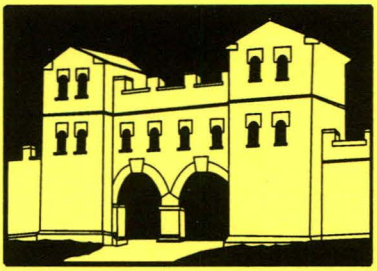
THE ARBEIA JOURNAL



VOLUME II 1993

THE ARBEIA SOCIETY
MCMXCIII

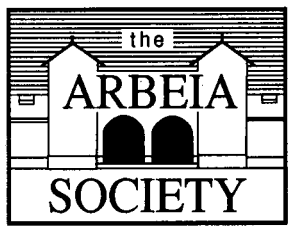
THE ARBEIA SOCIETY

OFFICERS 1993

All correspondence to the Society should be addressed in the first instance to:

The Secretary, Arbeia Society, Arbeia Roman Fort, Baring Street,
South Shields, Tyne and Wear, NE33 2BB

THE ARBEIA JOURNAL



VOLUME II

The Arbeia Society, Arbeia Roman Fort, Baring Street,
South Shields, Tyne and Wear, NE33 2BB

Produced for the Arbeia Society by M.C. Bishop
Printed in England by Tyneside Free Press

The Arbeia Society

MCMXCIII

CONTENTS

EDITORIAL

This volume sees the first inclusion of an excavation report in the Arbeia Journal. It is intended that future issues will also contain the final publication reports on some of the smaller excavations conducted by Tyne and Wear Museums Department of Archaeology in the region; unfortunately space and costs preclude the publication of large reports as yet. The publication of excavation reports marks an important step for the Journal, and is a necessary departure if it is to thrive and build on the reputation it has already gained with volume I, which was well received by members and non members alike.

The notes section of this issue is given over to reconstruction work carried out either by or on behalf of the Society's re-enactment group 'Quinta'. No apology is made for this, as all too often such work is left unpublished, the results from it lost. All the reconstructions made by and for Quinta for experimental work are as authentic as possible, both in terms of the materials used and techniques of construction applied, so that some attempt can be made to quantify their usefulness and durability in given situations. It is hoped that the publication of this work will show that reconstruction can be an important research tool to both archaeologist and ancient historian alike. However, there is no intention that publication of this work will take over the Journal, and copy on other subjects of interest and relevance to the Society is always welcome.

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, 5.25" or 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 REPLICA ROMAN JAVELINS

W.B. Griffiths & D. Sim[1]

The javelin was a widely used weapon in the ancient world, both in warfare and hunting. However, for the most part it was never developed as a primary weapon of war (Gonen 1975, 35); instead javelins were most commonly used in battle by light armed troops, such as the Republican *velites*, operating as skirmishers. Within the Roman army the development of javelins in warfare reached its zenith with the creation of the *pila* for the legions. These however are not the subject of this paper which deals instead with the more standard javelin which consisted of a small metal head fixed to a slim wooden shaft. This type of javelin was used throughout the Roman period by cavalry and auxiliary infantry troops alike; however, it is sometimes difficult to determine from the sources how widespread its use was, and how effective it was as a weapon. This problem is made worse by the difficulty experienced in trying to distinguish between javelins, designed for throwing, and thrusting spears, intended for use in hand-to-hand combat.

Theoretically, the most reliable source of information on the use and distribution of javelins within the Roman Empire should be the archaeological record. However, only the iron heads of javelins survive, the wooden shafts having decayed through time. Moreover, the precise identification of javelin heads is problematical as typologically there is little or no difference between javelin heads and heads of thrusting spears. Various attempts to present a typology of spear and javelin heads, especially the misleadingly termed 'leaf shaped heads', have failed to provide convincing conclusions (Marchant, 1990, 5 & 1991, 277). There is however broad agreement that the larger the size of the head and/or shaft diameter, the more likely that the head is from a thrusting spear rather than a javelin. Heads of medium size could have functioned just as well in either capacity, and indeed may even have been intended to do so (Bishop and Coulston 1993, 69).

Sculptural reliefs provide us with little information on the subject. Certainly the size and length of a representation cannot be used as a guide as the sculptor is, especially in the case of tombstones, more often carving

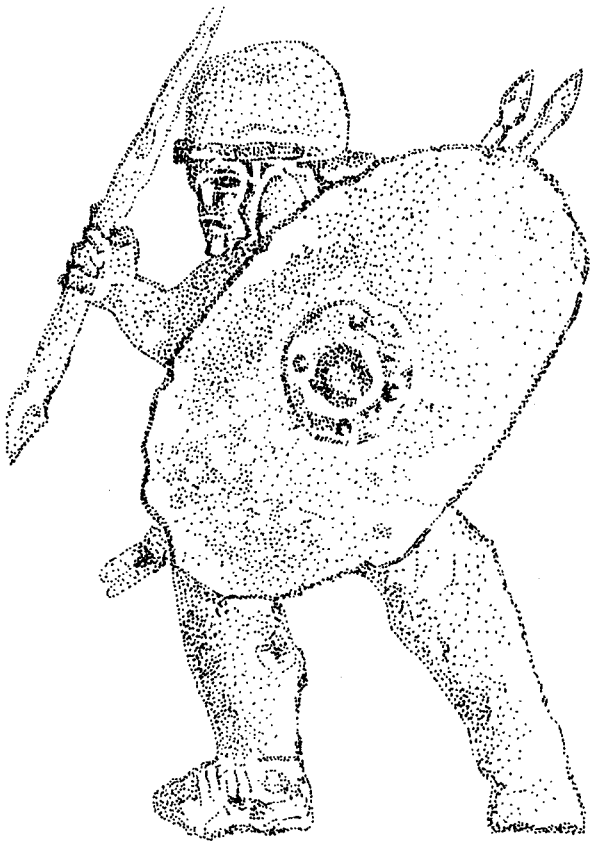


Fig. 1: Pedestal relief from Mainz depicting a soldier carrying javelins behind his shield. (Drawn by R. Lavery)

to fit the scale of the work rather than providing a totally accurate image (Bishop & Coulston 1993, 69). However some reliefs can perhaps be interpreted as depicting javelins rather than spears. One example (Fig. 1), from Mainz, shows a figure holding two javelins/spears behind his shield (in the manner of velites) and a third in his hand (Selzer *et al* 1988, 244 No 271). The tombstone (Fig. 2) of a *discens lanciarius* (which loosely translates as 'trainee javelineer') from Apamea shows a man carrying five equal

Fig. 2: Tombstone of Aurelius Mucianus, a 'trainee Javelineer' from Apamea in Syria. (Drawn by R. Lavery)

length javelins with small leaf shaped heads in his right hand. (Balty 1988, Pl. XIV, 2) On his left he has a small round shield. No soldier could use more than one thrusting spear in battle, and it must surely be safe to see both these depictions as representing men carrying javelins.

It is all but impossible to identify depictions of javelins in use in battle on monumental reliefs as they are never shown in flight, and could thus be interpreted as thrusting spears. Scenes on Trajan's Column, depicting the defence of Roman forts show soldiers on ramparts apparently casting down javelins against their opponents (Cichorius 1896 & 1900, Scenes XXXII and XCIV). However, the weapons were originally provided by metal attachments to the column, and these have long since disappeared, so this identification is not assured.

The classical authors certainly indicate that use of the javelin was widespread. A clear description of the javelin is given by Polybius, in his account of the *velites* of the republican army:

'The wooden shaft of the javelins which they carry is about three feet in length and a finger's breadth in diameter. The head is a span (c 22.5cm) in length and is hammered out thin and so finely sharpened that it is inevitably bent at the first impact, thus making it useless for the enemy to hurl back; otherwise the weapon would be equally serviceable for both sides.' (VI, 22).

As will be seen below, this description is particularly fitting to the reconstructed javelins used in the experiment.

Vegetius, when discussing the training of the Roman infantry, mentions that javelins heavier than normal were thrown by troops at the practice post (*Epitoma rei Militaris* I, 14). Arrian, in his *Techne Taktike*, records the throwing of javelins from horseback during cavalry parade manoeuvres, which must surely reflect the kind of training the Roman cavalry was put through (cf. for example 37.4, on the *petrinos*, and Hyland 1993, 121 for discussion of the manoeuvre). For the most part however, references to the use of the javelin by the Roman army in classical literature are fleeting, especially as javelin men tended to be placed within the rather more general category of 'light armed troops', the various weapons of which (such as bows and slings as well as javelins) would not usually be distinguished by the ancient authors; their activities tended to be treated as one. A notable exception to this is Onasander: 'attacks of the light armed troops on the flanks cause the enemy greater loss, since they cast their javelins from the side and, of necessity, strike the body where unprotected' (The General, XIX, 2).

Given the lack of clear information on the javelin, it was decided to use replicas to make some assessment of the range and accuracy of which Roman javelins were capable, in order, along with the other experiments in this series, to demonstrate the potential usefulness of the weapon to the Roman Imperial Army. To achieve this, accurate reconstructions of Roman javelins were made using authentic materials and tools. The closer the replicas are to the originals, the greater the degree of validity that can be attached to the results.

The Reconstructions

The first step in the construction process involved having five replica javelin heads made. It was decided to base them on a javelin head[2] found at

South Shields fort. The light weight and short length (140mm) of the blade, and narrow external diameter of the shaft socket (16mm) indicate that the example would not have formed an effective spear head, and it is thought that it was intended for a javelin. This work was carried out on behalf of the Society by David Sim, whose detailed account of the construction and performance of the heads is produced separately in the notes section of this Journal (see Sim, below p 37). Once the heads were complete, shafts had to be prepared. There is no direct evidence for the type of wood used for javelin shafts at South Shields fort, but analyses of remnants of wooden shafts found within the sockets of javelin/spear heads from various sites show that several types of wood, including willow, alder and poplar, were used (Marchant unpub., 277). However, it was decided that ash, which has also been found at several sites, including Corbridge, would be employed for the reconstructions. The diameter of the shafts was that of the maximum outer diameter of the original javelin head (16mm). The shafts were cut to the required length and the ends whittled to fit into the tapering sockets of the metal heads. In order to ensure a tight fit, the section of shaft at the base of the socket was left slightly too wide to fit easily into the socket, and the shaft was instead rammed firmly into place.

The original javelin head had a small hole, 2mm in diameter, in the socket that contained a nail used to help hold the wooden shaft in place. Such finds are not uncommon (ie Allason-Jones and Bishop 1988, 13, No. 28), and it would appear that this method of fastening was standard practice. A hole of the same diameter as the original was drilled through both sides of the socket on each reproduction head; and once the wooden shafts were in place, narrow guide holes were drilled through them, and metal carpet tacks, the nearest modern equivalent to the nail used in the original javelin, hammered in. The malleability of the tacks meant that the protruding points could be hammered flat, as could the heads themselves. The tacks proved extremely effective at holding the shafts in place, but frequently, when the shafts snapped, they did so around the area of the tacks; however, as will be argued below, this need not be seen as disadvantageous.

One problem caused by the lack of survival of any complete javelin shafts is that their length can only be guessed at. The translation of Polybius of 'about three feet in length' cannot be regarded as particularly reliable, except to indicate that they were shorter than spears. As a result it was decided to incorporate this problem into the experiment, and each head was affixed to a shaft of a different length (sizes were 0.75, 1.0, 1.25,

1.5, and 1.75m). It was found during practice prior to the experiment that shafts of 2m in length would snap at the base of the socket after almost every throw, and that the shaft would oscillate in flight thus increasing drag and reducing the range of the weapon. Lengths under 0.75m were found to be too heavy at the head, their aerodynamic effectiveness reduced to a point where they were no longer viable as missile weapons.

The Experiment

The experiment was divided into three basic sections, first testing range on the flat, then range from the gateway parapet, and finally accuracy. In all, five members of Quinta, four in full auxiliary kit of the third century AD and one in civilian clothing of the period, participated. The authors, in twentieth century garb, also took part in the experiment. Each participant threw each of the five javelins once at each stage of the experiment. At each stage half the throwers would start with the longest javelin and progress to the shortest, and the others would work from shortest to longest. This was reversed at the next stage in order to avoid any bias of practice or weariness influencing the overall picture of the performance of individual shaft lengths. Space does not permit the detailed publication of the results here, but the main points are summarised below. The first section of the experiment involved all the participants throwing the javelin on level ground from a standing position. At first participants threw without holding a shield, although some held the other javelins in their free hand in the manner of velites. All distances were recorded, along with the length of shaft of each throw.

As was to be expected, the throwers varied in ability, with distances achieved ranging from 8.9 to 20m. The mean of the best casts of the seven throwers was 15.08m, and the mean of the worst was 11.58m. On the whole the best ranges were achieved with the longer shaft lengths (1.25–1.75m) and the worst with the shortest (0.75–1.5). However, most throwers did not seem unduly affected by shaft length, one thrower grouping all five javelins between 11.2–11.6m.

The second stage of the experiment involved repeating the throws, except that the participants also had to hold a shield[3] and the other javelins in their free hand. Again the throws varied, from 9.0 to 20.2 metres. The average from the best shots of each thrower was 14.4 metres and the mean of the worst was 11.3 metres. Again it was the longer shafts (1.25 to 1.75 metres) that produced the best results, and the shorter shafts (0.75 to 1.0 metres) that produced the worst.

Fig. 3: Members of Quinta preparing to launch a volley of javelins from the parapet of the reconstructed gate at South Shields. (Photo: author)

When the mean of all the averages of the throws were compared for the two events, the shield was found to only reduce the mean from 13.4 to 12.95 metres. Three throwers, including the two best, achieved slightly better results with the shield, and it may be that if the soldier was trained properly in the use of the javelin, the shield might perhaps function as a counterbalance when throwing. However, it is always possible that the improvement in range was simply the result of practice with the javelins.

