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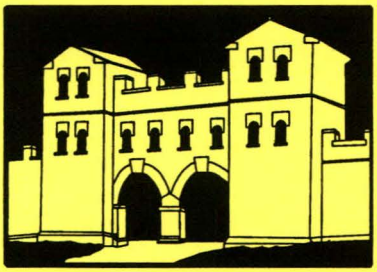

VOLUME IV 1995

THE ARBEIA SOCIETY
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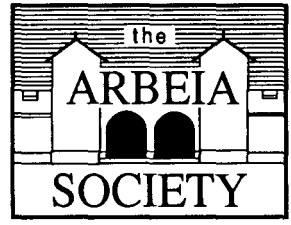

VOLUME IV

The Arbeia Society, Arbeia Roman Fort, Baring Street,
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CONTENTS

	Page
Experiments with Plumbatae *W.B. Griffiths*	1
Experiments to Examine the Manufacturing Techniques used to make Plumbatae *D. Sim*	13
An Excavation on Dere Street at Riding Mill *M.E. Snape & S.C. Speak*	21
Thoracomachus *I.P. Stephenson*	35
A Hoard of Roman Military Equipment from South Shields *A.T. Croom*	45
Note	
A Reinstated Section of the Branch Wall at Wallsend *W.B. Griffiths*	55
Excavation Summary	
South Shields – Arbeia, South Shields – Brigham and Cowan Yard, South Shields – Morton Walk, Berwick-upon-Tweed, Corbridge, Hylton Castle, Newcastle – Bridge Hotel, Tynemouth	61
Review Article	
A view of Roman Frontiers for the 1990s.Whittaker, Frontiers of the Roman Empire: a social and economic study (*N. Hodgson*)	73

EDITORIAL

One of the roles of the Arbeia Society is to provide links between professional and amateur archaeologists for their mutual benefit. In recent years Tyne & Wear Museums' excavations at Arbeia have been one of the last bastions in the North East for people wanting to experience the 'joy of digging'. Sadly, for a time at least, 1995 represents the last season that individual volunteers could be readily accepted to the site; the increased pressure on the excavation budget means that posts for suitably qualified and experienced excavation supervisors to oversee volunteers cannot currently be funded. However, there is sometimes space available for volunteers on smaller scale excavations and fieldwork projects outside the fort. To this end the Arbeia Society has established a database of its members who wish to take part in excavations. No prior experience of archaeological work is necessary and it is intended that the database will match suitable volunteers to various excavations (not necessarily just those of Tyne & Wear Museums). Indeed the Arbeia Society has already established its own fieldwork team for the National 'Defence of Britain' Project.

Archaeology in Britain has a long and noble tradition of interaction between professional (paid) and amateur (unpaid) fieldworkers. Although nationally current funding regimes have put pressure on this, the Arbeia Society, as well as several other regional and national bodies is determined to redress the balance as the continued intermingling of ideas resulting from the fusion of the two groups can only be good for archaeological development.

NOTES FOR CONTRIBUTORS

1. All Papers should be submitted to: The Editor, Arbiea Journal, Arbeia Roman Fort, Baring Street, South Shields, Tyne and Wear, NE33 2BB, by the 1st of July each year, if they are to be included in that year's volume.

2. All papers should ideally be submitted on paper (clearly typed on

A4 pages, with all references filled in ready for printing, subject only to correction of printer's errors. Wherever possible, a plain text copy (ie ASCII file, *not* a wordprocessor file) should also be submitted on disc (IBM/MSDOS or Acorn 3.5").

3. Line illustrations will usually be reproduced as figures and should be no larger than 290mm by 410mm. They must be able to reduce to a finished size of 180mm by 125mm including captions.

4. The Journal can take photographs, which should ideally be 90mm by 65mm, but can be 180mm by 125mm if necessary.

5. All references, whether in text or footnotes should be in the Harvard style with page numbers included, ie (Smith 1979, 223).

EXPERIMENTS WITH *PLUMBATAE*

W.B. Griffiths

The *plumbata* was a lead-weighted, and often barbed, dart/javelin in use during the later Roman period. Vegetius, in his *Epitoma Rei Militaris*, mentions *plumbatae* (from *plumbo* – lead), and states they were also known as *mattiobarbuli*, believed to be a mistranscription of *martiobarbulus* (Bennett 1991, 59), implying they were barbed weapons. It is worth reproducing Milner's (1993) translation of Vegetius' passage on the weapon in full:

> 'Training with lead-weighted darts, which they call *mattiobarbuli*, should also be provided to recruits. In Illyricum once there were two legions which had 6,000 men apiece and were called *Mattiobarbuli* after their skilful and brave handling of these weapons. By them, as is well-known, long ago all wars were concluded in a most vigorous manner; so much so, in fact, that when Diocletian and Maximian acceded to the throne they decreed that these *Mattiobarbuli* be called *Joviani* and *Herculani* in recognition of their valour, and they are reported to have preferred them to all other legions. They usually carried five *mattiobarbuli* each, slotted inside their shields. If soldiers throw them at the right moment, it seems as if the shield-bearing infantry were almost to imitate the role of archers. For they wound the enemy and his horses before they can get not merely to close quarters, but even within range of javelins' (*Ep. Rei Mil.* I;17).

Vegetius' work is generally dated to the end of the fourth or early fifth century AD (Barnes 1979; Milner 1993, xxv). It has been suggested his source was a military handbook by Modestus written in AD 275 (Marchant 1993, 189), which along with his reference to Diocletian indicates that the weapon was in use from at least the late third century AD. Vegetius assigns the weapon to his *antiqua ordinatio* legion (II, 16), but references to this unit need not be seen as proof of ancient practices (Speidel 1992, 26ff).

The only other reference to survive that mentions the weapon is from the anonymous author of *De Rebus Bellicis*, written in the mid-fourth century AD, who discusses two varieties of the weapon. He describes the standard version (*plumbata mamillata*) in this way:

> 'A shaft, nicely long and straight, will have fitted to one of its ends a piece of iron,

> round in section and tapering to a point, with a lead weight and flights [*pennis*] attached....., so that the bulbous weapon, assisted by the weight of the lead and the swiftness of the flights, will be powerful enough to penetrate very easily the enemy's shields and similar obstacles' (XI, 1).

The other form is far more exotic, referred to by the Anonymous as the *plumbata tribulata*. It appears to have resembled the standard *plumbata*, but with an addition, 'spikes like calthrops project, moulded on with lead' (*De Reb Bell* X, 2 ; and see fig. 1 for reconstruction). The Anonymous describes its use thus:

> 'This can be seen to threaten death in one of two ways to the man who is wounded by it; for it either buries itself in his body and kills him, or it falls away without wounding him and lies on the ground and sticks in his foot when he treads on it, because, whatever way it is turned, it can inflict a wound from its edge with the prong projecting from it' (X, 1).

No examples of this weapon have yet been found, and it is possible that it never actually existed, as is generally believed to be the case with some of the other inventions reported by the Anonymous, such as certain of the war chariots (Hassall 1979, 77). Illustrations showing both forms of *plumbata* accompany the extant medieval manuscript (Hassall and Ireland 1979 pl.IX) and it is clear from the main body of the text that illustrations also accompanied the original manuscript. However, these illustrations, although showing the flights and spikes(?) of the *tribulata*, do not show the distinctive lead weight and are thus unreliable. The weapon would indeed be effective in the way described by the Anonymous, but several problems

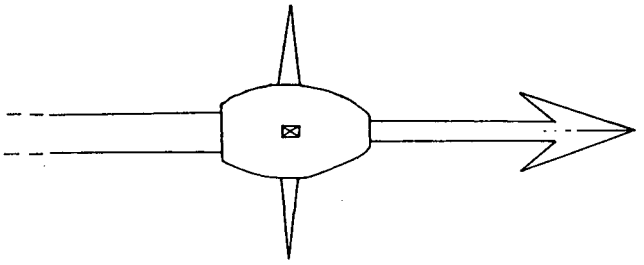

Figure 1: Reconstruction drawing of a plumbata tribulata (drawn by author).

appear with its use. If held in a rack in the shield, which the Anonymous does not mention, the spikes would present quite a problem to the user; also it would have to be handled carefully prior to throwing if the user was to avoid impaling his hands during the heat of battle. Indeed, the weapon would be of little use in a battle, as opposed to defensive situation, as should troops advance after discharging it then it would present an obstacle to them also. Ultimately one must remain sceptical as to its existence.

The *plumbata mamillata* is a not uncommon find on Roman sites, both in Britain and on the continent.[1] In addition, several other examples may well languish un- or misidentified, as at Intercisa in Hungary, where an example observed by the author in the town museum was labelled as an artillery bolt.

Vegetius describes it as a legionary weapon, but the spread of findspots would seem to indicate a more widespread use. It is worth noting that none of the findspots need date the use of the weapon to any earlier than the late third century AD. Milner, in his translation of Vegetius, suggests that the *plumbata* originally developed from a special sling bolt known as the *cestros* (1993, 16 fn 4). This weapon is attested by Polybius (27.11 (9).1) and Livy (42,65,9), but there is some doubt as to whether it ever existed (Griffiths 1989, 260).

Construction

All the texts tell us of the design of the *plumbata* is that it contained a lead weight and was flighted. The name *martiobarbuli* suggests that it was also barbed, as can be seen on examples recovered from Wroxeter for instance (Barker 1979, 97). Analysis of *plumbatae* from Wroxeter and Burgh Castle shows two different methods of construction (Sherlock 1979, 102; and see Sim this volume fig. 1). The lead bulb encloses the join between the iron tip and the wooden shaft of the weapon in both cases. Thus the lead surviving on the Wroxeter example obscured the join even to X-rays. However, neutron radiographs have revealed that it is of split socket design encasing the wood with a nail through the two to increase stability (Robertson 1975, 17). On the Burgh Castle example the iron tang is inserted into the shaft. Part of Quinta's experiment was to reconstruct the *plumbatae* using both techniques, and compare levels of difficulty and time taken. This work is commented on separately (see Sim, this volume).

Previous Experiments

Both Vegetius and the Anonymous indicate that *plumbatae* were developed as a result of their superiority in terms of range and penetrative ability. In the past several sets of experiments have been conducted with replicas in order to quantify this:

Musty and Barker 1974: Reconstructions of *plumbatae* by Russell Robinson were used at the Tower of London. The authors found that the greatest ranges were achieved using a strap attached to the shaft in order to provide additional momentum. With practice, ranges of 70–80 yards were gained.

Eagle 1989: Plumbatae reconstructed for this experiment were initially thrown like javelins, acheiving a range of 20.5m, then overarm (gripping the end of the shaft), a range of 11.5m. Subsequently tests were conducted throwing the darts underarm (again gripping the end of the shaft), with a range in excess of 50m being achieved without the addition of a strap.

Robertson (pers comm): Tests by T.J.M. Robertson involved the use of a cord attached to the shaft. He achieved ranges of *c*80 yards, and noted an impact angle of 80 degrees from the horizontal. He also observed that at that range and angle the darts would penetrate a 3mm thick sheet of modern plywood lying on sun hardened clay soil.

The Quinta experiment was conducted with the aim of adding to the above information set, and in order to allow direct comparison with other Roman hand launched missile weapons that have been the subject of previous experiments,[2] and to test its effectiveness from a defensive location, in this case the reconstructed southwest gateway at Arbeia. As in previous years, an adjunct to the experiment is the authentic reconstruction of *plumbatae* using Roman materials and techniques in order that the modern examples will perform similarly to their ancient counterparts. The construction of the *plumbatae* for the experiment is described separately (see Sim this volume).

The Reconstructions

In total six *plumbatae* were manufactured for the experiment. All were constructed with 16mm diameter ash shafts, as used for javelins earlier in this series (Griffiths and Sim 1993, 5).[3] Three of the weapons were provided with flights, and three without, in order to allow a comparison of their performance. Three lengths of shaft were used, with and without flights,

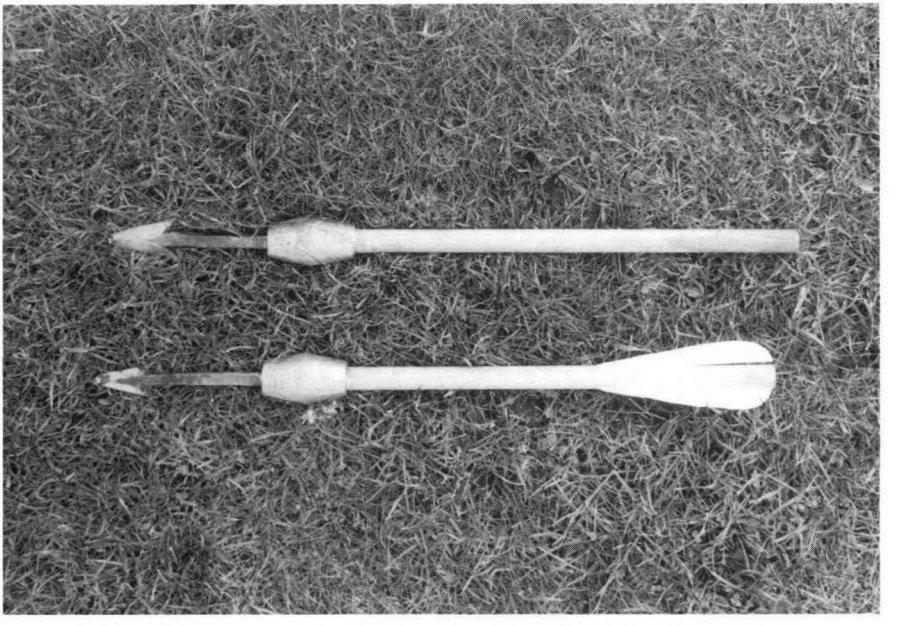

Figure 2: Two reconstructed plumbatae length 0.5m (photo: author).

and, including the heads, the lengths were 0.5m (fig. 2), 0.75m and 1.00m. The latter is the maximum length that could be held behind a shield.[4]

The Experiment

The experiment was divided into two basic sections, firstly testing range on the flat, and secondly from the gateway parapet. Four members of Quinta, three in full auxiliary kit of the third century AD, and one in civilian clothing of the period participated, along with the author in twentieth century garb. In the first section the *plumbatae* were thrown from a standing position on the flat with a standard overarm javelin throw, with a strong cross-wind cutting across the line of flight. With the unflighted examples ranges achieved varied from 6.2–13.6m, each participant achieving broadly similar distances with each dart, the best results usually being achieved with the shortest dart. However, the shortest was also the most unstable, and often cartwheeled through the air, making it unsatisfactory as a weapon. The flighted examples improved range marginally, with the middle and shorter *plumbatae* performing better than the longer, and all

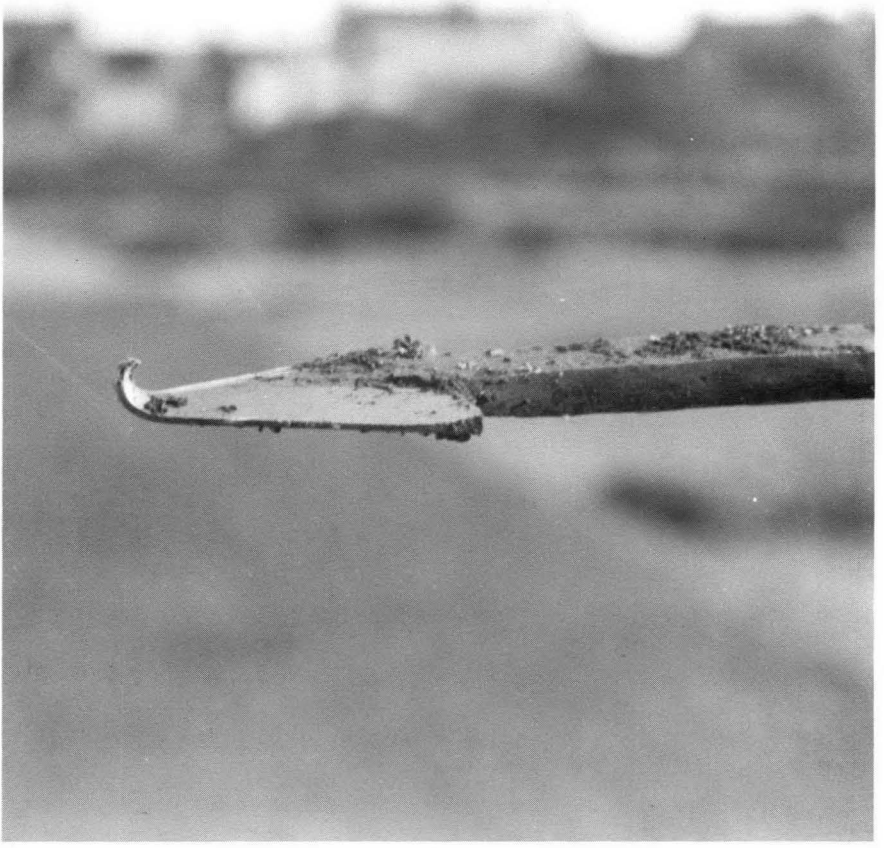

Figure 3: The turned tip of a plumbata (photo: author).

three were much more stable in flight, landing at a much more convincing attack angle, that is closer to the vertical than the unflighted darts. During this phase of the experiment, the 0.75m length unflighted *plumbata* snapped its shaft just below the lead weight. It was the only weapon to break during the entire trials, testifying the general robustness of the darts, the lead covered joint standing up better than the exposed joints of standard javelin heads.[5] Of course, the use of a thinner shaft may perhaps have resulted in more breakages, which may be desirable if you do not wish the weapon thrown back at you. This said, the tips of the heads turned and blunted

Figure 4: A soldier of Quinta preparing to cast a plumbata (photo: author).

very quickly (fig. 3), as was found during the earlier javelin experiment (Griffiths and Sim 1993, 11), making them less effective should they have been picked up and thrown back.

The ranges achieved with the standard overarm throw were disappointing, being slightly less than those achieved with the standard javelins, thus not tallying with Vegetius' statement that they allowed a greater range. It

was decided next to try to throw the weapons underarm, with the shaft gripped between the flights as proposed by John Eagle (1989). This almost doubled everyone's ranges, to an average of 18–20m, with both types; again the flighted examples allowed a better stability in the air. The arc of the weapon through the air was, as observed by Eagle, very impressive, and it would indeed be possible to throw it over tall obstacles, and it would land much closer to the vertical than the average javelin. This throw also meant that the *plumbatae* effectively outrange javelins slightly.[6] Another observation made was that the crosswinds seemed to have no effect on the weapon.

The next stage in the experiment was to test the effectiveness of the weapon when used from the reconstructed southwest gateway at Arbeia. The lack of space on the parapet wall precluded throwing the darts underarm, so the javelin throw was used instead (fig. 4). Once again each thrower's shots grouped well, with the *plumbatae* tending to fall around the central of the three ditches (around 15m). Once again the flighted examples landed at near vertical angles, with the flightless examples not proving quite so aerodynamic, although the longer example performed very similarly to a standard javelin. On landing the heads would bury themselves in the ground at least part way up the lead weight.

A final part of the experiment involved assessing the usefulness of the weapon on attackers at the base of the wall. Soldiers could have leant over and cast the darts down at their enemy, but this would have exposed them to return fire. However, it was found that the darts operate well if they are simply dropped from the wall without leaning out, the soldier protecting himself behind the parapet wall; the weight of the lead making up for the lack of thrown forward momentum.

