarp and counterscarp suddenly become vertical and so continued to the base of the descent'. Macdonald reports that the same occurs at Bar Hill in the fort ditches and the Wall Ditch in front of the fort, but not further east, where it was cut through rock. Macdonald reserved judgement on how widespread this phenomenon may have been. Subsequently this conclusion has not changed much. Hanson and Maxwell (1983, 75) also reserve judgement, quoting Macdonald's work. They note that the Ditch of the Antonine Wall was V-shaped and that:

in places along its length there are indications of a square cleaning-out channel at the bottom (Macdonald 1934, 90) but too few complete sections have been cut through the infilled ditch to be certain that this was a consistent feature

In the same volume Hanson and Maxwell (1983, fig 5.1) give a series of sections through turf built frontiers, showing an actual section as excavated at Tentfield (Robertson 1964), where there was no square basal channel, together with hypothetical reconstructions of the Antonine Wall and Hadrian's Turf Wall, both of which show the received profile including the square channel. As on Hadrian's Wall recent excavation on the Antonine Wall has not reached the bottom of the Ditch (Dunwell *et al.* 2002).

As Welfare (2004) rightly notes, the study of the Ditch of Hadrian's Wall was enormously influenced by the idealised section produced by Parker Brewis (1927, 121). Brewis (*ibid.*, 115) gave the first estimate of the height of the Wall, and from this derived a blueprint for the width of the berm and the depth and profile of the Ditch. The illustration, presented without comment by Brewis and reproduced, also without comment, by Birley (1961, 323) shows a symmetrical V-shaped Ditch with a slot 3 feet (1.17 m) wide and 1 foot (390 mm) deep in the bottom. The angle of the south side of the Ditch is made to project to the Wall top in order to coincide with the line of sight of a soldier on the Wall top. It was in this illustration that the basal channel, drawn to Newbold's exact dimensions, became part of the universally accepted ideal Ditch profile. The channel continued to be assumed in all subsequent interpretative drawings of the Ditch, exactly as it had in Simpson's two 1913 plates. The famous Birdoswald excavation of 1929 (Richmond and Birley 1930) examined the phasing of a series of buildings constructed above the backfilled Ditch. The Ditch was not bottomed during the work, but the drawn section through the structures includes a hypothetical Ditch profile which includes the slot. Subsequent work at Birdoswald (Wilmott 1997), perhaps unfortunately, did not reach the bottom of the Ditch either. In the published interpretative section of the 1934 cable trench observation in Newcastle, the Brewis ideal profile of the wall and its Ditch were superimposed onto the actual section. Though no basal channel was recorded in the text, as

already noted, the Brewis profile gives the misleading impression that it was there. At Halton Chesters in 1936, the Ditch was found to be flat bottomed, and no basal channel was excavated, however, in the published drawings a channel to Newbold's dimensions was dotted in rather incongruously to meet the base of the north edge of the ditch (Simpson and Richmond 1937, figs 2, 3).

In 1942 a paper appeared on the gates of the forts on Hadrian's Wall (Richmond and Child 1942), and a number of illustrations were made for this work by F. A. Child. In these illustrations the channel has shrunk from the Newbold dimensions in Brewis' original to 609 mm deep and 457 mm across. This measurement appears in all of the Child drawings in the article on gates (Richmond and Child 1942, figs 2, 3). In fig 2 the Ditch profile with even '45°' sides and a narrow basal channel appears in the theoretical reconstruction of the east gate. Though no remark was made on the profile of the ditch, fig 3 re-presents the mathematics behind the Brewis reconstruction, and the authors also recapitulate the Brewis argument in connection with the height of the fort Wall:

It will be recalled that a minimum height of 15 ft [4.57 m] is required in order that the whole ditch, 27ft [8.2m] wide and 13.5 ft [4.11 m] deep; situated 20 ft [6.09 m] in front of the Wall, may be kept in view from the parapet walk. (Richmond and Child 1942, 186).