It would certainly seem from this part of the experiment that a maximum effective range for the velites would have been twenty metres (although this figure could no doubt be considerably improved upon with practice). This seemed a short range for battle, so a small test was introduced. One javelineer undertook to attempt to throw all five javelins from behind his shield and draw his sword in the time it took another Quinta member to run 20 metres towards him in full kit with his sword drawn. The javelins were to be held behind the shield prior to use, and thrown to one side to avoid injury. No time was to be taken in aiming, as this would not be required against a large body of men at that range. To everyone's

surprise, not least that of the attacker, the javelin man succeeded in launching all 5 javelins and drawing his sword while his opponent still had just under 10 metres left to run; indicating that a soldier armed with javelins could indeed engage an attacking enemy in close combat.

The next stage of the experiment involved all participants launching javelins from the parapet walkway on the north side of the reconstructed south west gate at Arbeia (Fig. 3). The throws were aimed out over the ditches. Again the distances of each throw were recorded, although this time in terms of where in the ditches they reached rather than strict distance (Fig. 4). The angle of the javelin at landing was also noted in order to consider whether each individual cast was capable of delivering an incapacitating blow.

It was noticeable that the shorter javelins (0.75 to 1.0 metres) fell slightly shorter than their counterparts, although almost all the javelins landed between 15-20m from the gate, on the berm between the central and outer ditch. For the most part the shorter javelins landed at an angle more approaching the vertical while the longer tended to land at circa 45 degrees. Each would have had its advantages in different situations, the shorter clearing shields and dropping onto the heads and shoulders of attackers and men attempting to seek cover. A similar phenomenon has been demonstrated by experimentation with plumbatae (Eagle 1989, 253, Fig.6). Javelins with longer shafts approached at an ideal angle for striking an attacker in the chest (see fig. 5).

The next stage of the experiment involved the setting up of two human sized target boards, one in the central ditch and the other on its outer lip. All the participants threw at these figures from the parapet but, although several glancing blows were made, no one achieved a direct hit. However, all the throwers' shots grouped well in the vicinity of the target. Doubtless the inability of the participants to hit the target was more a result of their lack of training and practice than of any defect in the javelins themselves.

The legionary pilum was in part designed to penetrate the shield of an enemy, and if not maim him, then at least remain stuck fast in his shield as an impediment (Caesar *Bell. Gall.* II, 1; Bishop and Coulston 1993, 48). Thus, following on from the target shooting, it was decided to test the effectiveness of the javelins against a shield to see if they shared this particular characteristic with the pilum. In order to do this one member of Quinta held an 18mm thick shield out in front of himself while another threw the javelins at him on the flat over a distance of 10 metres. One of the five javelins bounced out, and, of the four which lodged in the shield, two

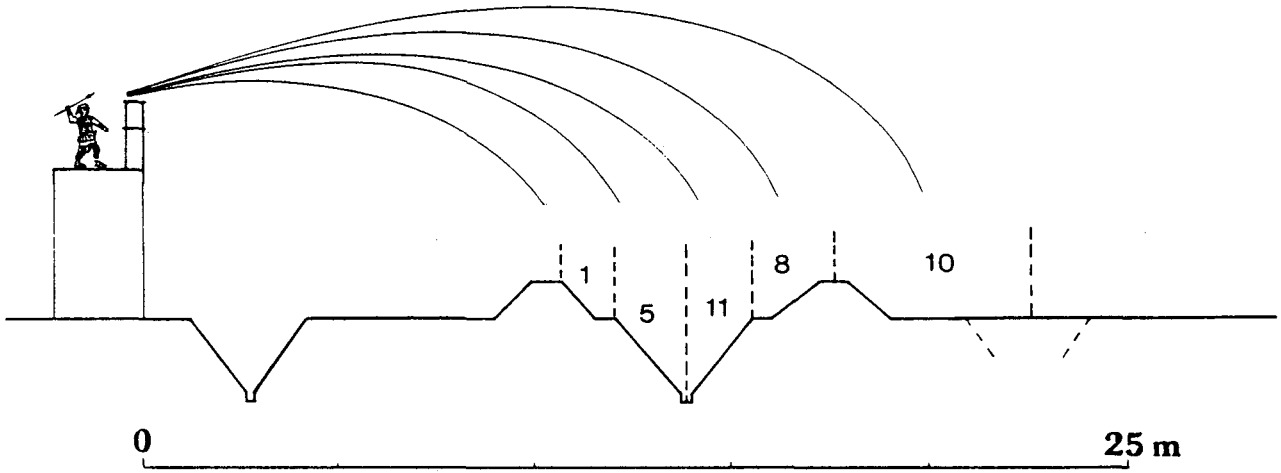


Fig. 4: Cross section through fort wall and ditches indicating ranges achieved in the experiment; the numerals indicate the number of javelins landing in each zone. (Drawn by R. Lavery)

Fig. 5: The typical landing positions of the javelins: with human scale! (Photo: author)

penetrated right through the wood of the shield projecting c10mm out the back. Suprisingly, the shield-bearer stated that he did not feel weighed down. When he was asked whether the javelins would cause a problem for manoeuvring, he simply drew his sword and swept them from the shield in two blows. Three javelins were completely detached from the shield and one broke off at the top of the shaft, leaving only the head protruding from the shield. This would have been as much, if not more, of an impediment to any would be attacker than to the shield-bearer as it projected 150mm from the shield. This would seem to imply that such javelins were of little use against a body of close formation infantry, but their value in terms of morale, and for slowing down the approach of an enemy cannot be quantified here. The experiment gives added emphasis to Onasander's contention, quoted above, that javelins were best used against the flank of a body of men to seek out undefended areas.

Another aspect of the experiment was the study of the durability of the javelin heads. When under construction it was felt that the narrow necks might break when in use but this was found not to be the case. Instead the

shaft would snap on impact at its junction with the javelin head; this was especially the case with the longer shafts. Repairs could be carried out in a couple of minutes by whittling to a point what was left of the shaft and by removing the remaining wood from within the head using pliers. Damage caused to the points of the heads was most common when the javelins struck stone in the ground, and was easily remedied (see Sim, this volume). It is interesting to note that this kind of damage accords with that described by Polybius (see above p 4).

Conclusions

The throwing of the javelins clearly demonstrated that the Roman javelin had a range of at least 15–20m, a distance which can surely be dramatically improved upon with constant practice and training, as could the accuracy of the throws. Even so, this minimum range is enough to allow for the launching of five javelins at an attacker, and still leave enough time to prepare for close combat. This range also covers the 'killing zone' of the fort's defences (cf fig. 4).

Surprisingly, the length of the javelin shaft did not make as much of an appreciable difference as had been expected; indeed the length of shafts may have depended to an extent on the preference of individual soldiers. Most of the participants tended to favour 1.25–1.5m lengths, as they felt uncomfortable throwing the shorter shafts, and found it difficult to hold the 1.75m shaft easily behind the shield.

The durability and ease of repair of the heads, coupled with the large amount of time, more than an hour, required for the manufacture of each one, suggest that they may have been retained in use as long as possible (cf Sim below, p.38). They were certainly easy to re-shaft and re-point, requiring no special skills or tools for either process. Weapons, along with other equipment, were a soldier's personal property, purchased from the army (Tacitus *Annals* 1.17; cf Breeze *et al* 1976, 193–5 for discussion), so it is to be expected that every effort would be made to maintain and repair javelins if possible. However, it was noticeable that the heads could easily be lost; on several occasions the head would bury itself completely in the soft earth of the ditch banks and the shaft snap off, resulting in a few minutes of frantic searching in the long grass! The way in which the shaft would break near the head prevented the weapon being thrown back by an enemy without repair, as would also the bending of the blade-tip; yet all the damage would be easy to repair after battle.

Overall this experiment has raised an interesting set of possibilities

which indicates that the javelin was not only a useful weapon, but also a durable one. The experiment dealt only with the use of the javelin by infantry troops, and it would be interesting to see the work replicated by re-enactors of Roman cavalry.

Acknowledgements

Thanks are due to Quinta members, Paul Carrick, Mark Jenkins, George Mattick, Paul Mullis and Ian Stephenson, for agreeing to take part in the experiment. The initial research into the material for the shafts and the purchase of the wood was carried out by Ian Stephenson; while the construction of the javelin heads was organised by Alex Croom, who also provided much technical support and encouragement on the day of the experiment. Thanks are also due to Dr D. Marchant for permission to refer to work from his unpublished PhD thesis.

Notes

1. This paper is the second in the Arbeia Society's Weaponry Research Programme (for the first see Griffiths 1992). The initial work on the project was carried out by WBG, and the construction of the javelin heads by DS. Both authors took part in the experiment.
2. Javelin head = SS87, I200, context 6386, Per 5B construction, AD205/207 to 222/235.
3. The shields used by Quinta are based on the plank shields recovered from Dura Europos, and are made of oak.

Bibliography

Allason-Jones, L. & Bishop, M.C. 1988 *Roman Corbridge: The Hoard*, London.

Balty, J.CH. 1988 Apamea in Syria in the Second and Third Centuries A.D., in *JRS* **78**, 91–104.

Breeze, D.J., Close-Brooks, J. and Ritchie, J.N.G. 1976 'Soldiers, Burials at Camelon, Stirlingshire, 1922 and 1975' in *Britannia* **7**, 73–95.

Bishop, M.C. & Coulston, J.C.N. 1993 *Roman Military Equipment*, London.

Cichorius, C. 1896 and 1900 *Die Reliefs die Traianssaule*, II & III, Berlin.

Eagle, J. 1989 Testing Plumbatae, in Driel Murray, C. van, *Roman Military Equipment: The Sources of Evidence*, BAR Int **476**, Oxford, 247–53.

Gonen, R. 1975 *Weapons of the Ancient World*, Jerusalem.

Griffiths, W.B. 1992 'The Hand thrown Stone' in *Arbeia Journal* **1**, 1–11.

Hyland, A. 1993 *Training the Roman Cavalry*, Stroud.

Marchant, D.J. 1990 Roman Weapons in Great Britain, a Case Study:

Spearheads, Problems in dating and Typology, in *J Roman Military Equipment Studies* **1**, 1–6.
Marchant, D.J. 1991 *Roman Weaponry in the Province of Britain from the Second Century to the Fifth Century AD.*, Unpub. Ph.D thesis, Durham.
Selzer, W. *et al.* 1988 *Romische Steindenkmaler*, Mainz.

A GROUP OF BROOCHES IN THE MUSEUM OF ANTIQUITIES, UNIVERSITY OF NEWCASTLE UPON TYNE

Margaret E. Snape

Introduction

A collection of nine Romano-British brooches, all in copper alloy, was donated to the Museum of Antiquities in Newcastle in 1984. All are unprovenanced, but as the former owner lived in Tynemouth and there is no record of his having collected antiquities from outside the region or having attended sales, an origin in North Tyneside might be assumed (information: L Allason-Jones).

One of the brooches from the collection has already been published (Snape 1987), the others are catalogued here.

1. Head stud L(surviving):34mm W:10mm

(Figure 1) A very small example with a slightly facetted, tapering bow. The stud is cast-in-one with the bow, and has a circular depression in the centre. Probably there was originally a fixed head-loop, cast-in-one with the brooch, but only traces remain. The short arms are undecorated; behind them is a cylindrical housing for a hinged pin, half of which survives. The head of the pin moves loosely on the axis wire. The foot is splayed, with a flat, oval base. The catchplate is damaged.

This particular example is not closely paralleled, although the general type can be classified (Snape type 3.1Dii). It presumably represents a late development in which the functional stud has been reduced to a mere decorative boss and the headloop is not formed from a separate piece of wire, but is cast-in-one with the brooch. For a general discussion of headstuds, see Painter and Sax 1970, Mackreth 1985, 199 and Snape 1993, 14-6 and Appendix IIa.

The type represented here was probably in existence by the late first century and could have remained in use until Antonine times. For further discussion of the dating of headstuds, see Mackreth 1989, 93-4.

2. Head stud derivative L:43mm W:15mm

(Figure 1) Derivative of the 'Thealby Mine' type. The tapering bow lacks a decorative stud, but there is a fixed head-loop, cast-in-one with the brooch. The loop, now slightly distorted, rises from a small rectangular plate. The short arms have rims which project forward slightly. There is a cylindrical casing for a hinged pin, the head of which is still corroded to its axis wire, although the rest of the pin is missing. The foot is splayed, with a flat semi-circular base and has a simple moulding above. The catchplate is damaged, with only a trace of the turnover remaining.

This derivative is named from its occurrence at a site in Lincolnshire (Dudley 1949, 20, fig. 52.6), where it was found in a second century context.

Also paralleled at: South Shields, five examples (Allason-Jones and Miket 1984, nos 3.66 and 3.69-71; Allason-Jones 1983, 119, no. 165, fig. 77), Vindolanda, two examples (Snape 1993, 73-4, nos 177, 178, fig. 15), Newstead, two examples (Curle 1911, 32 3-4, pl. LXXXVI nos 17, 18), Traprain Law (Curle and Cree 1921, 184, fig. 21.3), Richborough (Henderson 1949, 114, no. 37, pl. XXXVIII).

The above examples were either unstratified or came from contexts which were not closely dated.

3. Head stud derivative L:73mm W:26mm

(Figure 1) A larger and more elaborate version of the above. The strongly arched, tapering bow is distorted. It is square-sectioned and decorated with an incised line down each side. The arms are short and appear to be decorated with longitudinal grooves, although this is partly obscured by corrosion; the edges are milled. The fixed head-loop is supported on a rectangular head-plate. This has three transverse ribs, the central one with cabled decoration. The back of the head is flat, with a cylindrical housing originally for a hinged pin, now missing. The axis wire survives. The foot, which projects forward, is a flattened cylinder with three bands of ridge and groove decoration, the central one milled. The flat base has the remains of a casting 'runner'. The catchplate, which has several holes in it, also lacks a turnover. This appears never to have been formed, rather than having been broken off.