In addition to the Quinta experiment David Sim conducted an independent series of field tests. These achieved broadly similar results. However, he also used a leather strap[7] and found that with an overarm throw it increased the ranges achieved from *c*15 to *c*18m. Subsequently a different throwing action was used, more similar to the method of throwing a discus, in that the arm was laid back behind the body then moved forward and up. Range was increased to 26.55m for the 0.5m dart, 26.10 for the 0.75m and 21.2 for the 1.00m. This method of throwing was also regarded by Dr Sim as giving considerable accuracy.[8]

Overall Comments

This experiment has provided a set of minimum possible ranges for the *plumbata*, as well as a consideration of methods of construction (see Sim, this volume). It would seem clear that in battle soldiers would not have deployed this weapon with a standard javelin throw, but would rather, with or without a strap (*amentum*),[9] have launched the weapon underarm, or perhaps discus style as per Sim's experiment if none of their own troops were in front of them, in order to achieve maximum range. There can be little doubt that a shower of such darts, outranging javelins, would have been most effective.

Both within battle and defensive situations the weapon would prove useful. The lead weight would have a greater striking power than a standard javelin, while the near vertical landing angle would also prove useful. This bears out Vegetius' assertion that when attacking a fortification slingers, archers and men with *plumbatae*, amongst others, would be used to clear the walls (*Ep. rei Mil.* IV 21).

Acknowledgements

Thanks are due to Quinta members Paul Carrick, Bob Carr, Bill Leslie and George Mattick for taking part in the experiment, and to Alex Croom for support on the day. Thanks are also due to Mr T.J.M. Robertson for freely supplying information from his own researches, and to Dr David Sim for manufacturing the reconstructions and sharing the results of his own field trials. Both the costs of manufacture of the *plumbatae* and the publication of this paper were generously funded by a grant from the Roman Research Trust, to whom both the author and the Arbeia Society are extremely grateful.

Notes

1. In Britain *plumbatae* have been identified at a minimum of six sites: Burgh Castle (Sherlock 1979, 101), Catterick, Segontium (Marchant 1993, 189), Doncaster, Richborough and Wroxeter (Bennett 1991, 60). On the continent they have been identified at eight sites: Augst, Pitsuna (Bennett 1991, 60), Intercisa (*pers obs*), Furfooz, Lauriacum, Linz, Weissenberg and Wiesbaden (Marchant 1993, 189). In addition to these finds there may well be un- or mis-identified examples in museums, or their stores, elsewhere.
2. Prevous experiments have been published in the *Arbeia Journal* and are

as follows: hand thrown stone (Griffiths 1992), javelins (Griffiths and Sim 1993, Sim 1993) and slings (Griffiths and Carrick 1994).

3. A diameter of 16mm is thicker than many surviving heads would suggest, with 10mm appearing to be nearer the standard. However, it was felt that a thicker shaft would allow a more prolonged use of the weapons through the experiment.
4. Based on the surviving *scutum* from Tower 19 at Dura Europos in Syria – vertical length 1.02m (Rostovtzeff *et al* 1936, 456).
5. The shaft broke as a result of a fault in the wood.
6. One problem with the throw was that the flights would catch the hands causing cuts to the skin.
7. The strap was constructed from three leather boot laces plaited together.
8. Dr Sim felt that larger flights and perhaps four fletchings rather than two would give greater stability in flight.
9. For the darts to be thrown while the soldier retains his grip on his shield it is clear that an individual strap would have to be fixed to each of the weapons.

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EXPERIMENTS TO EXAMINE THE MANUFACTURING TECHNIQUES USED TO MAKE *PLUMBATAE*

David Sim

General observations

The *plumbatae* heads considered in this experiment are of two types. those with a socketed head into which the wooden shaft is fitted and then pinned, and those with a plain tang that is fitted into the shaft (Fig. 1, cf also Sherlock 1979; Griffiths, this volume). At first sight, the socketed type seems more sophisticated than the plain tang type. Apart from the method of fixing the head to the shaft, these weapons are identical.

A study of the weapons showed that their construction can be divided into different operations:

a) the forging of the iron head.
b) making a mould to cast the lead weight.
c) preparing the ash shafts.
d) casting the lead weights on the shafts.

I wondered if the plain tanged type may have been produced by the legionaries, and the socketed type by professional blacksmiths. Following the theory that the tanged type was made in the field, I considered that this type might be quick to make, with the lead cast as a simple cylinder then forged to shape when cold.

The first question I addressed was how the lead weight was fitted to the head and the shaft. Prior discussion on this subject (Sherlock 1979, 101) has centred around the hypothesis that if liquid lead was used it would burn the shaft and thus weaken it, so the lead must have been applied in the same manner as a lead wiped joint in plumbing. I was not convinced by this, so to test this theory a simple cylindrical hole was made in some earth, a shaft of pine placed in the centre of the hole and lead poured around it. The shaft exhibited no scorching on the surface. The lead weight was cut across its long axis revealing the lead weight with the wooden shaft in the centre. Examination showed only light scorching on the surface of the wood and that to a depth of only 0.1 of a millimetre.

In order to put this test on a more secure basis, the experiment was

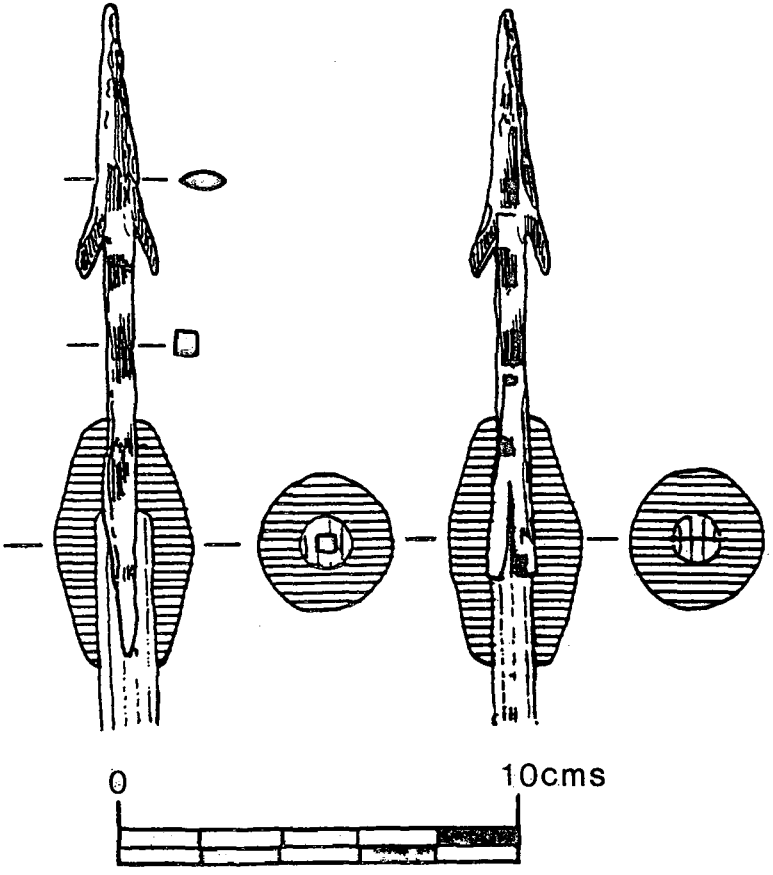

Fig.1

repeated with the shaft made of ash. The temperature of the lead was measured with a thermocouple and was found to be 365°C. After casting, the shaft showed no burning. To find the burning temperature of ash, an oven was set at 400°C, a sample of ash was placed inside the oven and left for 1 minute. A light scorching was visible on the surface. The experiment was repeated with the oven set to 500°C. On removal the surface of the wood was black and scorching had penetrated to a depth of 1.3mm. It was clear from this set of experiments that the lead could easily be cast onto the

head and wooden shaft without weakening the shaft.

To produce a weight of the same shape as that shown in Fig. 1 it was first necessary to make a pattern. This was then used to make a mould for casting, which proved time consuming. I decided to examine the possibility that the weight was cast as a cylinder and then forged into shape, which might save time. To test this theory, the lead weight was cast as a cylinder and then hammered on an anvil to see if the shape of the weight could have been produced in this manner. It took 17 minutes to hammer the weight to shape and a further 6 minutes to file the end of the weight flat. I decided that this was not a time saving way to make the weights.

Trials to forge the tanged head

It is seldom that there is only one way to forge an item to shape; it is usually the case that several sequences of operations will produce the same end result. In order not to spend too long on all the various possibilities, I decided that the criteria for forging these plumbatae heads should be that they were made in the shortest possible time, that the minimum amount of fuel be used, and that only tools which are known to have existed in the Roman period would be used.

A piece of flat-wrought iron bar measuring 6mm × 25mm was used (Fig. 2a). First the tang was rough forged using the edge of the anvil and a cross pene hammer (Fig. 2b) and then it was forged smooth into a square tapering point (Fig. 2c). The blank was cut from the parent bar and two wedge shaped pieces of metal were cut off to form the point. This was achieved by cutting the metal halfway through and then turning it over and cutting from the other side. From this procedure, it can be seen that the cutting edge had started to form (Fig. 2d). A hot set was used to cut the head to form the barbs, and when they were cut out, the set was used as a lever to prise the barbs out a little (Fig. 2e). The cutting edges were forged down – but not to a razor edge (a razor edge would burn during forging). When cold, the iron was filed to give the head sharp edges and a sharp point (Fig. 2f).

The procedure was the same for the socketed heads with the exception that the end of the bar was flared first, then the shanks were forged and then the head. Finally, the flared end was rolled to shape to form the socket.

Making the mould for the weights

The weights would be cast onto the shafts and heads using a mould. A wooden pattern was turned up on a pole lathe, and this was used to form the mould.

The whole question of mould material is complex and work is being carried out at the moment to determine exactly what materials were used. In the field, moulds would probably be made from clay mixed with sand (Tylecote 1987). On this occasion, it was not possible to experiment with different materials for moulds, but this would be an interesting topic for future experimentation. Plaster was known in the Roman period and I felt justified in using it for this mould.

Several experiments were necessary to get the runners (pouring hole) and risers in the correct position. In all, the mould was used to cast 31 castings and it was still in serviceable condition at the end of the experiment.

The tanged type of head was fitted into the shaft by heating the tang to a dull red colour and burning into the shaft. A small hole was first drilled in the end of the shaft to act as a guide. When the tang was in deep enough, the head was quenched and then re-positioned and given a light tap with a wooden mallet. The head was firmly in position and could not be withdrawn from the shaft. The shaft and head were positioned in the mould which had been pre-heated and the lead was poured in. The lead was only given enough heat to melt it (a temperature of 360° was recorded) and it was poured slowly into the mould. Slow pouring is essential to allow air to escape from the mould. The lead solidified within 10 seconds of the end of the pouring. It was then removed from the mould and laid on the floor to cool. The runners and risers were cut off and the lead weight was lightly hammered to tighten it onto the shaft and head. The shafts were then cut to length with a wooden framed saw (a copy of the Roman type). The socketed heads were fitted to the shafts using a knife to shave them to fit the sockets. A bow drill was used to drill a hole in the socket and through the shaft. This was done quickly because the drill was only of 1.2mm in diameter. A pin was put in the hole and riveted in place. The casing of the weight was just the same as the tanged type.

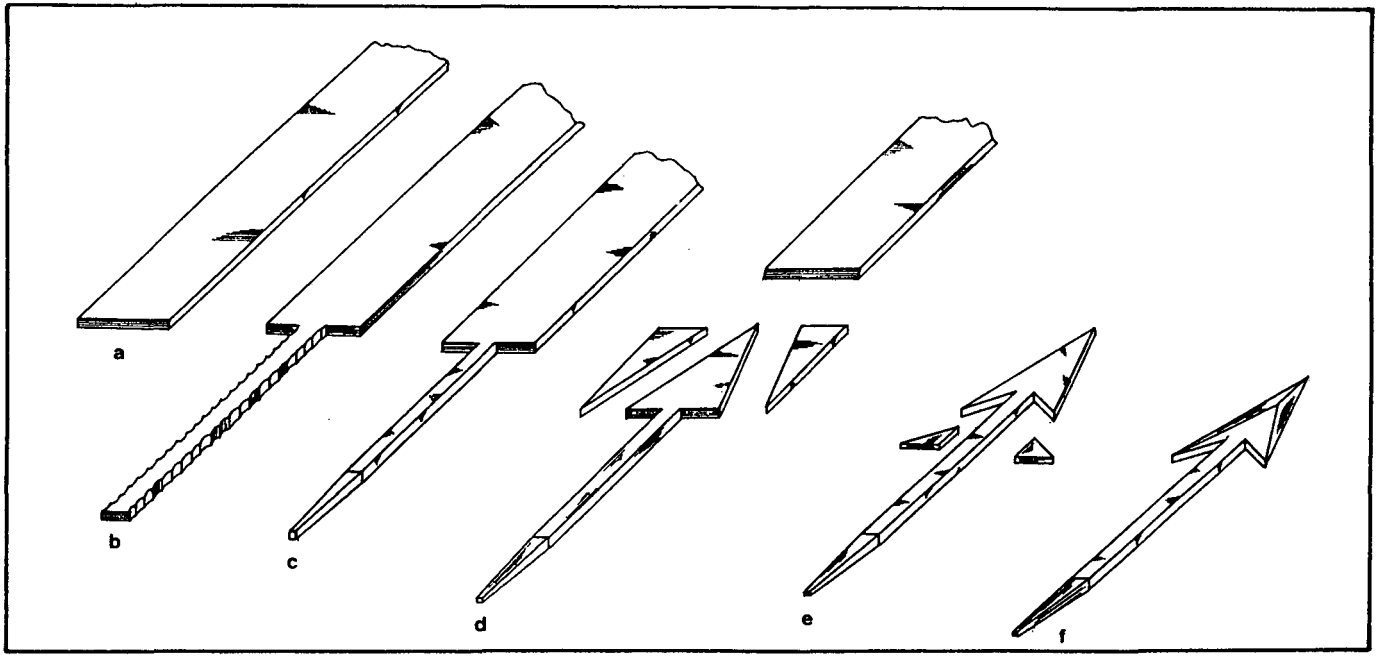

Fig.2 Stages of plumbatae head manufacture

Times

Operation	*Time*
Forging the tang type heads	14 minutes 23 seconds
Filing to shape	10 minutes 11 seconds
Burning the tang into the shaft	3 minutes 34 seconds
Casting the weight	1 minute 18 seconds
Fettling the weight	5 minutes 22 seconds
Cutting the shaft to length	0 minutes 9 seconds
Forging the socket type heads	17 minutes 17 seconds
Filing to shape	10 minutes 11 seconds
Casting the weight	1 minute 18 seconds
Fettling the weight	5 minutes 22 seconds
Cutting the shaft to length	0 minutes 9 seconds
Trimming the shaft to fit the socket	5 minutes 22 seconds
Drilling the socket for the pin	1 minute 15 seconds
Positioning the pin and riveting	0 minutes 41 seconds
Casting the weight	1 minute 18 seconds
Fettling the weight	5 minutes 22 seconds
Cutting the shaft to length	0 minutes 9 seconds
Total time to make tanged type	34 minutes 57 seconds
Total time to make socketed type	41 minutes 35 seconds.

Conclusion

The heads are quite easy to forge and do not require any special equipment. The tanged type could be made quite easily in the field by trained legionaries; however, the socketed type is more difficult to make and would require the skills of a trained blacksmith. The forging times are quick and could be reduced by 30–40% if the blacksmith were assisted by a striker which is probably what happened. The making of the pattern for the mould and the mould itself was straightforward and once the pattern was made it could be used to make hundreds of moulds before it needed replacing. It is possible that several moulds were in operation at any one time and the weights would have been cast on in batches. This would have speeded up casting time. The loss of lead in each casting was less than 1% of the total weight. Runners and risers would be returned to the melting pot and re-cycled. This makes the casting a very economical operation. The

total loss of iron due to forging and filing was 19%. This is about average for this type of manufacturing process. For a thrown weapon, a manufacturing time of 41 minutes may seem excessive when one considers the possibility that the weapon may not be recovered, but the time was arrived at from one man working alone and, as already stated, a team effort could reduce the total time by 40%. This seems to be a very sturdy weapon which would have been quick to produce.

Acknowledgement

The construction of the plumbatae and the publication of this paper was funded by a grant from the Roman Research Trust to whom both the author and the Arbeia Society are extremely grateful.

Appendix 1 Details of weapons

Finished weights (point, lead, ash shaft).

T indicates tanged type. **S** indicates socketed type.

T1	486g	S1	468g
T2	552g	S2	546g
T3	582g	S3	576g

Lengths

T1	S1	0.5 metre
T2	S2	0.75 metre
T3	S3	1.0 metre

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AN EXCAVATION ON DERE STREET AT RIDING MILL

M E Snape and S C Speak

Introduction

An evaluation was carried out in January 1995 at Riding Farm, Riding Mill, Northumberland (NZ 013619) in advance of housing development by Meadowcroft Estates. A trench cut across the presumed line of Dere Street established that a road, presumed to be the Roman road, survives in a good state of preservation. At least three phases of road surfacing were found, and there was evidence of a possible medieval road or boundary following the southern edge of the assumed Roman road.

Previous Research

Dere Street in the vicinity of Riding Mill has been described by Margary (1967, 440) as follows:

> 'At the descent into the Tyne Valley at Riding Mill the road passes through a pine wood where the *agger* is clearly visible, some 40 feet (12.19m) wide and 2 feet (0.61m) high, below the present road. On the north side of the village street the cobbles and kerbs were recently disclosed during the digging of a gas-main trench, between the Wellington Hotel and the station approach road. Beyond Farnley (*c*2km west of Riding Mill) the old road was a little to the south of the modern road, and can be traced at some points through the fields. Then it turns down the hillside, not now visible, to cross Dilston Haughs at the cemetery direct to the site of the Roman bridge over the Tyne, opposite the important base fort of Corstopitum situated upon a slight plateau at Corchester, just to the west of Corbridge.'

The sector of road uncovered while digging the gas-main trench is described by Bulmer (1956, 335–6) as '... large to medium cobbling from a depth of 3 ft 7 in below the present road surface'. Large stones which had appeared first in the trench were interpreted as kerb stones; these were found at both the north and south sides of the cobbling.

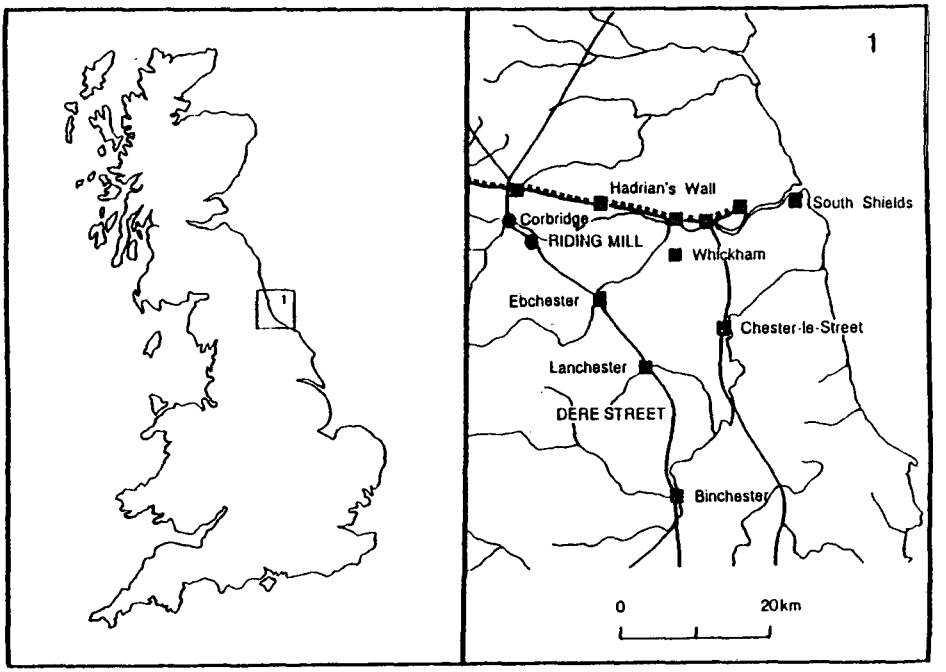

Figure 1 Location of site

Margary noted that the road was narrower immediately north of Corbridge than at Riding Mill (1967, 476–7):

> 'Dere Street leads out of the fort at Corbridge (Corstopitum) somewhat farther to the east than its entrance from the Tyne bridge, so that a short traverse along the main street from west to east was necessary. The road is visible at once as a wide low *agger* running up to the west side of the Corbridge school, and then, through the fields beyond, it is very plain indeed, becoming a fine high bank 27 ft (8.23m) wide and 2–3 ft (0.61–0.92m) high, as it approaches the present Corbridge–Portgate road, with which it then merges.'