Child also re-drew the Brewis ideal section of the Wall and ditch. Though dated 1941, and doubtless part of the same set of illustrations, this drawing did not appear in the article on gates. It was, however, used as the standard illustration of the reconstruction of the Wall in the 12th (Bruce 1965) and 13th (Bruce 1978) editions of Bruce's *Handbook* to the Wall. Successive editions of the *Handbook* have accompanied the Child profile with description and discussion. The 12th and 13th editions both state:

To judge from the sections preserved in virtually the original conditions (because soon filled) at Haltonchesters, Chesters, and

Birdoswald, it was a standard Roman military ditch, V-shaped in section with a small square drainage channel running along the bottom. Weathering, re-digging and difficult ground have, however, produced wide variations.

This statement is erroneous: in fact the drainage channel has not been proven at even the three sites specifically mentioned. We have seen that at Halton Chesters this profile was not discovered, but was interpreted in the published drawings. The same was true at Birdoswald where none of the excavators of the ditch (Haverfield, Simpson and Richmond, Gillam or Wilmott) reached the bottom. At Chesters, the drawings of Child assumed a neat V-profile with a square channel in the base, however Haverfield (1901, 87), the only excavator to examine the Ditch here, did not achieve a full section. In his report he writes;

We did not think it needful to dig out all the ditch ... Its shape was amply attested by the points actually excavated. It is not flat-bottomed like the Vallum ditch but V-shaped, as it is called, like the turf Wall Ditch at Birdoswald, the Ditch of the Wall and the ditch of the Vallum of Pius in Scotland. The steepness of the sides of these and other V-shaped ditches is of course very rarely, if ever, as great as that of the letter V.

The idea of a basal channel in the Wall ditch has appeared in every text book and every generalized section since 1913, but is not mentioned before this date by Haverfield or any other researcher. Newbold's interpretation of the rock-cut ditch at Limestone Bank was picked up by Simpson, and through Brewis' ideal section, and repeated interpretative and reconstruction drawings became a "factoid" of Hadrian's Wall. It is possible that this occurred in part because the excavators of the time expected to see something of the kind. This expectation may be revealed in R. G. Collingwood's (1930) textbook, *The Archaeology of Roman Britain*. In his discussion of Roman camp ditches he wrote:

Temporary camp ditches are almost always V-shaped, or, as Hyginus calls it 'fastigate' ... The bottom of a fastigate ditch is normally cut into

a small square channel; this makes it easier to clean out with a shovel, and seems to increase its effectiveness as an obstacle: it is almost impossible for a man standing in this channel, which compels him to have both feet parallel to the axis of the ditch, to climb out. (Collingwood 1930, 12)

Welfare and Swan (1995, 18) have noted that, despite being frequently cited as a typical Roman characteristic, the basal channel, also described as the 'cleaning slot' or 'ankle breaker' has been rarely encountered in the ditches of temporary camps (they cite three examples: Cawthorn C (N. Yorks), Farnsfield (Notts) and Upper Affcott (Salop)).

The Wall ditch clearly varies enormously in its method of construction (Welfare 2004) and its general shape. What is very apparent from this brief study is that the idealised V-shaped profile with a square basal channel does not exist anywhere. The channels seen in the bases of many Roman military ditches may have been created accidentally during cleaning out, by running a spade along the base of the ditch (Johnson 1983, 47), and it is probably relevant to observe that in no Wall ditch section, even partial sections, is there any sign of cleaning out (unless one accepts that this was done by going to or beyond original edges). The misinterpretation of the sections at Limestone Bank and Appletree was not noticed until both were re-excavated within a couple of years of each other (Wilmott and Bennett forthcoming), but the longevity of what we may now see as the fallacy of the 'typical profile' is an extraordinary example of the way in which original interpretations gain the force of orthodoxy by repetition. In conclusion, it would appear now to be time to 'ditch' the old interpretation, to accept that it is misleading to continue to regard it as typical, and other profiles as 'variations': the ditch profile was simply varied.

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