The brooch therefore appears to be a flawed casting, which was left unfinished.

This brooch has one almost exact parallel from Kirkby Thore (Painter and Sax 1970, 168 no. 21, fig. 4), but there is no evidence to suggest its dating. An example found near Newcastle (Hattatt 1985, 101–2, no. 420, fig.

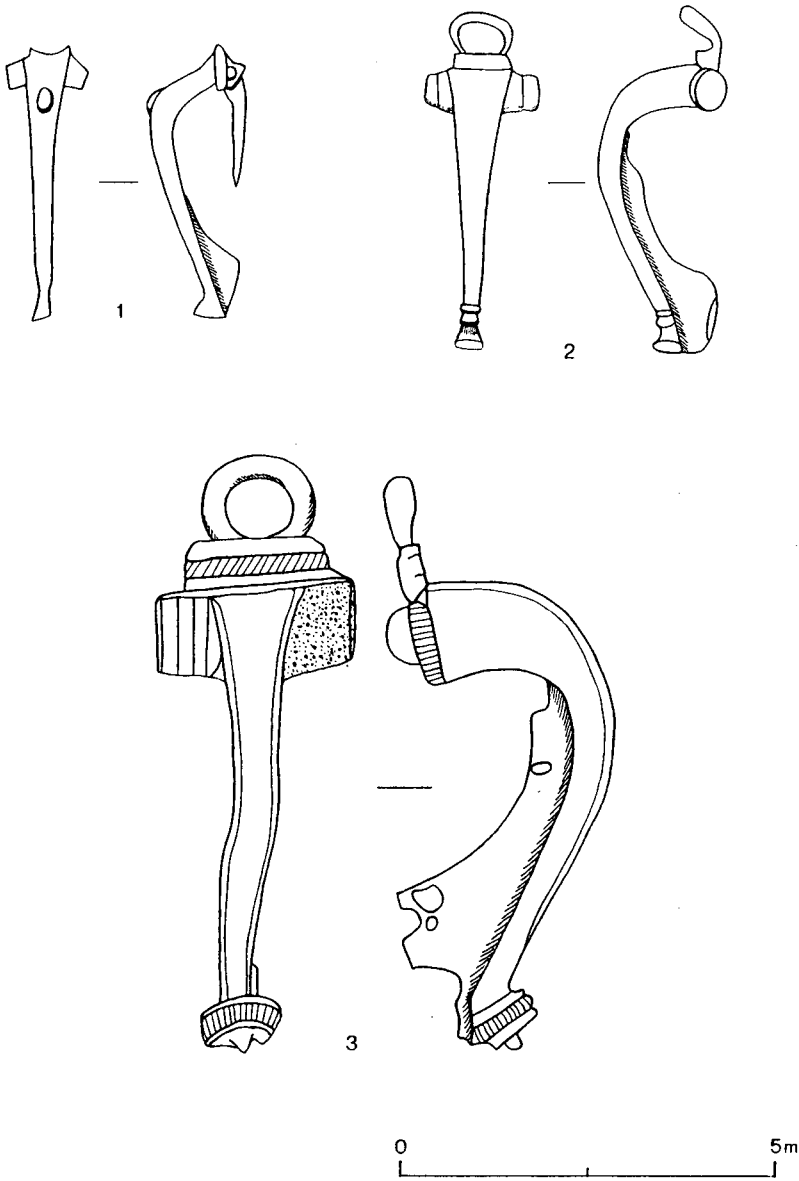


Fig. 1. Brooches in the Museum of Antiquities, Newcastle upon Tyne. Scale 1:1 (Drawn by R. Oram).

42) has a separate head stud rivetted on to the bow. Perhaps the brooch described here would have been treated in the same way if the casting had not been flawed.

4. Trumpet brooch L:74mm W:16mm

(Figure 2) Brooch of Collingwood's type Rii, that is, one in which the central decoration of acanthus leaves and mouldings is continuous around the bow (although in this example the decoration is rather flat at the back). The small trumpet-shaped head is hollowed out at the back and has a central loop carrying an axis wire for a spring of six turns. The pin is complete. The axis wire curves upwards to form a separate head-loop; the collar wrapped around this has three bands of ridge and groove decoration at the front. The upper bow is undecorated and has a sharp V-shaped section. The lower bow has a convex profile and shallow D-shaped section; there is an incised line down each side. The cylindrical foot has three bands of ridge and groove decoration and a flat base. The turnover is complete.

The brooch is in very good condition apart from slight wear at the top of the head-loop.

Trumpet brooches are thought to have originated in the Midlands (Mackreth 1973, 22-3), although many examples are found in the North. A recent review of their dating suggests that they were developed before AD 75 and that most went out of use between AD 150 and 175 (Mackreth 1990, 109).

The type is found throughout Britain, with some examples on the Continent. Parallels from the northern frontier include: South Shields, 13 examples (Snape 1993, 109, nos A18-A30), Corbridge, nine examples (ibid., 40, nos 22-27.1, 70, no. 159), Chesters, five examples (ibid., 114, nos A241-A245), Vindolanda, at least four examples (ibid., 74, nos 180-3), Carlisle, seven examples (ibid., 90-1, nos 259-62; Padley 1991, 105, no. 7; Mackreth 1990, 109, no. 9).

The wear on the headloop of this particular example is interesting. Brooches were usually worn with the head downwards, and types like the trumpet and the headstud were sometimes worn in pairs linked by a decorative chain attached to the headloops (Wild 1965). Surviving examples of linked pairs are rare; it is slightly more common to find an individual brooch with a short piece of broken chain still attached (Snape 1993, 6). In five such examples from the northern frontier it was noted that the chain had caused wear on the headloop; in other examples where only the wear was found, it was assumed that a chain had originally been

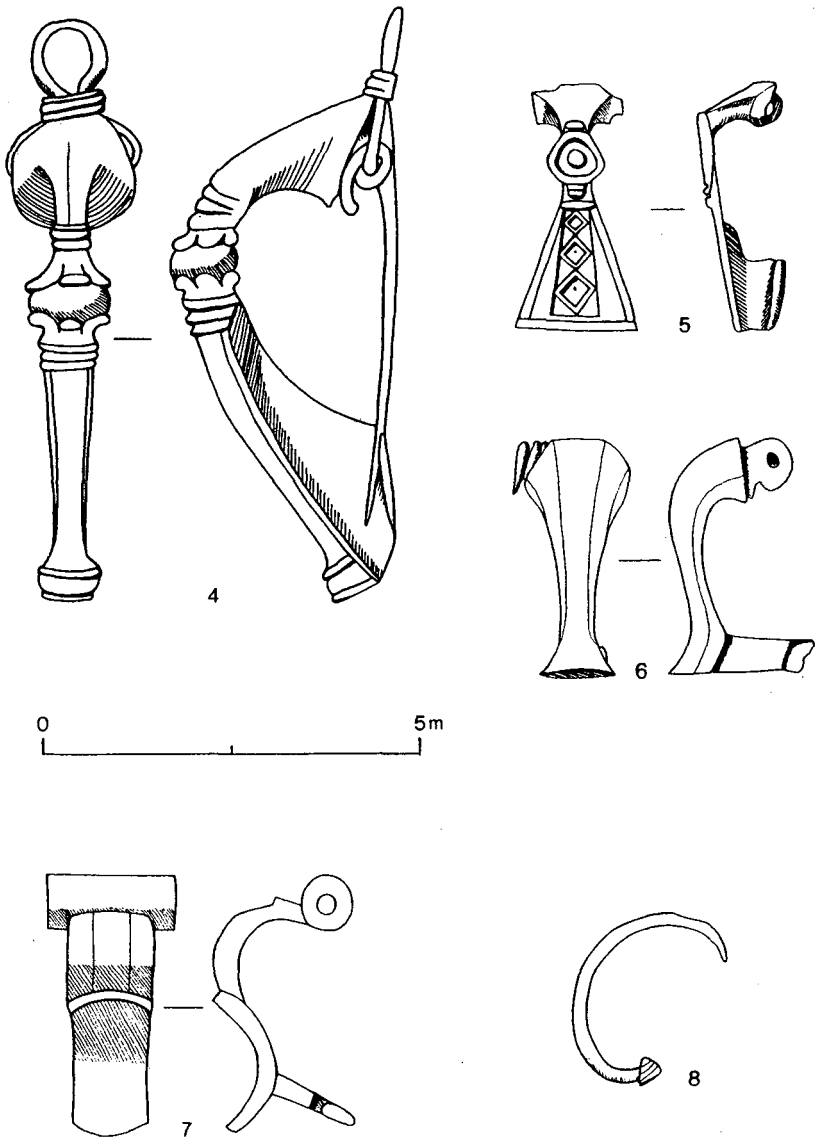


Fig. 2. Brooches from the Museum of Antiquities, Newcastle upon Tyne. Scale 1:1 (Drawn by R. Oram).

present and had been lost (ibid.).

Wear on the side of the headloop obviously suggests a linked pair of brooches, while wear in the centre, as in this example, may indicate a single brooch from which a pendant or châtelaine was hung. Although Roman brooches were worn by both men and women, the wearing of linked pairs seems to have been a purely female fashion, so a brooch with either a length of chain attached or with wear on the headloop would appear to have been worn by a woman.

5. Brooch with plate and fantail L:32mm W(max):16mm

(Figure 2) An unfinished example. The head of the brooch is incomplete, but probably originally consisted of a crosspiece with cylindrical spring-case. The pin is missing and details of any remains of spring or axis wire are obscured by corrosion products. The central plate has four small outer projections. The raised central circle is surrounded by a hollow ring obviously intended for enamel, although no traces are present. The fantail has ridge and groove decoration around the edges and a central panel containing three lozenge-shaped cells with raised rims. The small central depression in each was probably intended to 'key-in' enamel. The small catchplate is complete with turnover.

Brooches of this type usually have a headloop. It is difficult to tell whether this example has been damaged or always lacked the headloop because of a casting fault. The fact that it is unenamelled suggests an unfinished flawed casting.

Parallels include: Thetford, Suffolk (Hattatt 1985, 113, no. 449, fig. 47), Winterton (Stead 1976, 199, no. 26, fig. 101), Corbridge, two examples, also with missing headloops (Allason-Jones 1988, 161, nos 8, 9, fig. 76, and see two other examples listed there, unprovenanced but from the Hadrian's Wall area), Rudston (Stead 1980, 95, no. 14, fig. 61), Traprain Law (Curle 1932, 333, fig. 31, no. 14).

The type may have originated in the Midlands (information, D Mackreth). A date in the second half of the second century was given for the Traprain example.

6. Knee brooch L:30mm W:13mm

(Figure 2) Brooch with rounded profile and facetted bow. There is a single central plate at the back of the head, pierced to hold an axis wire, half of which is still in position, supporting four turns of a spring. The pin and the other half of the spring are missing. The splayed foot has a semi-

circular base, and the catchplate is a narrow bar bent to form a hook at the end (cf. Snape 1993, fig. 3ii).

An unusual example. Knee brooches of this type usually have either a cylindrical springcase (ibid., fig. 3B) or a semi-circular head-plate (fig. 3D).

Knee brooches and their derivatives are common on the German frontier, and may have originated there, but the type is also found throughout Roman Britain and some sub-groups may be of British origin (ibid., 17-20). There are at least 60 examples from the northern frontier region, in addition to many derivatives (ibid., Appendix IIb). The date range is from the mid-second century into the third.

7. Knee brooch derivative L:35mm W:17mm

(Figure 2) Derivative with an S-shaped profile (ibid., type 5.3). The cylindrical springcase is open at the back, and the axis, spring and pin are missing. There is a 'step' between the head and the bow and another at the point of recurve; the bow is facetted between the two steps. The catchplate consists of a notched bar (ibid., fig. 3iii).

Ten examples of this derivative have been catalogued for the northern frontier (ibid., 19, and Appendix IIb) and others have been found elsewhere in Britain, as at Chilgrove villa, Chichester (Mackreth 1979, 145 no. 5, fig. 43).

In most examples the foot has a flat base. The upturned foot of this brooch is paralleled by an example from Brough-on-Humber (Mackreth 1969, 93-4, no. 35, fig. 39; see also other parallels cited there).

Other brooches with upturned foot include an example from Carlisle (Snape 1993, 92, no 267.1) and one from Vindolanda (ibid., 77, no. 196, fig. 16).

This variant may be of British origin as it is uncommon on the Continent. There is one example from Zugmantel and one from the Saalburg (B"hme 1972, Taf. 9, nos 4468-9). A third-century date seems most likely.

8. Penannular D:23mm

(Figure 2) Damaged example of brooch of Fowler type A2, i.e. with milled, uncollared terminals. The hoop is too corroded to determine the original cross-section. The pin and one terminal are missing.

Type A2 penannulars have a wide distribution, but there are particularly large numbers from the northern frontier (over 20) and from Traprain Law, and they are found in contexts ranging from the first century to the fourth

(Fowler 1960, 174). See Snape 1993, 67 for examples from the north.

Discussion

The ninth brooch from this group, already published, is a simplified version of an unusual bow brooch of which there are a few examples in the north, but which is more common in south-west Britain (Snape 1987). This, like numbers 3 and 5 above, is an unfinished casting.

Such a concentration of flawed castings and very uncommon brooches in a small collection suggests they might represent a single group of 'rejects', possibly a hoard of metal-worker's scrap awaiting melting down for re-use.

However the dating evidence tends to argue against this. Apart from number 7, the group seems clearly to belong to the mid- to late second century. Number 7, the S-profile knee derivative, is a type not closely dated, but said to belong to the third century. Therefore either this type may have had a slightly earlier origin than previously thought, or does not represent part of a single hoard.