Excavation in 1974 in advance of the construction of A69 bypass to the north of Corbridge revealed part of the line of Dere Street for a length of c8m (Casey and Hoffmann 1995, 17, Fig. 2). However, mechanical stripping prior to excavation had removed most of the stratigraphy, and Dere Street only survived as a concentration of small stones embedded in the surface of

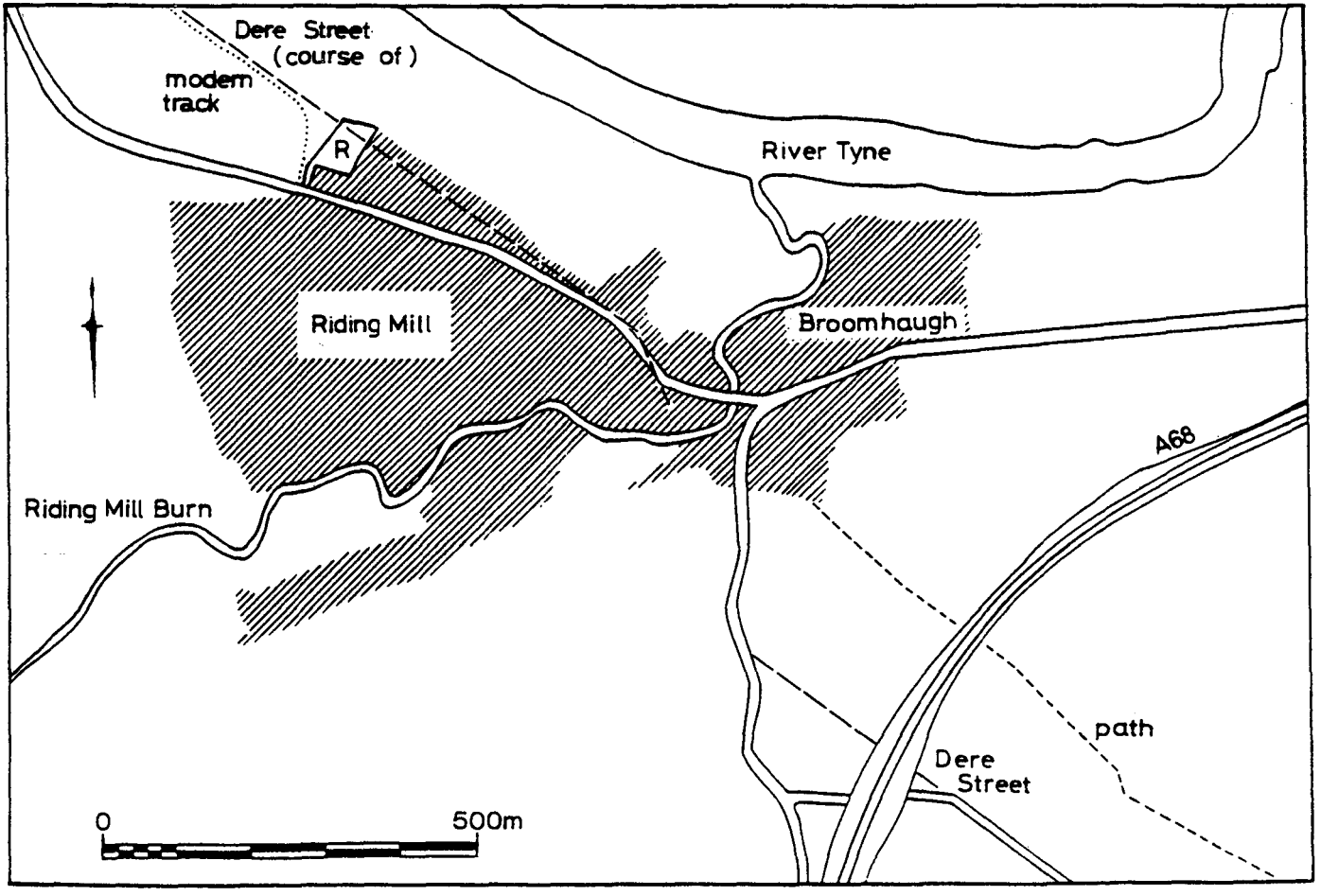

Figure 2 Course of Dere Street through Riding Mill. Site shown as R. Scale: 1:10,000

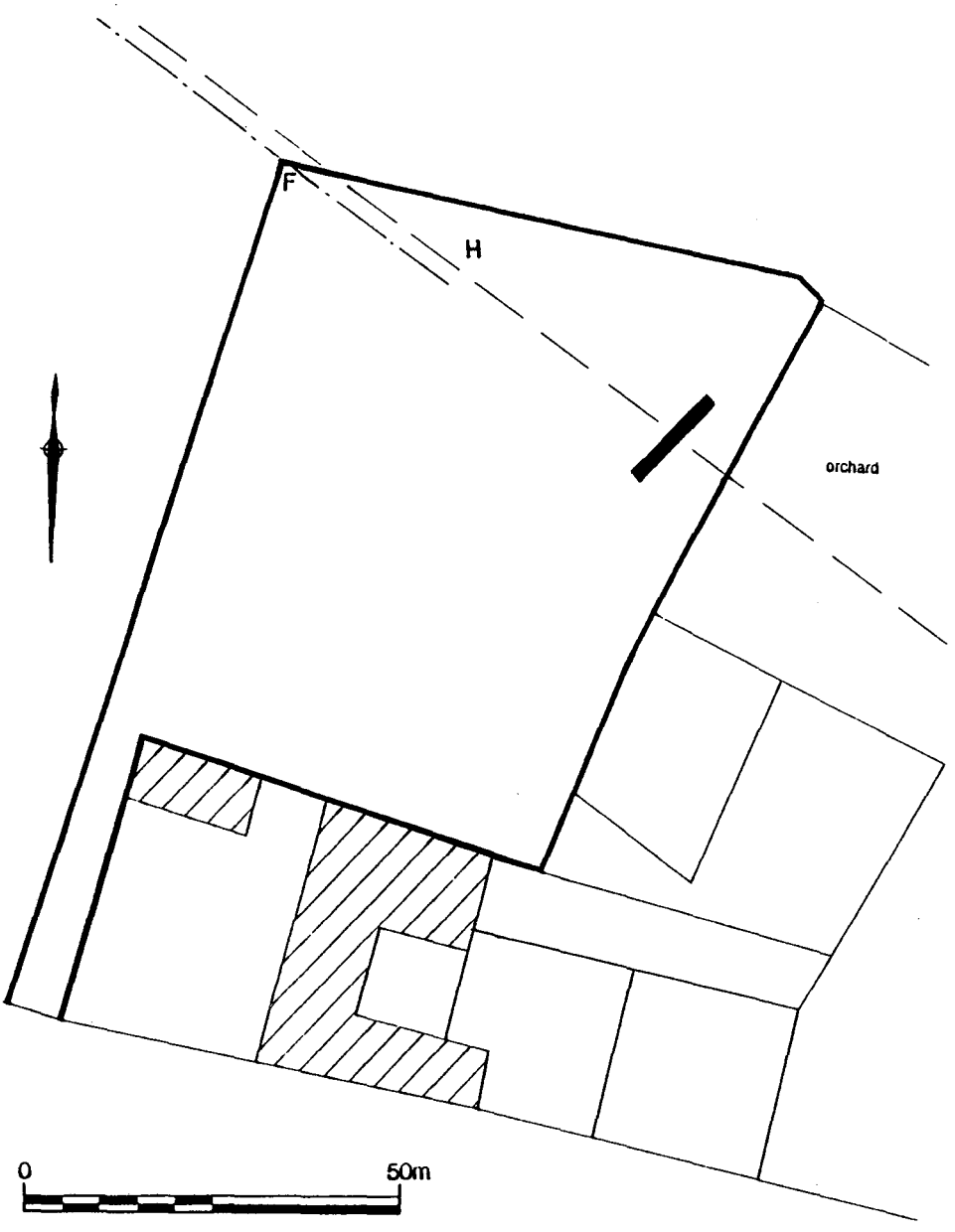

Figure 3 Location of excavation trench. Excavation trench shown in black; limit of development area shown in heavy line. Presumed course of Dere Street shown by a dashed line; surface indications of Dere Street shown by dot- and-dashed line; hollow at H; large stone visible beside modern fence post at F. Scale: 1:1000

the boulder clay. The exact width of the road could not be determined. Although roadside gullies might have been expected to survive the degree of erosion, no traces were found.

Location and Topography of the Site (figures 1, 2)

The development site lies to the north and west of Riding Farm (R on Figure 2) on land sloping to the north-west.

The line of Dere Street can be traced as an earthwork not only at Farnley as mentioned by Margary, but also in the fields immediately to the west of the site (Figure 3). Two slight ridges, *c*1.40m apart, probably represent the northern kerb of the road and the edge of a road-side gully (Figure 4). This lies at the bottom of a gentle slope which shows rigg and furrow, measuring *c*8m from ridge to ridge, running roughly north/south and which conceals the rest of the road. At a distance of *c*11m up the slope from the northern kerb of Dere Street is a green track, 3m in width and likely to be of fairly recent origin, which cuts across the rigg and furrow. It runs parallel to Dere Street for some distance, but curves away to the south-west towards the modern road west of the development area.

There are a few surface indications of Dere Street in the north-western part of the development site. Beside the fence post at the north-west corner of the development area (F on Figure 3) a flat stone block, presumably part of the northern kerb, projects through the grass; a small area of cobble metalling is also visible. Running south-east across the development area for approximately 22m are extensions of the two ridges visible in the fields to the west.

One more large stone projects through the grass at this point 22m from the fence post, before the ridges are interrupted by a large hollow (H on Figure 3), *c*10m wide, cut for a drain which runs into a small pond beside the field boundary. The western side of the pond has a revetting of large stone blocks, probably derived from Dere Street. Also within this hollow is the stump of a large tree, and many cobble stones are visible in the soil disturbed by root action.

Across the rest of the development site to the east of the hollow there are no surface indications of Dere Street. Pronounced ridge and furrow, *c*8m in width runs down the slope.

The excavation trench was located *c*32m east of the large hollow, on the crest of a plough ridge, the ground falling to the north at a slope of 1 in 7. There are four plough furrows between the trench and the hollow, two

being deep and two shallow. To the east of the excavation trench a deep semi-circular hollow had been terraced away, presumably to provide access to the adjacent orchard.

Results of Excavation

Roman

The trench 14m in length and 1.5m in width was hand-dug to remove turf and topsoil (001) (Figures 6 and 7). Because the archaeological deposits were deeper and in a better state of preservation than anticipated, it proved necessary to concentrate the investigation on the western half of the trench only. This was done by cutting a sondage, 0.70m wide and not extending the full length of the trench, but ending 1m from the southern limit. It was further extended across the full width of the trench at its centre and at a point 1.30m from its northern limit (Sondages 1 and 2 on Figure 6.1), when archaeological deposits were encountered.

The earliest layer to be fully investigated (005) was a deep road make-up layer of Dere Street (Figures 5 and 6.2), which included river-worn cobbles and boulders, the largest measuring 0.50m by 0.30m by 0.20m, and also irregularly-shaped sandstone fragments and one fragment of limestone, in a matrix of sand and gravel. The southern edge of the road was difficult to delineate because it was covered by a deep cobble layer, described below, but the estimated width of the road make-up layer was 8m. There was a slight camber at both sides, and it was noticeable that the stones of the northern half of the road were pitched into the slope rather than slanting down it. One of the largest boulders was scored by ploughmarks running north/south (P on Figure 6.2). The upper metalled surface (004) was composed of cobbles varying in size from 0.05m to 0.10m in a mid-brown sand, covered by a layer of compacted gravel. This surface was found only on the northern half of the road, and extended beyond the northern edge of the make-up layer, running into the northern limit of excavation. This layer was removed down the western side of the trench, but an area of it on the eastern side was cleaned and photographed.

On deepening the sondage at the centre of the trench, it was found that the make-up layer (005) was 0.20m in depth and that at least two, and possibly three earlier road surfaces were intact (Figures 6.2 and 6.3). Immediately beneath the make-up (005) was a well-worn, flat surface of small to medium sized cobbles (012), set mainly in orange sand, with some gravel patches; the depth of this layer was 0.15m. Beneath it was a very

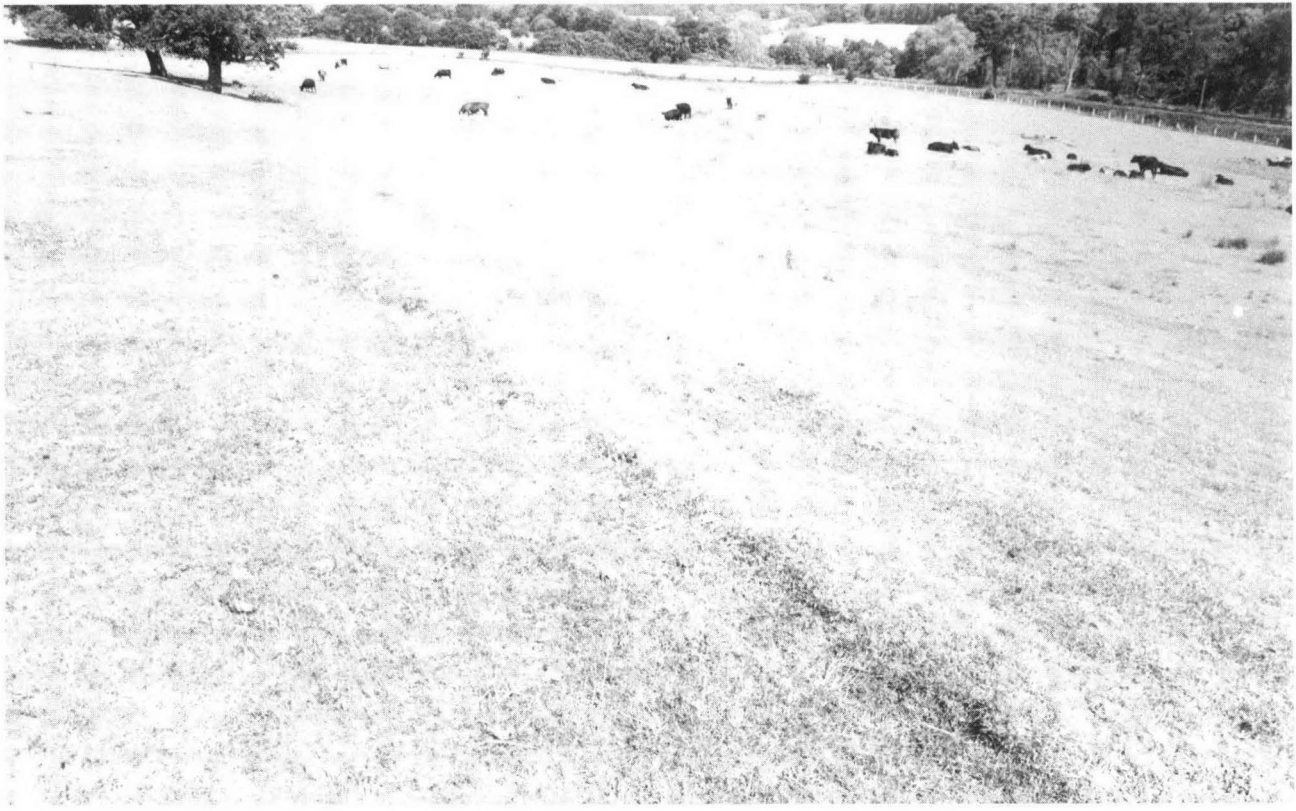

Figure 4 Field to the west of Riding Farm, looking west, showing northern edge of Dere Street and possible roadside gulley, visible as ridges (Photo: Tyne and Wear Museums)

Figure 5 Dere Street during excavation, looking south (Photo: Tyne and Wear Museums)

well-constructed road surface (013), comprising a make-up of large flat cobbles and small irregular blocks of sandstone, covered by a layer of fine pea gravel. The total depth of this layer was 0.25m. Beneath it was a very close-set layer of large cobbles (014), which included one large boulder; all were set in a sand and gravel matrix. Only a small part of this layer was seen, and as there was insufficient time to widen or deepen the sondage, it was not possible to establish the depth of this layer or to say whether it represented an early road surface or a foundation or levelling layer. However, it is clear that the total depth of the central part of Dere Street was in excess of 0.60m (Sondage 1 on Figure 7).

A further sondage was cut at the northern limit of excavation, to a maximum depth of 1.20m (Sondage 2 on Figure 7). This extended for 2.70m and cut through the the road. However, the sequence of heavy make-up layers seen at the centre of the trench was absent at this northern edge.