Bibliography

Allason-Jones L 1983 The small finds, in R Miket 1983 *The Roman fort at South Shields: Excavation of the Defences 1977–81*, Newcastle, 109–20.

Allason-Jones L and Miket R 1984 *The catalogue of small finds from South Shields Roman fort*, Soc. Antiq. Newcastle upon Tyne mon. ser. **2**, Newcastle.

Allason-Jones L 1988 The small finds, in M C Bishop and J N Dore 1988 *Corbridge. Excavations of the Roman fort and town, 1947–80*, HBMCE rep. **8**, London, 159–66.

Böhme A 1972 Die Fibeln der Kastelle Saalburg und Zugmantel, *Saalburg Jahrbuch* **29**, 5–112, Taf. 1–37.

Curle J 1911 *Newstead: a Roman frontier post and its people*, Glasgow.

Curle A O and Cree J E 1921 Account of excavations on Traprain Law in 1920, *Proc. Soc. Antiq. Scot.* **55**, 153–206.

Curle J 1932 An inventory of objects of Roman and provincial Roman origin found on sites in Scotland not definitely associated with Roman constructions, *Proc. Soc. Antiq. Scot.* **66**, 177–397.

Dudley H 1949 *Early days in north-west Lincolnshire*, Scunthorpe.

Fowler E 1960 The origins and development of the penannular brooch in Europe, *Proc. Prehist. Soc.* **26**, 149–77.

Hattatt R 1985 *Iron Age and Roman brooches*, Oxford.

Henderson A M 1949 The brooches, in J P Bushe-Fox 1949 *Fourth report on*

the excavation of the Roman fort at Richborough, Soc. of Ant. of London rep. **16**, Oxford, 106–22, pls XXV-XXXII.

Mackreth D F 1969 The brooches, in J Wacher, *Excavations at Brough-on-Humber, 1958-61*, Soc. of Ant. of London rep. **25**, Oxford.

Mackreth D F 1973 *Roman brooches*, Salisbury.

Mackreth D F 1979 The brooches, in A Down, *Chichester excavations: the Roman villas at Chilgrove and Upmarden*, Chichester, 145–8.

Mackreth D F 1985 The brooches, in J Hinchliffe and C S Green, Excavations at Brancaster 1974 and 1977, *E. Anglian Archaeol. rep.* **23**, Dereham, 196–205.

Mackreth D F 1989 The brooches, in K Blockley, *Prestatyn 1984-5. An Iron Age farmstead and Roman-British industrial settlement in North Wales*, BAR **210**, Oxford, 87–99.

Mackreth D F 1990 The brooches, in M R McCarthy, 1990 *A Roman, Anglian and medieval site at Blackfriars Street, Carlisle: Excavations 1977–9*, Kendal, 105–13.

Padley T G 1991 *The metalwork, glass and stone and stone objects from Castle Street, Carlisle: Excavations 1981-2. Fasc 3*, Cumberland Westmorland Antiq. Archaeol. Soc. rep. **5**, Kendal.

Painter K and Sax M 1970 The British Museum collection of Roman head-stud brooches, *Brit. Mus. Quart.* **34** no. 3–4, 153–74.

Snape M E 1987 Museum note: an unusual Romano-British brooch, *Archaeol. Aeliana* 5 ser. **15**, 309–12.

Snape M E 1993 *Roman brooches from north Britain*, BAR **235**, Oxford.

Stead I M 1976 *Excavations at Winterton Roman villa and other Roman sites in north Lincolnshire*, HMSO, London.

Stead I M 1980 *Rudston Roman villa*, Yorks Archaeol. Soc., Leeds.

Wild J P 1965 How were Provincial-Roman brooches worn?, *Latomus* **24**, 610–13.

EXCAVATION TO THE NORTH-EAST OF WALLSEND ROMAN FORT – 1993

W.B. Griffiths

Excavations to the north-east of Wallsend Roman fort in February and August/September 1993 revealed a series of gullies containing pottery of the third century AD. Although the site lies beyond the protection of Hadrian's Wall, it is suggested that the gullies represent the remains of some form of 'allotment' system for the inhabitants of the fort and/or vicus.

Recent History

Excavation was undertaken in 1993 by the Archaeology Department of Tyne and Wear Museums in advance of development of the old Swan Hunter car park 80m to the northeast of the Roman fort of Segedunum, Wallsend (NZ 30136615). Despite its location within the heart of Wallsend (cf Fig. 1), the area had never before been developed, its earliest recorded usage being as 'Grass and Arable' (Wallsend tithe map, 26/6/1839, NRO ref DT474M). The first three editions of the Ordnance Survey map for Wallsend record the land as unoccupied. On the fourth edition (1941), the area is shown as occupied by allotments; a number of modern wells discovered during the excavation are believed to be associated with this activity. More recently, the area became a roughly surfaced car park for Swan Hunter Shipyard.

Archaeological Potential

No archaeological finds were known from the area, but trial excavations were thought necessary for two reasons. Firstly, much evidence for pre-Roman cultivation had been found beneath the fort (Goodburn 1976, 308), and it seemed possible that further evidence might survive in the car-park site. Secondly, a road from the east gate of the fort might have crossed the site. In the event abundant remains of agricultural activites were recovered, but they were of the third century AD, rather than of pre-Roman date.

The Excavations

The trial excavation in February 1993 failed to locate any traces of a road running east from the fort, which, if it existed, must presumably have run

to the south of the development area. However, a two phase system of gullies containing pottery of the third century AD was located. As a result of this unexpected discovery, a much larger excavation was carried out prior to development.

The main excavation took place over six weeks in August/September 1993. After consultation with the developers (Caddick Construction Ltd), it was decided that the best strategy would be to open an L- shaped trench to the north and east of the trial excavation in an attempt to follow the gullies located there. In addition, a watching brief was maintained on the foundation trenches being cut for a building to the north of the excavation area. Within the main excavation not only were more gullies located, but a series of pits, believed to represent limited quarrying of sand from the site in the Roman period, were discovered (cf Fig. 2).

For the most part there were no stratigraphical relationships between the features on the site, which were all cut into natural subsoils (which consisted of mixed bands of sands and clays, yellow, brown and grey in colour). The fills of the features were very similar to each other and consisted of grey silty clays. Thus, detailed phasing of the Roman activities on the site was not possible, and the gullies are instead described by trench. Given the size of the site, it was not possible to excavate fully each gully in the time available; instead the line of each was recorded in plan, and sections cut to record profiles.

Pre-Roman

No features were located that could be assigned a prehistoric date. However, one sherd of late Bronze Age or early Iron Age pottery (see below p 35) was recovered from a Roman gully (75, fill 74) in the east trench of the main excavation. This further strengthens the argument for the presence of some form of prehistoric settlement in the area. No ard marks of any period survived.

The Quarry Pits

A series of irregular pits was discovered cut into a band of sand in the central part of the north trench. The pits were generally shallow (average depth c0.5m) but steep sided; their fills consisted of mixed grey and yellow sands and clays. One pit (90) also contained fragments of a lava quern, iron slag and cinder, presumably the result of rubbish dumping during backfilling of the pit.

To the west the pits did not extend beyond a north–south gully (69). To

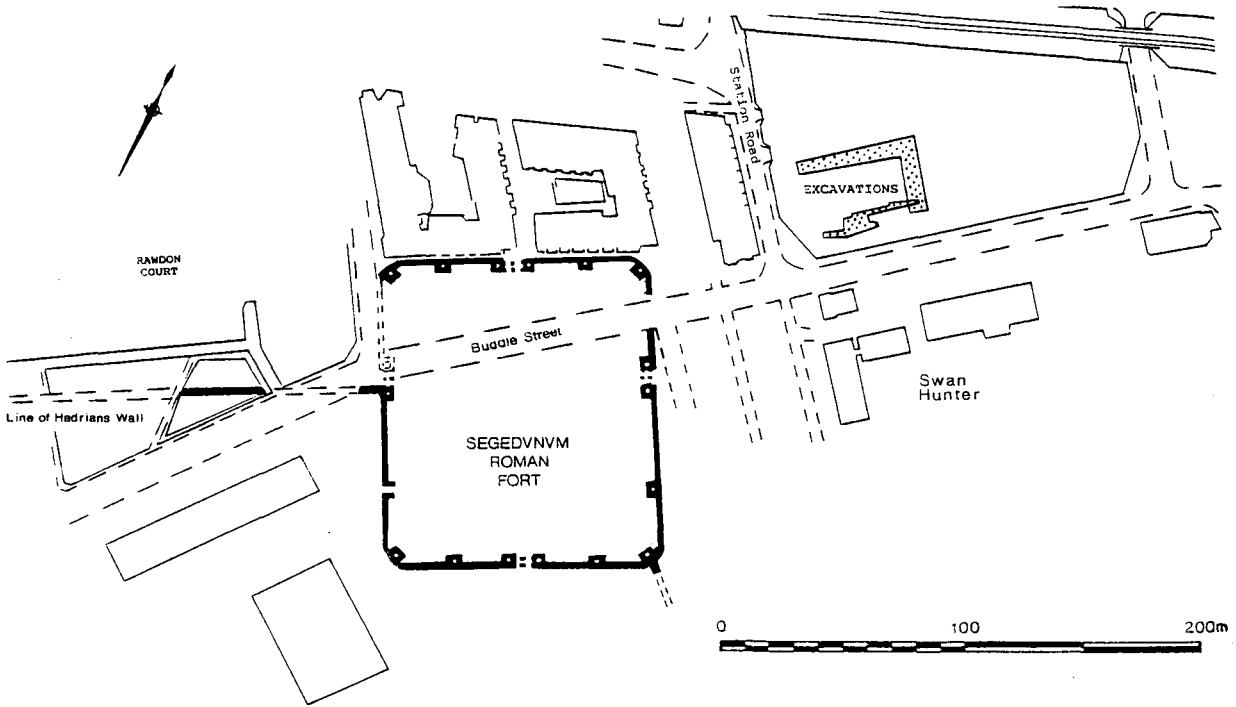


Fig. 1: Location of the excavations in relation to Wallsend Roman fort (Drawn by R. Oram).

the north, they appeared to run off beyond the edge of excavation, while to the east they did not extend beyond a ridge of natural clay. To the south they did not appear to extend beyond an east–west gully (71) that ran along the south edge of excavation. The top of the natural in the area of the pits was generally 0.2m lower than over the rest of the north trench, and it appears that a layer of clay may have been stripped or quarried from the area. The cutting of a machine trench for access to the south side of the trench at this point revealed the level of the natural rising back up to the south of the east–west gully (71).

The Gullies

Trial Excavation: The earliest gully (7/19), 0.5m deep and 1m wide, ran east–west across the excavation and was filled with a mix of yellow and grey sandy clays (6/18). Another gully (21) with a similar fill, only 0.15m deep, ran south from it beyond the edge of excavation.

After the main east–west gully (7/19) had been filled, it was cut through by a north–south gully (5), cf Fig. 3.1. This was 1.5m wide and 0.5m deep and filled with a grey silty clay (4). Five gullies ran into the main north–south gully, three from the east and two from the west. The two from the west (15, 17) were wider and deeper, at 0.4m, than those to the east (9, 11, 13) which were only 0.1-0.15m deep. All were filled with grey silty clay, and emptied into the main north–south gully.

At the south end of the trench the terminal of another north–south gully (29) was found immediately to the east of the main gully; the two were linked by a narrow gully (33).

Two unconnected gullies (25, 27) were located in the western arm of the trench. Traces of gullies aligned northwest-southeast were also observed in the eastern arm of the trench, but flooding made it impossible to study these in any detail.

Main Excavation – North Trench: Within the central part of the main excavation was one north–south gully (69) into which several east–west gullies appeared to feed. An east–west gully (43), cf Fig. 3.3, ran into it from the west and had been recut at least once. Two gullies ran into this east–west gully; one (58) from the north, and one (114) from the south. The northern gully (58) was out of use by the time the main east–west gully was recut. The precise relationship of the southern gully to the main east–west gully was destroyed by a machine trench. To the west the main east–west gully turned southwards apparently cutting through the west

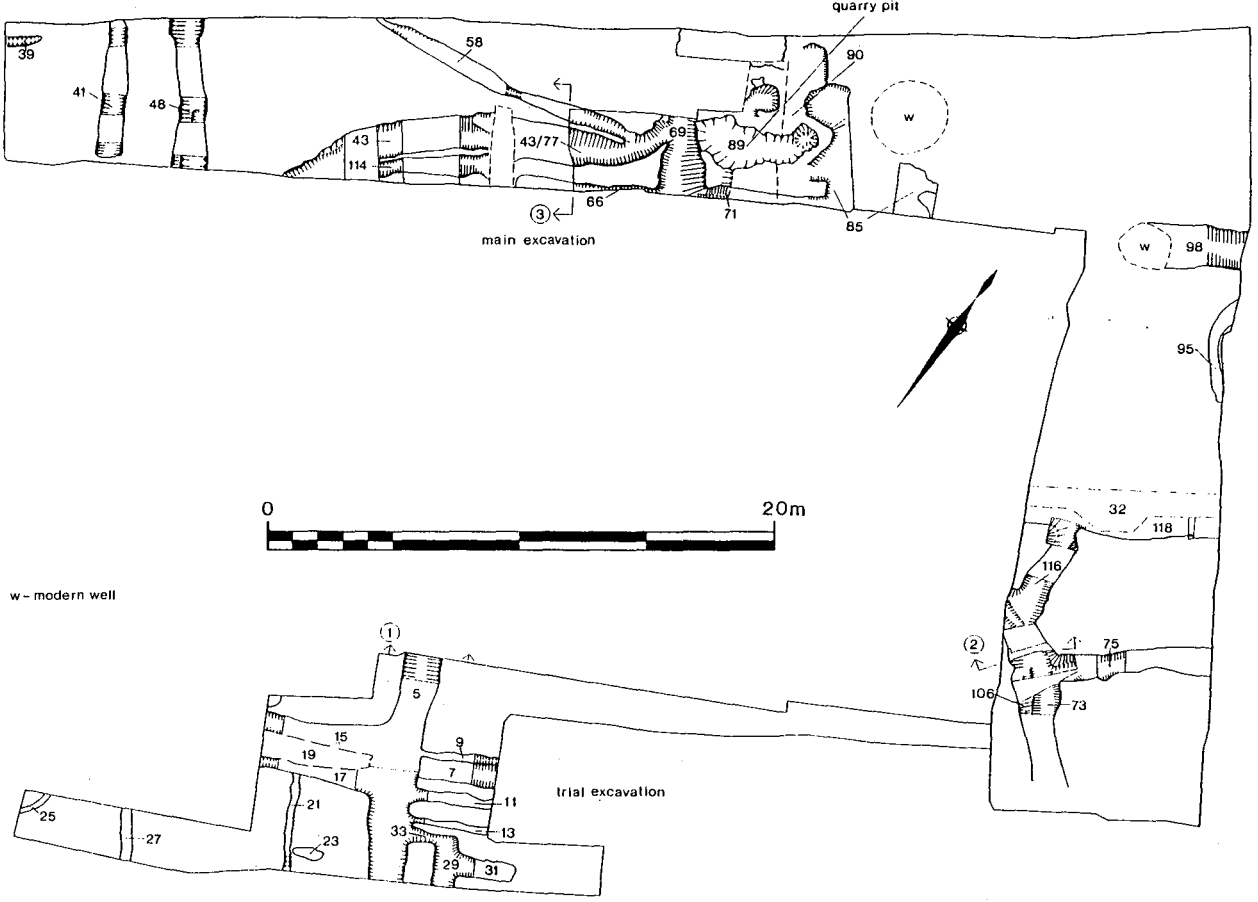


Fig. 2: Plan of the excavations (Drawn by D. Whitworth).