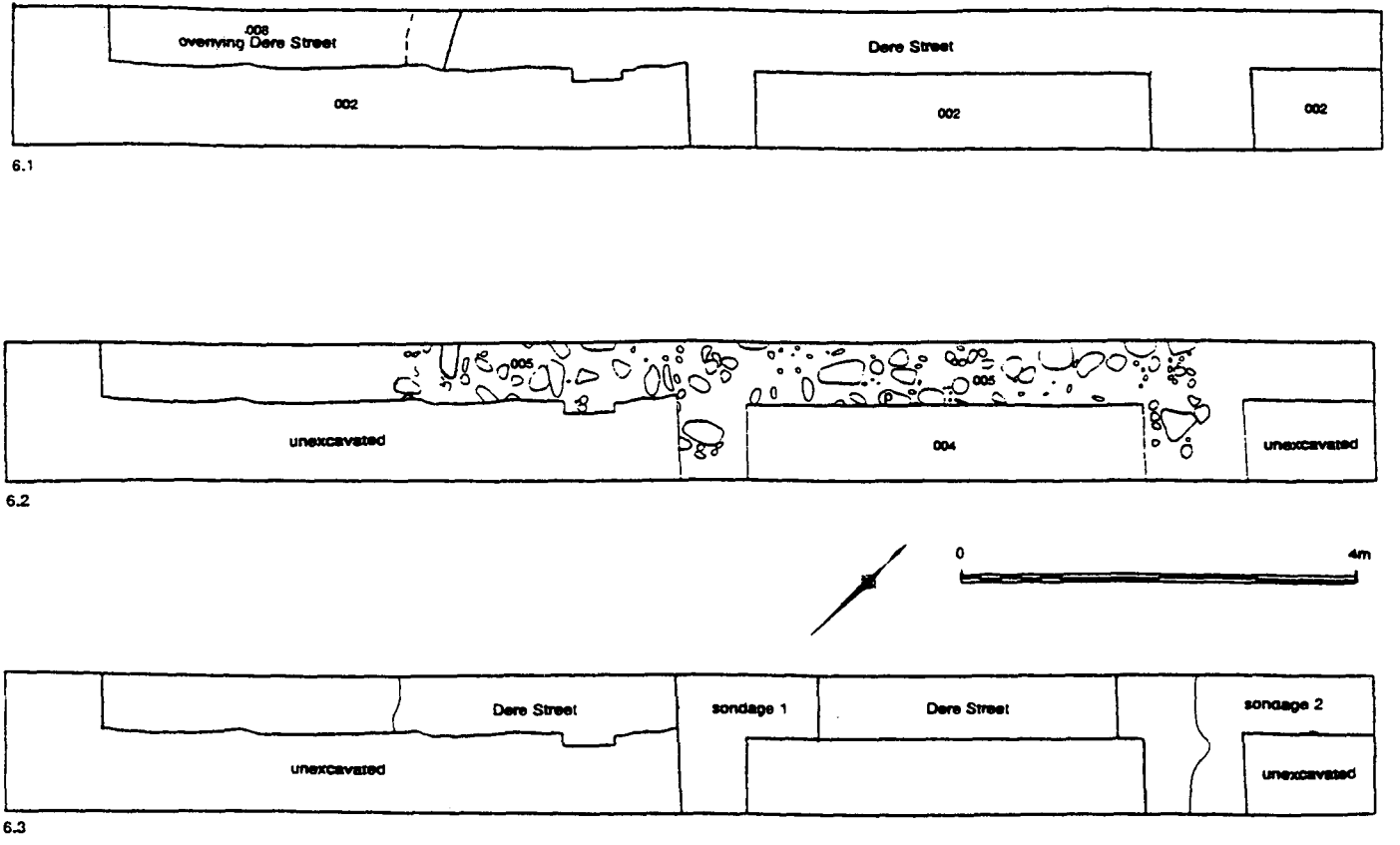

Figure 6 1. Trench plan showing extent of Post-Roman feature (008) overlying Dere Street. Scale 1:80
2. Trench plan showing extent of upper surface (005) of Dere Street. Scale 1:80
3. Trench plan showing positions of Sondages 1 and 2. Scale 1:80

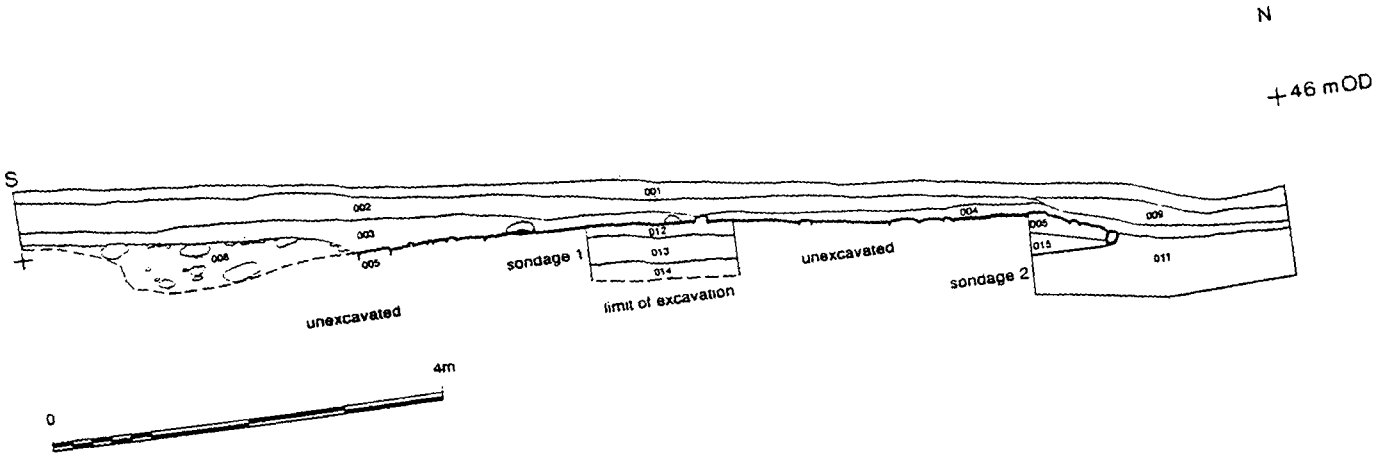

Figure 7 East facing section across Dere Street. Upper surface of road shown in heavy line. Scale 1:80

Beneath the upper road make-up (005) there was only a compacted layer of small cobbles (015), 0.25m in depth. Possibly the primary and early phases of Dere Street may have lain a little further south, with the latest resurfacing (005) and its underlying layer (015) lapping over the original northern edge.

If this were the case, any roadside gully belonging to the earlier phases would have been obscured. There was certainly no evidence of a roadside gully associated with the latest phase, despite the presence further west of a surface feature possibly indicating a roadside gully, noted above. Sealed beneath the lowest cobble layer (015) was a layer of mixed yellow and grey sands (011), an average of 0.50m in depth (see Figure 7), undisturbed by any archaeological features. Within the sand were horizontal bands of charcoal and one band of orange clay.

It is not known whether there was a gully at the southern edge of the road, as it was not possible to excavate fully the stony feature, described below, which overlay this edge of the road.

There were no finds within any of these deposits, and therefore no conclusive proof of their Roman date.

Post-Roman

Lapping over the edge of the road at the southern end of the trench was a deep layer of cobbles (008), interleaved with layers of gravel and light brown sand. The cobbles were c0.30m in size in the upper layers, increasing to 0.40m lower down and the whole feature was very compacted. Therefore only a length of just under 3m was excavated, to an average depth of 0.50m. The top of the feature, which sloped down to the north, was covered by a lens of dark brown sand (006), less than 10mm in depth (not shown on Figure 7).

Possibly this feature represents a medieval road running to the south of the Roman road on the same line as the 'green road' observed in the field to the west of the study area, as described in section 2 above. The depth of the feature (in excess of 0.50m) suggests either a road which had been resurfaced many times or a road running on top of a bank.

Overlying this feature (008) was a layer of orange sand (003), the average depth of which was 0.20m; this layer became shallower down the slope and petered out c6m from the northern end of the trench. It contained sherds of medieval pottery, dating from the fifteenth to the early seventeenth century (see below and Figure 8), and may represent an upper road surfacing washed down the slope. Also in this layer was a small copper alloy buckle

loop (see below and Figure 9) of a type not closely paralleled but dated to the fourteenth to sixteenth centuries (information C Hart).

Overlying the sand was a layer of compacted gravel set in a light brown sandy soil (002), which contained post-medieval pottery. It was a maximum of 0.30m deep at the southern end of the trench, becoming shallower down the slope and being absent from an area *c*3m by 1m in the north-west corner of the trench. This material may possibly be upcast produced by the terracing, described above, which had taken place immediately to the east of the position of the excavation trench. Immediately under the topsoil at this northern end of the trench was a low mound of cobbles set in dark sandy loam (009; see Figure 7), presumably also a modern deposit.

Finds

Context 001 (topsoil and unstratified)
8 sherds post-medieval pottery
4 sherds abraded medieval pottery
1 fragment clay pipe stem

Context 002
1 sherd post-medieval pottery
3 sherds medieval pottery

Context 003
4 sherds medieval pottery, comprising 3 sherds green glazed ware, 1 rimsherd possibly of northern gritty ware (Figure 8)
1 small copper alloy buckle loop (Figure 9)

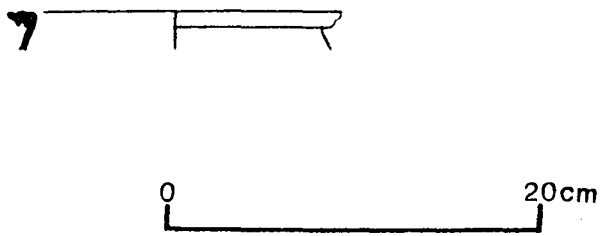

Figure 8 Medieval pottery sherd from layer 003. Scale: 1:4

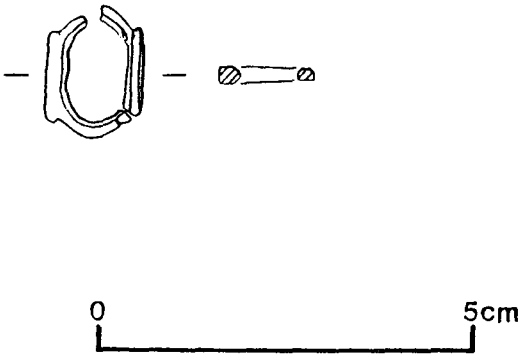

Figure 9 Medieval buckle loop of copper alloy from layer 003. Scale 1:1

Discussion

The excavation established that Dere Street survives across approximately 50m of the development site, damaged only by a drain at the western end and damaged or possibly removed for 7m at the eastern limit. Elsewhere the road is likely to be in a good state of preservation, observations during fieldwalking having indicated that even the deeper plough furrows are not likely to have penetrated deep enough to do more than superficial damage to the uppermost stones.

Excavation showed the depth of modern deposits above Dere Street varied from 0.20m to 0.60m. The latest phase of the road lies on the projected line of the known road to the west and is approximately 8m in width. This compares with Margary's observation of the width of the agger north of Corbridge as c8m, but as c12m at the approach to Riding Mill. However, it should be remembered that the width and precise course of the primary phase at Riding Farm is unknown. The total depth of road metalling at the centre of the road was found to be in excess of 0.60m and could possibly be as great as 0.80m.

However, much information about the road remains unknown. It is not possible to say whether the ground surface had been prepared in any way for the construction of the road, as for example with the laying of turf blocks, nor whether any pre-Roman features might have been sealed by the road. No dating evidence was found with any of the phases. No details of kerbstones or roadside gullies could be established. In view of the results of the Corbridge Bypass excavation, mentioned above, it may be that no gullies ever existed in the vicinity of the Riding Farm site. They may not

have been necessary, as water may have drained easily, especially on the northern side, where the ground sloped down to the river.

The post-Roman feature overlying the southern edge of the road is interesting, but as the full extent was not excavated, it cannot be interpreted with certainty. However, the evidence of excavation and fieldwalking, together with reference to Figure 1, suggests a possible sequence of Roman, medieval and post-medieval roads at Riding Mill.

From Figure 1 it can be seen that the course of Dere Street changes at some point within modern Riding Mill, entering at the north-west and emerging beyond the south-east corner of the village. It may be that the road altered direction in order to cross the Riding Mill Burn at an approximate right angle, before continuing its course south of, but parallel to, its line west of Riding Mill village.

However, it may be significant that a footpath leaving the eastern side of the village continues the line of the north-western portion of Dere Street almost exactly. Possibly a medieval road ran parallel to Dere Street from the north-west and continued straight through the village without deviating like the Roman road. The stony feature found in excavation, and overlain by a deposit possibly dated to the forteenth to sixteenth centuries, could represent such a road. If so, then the study area may contain medieval field boundaries, banks or other features in addition to a medieval road.

Acknowledgements

Tyne and Wear Museums are grateful to Meadowcroft Estates for funding the evaluation, especially to Peter Curry for his co-operation, and also to Sara Rushton of the Archaeology and Buildings Conservation Section of Northumberland County Council for advice. Excavators were John Wilson, Keith Ferguson and Mark Hoyle. The illustrations were drawn by Mark Hoyle, Graham Hodgson, Mark Defty and Gary Brownsword, supervised by Roger Oram.

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THORACOMACHUS

I.P. Stephenson

'Inter omnia quae ad usum bellicum provida posteritatis cogitauit antiquitas, thoracomachum quoque mira utilitate ad leuamen corporis armorum et asperitati subiecit.'

'The ancients, among the many things which, in their forethought for posterity, they devised for use in war, prescribed also the thoracomachus to counteract the weight and friction of armour: it is amazingly useful for protecting the body.' Anonymous, *De Rebus Bellicis* XV

The text then goes on to describe the garment, *thoracomachus*,[1] as being made of thick cloth (or as Wild (1979, 105) translates it, felt) which is made to fit the torso of the soldier and is worn under the armour. The garment is also seen as being multi-purpose. Firstly, it serves as added protection for the upper half of the body; secondly, it protects the wearer from armour chafing and helps distribute the weight of the armour. Thirdly, it allows the wearer to function more efficiently in cold weather. However, the *De Rebus Bellicis* (*DRB*) also recognizes that in rain the garment becomes soaked and unusable due to its increase in weight and to counteract this it advises a second garment made of 'Libyan hide' (*DRB*, XV) the same shape as the *thoracomachus* which the *DRB* recommends be 'put over the top' (*DRB*, XV) – whether it means on top of the *thoracomachus*, or on top of the armour is unclear and will be discussed below.

The construction of the thoracomachus is open to debate. Bishop and Coulston (1993, 59) see it as a padded undergarment, whereas Wild (1979, 106) sees it as 'a long-sleeved shirt of standard late-Roman pattern' with no mention of padding. The text does not explicitly support either, although the initial description in the text of a thick cloth garment and the majority of surviving illustrations; manuscripts C (fig. 1), P, M & M *,[2] tend to support Wild's interpretation; whereas the illustration in the *editio princeps* of 1552 (fig. 2) appears to represent a padded garment. However as Wild himself admits (1979, 107–8) there is some confusion as to what the illustrations are actually showing. Indeed there is no guarantee that the artist(s) actually saw the items in question, as the illustrations come down

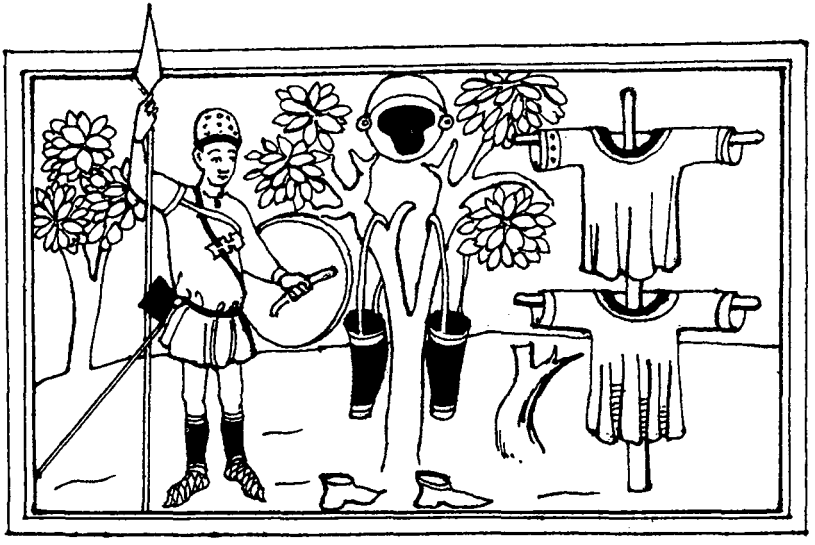

Fig. 1: Thoracomachus *and 'Libyan hide', hanging on a wooden frame. From the C MS. of* De Rebus Bellicis. *Neither this MS, nor any of the other surviving MSS state which garment is the* thoracomachus, *and which the 'Libyan tunic'. (Drawn by M. Daniels).*

to us from early Renaissance copies of ninth or tenth century Carolingian manuscripts, rather than as copies of late antique manuscripts (Alexander 1979, 11–15). Although, Alexander admits that Carolingian copiers are 'remarkable for their ability to reproduce the illusionistic style of their models' (ibid, 12), Alexander also points out the unclassical stylisation apparant in the M* manuscript and the copyist differences, both omissions and additions which occur between the M, M*, P and C manuscripts (ibid, 12). In the case of the *editio princeps*, the artist may well have been following sixteenth century fashion for he appears to have used either a *gambeson* or *jupon* as his model, although this need not be too far off the mark. Therefore, when considering the validity of the illustrations as evidence, it should be borne in mind that not one of the illustrations is contemporaneous with the period in question and all potentially suffer either from transcription error or deliberate alteration. Thus any conclusions drawn, using the illustrations, concerning the nature of the *thoracomachus*, must be viewed as tentative. However, the accuracy or otherwise of the surviving

Fig. 2: Thoracomachus *and 'Libyan hide', hanging on a wooden frame. From the editio princeps MS of* De Rebus Bellicis. *(Drawn by M. Daniels).*

illustrations is not as much of a problem as it might appear, for the solution to the question as to whether or not the garment was padded does not, in all probability, lie in an interpretation of the illustrations, but more probably lies in an interpretation of the implicit information given in the text. The *DRB* states that the *thoracomachus* helps to spread the weight of the armour, increases the wearer's level of protection and becomes if not unstable, then problematic when wet. If all of these advantages and disadvantages accrue from one extra layer, than it would need to be rather thick, whereas a laminated or padded garment would appear easily to fulfil all of the above roles. The argument for padding is strengthened by a

passage from Caesar (*Civil Wars*, III.45) where he states that 'the soldiers had made themselves jerkins or other protection out of felt, quilt, or hide' (*'atque omnes fere milites aut ex coactis aut ex centonibus aut ex coriis tunicas aut tegimenta fecerant, quibus tela vitarent'*). Although not overly detailed it is possible that Caesar is describing the material and method of construction of the *thoracomachus* and the material of the 'Libyan Hide' – although this may be taking a remark open to a number of interpretations much too far. However, a balanced view of the evidence still points to a padded garment.

Having briefly considered the written and pictoral evidence, the next step is to examine the comparative and reconstructional evidence. The *DRB* and Caesar's are the only contemporary descriptions available, and any reconstruction attempted must be based upon our preferred interpretation of them. However, in order to support this interpretation and to facilitate reconstruction the use of comparative sources must also be examined, bearing in mind that they are comparative and that any results remain conjectural, as indeed are any results obtained from reconstruction.

The best comparative material is medieval, with the garment in question being either a *gambeson* or *aketon*. Edge and Paddock's description is particularly pertinent as they not only descibe the construction of the *gambeson*, but also its location and the reason for its introduction:

> 'Mail is not a rigid defence and, although it will stop a cut, the force of a blow is transferred directly through it, causing injuries of a type known as blunt trauma, that is broken bones and haemorrhaging. Furthermore, it gives inadequate protection against a thrust with a sharply pointed weapon or from arrows or crossbow bolts, all of which can burst the links apart. These problems were dealt with in two ways [in the medieval period]: partly by wearing .... rigid defences [the cuirass] .... over the mail, and partly by the adoption of quilted and padded undergarments. The latter were separate defences which could be worn by the knight either as an accompaniment to his mail hauberk or, on occasions, in its stead. These are referred to in contemporary sources as *'aketons*, *'gambesons'* or 'pourpoints'. These terms seem to have been interchangeable but the weight of evidence suggests that the 'aketon' refers to garments worn under the mail while gambesons were worn over or instead of it. All these garments seem to have been vertically quilted. They were usually made of two or more layers of linen stuffed with tow rags or other material.' (1988, 57).

Norman (1993, 221) and Oman (1924, 4) give similar descriptions of form

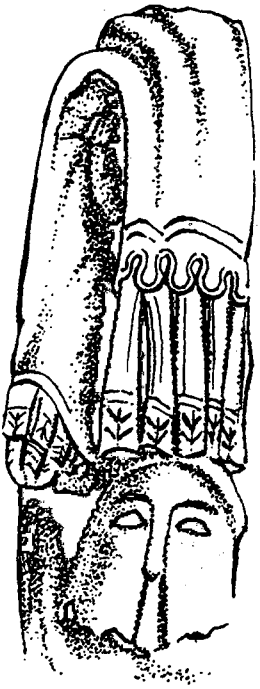

Fig. 3: 'Arming doublet' with pteruges, *detail from a statue in the Museo della Terme, Rome. (Redrawn by M. Daniels from Russell Robinson 1975).*

and function. However, they both see the *aketon* as a synonym for the *gambeson* and regard both garments as being worn under armour, and thus do not make the same fine locational distinctions as Edge and Paddock.

The reconstruction attempted by Cohors Quinta Gallorum (CVG) (fig. 4) is similar in appearance to the illustrations in the *editio princeps* (fig. 2) and the description of the *gambeson* given above. In material terms it is made of two layers of linen, stuffed with wool, and then vertically quilted so as to hold the stuffing in place. The reconstruction attempted by CVG appears to fulfil all the functions required of it by the DRB and a similar reconstruction by the Ermine Street Guard has also solved the problem of the chest plates on modern reconstructions of *'lorica segmentata'*, which previously had fitted awkwardly at best (pers. comm. C. Haines). A second reconstruction was made by CVG, using the same materials and method as above, this time with *pteruges* as per the 'arming doublet'[3] referred to by Russell

Fig. 4: Cohors Quinta Gallorum's reconstruction of a thoracomachus, *made by Philip Clark (Photo A. Croom).*

Robinson (1975, 148) (fig. 3).

The use of the reconstructions at The Roman Military Equipment Conference at Archaeon in the Netherlands in 1994, in sometimes heavy rain, showed the necessity for a waterproof overgarment. The *thoracomachus* became burdensome and did not dry out fully overnight and kept the soldier and his clothing cold and clammy – lowering his morale and thus impairing his operational ability. The need for an overgarment is thus not questioned; however, the material, construction and location are. Anonymous (*DRB*, XV) states that 'it will be advisable to put over on the top a covering garment made of nicely-treated Libyan hide in the shape of the *thoracomachus* itself' (*DRB*, XV). Whilst leather was the best waterproof material available in the ancient world, the use of the term 'Libyan hide' is obscure. It may be that as the Libyans in Roman times were noted for wearing leather garments, and thus presumably tanning and waterproofing leathers (pers. comm. C. Daniels), the phrase 'Libyan hide' may have become a synonym for any waterproof leather garment. In terms of construction, the *DRB* (XV) states that it is the same shape as the *thoracomachus* with the presumption that it should be larger in order to facilitate wear. Methods of stitching can be surmised from other finds of Roman leather work, particularly the tent and the shield cover (see Mayes 1994, 184 and van Driel-Murray 1988, 62 respectively, for stitching methods), both of which are not only military but are also presumed waterproof. However, seams were probably on the outside of the garment, as on buff-coats of the seventeenth century (Blackmore 1990, 18–23), in order to reduce stress on the stitching, although, unlike buff-coats which were in the main lined, it would be expected that this leather garment was a single layer. As a multi-layered leather covering could prove to be too heavy then any increase in the protection it offered could be out-weighed by the increase in encumbrance. In terms of treatment, tallowed leather could be used, as was the case with the Ermine Street Guard's reconstruction tent (Mayes 1994, 184), or the leather could simply be oiled by the individual soldier, and an effect produced similar to the oilskin covers used for headgear in the Napoleonic wars (Oman 1913, 296).

The next question is location, and two choices present themselves. Either, the 'Libyan hide' was worn on top of the *thoracomachus* and under the armour, or it was worn over the armour. Wild proffers the suggestion that it was 'worn over the *thoracomachus* but presumably under the breastplate'. However, he adds the proviso 'if the soldiers could have fought

under such a weight of protective clothing' (1979, 107). This presumption that it is worn constantly ignores the use of the garment, which is to allow the soldier to operate under arms in wet weather. Wet weather, even in northern Europe, is not constant, and the need to wear this extra layer would not always be necessary. Indeed as oiled leather would trap perspiration, and thus over-heat the body, it would appear to be much more practicable if this tunic were carried and only worn when absolutely necessary. If worn under the armour the soldier is faced with a major task when he comes to don it, requiring the removal of helmet, sword, belt and armour, with the added possibility that help is required to re-dress himself. On top of this the soldier also requires armour large enough to accommodate an extra layer beneath it and still allow freedom of movement, whilst not being over-heavy. More sensibly a garment worn over the armour – which would only require the removal of helmet and sword and which the soldier would not need help to put on – seems the logical solution, especially as it would serve the dual purpose of protecting the armour from the elements and, subsequently, rust, as well as serving its primary function of preventing the *thoracomachus* from becoming waterlogged. A medieval parallel for this 'over armour' is the surcoat, which was introduced partly to protect the armour from the weather, as in *The Avowing of King Arthur*, which refers to surcoats as, 'Gay gowns of grene / to hold thayr armur clene / And were hitte fro the wete.' (Edge & Paddock 1994, 57)

Thus in conclusion, the *thoracomachus*, if it is to fulfil all of the roles assigned to it, is most likely to be a padded garment. Very similar to a *gambeson* in both materials (felt/wool/linen) and construction (quilting). Wild's statements (1979, 105–7), therefore, that the *thoracomachus* is a 'shirt of standard late-Roman pattern', made of 'soft wool felt', which protects 'the chest of the wearer against the weight and friction of his armour and against the cold' but which in wet weather becomes 'sodden', are not incorrect, but do not paint the whole picture. Padding is an integral part of the garment: it spreads the weight of the armour, provides a protective function and is the reason it is unusable when soaked; a single layered felt tunic would not do this. The overgarment, which could possibly be called a 'Libyan tunic', is more likely to be unpadded and worn over the armour, for ease of use (wear and encumbrance) and protection of the armour as well as the padding. Finally, Wild, paraphrasing Vegetius (I.20), tells us that 'soldiers in the late fourth century had become over sensitive about

wearing unnecessary gear' (Wild 1979, 107). However, he leaves his comment there. Continuing where Wild left off Vegetius (I.20) tells us that the soldiers successfully petitioned the Emperor to be allowed to hand in their 'cataphracts' (body armour), presumably leaving them with their lighter thoracomachus as 'body armour'. Coulston (1990, 148–51) does not, however, see this as the complete picture but sees Vegetius' words as rhetorical and any lack of armour by the Roman army as a result of either disaster (Adrianople) or policy (army growth in the Tetrarchic period), with supply eventually catching up with demand. This interpretation is undoubtedly correct, although it is possible in some cases, particularly in Britain after *c.*AD 400, that supply never caught up with demand.

Notes

1. Wild (1979, 105) sees the word *thoracomachus* as an invention of Anonymous, citing the facts that Greek scientists 'frequently coined new technical terms'. The constituent elements of the word are 'breastplate' or 'breast' and 'fight', producing a compound which Wild translates as 'chest-protector'. However, Anonymous also uses, in connection with the *thoracomachus* the term *'antiquitas'* which refers to the past and implies that the garment was already in existence. Bishop (1995, 1) states 'there are hints in the literary and subliterary evidence; when Septimius Severus entered Rome, he made the Praetorian Guard parade wearing nothing but a *subarmalis*, apparantly some sort of garment, the name perhaps giving us a clue to its function (*sub-* = under, *arma* = equipment). The *subarmalis* also turns up in one of the Vindolanda writing tablets, amongst a list that includes items of clothing' (*Tab. Vind.* II,184,iii,38: Bowman & Thomas 1994).
2. Several medieval copies of *De Rebus Bellicis* survive, each with stylised copies of the original illustrations that accompanied the (lost) original text. For a summary see Alexander (1979).
3. 'Arming Doublet. Quilted garment worn under the armour from the early fifteenth century, equipped with points [ties] to attach mail gussets and pieces of [plate] armour' (Edge and Paddock, 1988, 183). Russell Robinson's use of the term (1975, 149) is inaccurate, as arming doublets were only used with plate armour, and were not used as general underarmour garments as his use of the term implies.

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A HOARD OF ROMAN MILITARY EQUIPMENT FROM SOUTH SHIELDS

A.T. Croom

In May 1875 excavations in the east quadrant of the fort uncovered the fort wall and one wall, probably the north, of the angle-tower. Between the tower wall and the north-east wall of the fort the excavators uncovered some enameled fittings and 'numerous fragments of swords' (Hooppell 1878, 41), apparently deliberately hidden together. The early accounts of the excavations (Hooppell 1878, Bruce 1880) describe some of the objects, and they have been published as separate items (Allason-Jones and Miket 1984, nos 3.10, 3.401, 5.77–89), but have not previously been discussed fully as a group.

The ironwork

According to Bruce 'four or five swords' were found in the group, but it is now possible to distinguish only 3 blades with certainty. They are all fragmentary, and while some pieces of the ironwork are in a reasonable condition, others have defoliated badly, and it is now impossible to match up the pieces that originally belonged together. It is also unclear whether all the pieces excavated are retained in the museum collection. All three of the identified blades were buried in their wooden scabbards, with the traces of wood on the swords all having the grain running up the blades. Only one surviving copper alloy chape can now be associated with the scabbards (Bruce 1880, 168–9, Allason-Jones and Miket 1984, 3.401), a second one having been lost since the collection was catalogued in the 1950s. The earliest illustration of some of the objects from the hoard, consisting of three drawings each dated 8th October 1875 (soon after their excavation), shows two similar chapes, one attached to the tip of a sword (see below, blade 2; Blair 1957, 42). A description of museum exhibits in 1892 confirms that they both came from the hoard (Blair 1892, 105). There is no mention of any other form of scabbard fittings.

Blade 1 is the most important sword blade in the collection, being the well-known inlaid pattern-welded sword (fig 1, no 1, width: 67–56mm, breadth (max): 4mm; Allason-Jones and Miket 1984, 5.77). This is the widest of the blades, and tapers on the surviving fragment from 67 to

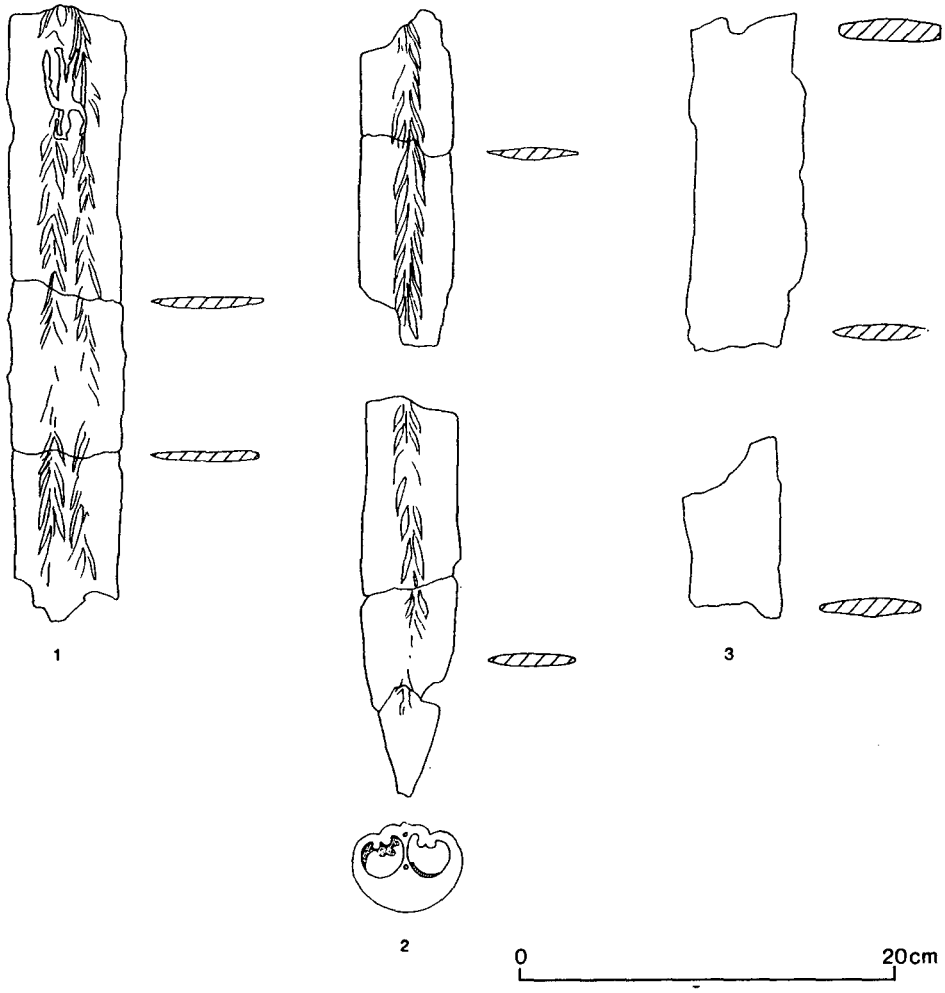


Fig 1: Sword blades and copper alloy chape; ironwork drawn from X-rays. 1:4

56mm, with inlaid figures of the god Mars and an eagle between two standards near the hilt. A sword found in Hromowka, Ukraine has a blade of equal width, with the same combination of inlaid figures executed in a very similar fashion, and must surely come from the same workshop (Ulbert 1974, taf 19, Bishop and Coulston 1993, fig 88, nos 1,3). As well as

the figures, the blade is decorated with a double line of herring-bone pattern-welding down its length. At present, it is displayed with a non-joining fragment of blade that could in fact come from either blade 1 or blade 2, and a 'hilt' with an iron cross bar (fig 2, no 4). However, the end of the inlaid blade has had the remains of the tang smoothed away in recent times, and it is now impossible to tell whether it ever joined, or why the two pieces were thought to belong together. The 'hilt' has an unusual cross-section for a tang and is probably not part of the sword.

Blade 2 (fig 1, no 2; width (max): 57mm, breadth (max): 6mm) is also pattern-welded, but has only a single line of herring-bone patterning. There are two separate lengths which do not join and they could just possibly represent separate blades. There are other unconnected fragments with single line herringbone, including a piece that could possibly be the tang, but this particular piece is in very poor condition, and has only one small area of surviving original surface. The surviving copper alloy chape came from the scabbard of this sword.

Blade 3 (fig 1, no 3; width: 54mm, breadth: 9mm) is apparently not pattern-welded. The largest fragment has thick wood remains on both sides, which could possibly mask any pattern-welding on the X-ray (as happened on parts of the X-ray of blade 1), but there is at least one fragment with little wood remains (fig 1, no 3, smaller fragment) that shows no pattern-welding. As with blade 2, these non-joining fragments could represent more than one blade.

There are various fragments of tangs or possible tangs, none of which is complete. The best example shows evidence of a wooden hilt, with wood grain impressions running vertically up the tang in the area of the grip, and horizontally in the area of the hilt guard. There is a thin iron ridge between the two pieces of wood (fig 2, no 5; surviving length: 135mm, width: 20–10mm, breadth: 9–5mm).

The X-rays of the collection make it clear that the hoard contained more than just swords. Amongst the surviving fragments, there is an incomplete spearhead-shaped finial without cutting edges (fig 2, no 6). This is a category of spearhead often described as 'standard tips' but which are more likely to be honorific or symbolic spearheads, and this example is probably either a military award or a badge of office. A reasonable number of these finials are known from military sites (including two others from South Shields, SF numbers I413, I430, unpublished), although current studies show that they generally have a more distinctive shape (Croom,

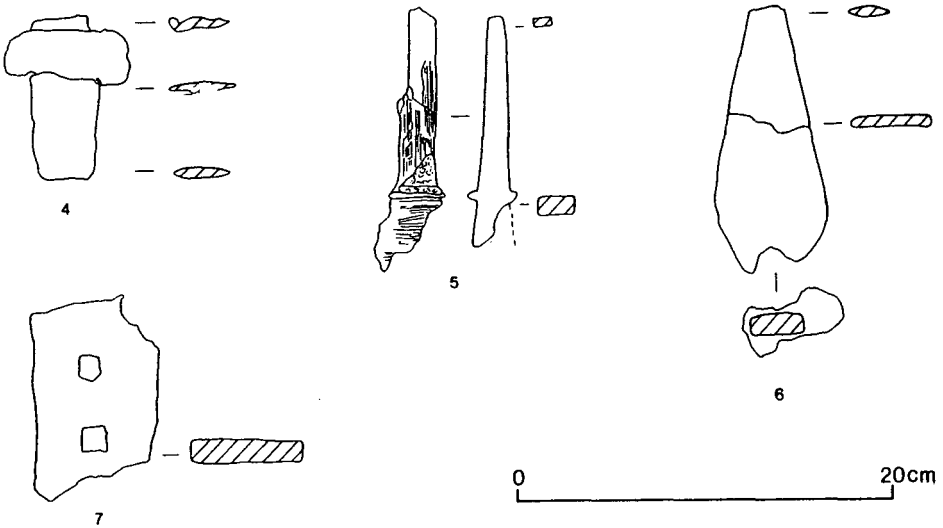
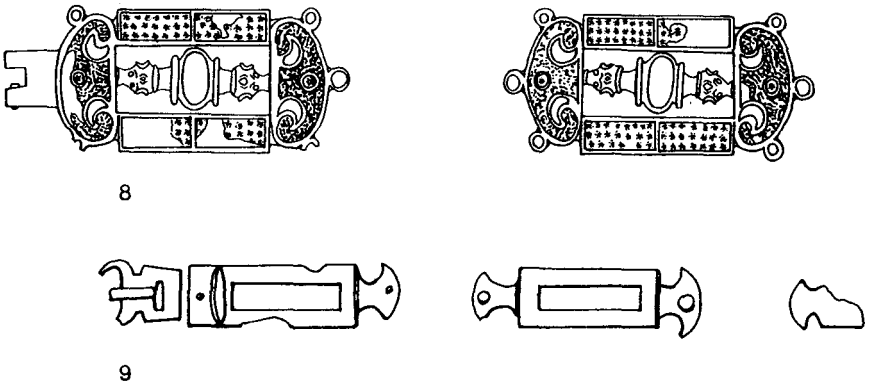


Fig.2: Ironwork, drawn from X-rays. 1:4

forthcoming). Also within the collection of ironwork there are also at least three fragments of heavy iron sheet, one of them 12mm thick, two with rectangular holes piercing them (fig 7, no 7).



The belt fittings

These consist of four matching openwork enameled plates, one with a hinge terminal and another with a square attachment loop, and possibly a fifth plate of a different design (Allason-Jones and Miket 1894, no 3.11). The 1875 illustration has a pencil outline drawing of this extra plate next to a pencil and watercolour drawing of the plate with the attachment loop, but this could have been for purely for comparative purposes.[1] Originally identified as harness fittings (Hooppell 1878, 41) and then more correctly as belt fittings (Bruce 1880, 169), they were described in some detail in the early publications. Both Hooppell and Bruce illustrate the same belt plate (with minor changes in detail), showing some form of patchy backing behind the central bar. No trace of this now survives, and it is not clear if it was some form of corrosion, leather remains from a belt, or a thin copper alloy sheet, as has been found on the back of two openwork (unenamelled) belt plates from South Shields (SF nos BR387, BR388, unpublished). Hooppell and Bruce describe an individual plate in detail, mentioning the other ones found with it, but there is no suggestion at all of any linking between the plates as exists today, and indeed Bruce describes them all as being 'buckles' (Bruce 1880, 169).

The plates are currently linked closely together with their long axis vertical, but these links are in fact modern, being made of a silver metal

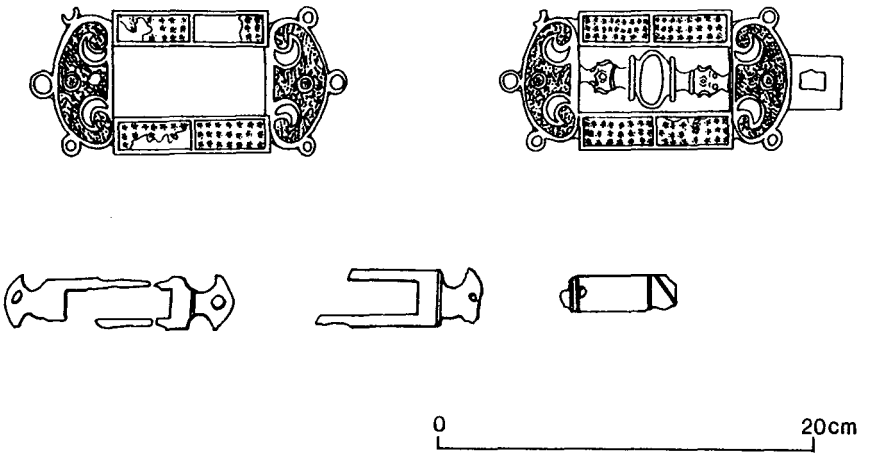


Fig 3: Copper alloy belt fittings. 1:4

with a green covering, and the plates would no doubt have been originally mounted on a belt with their long axes horizontal. This orientation makes more sense, since Roman belt-plates associated with buckles almost always have their long axis horizontal, and presumably matching belt-plates would have the same orientation. The hinge on one of the plates is, therefore, likely to be for the buckle loop, such as on the enamelled examples found at Osterburken (ORL nr 40, fig 18, 49) and at South Shields itself (SF no E26, unpublished). These plates could have been deposited as a complete belt set (fig 3, no 8).