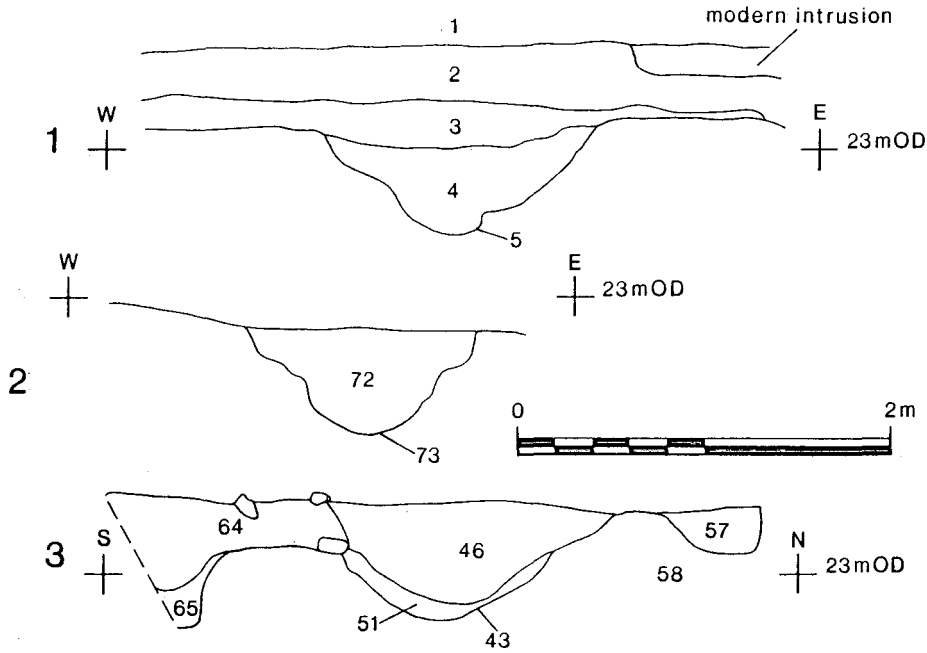


Fig. 3: Sections through several of the gullies (drawn by R. Oram).

end of the southern gully (114), although this was not proven. It is unclear whether both gullies terminated at this point or simply continued southwards beyond the limit of excavation.

Two gullies (66 and 71) were located on the south edge of the excavation; only their north edges were visible. Both appeared to run into the north–south gully (69), and both appeared to start only a short distance from it. However, it is possible that one or both may have turned south instead.

A section cut on the line of the north–south gully (69) at the north edge of the trench located what was taken to be the west side of the gully, but the base and east side were disturbed by quarry pit activity. Continual flooding within the trench made it unclear whether the gully had been cut by a pit, or cut through one. The gully had clearly been maintained for some time, as it continued in use after the east–west gully (43) that ran into

it had been filled in.

To the west of this complex were two north–south gullies (41, 48) running parallel, 2m apart. The western of the two (41) was only 0.28m deep and terminated just short of the south end of the trench. The eastern gully (48) was 0.5m deep and ran across the full width of the trench. A small east–west gully (39), 0.2m deep, was located running off beyond the west edge of excavation.

Main Excavation – East Trench: At the south end of this trench a gully (73), cf Fig. 3.2, was located aligned northwest-southeast. Two other gullies ran into it from the east. The northern of these two gullies (116) terminated just 4m from the main gully, and at its north end it was cut through by a shallow east–west gully (118) that ran across the entire width of the trench. The other gully (75) that ran into the main gully ran off beyond the edge of excavation to the east. All the gullies were filled with grey silty clay.

To the north of these gullies lay two unconnected features; a curving gully (95) on the east edge of the trench, and, a little to the north of that, the terminal of another east–west gully (98).

Abandonment

The quarry pits and the gullies immediately to the west of them, as well as the main complex of gullies recovered in the trial trench, were sealed by a deposit of silty grey clay, in places 0.4m thick, almost indistinguishable from the fills of the gullies themselves. In all probability this represents a general silting up of the hollows left by the gullies and pits on the site, filling up after abandonment; it contained only Roman period finds.

Ploughsoil

All the features and the overall layer of grey silty clay were sealed by a brown loam which varied in thickness from 0.1–0.5m. It contained Roman, medieval, and post-medieval pottery. During initial machining of the main excavation, it proved possible to strip away the modern deposits overlying this layer to reveal a north–south aligned ridge and furrow system. The peaks of the ridges were approximately 9m apart and survived to a height of 0.3m. When this ploughsoil was removed, traces of an earlier east–west system were discovered below, indicating that the area had been under cultivation for some time. Given the amount of time available for the excavation, and the expectation of Roman features below, no detailed records were made of these systems.

As stated above, it is known that this area was in use for arable and pasture at least until the mid-nineteenth century, and it would appear that this was its only use from the Roman period onwards.

Modern

The ploughsoils were overlain by a black clayey loam 0.4m thick. This contained pottery of the early twentieth century, and is assumed to represent the allotments recorded by the Ordnance Survey. It was in turn sealed by red clay shale and brick rubble 0.4m thick used to provide a rough surface for the Swan Hunter car park.

Watching Brief

While the excavations were in progress a watching brief was maintained during the construction of the foundations of a building to the north of the site. Traces of several gullies, aligned both north–south and east–west, were located. One (330) contained a sherd of decorated samian. These discoveries indicate that the system spread at least as far north as the modern railway embankment.

Discussion

That these features are Roman is hardly in doubt. They contained a significant quantity of Roman pottery, while the only post Roman pottery (all of the twelfth century or later) on the site was contained firmly within the later ploughsoil. Initial analysis of the pottery from the gullies and the quarry pits dates activities from the late second to early fourth centuries AD. The lack of any late fourth century pottery suggests that the Roman pottery was not imported to the site from the fort in the post-Roman period, but was deposited in the gullies while the site was still under Roman occupation.

As is clear from the plan, the gullies do not form part of a regular layout (although they do align broadly with the fort); there is, however, a system of north–south aligned gullies into which lesser tributaries run; the north–south gullies themselves all slope down to the south. Where stratigraphic relationships can be established, it appears that the north–south gullies were maintained through to the final abandonment of the system. However, none of them follows through on straight lines from one trench to another, which would suggest that either they terminate or change course in the unexcavated areas of the site.

The gullies are not constructional in character, and there can be little

doubt that they are connected in some way with cultivation, either as drainage channels or plot boundaries; perhaps even serving a dual purpose. It is clear that the gullies were cleaned and maintained, so it is reasonable to assume that drainage must have been at least part of their intended purpose, especially as the main gullies all run south.

With the possibility that they may also have formed plot boundaries in mind, it may be worth noting the alignment east–west of gullies 66, 71, and 98, on the south edge of the north trench (cf fig. 2); the gap between 71 and 98 could perhaps be interpreted as for access.

Despite careful searching no traces of any plough or ard marks were observed. One possible explanation for the lack of marks would be if hand tools, such as spades or hoes had been used for cultivation. The sheer number of gullies located in the area of the excavation would seem to suggest a series of small plots rather than a field system; given the proximity of the site to the fort and vicus at Wallsend, the most likely explanation is that the area is covered by some form of allotment system. The possible existence of similar systems has been noted at several forts including Housesteads (Daniels 1989, 55), Croy Hill (Goodburn 1978, 413), and possibly Moresby (Grew 1981, 325). It is impossible to comment, given the lack of evidence, as to whether this land was provided for off duty soldiery, or simply utilized by the inhabitants of the vicus.

The positioning of such a system beyond the Wall seems at first sight a little odd. However, in the case of Wallsend it can easily be explained by the general situation of the fort and vicus; the river Tyne runs immediately to the south of both, and the only land behind the Wall available for crop production lies to the west in the comparatively narrow strip between Wall and river. Temples have been recorded c475m west of the fort (Tyne & Wear Museums 1991, 3), and any cultivated land would therefore have to be situated beyond that, quite a distance from the settlement and its military protectors. The most probable explanation is that this cultivation took place to the north of the Wall simply due to the lack of available land behind it. Thus this discovery need not be taken as indicating that land would necessarily be used in the same way to the north of other Wall forts. Excavations currently being conducted by Tyne and Wear Museums Department of Archaeology have located similar gullies on the site of the former Rawdon Court flats immediatly to the north of Hadrian's Wall and the east of the fort, indicating that the system was widespread.

FINDS

The Coins (by R. Brickstock)

Two coins were recovered from the excavations, both from post-Roman unstratified deposits.

1. Denarius of Julia Domna (well worn) Obv. [IULIA] AUGUSTA Rev. [FORTVNAE] FELICI Diam: 17.5mm. Date: 196-211. RIC 552.

2. As (completely worn)) Obv. Illegible Rev. ? Concordia Diam: 24mm. Date: Late second-mid third century AD, probably later rather than earlier in this period.

Small Finds (by A.T. Croom)

Glass

Nine fragments recovered including:

- Fragment from the base of a blue-green square-sided bottle with one moulded concentric rib surviving. Context 64 SF.1 (Fill of gully 66).
- Edge piece of almost colourless translucent window glass. Context 312 SF.1 (Unstratified).
- Playing counter, roughly shaped, of almost colourless translucent glass (Unstratified) Diam (max): 13mm.

Iron

The iron finds consisted mainly of nail fragments. Some slag and cinder was also recovered, the only stratified items being from the backfilling of the quarry pits (85 and 86; see above p. 26).

Other Small finds

- Fragmented remains of a Niedermendig lava quern. Context 86 SF.1 (Quarry pit fill)
- Gaming counter from rilled body sherd of samian mortarium. Context 88 SF.1 (Quarry pit fill) Diam: 25mm.
- Decorative frill from chimney pot, sherd, micacious pale orange fabric with a grey core and large red inclusions. Context 34 SF.10 (Ploughsoil).

The Pottery (by P.T. Bidwell)

The excavations produced 5.33 kg of pottery, which was scattered thinly throughout the fillings of the Roman features and the overlying cultivated

soils. Many of the sherds were small and abraded. Most of the pottery was of late second- to late third- or early fourth-century date. There was one rim-sherd in a fabric heavily gritted with fragments of sandstone, which is probably of late Bronze Age or early Iron Age date (information from S.C. Speak). Details of the pottery will be included in the report on the Rawdon Court excavations.

Bone

Little bone was recovered from this excavation. An analysis of the bone from this and other Tyne and Wear Museums excavations around Wallsend Roman fort is to be published separately.

Environmental Samples

Core samples were taken from the fills of all the main gullies in the north and east trench. However analysis by Jacqui Huntley of the Archaeology Department, University of Durham, revealed no trace of any pollen surviving.

Acknowledgements

The main excavation was carried out by Tyne and Wear Museums Department of Archaeology on behalf of the site developers, Caddick Construction Ltd, who funded the main excavation and provided a mechanical excavator and driver. Thanks are due particularly to Harry Wright (Contracts manager) and Charlie Marriner (Site agent) for help afforded during the course of the excavation.

The trial excavation was funded by the UDC while the property was still in the hands of Swan Hunter. Thanks are owed to the Swan Hunter Property manager, Archie Laverick, for assistance with security and access.

In addition to Paul Bidwell (pottery), Richard Brickstock (coins) and Alex Croom (small finds) who presented reports above, thanks are owed to Jacqui Huntley (University of Durham) for checking core samples from the site for traces of pollen, and to Barbara Harbottle for supplying a copy of the 1839 tithe map of Wallsend. The excavation was directed by the author and supervised by Roger Oram. Numerous staff and volunteers assisted with the work, particularly Adam Frank and Richard Lavery, who were responsible for the majority of the on-site planning.

Bibliography

Daniels, C.M. 1989 *The Eleventh Pilgrimage of Hadrian's Wall*, Newcastle.