Dating

Current dating for the individual objects in the hoard would suggest a date in the third century. Inlaid swords are generally dated to the third century (Bishop and Coulston 1993, 126), while pattern-welded sword blades are usually dated to the third and fourth centuries, with only simple 'proto pattern-welding' occurring in the late second century (ibid, 111, 190). The chape is a type used in the second century that continues into the third century (ibid, 130) and the enameled belt plates are of third century form (ibid, 153).

The exact stratigraphy of the find is now lost. The location is described in unusual detail by Hooppell (1878, 41, 43, pl VIII), which puts it within the area of the rampart backing of the fort wall. If the group was deposited before or during the building of the rampart, it would belong to the construction period of the extended supply base. The start of this period is currently dated to AD 205–7 (Bidwell and Speak 1994, 9), which would be an early date for examples of such good quality pattern-welding. It is difficult, however, to suggest a later occasion for their deposition. Although buildings were later constructed within the area of the rampart backing, none is known to extend into the position of the hoard. The size of the hoard, consisting as it did of three swords in their scabbards, an ornate belt and other assorted objects, means that they must have been effectively hidden from sight to have avoided recovery.

There is, in fact, another complete belt set that is definitely in the construction layers of the same rampart backing, further to the north (Allason-Jones 1983, 114, no 97). It consists of five belt plates and a simple strap end (fig 3, no 9). A photograph of the set before conservation shows that the buckle loop (complete when excavated) is associated with the plate with a ridge towards one end. Such ridges seem to be a feature of

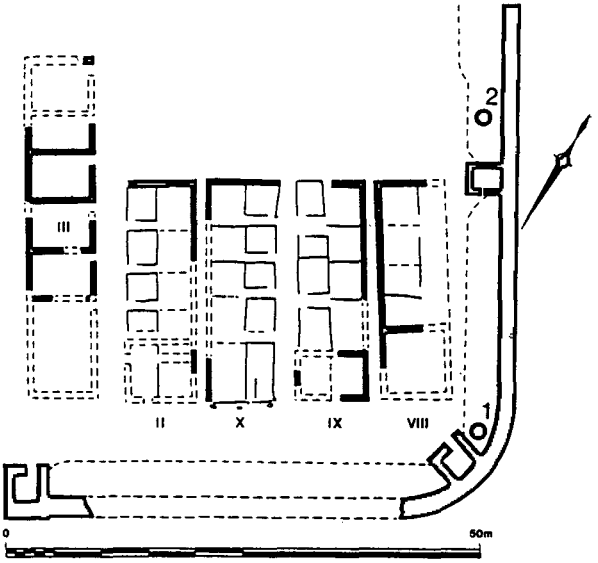


Fig 4: East corner of fort, showing location of the finds. 1 = The hoard; 2 = the belt.

buckle plates (eg Osterburken, ORL nr 40, fig 18, 28). It is clear that these plates were also mounted with their long axis horizontal (and not, as currently displayed, with them vertical), as with the enamelled set above.

Ritual deposition of Roman military equipment is now generally well accepted (Bishop & Coulston 1993, 37–8). Probable votive deposits containing swords in particular include, on land, pits at Newstead (Clarke & Jones 1994, 119) and a shaft at Jordan Hill, Dorset (Manning 1972, 235), and, in water, river deposits at fords on the Saône (Bonnamour & Dumont 1994, fig 2). Although ritual offerings are most commonly associated with water or pit/shaft deposits, it is possible that foundation deposits within military installations were also made. Hoards of military equipment from beneath ramparts generally are not unknown, a particularly famous example being the shields from Dura Europos in Syria (Rostovtzeff *et al* 1939, 326-9). Although not generally interpreted as such, it may be that these shields were deposited for ritual reasons,[2] a consideration which may perhaps also hold true in the case of the South Shields finds.

Notes

1. A pencil sketch made in 1875/6 by W. Willis, a visitor to the site, shows both designs and mentions '1 of this pattern, 3 of the other' (Blair 1957, 171), while Hooppell only mentions four plates of a similar design (1878, 12). Bruce (1880, 169) mentions three of one, and one of a differing design, later corrected to four of one design with no mention of the odd one out (1885, 261-2). Blair's 1892 description of the hoard on display mentions four plates of two designs (1892, 105). It is possible that only four plates were found in the hoard, but a fifth plate of differing design also found at the fort confused people into thinking it was one of the four.
2. I am grateful to Bill Griffiths for this suggestion.

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NOTE

A reinstated section of the Branch Wall at Wallsend

It has long been known that Hadrian's Wall ran from the south-east corner of Wallsend fort to terminate, in all probability, a little below the low water mark of the River Tyne. This section of Hadrian's Wall, known as the 'Branch Wall', was first recorded in 1726 (Gordon 1726, 70; cf NCH 13, 490); it finally disappeared from general view around the beginning of the nineteenth century.[1] Since that time sections of it have been revealed on three occasions. The first was in 1884 when excavations were carried out on the fort by Mr A.S. Stevenson on behalf of the Society of Antiquaries of Newcastle upon Tyne; this work included excavation of the junction of the fort and the branch wall (PSAN[2] I 1884–5, 124). W.S. Corder recorded that Stevenson located the 'rounded angle of the camp and a few stones of the actual wall's end which ran thence to the river' (PSAN[3] V 1911–12, 213). In 1903 Corder himself excavated a section of the Branch Wall, some 61m from the fort, revealed during an extension to the Swan Hunter shipyard in

Plate 1: The Section of Branch Wall in Wallsend Park

preparation for the construction of the Mauretania (PSAN[3] I 1903–4, 42–7). Further work at the yard in 1961 led to the discovery of another section of the Wall *c* 50m from the fort (Snape & Bidwell 1994, 22).

Of the three excavations the best recorded, and the one referred to in all discussions of the Branch Wall, is Corder's in 1903. A section of wall standing six courses high on its southern side, and four on the north was revealed. At the time of its discovery it was hoped that the section of wall could be left on view in the shipyard; however, this proved impractical and instead it was removed to Wallsend Park, now known as Richardson Dees Park (see Fig. 1), in September of that year[2]. The stones were not set up as they had been found, but rather collected together in a reconstruction of the approximate shape of the original. As can be seen in the photograph a stone plaque was set into the remains; it read:

PORTION OF THE EASTERN END
OF THE
ROMAN WALL
(THE WALLS END)
FOUND BETWEEN THE CAMP OF
SEGEDUNUM
AND THE RIVER TYNE APRIL 1903
–•–
PRESENTED BY
ALD G.B.HUNTER J.P.
MAYOR OF WALLSEND
AND ERECTED HERE SEP 1903[3]

Subsequently the remains were joined by those of the east gate of the fort, found in 1912, again by Corder (PSAN[3] V 1911–12, 209–14).

When the decision was taken to lay out the line of the perimeter of Wallsend fort in the mid 1980s, following the extensive excavations conducted by Charles Daniels, the remains of the east gate were returned to their rightful position. The section of the Branch Wall was left in the Park until spring 1991 when it was carefully dismantled and transported to the Wallsend Heritage Centre. In the winter of the same year the consolidation team of Tyne and Wear Museums Department of Archaeology reinstated the section of the Wall on the line of the Branch Wall, 5m from the fort, and only 56m from its original location, now taken up by offices in the shipyard.

The site chosen lay on the north side of the abandoned railway line. Corder's original note on the excavation was used to provide the angle of slope and number of surviving courses from the original (see Fig. 2). In order to ensure a secure foundation for the reconstruction a concrete base

Plate 2: The north face of the section as revealed in 1903

was laid, sloping at the same angle as the original ground surface below the wall. Corder stated that the wall was laid on footings of slabs 'four inches thick, two feet from front to back, and twelve inches long on the face' (PSAN[3] I 1903–4, 44). None of these was preserved in the section removed to the park, and as a result new ones were manufactured for the reconstruction, being cut from tumbled blocks from the old railway wall at the site.

Corder gave for the facing stones an average dimension of 10 inches high, 12 wide, and with a depth of 16–18 inches. However, very few of the stones in the section of Wall were found to be as large as this: nor were there enough stones to complete the reconstruction. As a result unstratified facing stones recovered from the recent excavations on the line of Hadrian's Wall immediately to the west of the fort were used to make up the numbers. The missing stones are almost certainly the result of stones being mislaid during the initial dismantling of the section, several stones being removed as 'curiosities' (Richardson 1923, 24).

The courses of the Branch Wall were laid horizontally, instead of following

Plate 3: The north face of the reconstructed section

the contours of the land. As a result, at each point where a course meets the ground slope, the final stones were cut to a tail to lie flush with the line of footings which do follow the slope. Almost none of these tailed stones survived in the section, and replacements had to be cut for the reinstatement.

The reinstated section (fig. 3) is thus only a representation of the original stretch of Wall as Corder found it in 1903. However it does provide visitors to the site with a clearer idea of the line the Branch Wall took from the fort to the river, and the form of construction of this unique part of the Frontier. Its return also ends the confusion caused to some by having a piece of the Roman Wall sited 2km north of its actual line.

Acknowledgements

I am grateful to the Wallsend Local History Society, and especially its chairman Vin Wallace, for permission to print plate 1 showing the Wall in the park; and also to Paul Bidwell who commented on an earlier draft of this note.

W.B. Griffiths

Notes

1. Bruce 1851, 113; and see Skinner (1978, 26) who records the dismantling of the foundations of the wall in the river in 1800 'on account of their being obstructive to vessels coming to the colliery'.
2. Swan Hunters subsequently displayed some stones from the wall within the yard (Davies 1974, 8).
3. By 1991 this plaque was so weathered as to be unreadable; however, it has now been restored at Wallsend Heritage Centre, along with other Victorian and turn of the century stones from Wallsend fort, by Mr John Jackson. It is hoped that these stones can, in the fullness of time, be incorporated into new displays at the site.

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EXCAVATIONS UNDERTAKEN BY TYNE AND WEAR MUSEUMS ARCHAEOLOGY DEPARTMENT IN 1994–5

Arbeia Roman Fort, South Shields

In 1995 excavations continued in the eastern quadrant of the extended fort, sponsored by Earthwatch, and with the support of South Tyneside MBC, Training for Work and the Arbeia Society. For general plans and previous work see P. Bidwell and S. Speak, *Excavations at South Shields Roman Fort Volume 1* (Society of Antiquaries of Newcastle upon Tyne Monograph Series 4) (1994), 11–47, and *Arbeia Journal* 3 (1994), 49–50.

1. In the area of 300 square metres containing a barrack building (III) and neighbouring street of Period 6 (*c*222/35–*c*300) the earliest arrangements of the barrack and street were recorded and excavated. In the street a well-preserved drain running along the front of the barrack had been filled in when the street surface was re-made, with a new drain 1m to the north-west, at some time in the course of the third century. The rebuild of the street coincided with the replacement of the door thresholds leading into the barrack. In the earlier drain was recovered an assemblage of near-complete pottery vessels which had perhaps been cleared out of the barrack when these alterations were made. Beneath the street a further north-south running wall belonging to a presumed series of barracks of Period 5 (*c*205–8 to *c*222/35) was observed.

2. Work began in a new research area of 300 square metres (first revealed in 1983, when, however, the Roman levels were not disturbed) immediately northwest of the area described above. Although it is known that this new area will contain the neighbouring Period 6 barrack (II) to barrack III described above, work in 1995 aimed at the definition and recording of the latest Roman and early post-Roman archaeological remains uncovered. In particular the objective was to establish the identity and function of the late-Roman buildings in the research area and to recover any evidence which might survive attesting their continued use after the end of the fourth century. The latest Roman buildings found consisted of the southeast ends of a row of barracks built in the late-third or early fourth century, when the fort was reconstructed for a new unit (Period 7). These

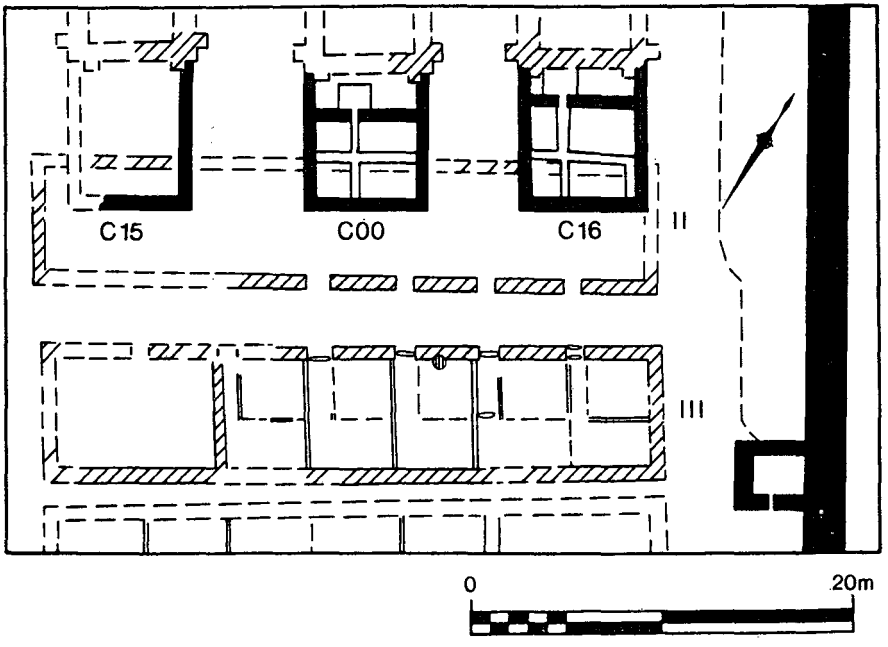

Fig. 1: Fourth century officer's houses (black) overlying buildings of third century date (shaded).

barracks were converted from former granaries of the third century supply base (Period 6), the southeastern ends being newly constructed extensions serving as officers' houses.

1995 saw the excavation of three of these officer's houses (fig. 1). Much of the main exterior walling had been robbed out in post-Roman times. Where fragments of walling survived, they were of crudely dressed but substantial masonry bonded in tenacious white mortar. Houses C00 and C16 contained the remains of high quality mortar floors (in contrast to the beaten earth and flagstones usual in the ordinary soldiers' barrack rooms in all periods) and a cruciform system of underfloor heating (hypocaust) channels. In each case part of the adjacent service room was investigated and the furnace pits which had fed the hypocausts, containing ash and burnt material, were revealed and recorded.

In the most northeasterly barrack (C16) the hypocaust channels were filled in the mid-fourth century. Their demolition fill contained many

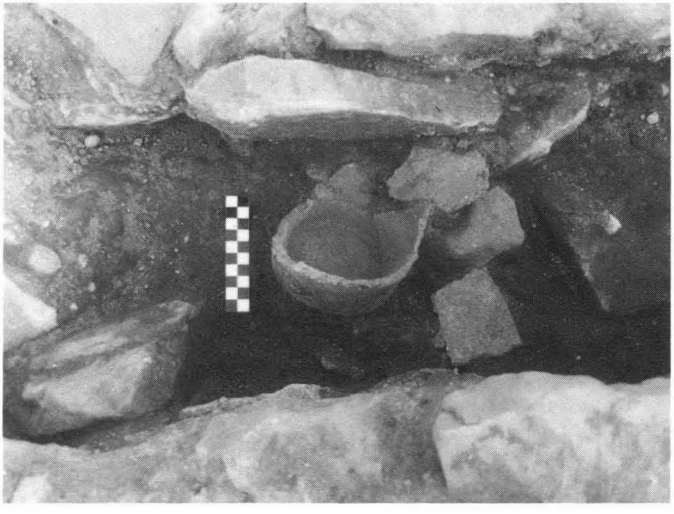

Fig.2: Pottery from the fill of hypocaust channels in barrack C16 (Photo: Tyne & Wear Museums).

broken but near-complete pottery vessels (fig. 2). Similarly, the furnace in the adjacent room was paved over, and beneath this floor was discovered a hoard of 30 coins, terminating in the mid-fourth century. After this date the officer's house no longer functioned as a high quality residence, for a hearth was inserted, connected with some unknown industrial activity. The floor become covered with a compact layer of ash. There was no definite evidence that occupation had continued beyond the early fifth century. An infant burial was found in the service room adjoining the officer's quarters, but this could not be dated more closely than to the fourth century.

In the central barrack (C00), an industrial hearth was also inserted, probably in the second half of the fourth century. In this case, however, the underfloor heating channels were perhaps not filled until after the end of the Roman period; their fills contained animal bone, many spindlewhorls, and one potsherd of possibly native manufacture, but no Roman pottery. The careful packing of the channels implies continued use of the room above, and this occupation may therefore have taken place in the early post-Roman period.

In the third officer's house to be investigated in 1995 (C15), no floor levels survived. No underfloor heating system was found. Only a stone

lined trench, of uncertain purpose, but possibly intended as a latrine, or associated with some industrial function, was discovered. Whatever its purpose, this feature seems to have been packed with clay before it was ever used.

Between the barracks, late-fourth century (Period 8) street surfaces consisting of re-used facing stones from demolished buildings were recorded and removed, to reveal the original, much finer cobbled street surfaces laid at the beginning of the fourth century (Period 7).
(Summary by N. Hodgson)

Brigham and Cowan Yard, South Shields

Five separate excavation trenches were cut in the area of the former Brigham and Cowan shipyard at South Shields on behalf of the Tyne and Wear Development Corporation during spring and summer 1995. Between them the trenches have provided an indication of the original line of the riverbank in the area, and some idea of its development. Most of the area of the yard had been reclaimed from the river, initially by the dumping of ballast, and subsequently by the dumping of industrial waste, possibly from salt panning which was a major industry in the area from the late fifteenth to the early nineteenth century. It appears that most of the waste was dumped as part of a major phase of reclamation. Several features were located during the excavations including quay walls of various periods, and the demolished remains of a sixteenth century building, including a near-complete H-section of timber from either an internal partition or the roof; this represents one of the earliest structures excavated from post-Roman South Shields. None of the occupation could be traced back into the medieval period, and all the remains found can be associated with the initial growth of South Shields.
(Summary by W.B. Griffiths)

Morton Walk, South Shields

An excavation was undertaken on the site of a former children's playground during August 1995. Previous excavation at the site had revealed a Roman cemetery of several phases containing both inhumations and cremations (Fig. 3 & *Arbeia Journal* **2**, 1993, 55–9; **3**, 1994, 50; Snape 1994, 43–66).

The 1995 excavation demonstrated the complexity of Snape's phase 1 ('The Unenclosed Cemetery'), showing that it consisted of several sub-

phases with areas being re-used with different layouts and even different funerary practices. An inhumation (Grave 6) was discovered on a parallel north-south orientation to graves 1, 3 and 4 from the earlier excavations. As with the other graves, no human bones survived due to the acidity of the soil. Further evidence of the possible use of timber coffins in the inhumation burials was indicated by the discovery of decayed timber planking in grave 6.

Subsequently two north-east/south-west running drainage gullies were cut. Overlying these were two successive sub-phases of cremation features. The first consisted of a cut feature and a spread of cremation material, both of which contained small fragments of burnt human bone. The second consisted of a cremation burial (Cremation 4) placed inside a Black Burnished Ware 2 cooking pot. Placed within the burial urn was a grey-ware beaker which probably represented a votive offering; it had been broken prior to burial, possibly as part of the burial-rite. Adjacent to the east side of the urn was an ovoid stakehole, perhaps from a grave marker associated with the cremation. Terracing associated with the construction of Victorian housing had removed any layers of features that may have belonged to phases 2 or 3 of the cemetery, with the exception of a continuation of the north-south aligned Phase 2 enclosure gully (221).

The discovery of two sub-phases of cremation activity which could be shown to post-date an inhumation (grave 6), was particularly significant. In general terms cremation was an earlier funerary practice in the Roman period, gradually being replaced by inhumation from the late second century onwards. Both rites were practiced in the third century with cremation tending to disappear during the final decades. Phase 1 at Morton Walk site provides an interesting illustration of this transitional period, containing funerary practices of both kinds. The fact that some of the cremations were later in date than some of the inhumations makes the site of especial interest.

Snape, M.E. 1994 An excavation in the Roman Cemetery at South Shields, *Arch. Aeliana* (5) **22**, 43–66.

(Summary by J. McKelvey)

Berwick Upon Tweed

A watching brief was conducted during excavation of test pits for a new sewer system immediately to the south of the town wall in the area of the New Quay. The work was funded by North Tyneside Council on behalf of

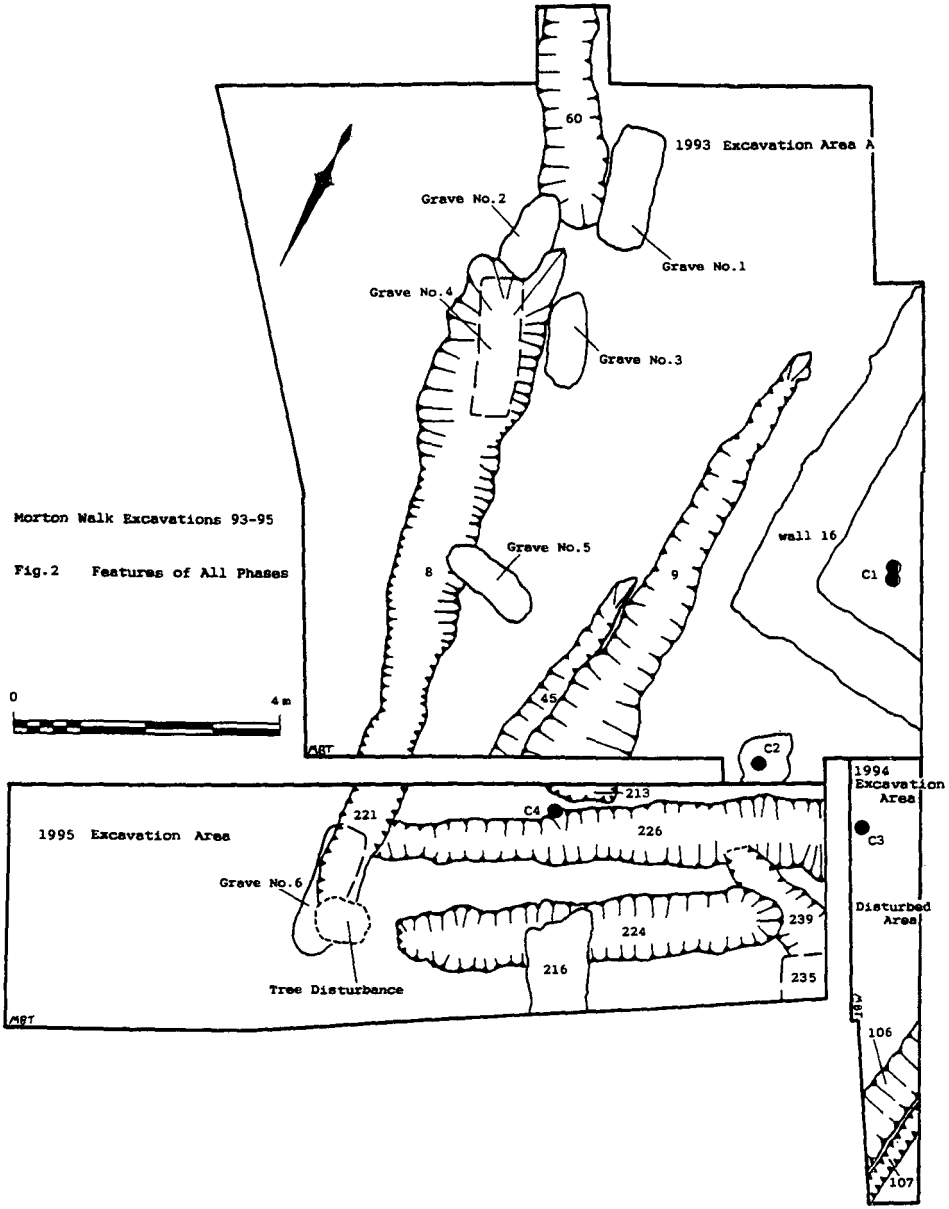

Fig. 3: Plan of the Excavations at Morton Walk, South Shields.

Northumbrian Water. The pits showed that considerable elements of the town wall are preserved beneath the current ground level in this area. It appears that much of the area between the wall and the river Tweed had been used for ballast and waste dumping during the post-medieval period. *(Summary by J. McKelvey)*

Corbridge

In September 1995 an evaluation was carried out on two structures beside the River Tyne at Corbridge. These were the southern abutment of the Roman bridge and a structure on the northern side identified as an Anglo-Saxon watermill. A brief appraisal was also made of the remains of the bridge piers in the river. The work, which was jointly funded by Northumberland County Council and English Heritage, was undertaken in order to assess the precise nature and the importance of the archaeological remains and the extent of damage being caused to them by erosion which has been observed over the past 20–25 years.

Roman bridge: Construction methods in the southern abutment had close parallels with the second-century bridge at Chesters. A road ramp, approaching from the south-east and making a right-angle with the abutment, was revetted with dressed blocks, 1m by 0.5m, surviving four courses high (fig. 4). Fallen masonry included a probable support for a statue base (fig. 5) and larger moulded blocks with small balustrade-slots.

Anglo-Saxon Watermill: The evaluation identified the mill as a horizontal-wheel type. The remains occupy an area 18m by 7m, in shallow water at the eastern end of a shelf of boulders and cobbles, probably representing the earlier position of the northern bank, flooded when the river moved northwards. The Roman site of Corbridge lies on the scarp immediately to the north; the remains of the Roman bridge meet the northern bank c 90m upstream from the watermill.

The western end of the remains comprises a floor of large dressed stones derived from the Roman bridge, bounded on the east and west sides by timbers 5.5–7m in length. This was interpreteted as the floor of the basement wheel-house, the slots in the timbers being intended to carry waterchute emplacements and uprights for a timber superstructure (fig. 6). Other areas of paving to the east and a large concentration of blocks derived from the Roman bridge suggested that the structure had been a complex one, possibly of several phases. Limited excavation revealed a line of stakes running under the present river bank, possibly the timber side of

Fig.4: Corbridge Roman Bridge – South abutment (Photo: Tyne & Wear Museums).

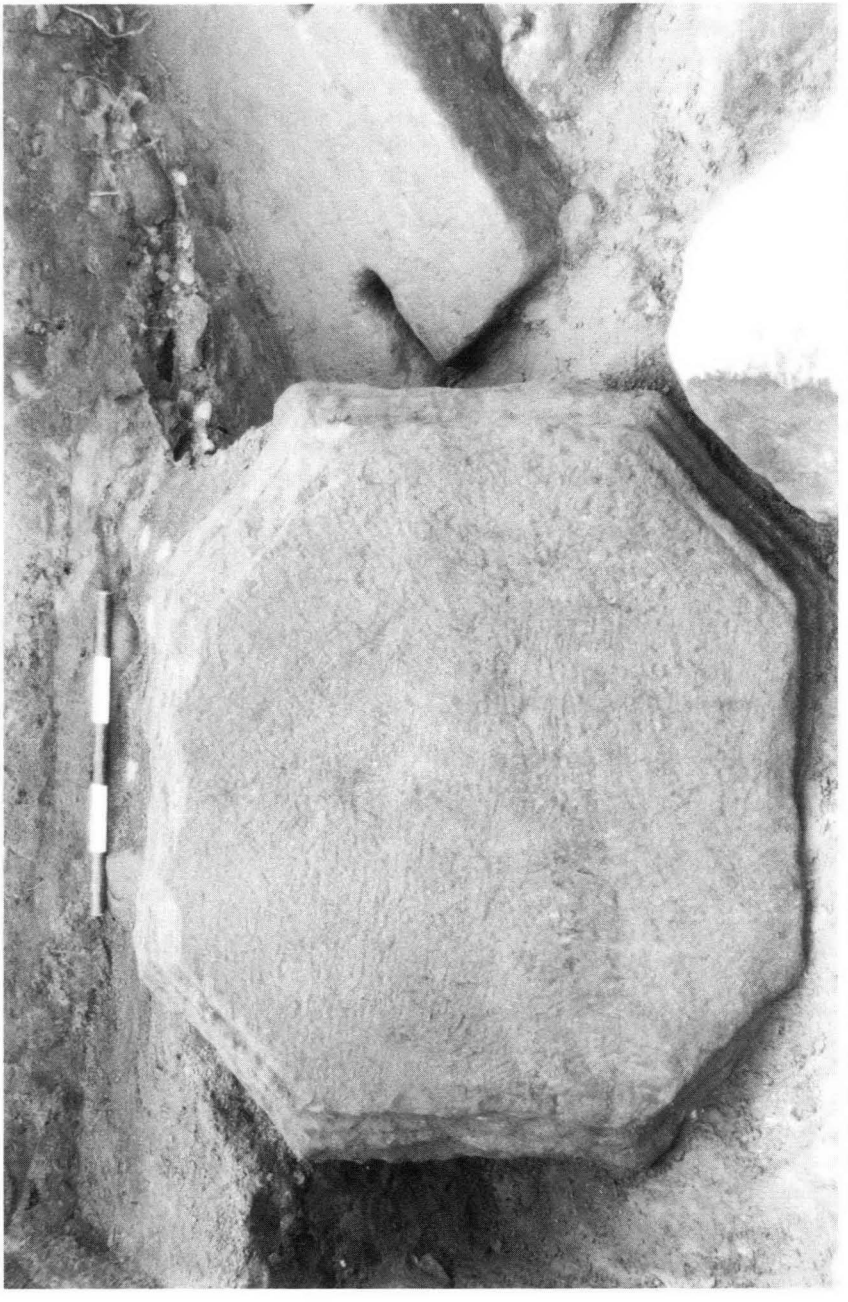

Fig.5: Corbridge Roman Bridge – Possible support for a statue base (Photo: Tyne & Wear Museums).

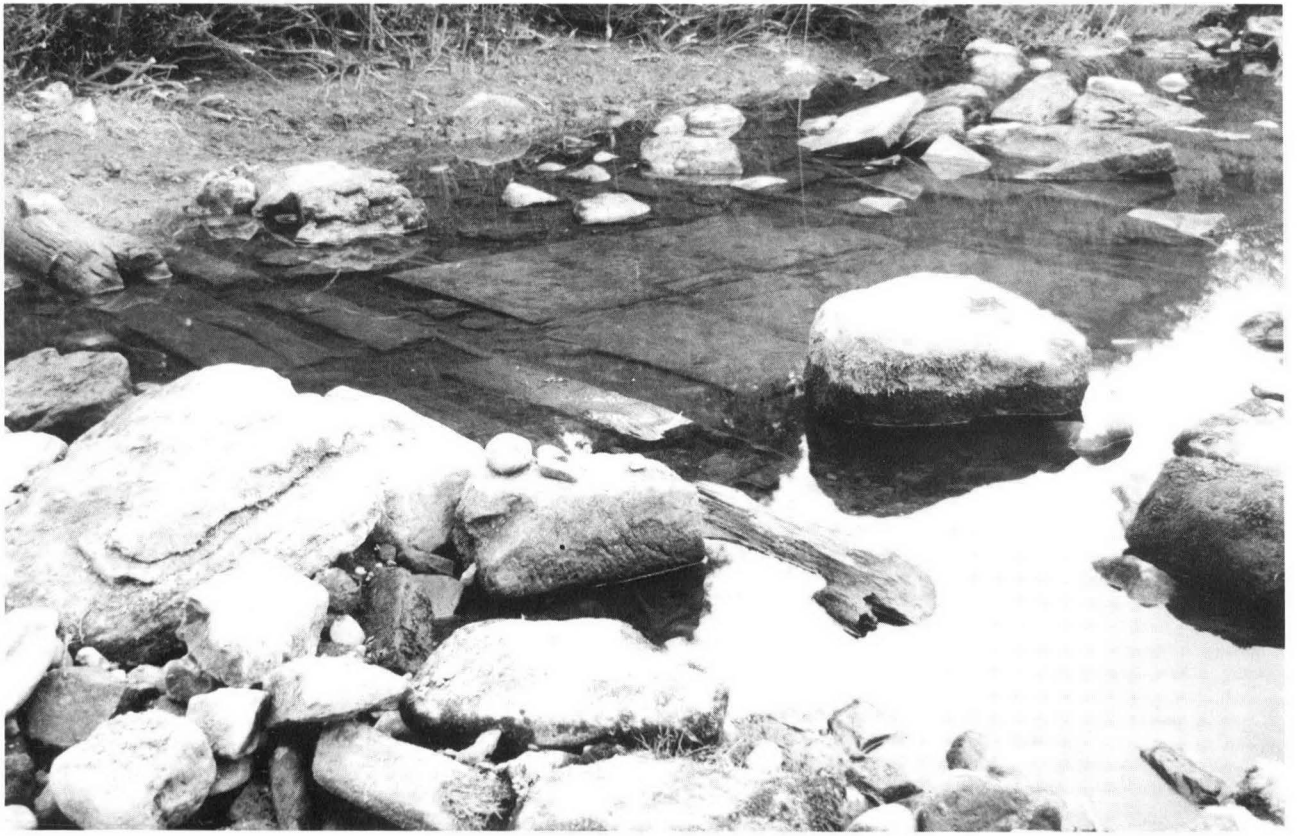

Fig.6: Corbridge Anglo-Saxon watermill – Reused remains from the Roman bridge (Photo: Tyne & Wear Museums).

a millpool. A timber waterchute, in excess of 4.6m in length, was discovered, no longer *in situ*, but lying on the edge of the shelf of boulders, one end tilted into deep water. It was not possible to recover it, but a field drawing suggests it to be a close parallel of a chute from a horizontal-wheel mill at Knocknagranshy in Ireland (Rahtz P and Meeson R 1992 *An Anglo-Saxon watermill at Tamworth*, CBA rep **83**, London, Figs 101, 102).
(Summary by M.E. Snape)

Hylton Castle

Subsequent to the work reported in *Arbeia Journal* **3** (1994, 54–5) a geophysical and earthwork survey, funded by Sunderland City Challenge, recorded earthworks provisionally interpreted as features belonging to a formal garden, probably contemporary with a possibly Elizabethan/ Jacobean building. These features included a sunken hollow, perhaps a water channel, and at least one rectangular pond. The terrace on which Hylton Castle was constructed was seen to be later than a well-preserved suite of reversed-S ridge and furrow. Additional documentary investigation revealed a plan of 1737 showing a stylistic knot-garden associated with Hylton Chapel and suggestions that a carved fountain existed somewhere within the Castle grounds.

Excavation undertaken to the west of the Castle in advance of landscaping revealed a large area of cobbles, perhaps representing a wagon stance or carriage park. A trench extending northwards from the north wing revealed the foundations and interior partitions of the north wing, added to the Castle by John Hylton at some time prior to 1712. The project continues and full publication is intended for *Archaeologia Aeliana* upon completion.
(Summary by S.C. Speak)

Bridge Hotel, Newcastle

An archaeological evaluation excavation was undertaken for and funded by Sir John Fitzgerald Ltd. within the cellar of the Bridge Hotel, Castle Garth, to the south of Newcastle Keep. Three levels of metalled surface were encountered, overlain by a deposit containing Roman and medieval pottery. The surfaces are thought to represent part of the intervallum road of the Roman fort of Pons Aelius. A second trench within the beer garden revealed a medieval wall foundation.
(Summary by R.C. Oram)

Riding Mill, Northumberland

See Excavation report this volume.

East Street, Tynemouth

Excavation took place within the car park at the east end of East Street Tynemouth during the summer of 1995 in advance of development work by Northern Rock Homes who funded the project. In all five evaluation trenches were cut; for the most part overlying stratigraphy had been removed by nineteenth and twentieth century activity, but several natural cut features were observed, which led to the opening of a larger area.

In all 104 post holes were recorded, and indicate the presence of timber structures dated by associated finds to the 13th–14th centuries. A stone lined garderobe, rectangular in plan and constructed from roughly dressed sandstone blocks bonded with clay was located to the north-west of the post holes. Structural evidence suggested it had once contained a timber frame for the support of a box platform for a toilet seat.

The excavations indicate that medieval Tynemouth expanded rapidly in the 13th and 14th centuries and then went into a state of decline with shrinkage of the village until the 19th century. It is evident from the orientation of the medieval post hole structures that the village, as originally planned, took on a row form orientated east-west.

(Summary by C.R. Hart)

REVIEW ARTICLE

A view of Roman frontiers for the 1990s

***Frontiers of the Roman Empire: a social and economic study.* By C.R. Whittaker, Johns Hopkins University Press, Baltimore 1994. Pp xvi & 341, illus. 51, ISBN 0 8018 4677 3.**

This work will change the way that we all think about Roman frontiers. Some of its revisions – or straightforward debunkings – of old ideas are already among the conversational currency of frontiers specialists, and in any case a version of the book was first published in French in 1989. In its denial of a defensive imperial attitude, and affirmation that frontiers were not defensible lines, any reader of Benjamin Isaac's influential *Limits of Empire* (1990) will find himself on familiar ground. But as the first synthesis in English of a series of complex and fundamentally important views of the imperial frontiers, the 1994 edition of this book provides a new landmark in historical and archaeological interpretation. This review outlines the contents of the work and comments on aspects especially relevant to Britain and northwest Europe.

The book opens with a brief introductory survey of frontiers historiography, intended to show how recent in origin the modern view of frontiers as sharp ethnic, national or moral boundaries really is. Chapter one follows with a consideration of the Roman cosmological view of the empire. The Romans were obsessed with marked boundaries: the definition of ordered space by surveyed and demarcated lines. Does this mean that they saw marked frontiers, when they came into being, as marking the boundary of the Roman empire? No, says W.: Rome always asserted her might beyond the frontiers, and considered that the peoples beyond lay within her power. Given the likely significance of artificial frontiers to the boundary-minded Romans, is this not a contradiction? Whittaker cuts this Gordian knot by introducing the useful concept of a dividing line between internal and external control. All was considered the Roman *imperium*, but an ordered inner space was separated from an area of external control, just as the boundary stones of the city of Rome itself defined its area of internal order, but did not limit its scope for military action. This is fine as a statement of theory, and may well be what Romans believed. But was the perception always true? Some readers may wonder how much of what the Romans liked to believe, and what their ideology proclaimed, corresponded to reality.

Chapter two opens with a consideration of the Roman ideology of conquest and frontiers. A holistic view of the empire bounded by great geographical features, expressed by Tacitus, Josephus and others, is seen as most likely having its origin in the map of Agrippa, displayed by Augustus with the intention of publicizing his own conquests, but not implying that rivers and mountain ranges were natural limits of empire. Augustus' famous advice that the empire should be kept within its boundaries calls for some ingenious arguing from Whittaker. But he points out that subsequent emperors up to Trajan took no notice of this advice, and concludes that the *consilium* means nothing more than that in the light of the disasters of AD 6–9 Augustus was concerned that the provinces be consolidated and fully Romanized before further expansion should take place. But surely an alternative emphasis could be placed on Augustus' deathbed words: that this advice coincided with the dawning realization that the whole of Germany would never be conquered. After Augustus no emperor seriously attempted the conquest of the whole of Germany. If Roman ideology refused to accept the fact of a German frontier, does this tell us most about Roman frontiers or about Roman literature? A further difficulty for W.'s belief in the absence of an ancient concept of hermetic frontiers is posed by writers such as Aelius Aristides and Appian, who describe the empire as bounded by defences excluding another world of uncivilized barbarians. Whittaker explains this partly in terms of their Greek origins and ideal view of the sacred space of a Greek city, partly in terms of the quiescent frontier policy of the emperor of the time, Pius (ignoring the fact that the latter advanced frontiers in Britain and Germany). But the same ideology is surely apparent in the frontier works themselves, with arrayed hierarchies of forts, fortlets and towers and walls forming ideally constituted wholes (at least in the western empire); these were the products of the Roman army, not Greek intellectuals, although surely the ideas were linked.