Grew, F.O. 1981 Roman Britain in 1980, *Britannia* **12**, 314-368.
Goodburn R. 1976 Roman Britain in 1975, *Britannia* **7**, 291-377.
Goodburn R. 1978 Roman Britain in 1977, *Britannia* **9**, 404-472.
Tyne & Wear Museums 1991 *The Roman Fort at Wallsend and its Environs*, unpublished survey.

NOTES

The Manufacture of Javelin Heads

The author was requested to make a set of five javelin heads for experimental purposes. After consultation it was decided that the heads would be based on an example excavated at Arbeia (cf Griffiths and Sim this volume, fn 2), and that they should be made as close to the original as possible. In order to accomplish this the heads were made from wrought iron and all forging was carried out using charcoal as a fuel. The forgings were made using reconstructions of Roman blacksmiths' tools. All dimensions were taken from a drawing of the original javelin head (Fig. 1).

For the manufacture of the javelin heads a set of criteria was established which was based on the following. All times for all operations were to be kept to a minimum, as was fuel consumption and material wastage. As much forging as possible was done to minimise the amount of time used in filing to shape. Only files were used to finish the heads (no abrasive stones). The heads were not hardened, and were sharpened to a sharp edge, although not as keen as a razor's edge.

Study of the drawing indicated that there were two possible methods of manufacture that could be employed. Theoretically there was no apparent difference in these methods and neither appeared to offer any particular advantage over the other. In order to solve this dilemma it was decided to try both to see if one offered any special advantages. Both methods began in the same way. A billet of wrought iron was reduced to a rectangular cross section and forged to a length that was long enough to handle without needing to resort to tongs (about one metre long). The end of the bar was flared to a fantail shape. The neck of the head was formed between the bick of a small anvil and a round faced hammer. From this point the two methods differed.

Method 1: The fantail was forged into a socket. The bar was cut to length using a hot set (chisel for cutting hot metal). The blank was held by the neck in tongs and the point was forged. The blade was forged to shape and the bevels that provide the cutting edges were forged on the edge of the anvil. Final shaping was done with a file.

Method 2: The bar was cut to length using a hot set. Holding the flared end in flat tongs the blade was forged into shape. The blade end was held in the same tongs and the socket was filed to shape.

Both methods were tried, and it soon became apparent that the second

method was unsatisfactory as the neck was very weak when at forging temperature, and tended to crack and break at this point. It was therefore decided to adopt the first method for the manufacture of this set of javelin heads.

Average weight of javelin heads: 99.4 grams.
Average forging time: 25.26 minutes.
Average finishing time: 42 minutes.
Total production time per javelin head: 67.26 minutes.

The forging time could be reduced if the blacksmith had an assistant; but unless mechanical means were employed it is difficult to see how the finishing time could be reduced.

Field Trials

During field trials (see Griffiths & Sim in this volume for details) some of the javelin heads were damaged when they struck stones. Only a very small section of the tip turned over, and this was remedied with two taps with a small hammer and four strokes with a file. When the heads were thrown at a target made of plywood the end of one bent over to an angle of 61 degrees to the long axis of the head. This was straightened out in the field with a small hammer using a stone as an anvil, and the tip was resharpened with a file; the whole process took 1 minute 51 seconds. One head was taken back to the maker's forge to repair it under workshop conditions. Straightening and sharpening were completed in 1 minute 34 seconds.

Discussion

I consider the forging of these heads to be a task that would be undertaken by a skilled blacksmith as it involves the use of some advanced techniques of forge work, although the reduction of the billet could be undertaken by semi-skilled labour. After completion the heads appeared to be very delicate and flimsy, and I had expected that after the first throw the tip would bend severely or that the head would bend at the neck. I also expected the edges to become blunted after the first throw. However, none of these assumptions proved to be correct: impact with a stone only caused a slight bending at the point, and rather than the head bending at the neck the wooden shaft fractured at the hole made for the fixing pin, this being the weakest point of the whole javelin. The results show that the decision

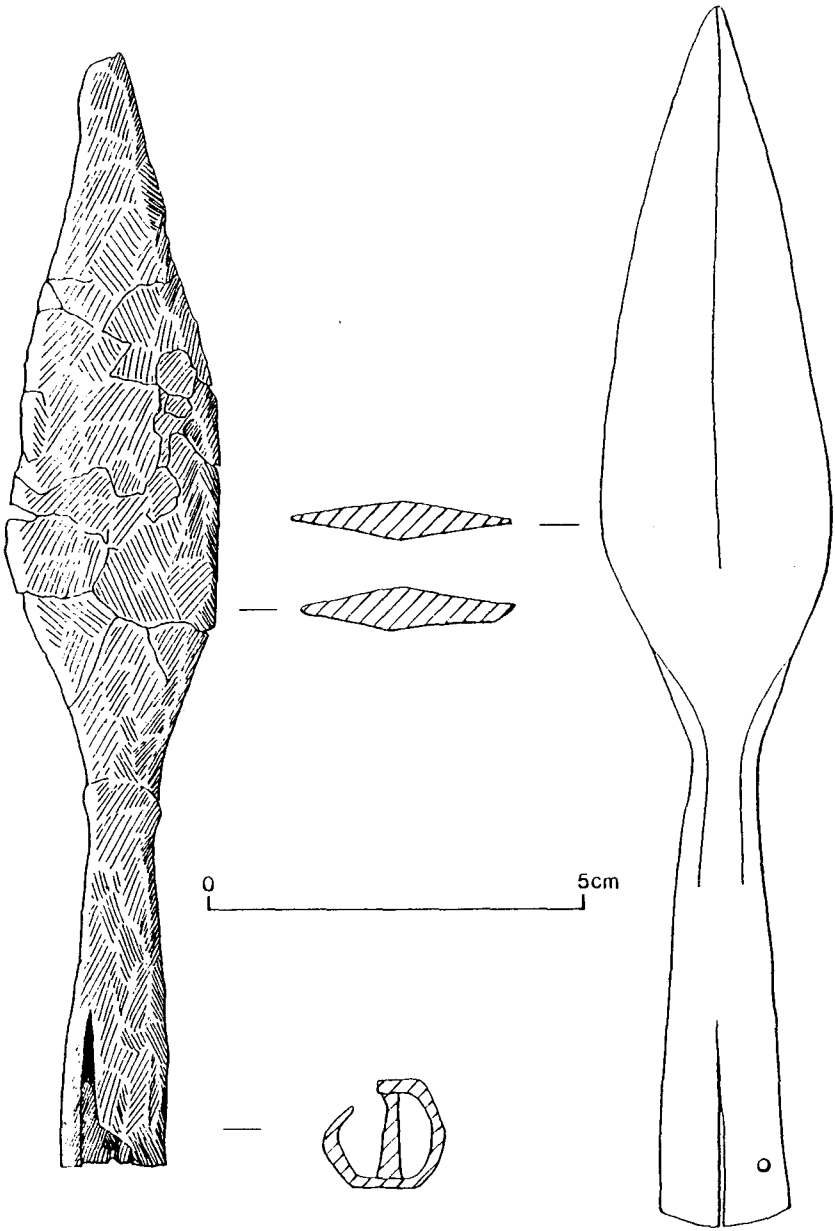


Fig. 1: Original and replica javelin heads. (Drawn by A.T. Croom)

not to harden the heads is justified on the grounds that remedial action could be carried out in the field by unskilled personnel while a hardened head would need the attention of a skilled metalworker to repair it. Furthermore hardening the head would increase the manufacturing time by several hours and would not increase the efficiency of this type of javelin head.
David Sim

The Reconstruction of a Roman Vexillum

Recently, cohors V Gallorum decided to replace its standard with one made entirely from authentic materials. The new standard, a vexillum, was based on the example found in Egypt early this century. Its exact find-spot and dating is unknown, but it has been dated to the early third century on stylistic grounds (Rostovtzeff 1942, 92). It is a rectangle of coarse linen 470mm by 500mm, with two selvaged sides, a hemmed upper edge and the remains of a fringe on the lower edge. It is scarlet in colour, with a painted figure of Victory and angle-fillers 'painted in brilliant gold' (Rostovtzeff *loc cit*).

The cloth

The Egyptian vexillum is described as being made of 'coarse linen', so a bleached white linen with c10 threads per cm in each system was chosen for the reconstruction. The weave of the cloth is not specified, so a plain weave was used as this was the most common weave in use for linen in the Roman period (Wild 1970, 46). Because the cloth was not woven specifically for the vexillum, the reconstruction has hemmed side edges, which were sewn using thread taken from scraps of the cloth. The fringe is integral to the cloth and was made by simply pulling out the weft threads.

Dying

Vegetable fibres do not take dyes as well as animal fibres (Baines 1985, 30), so it is difficult to dye linen, in particular, strong colours. Of the 33 examples of linen found in the 1932–33 excavations at Dura Europos, only 2 or 3 had definite traces of dyes compared to over half of the wool fragments (Pfister and Bellinger 1945). The Egyptian vexillum is 'scarlet' in colour; it could have been dyed using a variety of different dyestuffs available to the Egyptians, including alkanet, kermes, safflower or madder (Grierson 1989, 6, 29). It is possible that it was dyed using expensive kermes (Pfister and Bellinger 1945, 4, 6), but madder was chosen for the

reconstruction because Roman textiles dyed with this plant have been found in this country. Out of the nine samples of wool scraps from Vindolanda that showed distinctive traces of dyestuffs, five had traces of madder or a close chemical relative (eg lady's bedstraw), and three had definite traces of madder (Taylor 1990, 41). However, as the madder – and, indeed, the alum used for mordanting – was probably imported into Britain at this period, there is no reason why any other dyestuff not native to this country could not have been imported also.

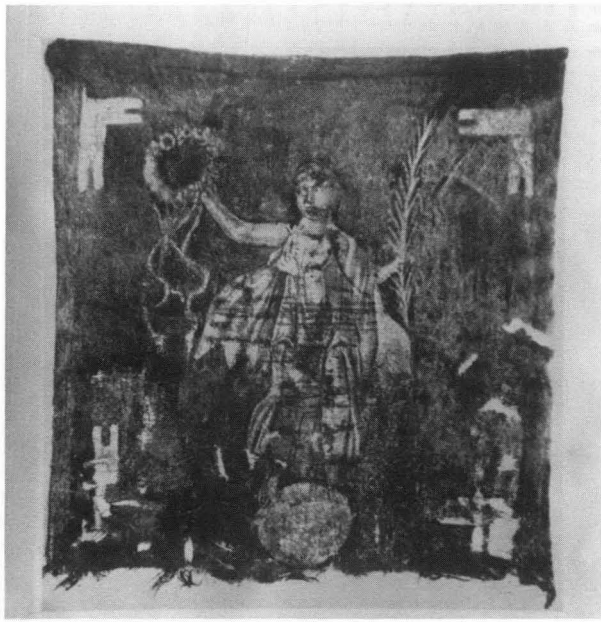


Fig. 2: The Original Vexillum from Egypt. (After Rostovtzeff 1942, Pl.IV)

To get as bright a shade of red as possible, a recipe for Turkey Red dying of vegetable fibres was chosen (Dalby 1992, 55). To make 'fugitive' dyes such as madder more permanent, a mordant has to be used on the fibres before dying to 'fix' the colour. An alum mordant is used in this recipe, since alum gives brighter shades than iron mordants (Taylor 1990, 40). The complex mordanting procedure reflects the difficulty of fixing vegetable dyes on vegetable fibres; the cloth was first boiled in an alum and soda solution for

one hour and then left to soak overnight. The cloth was next put into a solution of tannic acid (available from oak galls), heated for an hour and left overnight to soak. Finally, it was boiled again in an alum and soda bath and again left overnight. Since native deposits of alum could not be exploited in the Roman period, the alum could have been imported, or crude native alum-type mordants could possibly have been used instead,

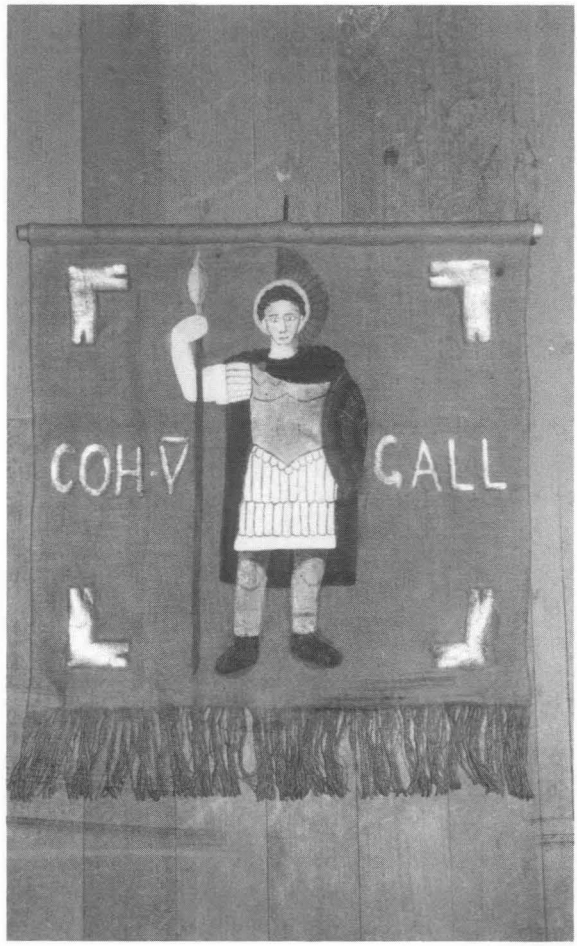


Fig. 3: CVG's reconstructed Vexillum. (Photo: Author)

produced from wood ash, human urine, sheep manure, oak galls, oak or alder tree chips, or even certain aluminium rich club-mosses (Taylor 1990, 40). The cloth was then rinsed and simmered for one hour in a solution containing a weight of madder root equivalent to the weight of the cloth and left overnight in the liquid. The finished result turned out to be a deep rose colour; presumably more experienced dyers could produce better results.