What of the frontiers themselves? Now physically apparent in the form of roads, forts, walls, ditches and so on, are they not a reality which conflicts with the ideology of endless Roman rule? Many archaeologists who have studied the original appearance of Hadrian's Wall or the German *limes* would think so, but these things evidently look less formidable from a distance. So it was at the time, and hence the peripherality of concern about these frontier systems in Roman writing. In the 1990s the historical perspective, very much generated at the centre of empire, holds sway. The

bulk of chapter 2 consists of a survey aimed at disproving this contradiction and demonstrating that frontiers East and West were organized over the centuries with the same objective: a visible limit to organized space and a claim to imperial control beyond this limit. For the East, the resulting picture is convincing: this was not a 'frontier system'. Rather, 'from the Pontic shore to the Red Sea...a line of communication and supply, the base from which the Romans extended their control without any sense of boundaries'. With this, W. concludes that frontiers in the East and the West were not essentially different. If this was the case, why did expansion in the west grind to a halt so soon (as W. concedes)? More consideration could have been given to the *proportionally* much greater concentration of the army garrisoned in the northwestern provinces, and especially Britain, than that in Africa or that strung along the huge eastern frontier. Frontier affairs in Britain and Germany in the second century are shadowy and cryptically reported. Britain and the Germanies were great military provinces, but unlike Syria, with its proximity to the Parthian state, there is no clear reason for this in W.'s account. W. makes much of monuments such as Hadrian's Wall or the German *limes* being almost immediately superseded – or augmented – implying that walls did not constitute an acceptance of a limit to empire. But the Antonine Wall was a costly failure, Hadrian's Wall probably being repaired and reoccupied only 15 years after the ill-fated advance, while apart from minor adjustments the German land frontier never shifted from the line established *c*90 after Domitian's war. The Whittaker/Isaac view of frontier lines as confidently held administrative devices will convince many, and obviously has an element of truth, but consideration of a modern parallel may suggest other possibilities. Israel until recently militarily occupied the Gaza Strip and West Bank, and clearly conducted a tough, outward looking policy in terms of control of their populations. But when barriers were built to seal off these areas, what was uppermost in the minds of her army: administrative regulation, and economic symbiosis between frontier peoples? Or simply the detection and exclusion of hostile infiltrators?

Chapter 3 asks the question: why did the frontiers stop where they did? W. dismisses Luttwak's Grand Strategy (Luttwak 1976) and the notion that the frontiers indicate what Roman strategists considered to be the most rational, scientific line of defence. Far-reaching, interventionist frontier policies were the norm despite the image in Aelius Aristides of an empire hedged around with barriers. One might point out here that W.'s evidence

for *propagatio imperii* is largely literary and ideological. Most of the archaeological evidence he cites refers to interference beyond pretty stable frontiers, rather than a wholesale permanent advance beyond established frontiers – or to put it another way, after the Flavians, and especially in the West, the Roman state consistently failed to expand as ideology would demand. Even in the ideological sphere, the literary evidence has been convincingly interpreted as suggesting that many of the upper classes paid lip service to the idea of world conquest, preferring a retention of the empire within sensible limits, and punitive expeditions beyond conducted only when necessary for the security of the empire (Campbell 1984, 394–401). Men were capable of distinguishing between their ideals and the reality of the situation.

The rest of the chapter comprises two separate but equally distinguished and important arguments, each of foremost importance to Roman frontier studies. The first is an argument against the notion of natural frontiers. The very idea of a frontier as a line on a map is modern. Ancient *limites* were never linear but always zones. In support of this he cites Appian: 'The Romans... rule some of the Keltoi beyond the Rhine.' This is an unfortunate choice of example, as in the context of the passage Appian is referring to the area beyond the Rhine bounded by the linear land frontier of Upper Germany, and this is tantamount to saying that Roman rule ran up to the German palisade. Where is the notion of external control here?

For W. the essential difference is between administrative frontier lines, which separate and differentiate, and frontier lands or zones, which unite and integrate. The Rhine, Danube and Euphrates did not form a boundary between cultures. On Hadrian's Wall W. ought to be on safe ground, given the reasonable belief that it cut through the territory of the Brigantes, but his choice of evidence is strange: possible tribal centres at Carlisle and Corbridge (neither proven), being on the wall, are taken to indicate that these territories must have extended north. The maintenance of Hadrian's Wall in the Severan period when the 'military threat was demonstrably not there' is seen as evidence for an administrative function. W.'s final judgement is that palisades, watchtowers and walls were more a line of trespass than a frontier, though they did serve a military purpose against raiders. These lines are an illusion, disguising the reality of the frontier as a zone. The question of why these lines are only known to exist in areas of Europe thickly populated with settled farmers in the pre-Roman period is not closely addressed. Obviously such large and potentially unstable

populations would require administration and regulation in their movements, but why the elaborate and formidable nature of the barriers and the density of military manning? The Roman army may have been the only institution in antiquity that could carry out this job, but why did they dig defensive pits so carefully between the Antonine Wall and its massive ditch, or for that matter in front of the Wall at Wallsend? Why was the building of these frontiers so dislocated and disrupted? A growing number of archaeologists suspect that the frontier installations of northwest Europe denote a concern with more endemic problems of unrest and infiltration than the anodyne 'raids' of unspecified seriousness which W. concedes as a possible factor in their design. Frontier zones may, as W. goes on to argue, unite and homogenize people rather than dividing them, but the Anglo-Scottish border march between 1300 and 1600 gives a good later example of how an artificially imposed outside factor – war and rivalry between the crowns – could unite all levels of border society in degenerative violence, brutality and economic backwardness. Where was the economic symbiosis of people on either side of the border in this case? Is it possible that the existence of permanent Roman frontier lines – a similarly imposed external factor – in populous northwest Europe from the early second century produced the social instability and hostility that would eventually undermine them? W. hints at something like this when he goes on to suggest that the existence of stable frontiers, with markets and regulated trade, transformed and developed the marginal areas beyond, so that the frontiers either had to expand to absorb them, or come under pressure from these new societies.

So why did Roman frontiers stop where they did? W. is unable to accept Mann's view (1974) that the halt was an accidental process. He sees the factors limiting expansion as economic and ecological, rather than political or military (Mann, Luttwak), and portrays the frontier zones in terms of increasing economic marginality. Much of this goes back, as W. acknowledges, to Lattimore, an influential frontiers theorist, and northwest European archaeologists will be familiar with another version of the argument by Groenman-van Waateringe (1980). Archaeological evidence is used convincingly by W. to argue for this in Britain and Germany, including the reproduction from Kevin Greene's *Archaeology of the Roman Economy* of a striking set of pollen diagrams from Britain, showing the thinning out of agriculture north of Hadrian's Wall, a conclusion supported by the recent survey of crop husbandry in the region by Marijke van der Veen (1992).

At first it may seem that W. has after all explained the halt in terms of natural frontiers, contradicting his earlier statement that frontiers do not fall on lines of natural division. But the crucial point is that the increasingly marginality of frontier zones occurred gradually over a wide area, and did not suddenly occur on any line. This zonality of W.'s approach is also intended to answer those (Fulford, Breeze) who have pointed out, in objection to the economic explanations, that Hadrian's Wall did not mark any sudden transition from one type of native economy to another. Marginal zones usually cause seasonal population movements, and this observation leads W. into a comparison of the evidence from Africa and Britain, and the explicit interpretation of milecastles as channels of seasonal movement. But this is a conclusion hard to reconcile with the provision of the Vallum on Hadrian's Wall, the narrowing of milecastle gates, and the occurrence in Germany of similar fortlets, unattached to a frontier barrier, and therefore clearly not intended for the channelling of civilian traffic through a frontier.

Generally convincing as the 'marginality' argument is, does it not by itself fail to explain the narrow timescale of Roman frontier development? Why, on all fronts, was the crystallization of artificial frontiers a feature of the later first and earlier second century? The unforeseeable distraction of military setback on the Danube front from 86 onwards seems to have been decisive here. The effect on Britain and Germany of the draining of their troops to other theatres reminds us that continuing advance in northwest Europe had to be underwritten by the presence of sufficient troops for conquest and occupation. The same problem arose in the 160s, and again the British frontier was adversely affected. All this implies an active opposition by peoples in and beyond frontier zones, a factor which plays no part in W.'s analysis before the Diocletianic period. And other factors were at play: earlier, W. touched but briefly on the 'random' element in frontier policy provided by differing imperial personalities. On a more structural level, any account of Roman frontier policy must examine the curious relationship between the emperor and the aristocracy in bringing about a paralysis of general expansion. The gradual monopoly on personal campaigning acquired by the emperor, and the obvious caution about letting ambitious and capable individuals have a free hand with large armies, must take their places as factors in the inertia which crept over frontier policy during the principate.

A chapter on Economy and Society of the Frontiers opens with an

important consideration of frontier supply. W. believes that even if land could theoretically feed army units, they would not rely on it because of variability of yields, climate, and difficulty of raising productivity among a subsistence community. Wheat would have to be imported, in the same way that we know that Mediterranean commodities were. This conclusion is, of course, wholly supported by the existence of a permanent coastal supply base at South Shields, presumably to house imported grain for the garrison of the northern frontier in Britain.

Accepting that the army was supplied from a distance, how did the supplies reach them? W. places himself firmly against the recent trend of downgrading the role of the state in military supply and emphasising the role of the free market – to put it bluntly, merchants at the gates of the forts – in providing for the army's needs. Certain distributions of pottery types on the frontiers can, W. claims, only be accounted for by special monopolies or state subsidies to favoured contractors. He cites the obviously frontier heavy distribution of BB1, BB2 and Colchester mortaria as not looking like a market-driven distribution. However, this evidence is familiar to those who favour a lack of direct state intervention: they would explain it in terms of the middlemen taking massive stocks to where they knew there was a massive demand for the vessels of southern British type. The most likely solution, and that adopted by W., is the existence of middlemen – *conductores* or *negotiatores* – who had a close, quasi-official relationship with the state. The archaeological evidence harnessed by W. to argue for this role is impressive, although the use of the 'Corbridge pottery shop' is badly out of date. He produces evidence that goods being transported for the army travelled tax-free. Such goods mingled with others transported on private initiative for profit, and laws had to be promulgated to ensure that the non-military parts of such cargoes were taxed. With such confusion in antiquity, is it any wonder that archaeologists find it hard to decide whether a state subsidy was involved for any given commodity?

The second part of this chapter concerns supplies from across the frontiers. Literary and epigraphic evidence shows that supplies were obtained in this way. Archaeological evidence is used, rather vaguely, to argue for economic development north of Hadrian's Wall. There is more tangible evidence from across the Rhine, with the emergence of many timber longhouse farms in the second century, and W. also gives an important discussion of the famous series of Romanized buildings beyond

the middle-Danube, suggesting trade with, and military protection of, Romanized princes across the Danube over a long period. In Africa and the East there was a symbiosis between desert and sown. Roman frontier systems, including those of the northwest, were, in this view, intended to maximize the profits of natural exchange, by controlling and monitoring movement, not preventing it. This vibrant trade and economic development made border regions on both sides of the frontier evolve differently from their hinterlands. W. theorizes the development of an invisible outer frontier, beyond the military *limites*, defining a *'Vorlimes'* region. This obtained the mundane commodities of regular exchange, such as wheat, pottery, wine etc. To those beyond went predominantly rare prestige articles associated with gift exchange – bronze, glass, silver etc. But within the *'Vorlimes'*, the imported commodities concentrate at prestige sites, like Feddersen Wierde in northwest Germany beyond the Rhine, or Traprain Law. W.'s consideration of the evidence from this last site is most interesting, and used to illustrate the theory that Roman occupation reinforced local aristocracies beyond the frontier. There was not a 'trickle down', however; W. argues that rural populations on either side of the frontier resembled each other in not receiving the goods that went to the elites. He illustrates this by citing Fulford's observation that the range of goods from Traprain is greater than that from any non-Roman site in Britain north of York. If accepted, this theory provides a most useful explanation for the apparent similarity of native sites on either side of a frontier like Hadrian's Wall.

Chapter 5, the Frontiers under pressure, is a narrative account of frontier affairs from the time of Diocletian to the early fifth century, region by region. The story is one of appalling inroads, in places and at times a veritable deluge. In line with the social and economic portrait of the frontiers presented earlier, W. here stresses the falsity of the picture of 'barbarian' and 'civilized Roman' confronting one another over a frontier line. Rather one border people was assimilated into another, so that in the end 'it was unclear who were the barbarians and who were the Romans'.

Throughout the region by region survey, several common themes are stressed: the assumption that Rome should exert its power beyond the visible frontier; the control and use of states and clients beyond; the lack of defensive lines. Nevertheless, W. seems in no doubt of the severity of the threats from outside that the frontiers had to deal with. Yet within W.'s narrative this endemic infiltration seems to have arisen suddenly out of

nowhere. Why were the frontiers so suddenly under pressure from Diocletian onwards? Many will suspect that things did not change overnight, and that, ill-recorded by our sources, the second and earlier-third centuries experienced a growing background of low-intensity frontier trouble, giving a real meaning to the elaborate nature of the heavily garrisoned 'lines of trespass' in the northwest provinces.

The British section of W.'s account portrays a northern frontier which went to seed for lack of protracted crises. W. states that all *vici* were given up about 370. This is an out-of-date view. It is now known that some were abandoned long before this, while some perhaps lasted into the fifth century. The idea, which he seems to accept, of families or federates moving into forts is very hard to prove. Ravenglass does not really deserve special mention as a site that may have evidence for destruction in 367; what about all the excavated sites which show no such evidence? Despite problems of this kind when focus is concentrated on individual sites, this long chapter is a masterly arrangement of evidence and a lucid account of complex and confusing events.

Chapter 6, The Collapse of the Frontiers, opens with an eerie portrait of late-Roman frontier life, not haunted by invasions, but by ghostly bandits who materialize, spread terror, disappear, and appear indistinguishable from law-abiding frontier folk. The frontiers were not like a dyke sustaining pressure; by now the frontiers of the barbarians 'were in fact extending deeper into the Roman empire'. The destabilization was within.

A section on Roman ideology considers the remarkable persistence of the old upper class and literary attitudes towards imperialism and frontiers. Rome was still commonly perceived as ruling the world with limitless power; the barbarians as alien, subhuman, separated from the Romans by rigid frontiers. W. portrays this as self-delusion about the changes which had really assailed the Roman world. He does not explain why he is so sure that self-delusion does not invalidate statements from the earlier empire upon which he relies for his description of the ideology of frontier expansion. Tacitus' belief that the rest of Germany could and would be conquered was not realistic, and if this was not clear to the writer in Rome, it would have been apparent to frontier builders on the ground.

In an important section, W. discusses the nature of so-called barbarian invasions. His basic point is that the description (in Ammianus and other sources) of barbarians entering the empire in floods may be an exaggeration. The truth is more likely to be that small numbers of, nevertheless,

debilitating, raiders and robbers amounted to 'banal but continued pressure' which in the long run did more damage than the invasions of Gaul and Italy which did occur, and than momentous defeats such as Adrianople. The archaeology of the Goths suggests small movements of infiltration by small groups of warriors. Again, the reader may suspect that similar problems of infiltration in the earlier empire may have been played down because of the lack of contemporary written evidence.

The next section deals with frontier demography and the dynamics of frontier societies, presenting a view already presented in detail by W. (1983). The very existence and stability of frontiers led to population increase and increasing demand on resources. Those resources were increasingly concentrated in the hands of elites on either side of the frontier, who had become culturally homogeneous and had long practised symbiotic exchange. Social divisions were accentuated. Rather than a migration of population or great invasion, the collapse of frontiers represented a struggle between small groups for the limited resources, leading to chronic instability. Barbarians and Romans in the frontier land became more like each other.

The final chapter, Warlords and Landlords in the Later Empire, resumes the narrative of Chapter 5, presenting a factual account of the frontiers, area by area, from the fifth century down to their last days. For Britain the account, as in Chapter 5, seems strangely selective and archaeologically naive – why, as earlier, is Ravenglass picked out? The statement that South Shields remained occupied until the seventh century, if it means the fort, is difficult to substantiate. In general Britain is seen, like the African frontier, as being inherited by successor kingdoms who carry on something of the Roman tradition, perhaps owing their origins to a recognition of federate status by Magnus Maximus. According to Procopius the last Roman soldiers on the Rhine frontier voluntarily went over to the Franks, but kept their Roman identity as units within the Frankish army – what better illustration of W.'s thesis that the frontiers made the peoples on either side more like each other?

Despite some of the reservations voiced above about a view of frontier installations as fulfilling merely an administrative role, and facilitating, rather than restricting general cross-frontier movement, the picture of the frontiers painted by Whittaker is, broadly speaking, deeply convincing. While finding much in common with Isaac's views, Whittaker tends to have more belief in rational decisions on the parts of emperors and those

that selected frontier lines. He sees Roman emperors and their governors as being rationally aware of economic realities and laws of diminishing returns in marginal frontier zones. On similar grounds he opposes Mann's theory of random contingency in the choice of frontiers. On the matter of military supply, the fragility of the agricultural regimes on which the army is often supposed to have relied is correctly stressed; conversely the complexity of the commercial arrangements by which units sought to supply themselves are revealed. The terror wrought by raiders and the reality of such infiltrators, whether Saxons, Saracens or Goths, is never downplayed, as in some recent writings. He has no doubt, for example, that the Saxon Shore forts were directed against a seaborne threat. The efforts of the Roman army to prevent these inroads are painted in a rational and convincing light: frontier lines may not have been defensive, but in the end, whatever they wanted to believe, the Romans were on the defensive.

Archaeologists familiar with Hadrian's Wall or with the frontier in Germany, may wonder whether this book has failed to perceive the earliest stirrings of frontier trouble to which these remarkable monuments may attest. The absence of literary sources means that W. has not presented a completely convincing picture of northwestern frontiers in the first three centuries that can satisfactorily supply the background to everyday frontierland events that we hear about from inscriptions. Any such account has to explain how and why two soldiers at Ambleside could be 'killed inside the fort by the enemy' (tombstone, *JRS* **53** (1963), 160), and in what circumstances auxiliary commanders were slaughtering bands of barbarians in the second or third centuries near Hadrian's Wall (dedications at Carlisle, RIB 942, and Corbridge, RIB 1142). And how do the old familiar literary references to frontier trouble, in the 180s, for example, when a wall was crossed and a Roman general killed, fit into the model presented in this book? It might be argued that these sources are misleading in their literary affectations, but they cannot simply be ignored. Strongest where the literary evidence is strongest, this book unconsciously reveals a strange lacuna in our knowledge of the least well documented of the early imperial frontier systems – amongst which include Hadrian's Wall. Yet whether it provokes agreement or disagreement, Whittaker's masterly treatment is an indispensable work for all concerned in whatever way with the frontier policy of the Romans and the monuments it has bequeathed us.

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3. Through its re-enactment group 'Quinta', to recreate as accurate a picture as possible of life in the third century at Arbeia.
4. To engage in reconstruction archaeology.
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