The painting

It had previously been decided that the unit would have a figure of Mars rather than Victory on its standard, so this was repeated on the new vexillum. Because there was no information to the contrary, we assumed the paint was tempera rather than encaustic. The figure was, therefore, painted using powdered pigments mixed with water and egg, following methods used in the medieval period. Egg-white, glair (egg-white whipped to a froth and left to stand), yolk and mixtures of all three were used; egg-white alone tends to be brittle, and egg-yolk too soft, while a mixture – particularly with glair – acts as a good binding agent and adds gloss to the paint (Thompson 1956, 60). Egg tempera is very permanent and does not discolour: 'when dry, and a little aged, this egg painting becomes very hard and durable and almost waterproof' (Thompson ibid, 63).

Most of the pigments used in the Roman period were natural earth colours, attested in this country mainly from wall-paintings. The colours used were white (lime putty), red (red ochre), brown (iron oxide), yellow (yellow ochre), and black (lampblack). The Romans used 'Egyptian blue' (copper calcium silicate) for their blues, which was made from ground glass frit (Davey and Ling 1981, 62). We used smalt, a pigment made from ground glass coloured by cobalt oxide. The other colours used in the painting – grey and flesh tones – were mixed from these basic colours. The figure had a white tunic, grey breast-plate, greaves and helmet, brown cloak and shoes, dark yellow trews and a blue shield and helmet-plume.

The gold leaf

There are three main methods for applying gold for illumination: gold leaf applied onto glue; gold leaf applied onto raised gesso beds; and powdered gold treated as a pigment ('shell gold') and applied with a brush. In the medieval period, the first two methods were used particularly for covering large areas to reflect the light, and the third for adding matt highlights over pigments (De Hamel 1992, 57). From Rostovtzeff's

description, it may be that the latter method was used on the vexillum: however, shell-gold uses more gold than gold leaf and is, therefore, more expensive. We chose to use gold leaf, since this can be burnished to look 'brilliant'. The areas to be gilded were first painted with yellow ochre to create a smooth surface over the cloth and then covered in a thin mixture of animal glue before the gold leaf was applied over it. Glair, size, gum arabic, gum ammoniac and even honey might also have been used as the glue. Since modern gold-leaf is probably finer than any the romans could have produced, two layers were used.

The cross-piece

The Egyptian vexillum was attached to a reed baton that must have been attached to a spear shaft using thong or string threaded through it, since there was apparently no other method of attachment. However, the Society wanted the reconstruction to look more like the usual depictions of vexilla (Rostovtzeff 1942, pl V), so the cloth was sewn onto an ash-wood baton that was then nailed onto the spear shaft.

Conclusions

In making this vexillum, we suffered from a common problem in reconstructional work: the lack of adequate technical information in the report on the original object. We had to make our own choices on several aspects of our reconstruction, and the result is satisfactory rather than good, although many of the problems encountered, such as the dying of the linen and the patchy application of the gold leaf, could no doubt be improved upon by more expert craftsmen. The pigments, although easy to apply, make the cloth quite stiff and, since it is clear from medieval practice that binding media and pigments varied according to the differing requirements of parchment, gesso panels or fresco, it will have to be seen how the mixtures we chose to use act on flexible cloth. The next stage of the project will be the most important: to see how the vexillum survives wind, rain and general use over the coming year.

A.T. Croom

Glossary

Encaustic	the use of pigments mixed with hot wax
Gesso	plaster mixture used to produce a smooth ground for paint or gold leaf
Mordant	a chemical mixture used to fix dyes to the fibres to make

	them more permanent
Smelt	a blue pigment made from ground glass coloured by cobalt oxide
Tempera	the use of pigments mixed with a binding agent such as egg

Bibliography

Baines, P 1985 *Flax and Linen*, Shire Album **133**, Aylesbury.

Dalby, G 1992 *Natural Dyes for Vegetable Fibres*. Minehead.

Davey N and Ling, R 1981 *Wall painting in Roman Britain*. Britannia Monograph Series no **3**.

De Hamel, C 1992 *Medieval Craftsmen: Scribes and Illuminators*. London.

Grierson, S 1989 *Dying and Dyestuffs*. Shire Album **229**, Aylesbury.

Pfister, R and Bellinger, L 1945 *The Excavations at Dura Europos Final Report IV, pt II The Textiles*, Yale.

Rostovtzeff, M 1942 Vexillum and Victory, *Journal of Roman Studies* **32**, 92-106.

Taylor, G W 1990 Reds and purples: from the classical world to pre-conquest Britain, in *Textiles in Northern Archaeology*, North European Symposium for Archaeological Textiles Monograph **3**, ed P Walton and J P Wild.

Thompson, D V 1956 *The Materials and Techniques of Medieval Painting*, New York.

Wild, J P 1970 *Textile Manufacture in the Northern Roman Provinces*, London

Painting a Roman Shield

The painted shields uncovered during the course of excavations at Dura Europos in Syria (Rostovtzeff *et al* 1939, 326–9) represent the only archaeological evidence for the form (in terms of size, construction and decoration) of shields in the Roman Imperial army in the third century AD. Thus when cohors V Gallorum (Quinta) decided to construct an authentic set of Roman shields the Dura examples provided the pattern to follow.

In the main, Quinta attempts to reproduce exact copies of artifacts from the early third century AD; however, whilst the shield illustrated in Figs. 4 and 5 follows the Dura Europos finds in terms of size, construction, and the decoration on the rear of the shield, the same cannot be said for the decoration on the front. The face of the shield is decorated in the style of the Dura Europos finds and draws on contemporaneous patterns from other sources. The validity of the designs used, although open to debate,

are not the concern of this note, which merely proposes to examine the mechanics of shield painting and the problems experienced with the authentic pigments during the course of the painting.

The types of pigments used by the Romans have to be mixed with a binding agent such as egg, casein and size (all used in tempera painting) or wax (encaustic method). This shield was made of planks of wood joined by bone glue, and then painted in tempera, following the example of the majority of the Dura shields. Egg yolk and glair were used as the binding media in this case, although other shields will be painted using other binding agents for comparison.

The shield was painted lying flat to prevent the paint running; although this is not important when painting the background colour, it becomes so when detail is added. All the paints were made by dissolving the pigments in water, then mixing with yolk and glair to form a paste, and diluting with water as appropriate before painting. The earth pigments were generally easily dissolved, but it proved more difficult to produce a solid colour with the vegetable-matter black to a lesser extent, and the smalt to a greater. A wide variety of pigments was used, and in the majority of cases they were used on their own. However, where necessary the pigments could easily be mixed to produce other colours: for example, a white, yellow and brown mixture was used on both the eagle and the cockerel. The green pigment (terre verte) originally used was very pale and produced an unsatisfactory colour, and it was found that a more stable, and indeed a more varied, range of green was available from a yellow and black mix. In terms of the order of painting, first the background colours were painted, the front (red) and then the back (blue), and then the shield fittings – the umbo, grip, and rawhide edging – were added, any damage caused to the paint being repaired before the detailing/pattern was painted. In this we went against the evidence of the Dura shields, where it seems that the fittings were added only when painting was complete; however, we found the fittings give a welcome strength to the shield during painting.

Front (fig. 4)

The first area to be painted was the shield's central blazon. This was made up of concentric circles of colour with further patterning on top. This design was achieved by painting each circle and leaving it to dry before starting the next. Once the circles were complete, thinner paint was used to complete the pattern. Since it was found that whilst thicker paint could be used as a wash for large areas, once layers of paint were built up care had

Fig. 4: The reconstructed shield, frontal view. (Photo: A.T. Croom)

to be taken not to make the paint too thick, otherwise it would either crack and flake or produce a lumpy/uneven finish.

Once the central blazon was complete the remainder of the front was painted, in the order – eagle/victory motif, warriors, cockerel, outer border. The eagle and cockerel were painted using a different technique of applying the main colour and then adding details while this was still wet.

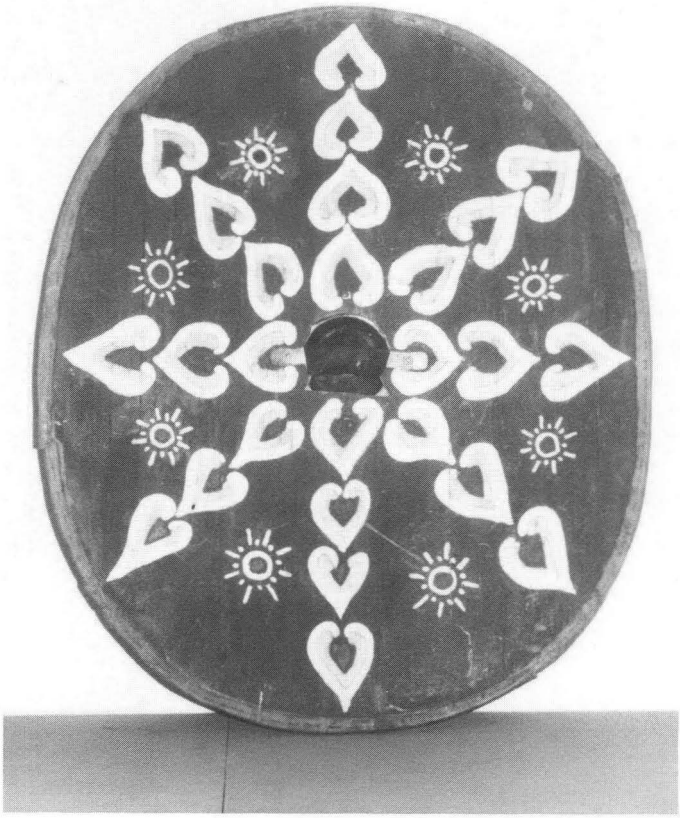


Fig. 5: The reconstructed shield, rear view. (Photo: A.T. Croom)

Each figure was completed individually. Some were outlined before painting, although the majority were painted free-hand. The outer border was also painted free-hand, and where figures encroached onto the boundary area the pattern ceased, starting up again after the figures, as on the Dura examples. Mistakes in any of the patterns were rectified after the front was fully painted. Finally a finish of egg-white was applied over the whole of the front in order for it to act as a protective varnish.

Back (fig. 5)

The shield was supported on four wood blocks, with a layer of leather between the wood and the front of the shield in order to protect the painting. The back, unlike the front, was given a wash of yellow paint as an undercoat below the blue. This served to darken the blue paint, which would otherwise have been lighter than required. The radiating hearts were then painted. These were painted free-hand, with each colour being allowed to dry before the next was added. No egg-white wash was applied to the back of the shield.

To conclude, the process is a slow and methodical one, especially as the drying time for each colour is not only temperature dependant, but also dependant on the viscosity of the paint. The process is also an untested one, for although all the materials used were authentic, the method remains experimental, at least in terms of proportions of pigment and binding medium needed to produce a hard-wearing waterproof coating. However, at this stage, some three months since completion of the shield, the process appears to have worked – although a longer time period (twelve months) is required before meaningful results can be obtained. The shield will also have to be compared to the shields painted using other methods. It should of course be remembered that all this work does is shed light on the practicalities of one particular method available to the Romans, and cannot be used as proof that this was the method adopted.

P. Carrick and I.P. Stephenson

Bibliography

Rostovtzeff et al 1939 *The Excavations at Dura Europos. Preliminary report of the seventh and eighth seasons of work: 1933-34 and 1934-35*, New Haven.

EXCAVATIONS UNDERTAKEN BY TYNE AND WEAR MUSEUMS ARCHAEOLOGY DEPARTMENT IN 1992–3

Arbeia Roman Fort, South Shields

Excavation continued in the eastern quadrant of the fort, as part of the programme funded by South Tyneside MBC and augmented by Training For Work. The Arbeia Society also contributed to the excavation budget, and in 1993 for the first time a substantial financial and volunteer contribution was made by the scientific foundation Earthwatch.

Prehistoric:

Total excavation to natural of an area of 1000 square metres inside the stone fort has led to the elucidation of four principal phases of prehistoric activity pre-dating the Roman occupation of the site:

Phase 1. Natural cut features, early-mid Iron Age or earlier; sealed by:

Phase 2. A disturbed soil horizon with possible evidence for ploughing. These early features are probably to be associated with numerous flints, some as early as the late mesolithic, which occur on the site.

Phase 3. (see fig. 1) A roundhouse and associated agricultural activity of mid-Iron Age date. The mid-Iron Age horizon of this phase has now been exposed over an area of 34m by 23m. The principal feature was a roundhouse 9m in diameter. The horizon of sand and clay contemporary with the roundhouse was corrugated by two successive series of shallow furrows, in an area beginning 10m from the roundhouse, which may have been caused by ploughing or other preparation of the ground for cultivation. The earlier series ran northwest-southeast, and was superseded by more widely spaced furrows running southwest-northeast. These latter may represent a type of Iron Age plough furrowing known in north Britain as cord rig. As these furrows run out of the excavation area, their full extent is unknown.

Charred wheat samples have produced uncalibrated radiocarbon dates from the roundhouse demolition deposit of 225 ± 55 BC and 330 ± 60 BC. Dates from a burnt area 5m to the northwest of the roundhouse were closely similar: 220 ± 55 BC and 265 ± 55 BC. Thus, the roundhouse settlement is firmly dated to the mid-pre-Roman Iron Age. There is no indication that the roundhouse settlement was enclosed. It is not known why this settlement was abandoned and parts of it destroyed by fire. Re-

occupation and a new laying out of the site may be attested by a small ditch (0.50m wide) and bank which bisected the research area, superseding the furrows. The bank lay on the side of the ditch away from the roundhouse. 10m northwest of the roundhouse the ditch terminated or was interrupted for at least 12m (it is possible that it started again outside the excavation area). The upcast bank sealed burnt deposits.

The burnt site, superseded only perhaps by the small ditch, was rapidly buried by a homogeneous layer of clean yellow sand. A study of the sand showed that it is most likely to have been windblown, perhaps deposited in a great storm.

Phase 4. A final phase of plough marks, on top of the blown sand layer which sealed Phase 3, probably represents late-pre-Roman Iron Age activity on the site. This discovery was made as the sand was being exposed and removed towards the southwest limit of excavation.Northeast of that point no traces of such agriculture had survived atop the sand because the deposit, which had probably risen towards the northeast, had been terraced to provide a level surface for the building of the Roman parade-ground that had to be removed everywhere in this area to reveal the traces of the Iron Age occupations underneath. This suggests that late pre-Roman Iron Age settlement to accompany the agricultural activity awaits discovery on top of the sand accumulation. This activity was followed (though it is impossible at present to say with or without any sort of interval) by the earliest Roman construction on the site.

Roman:

Excavation was carried out in three areas of Roman deposits:

i) A further 250 square metres of the possible parade ground of pre-stone fort date was recorded and removed to reveal the prehistoric features described above.

ii) Excavation of an area of the southeast rampart showed that the rampart of the first (mid-Antonine) stone fort had been cut into during the first phase of the extended supply-base fort (*c*205–7 to *c*222–35) in order to construct latrines opposite the officers' houses of the barracks of that period. In the second phase of the supply-base (*c*222–35 to *c*300), the rampart area contained a previously unknown barrack, giving a total of six barracks of this date in the fort's eastern quadrant. This building, in contrast to its companions, had later undergone a change of function, its distinctive barrack partitions being removed. In the fourth century the rampart area was occupied by a new building of unknown purpose.

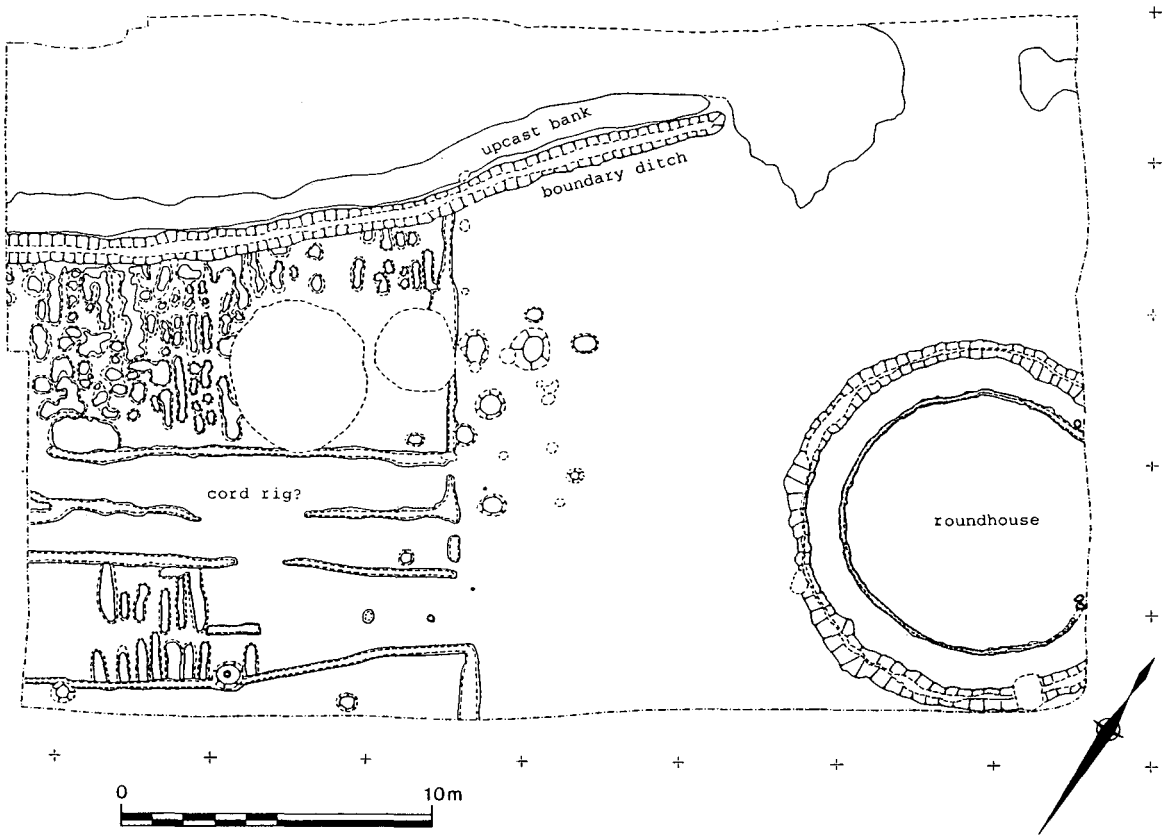


Fig. 1: The mid-Iron Age site beneath the eastern quadrant of South Shields Roman Fort (Drawn by K. Inkster).

(iii) Excavation of the baths in the southern corner of the fourth century courtyard house showed that the plan of the baths previously published represents the bath-suite after a considerable enlargement in a second phase. None of the apsidal plunge baths existed in the primary arrangement. The existing hypocaust basements were almost entirely of secondary construction. The plan of the primary baths was obtained.
(Summary by N. Hodgson)

Mill Dam, South Shields

Excavation was carried out in May 1993 on behalf of the Tyne and Wear Development Corporation on the proposed site of a new arts centre at the Old Customs House, the Mill Dam, South Shields. The aim of the excavation was to recover evidence for the location and topography of the Mill Dam inlet (known to have been filled before the building of the customs house in the 1850s) and for port installations, settlement or other activity in its vicinity.

The earliest archaeological levels explored consisted of dumps of gravel, red ash, and industrial clinker. Traces of stonework were noted below this, but continual flooding made it impossible to excavate further.

Built immediately upon this dumped material (which may possibly have been terraced) was a series of stone walls which formed part of an industrial installation. Initially it appears to have been used for coal storage, but a stone lined cellar was subsequently inserted and used as a furnace. This was eventually infilled with a dark soil that contained finds no later than the mid eighteenth century.

The area of the furnace was later cut into by a large pit containing industrial waste. A separate pit, containing gravel ash and slag, was found to the northwest of the stone structures. Neither pit produced finds more recent than the eighteenth century. Both were cut by a third intrusion filled with industrial waste (which produced no datable material) and the whole site was sealed by ballast.

It appears that the Mill Dam inlet in the area excavated had probably been filled in before the later-seventeenth or first half of the eighteenth century, the probable date of use of the industrial installation recovered, which had been built directly upon the ash and clinker infill of the Mill Dam. The water level prevented any detailed examination of the ground beneath the ash infill, and so the possibility of medieval or earlier activity in the area of the inlet preceding its infill cannot be precluded. There was no apparent evidence for the identity of the material being manufactured

or processed in the furnace-cellar, but the waste was sampled, and specialist analysis may identify the process. The installation probably passed out of use in the course of the eighteenth century, when the area was used for the disposal of further industrial waste before being turned over to a ballast dumping ground.
(Summary by N. Hodgson)

Morton Walk, South Shields

Excavation was carried out prior to redevelopment of a children's playground at Morton Walk, South Shields. The work, which was funded by South Tyneside MBC, took place in June-August 1993. The site lies approximately 300m south-west of Arbeia Roman fort in an area thought since Victorian times to comprise part of the cemetery of the fort, as burials and cremations were found there during the construction of housing. One of the finest tombstones now on display in the Roman Fort Museum, that of a young Moor called Victor, was apparently found in the area now occupied by the playground.

The excavation succeeded in its primary aim of confirming the presence of a Roman cemetery; in addition, it was possible to distinguish three main phases of development, and interesting grave-goods were found.

No pre-Roman structures were present, although worked flints distributed throughout the Roman levels suggested that there had been prehistoric activity in the area.

The earliest phase within the cemetery was represented by two cremations (A and B on Fig 2) and three inhumations (1, 3 and 4 on Fig.2). Both cremations were contained in pottery vessels dated to the second century. Cremation A was within a flagon; another flagon, possibly containing an offering, had been placed beside it. Both had been covered by a mound of clay. In the second cremation the burnt bone had been placed in a Black Burnished Ware 2 cooking pot, buried in a small pit.

On the evidence of small finds and pottery, the three inhumations can be dated to the fourth century. Because of the nature of the soil, no unburnt bone survived in any of the graves. However, the grave-goods and other evidence provided some information about the individuals buried there and the rites practised. The size of grave 3 indicates it was that of a child; it contained a pottery beaker. In grave 4 the decayed wood of a rectangular coffin was found, together with the remains of the bier on which it had been carried. Stains within the sandy fill of the coffin preserved the outline of a body, c.1.8m in length, and the individual is therefore presumed to be

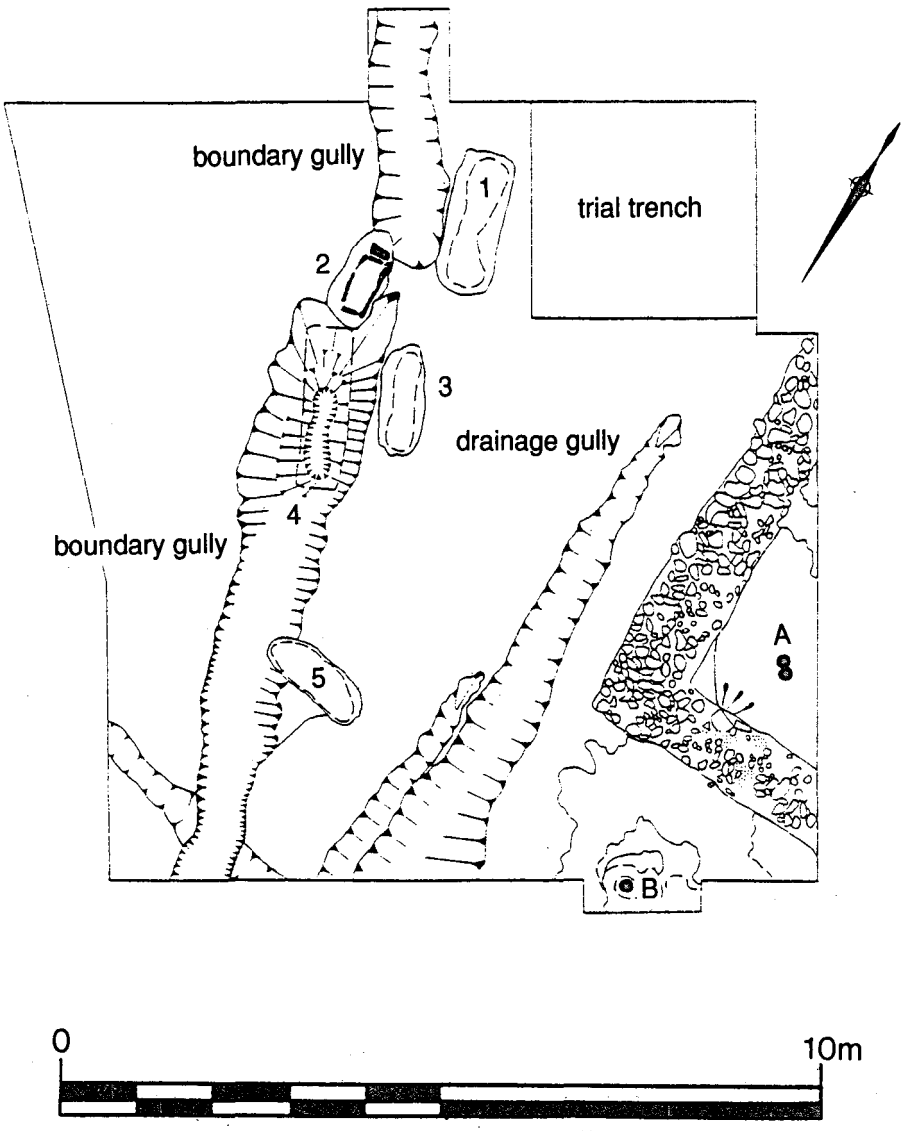


Fig. 2: Excavations at Morton Walk, South Shields, 1993. Scale 1:100 (Drawn by D. Whitworth).

Fig. 3: Morton Walk cist, with cover intact. (Photo: W.B. Griffiths).

Fig. 4: Morton Walk cist, after cleaning. (Photo: W.B. Griffiths).

an adult male. A small beaker had been buried with him. Grave 1 was clearly that of a female because of the type of grave-goods it contained. In one corner was a group of personal ornaments including bracelets, finger-rings, a decorative chain, a small knife and a necklace of glass beads, still lying in the order in which they had been strung.In the opposite corner was an object made of fine-quality jet, probably a distaff. A decorated jet spindlewhorl was also found in the grave.

The second phase of the cemetery was represented by a boundary gully. This had a narrow entrance, across which a stone-lined cist (grave 2 on Fig. 2) of a very young child had been inserted (see also figs. 3 & 4).

The boundary gully was superseded by a substantial stone wall, of which the cobble foundations survived. These were c.1m in width. Only a right-angled corner of the wall was found within the excavation area, so it is impossible to say whether it formed the perimeter wall of an entire cemetery or of an individual funerary monument. A possible grave was aligned with one side of the foundation (5 on Fig. 2).

The demolition of the wall is not precisely dated. Pits and scoops were found which suggested robbing. The silty fill of the latest scoop contained a sherd of pottery of thirteenth or fourteenth century date.

The excavation showed something of the way the topography of the area had changed in the nineteenth and twentieth centuries. In the Roman period the land sloped to the east and to the south. Terracing in Victorian times had removed all the higher ground in the western part of the site. Further landscaping occurred in the 1960s when the old houses were demolished for the construction of the children's playground. However, it was fortunate that Roman features survived immediately under the tarmac surface of the playground in the eastern and southern parts of the site.
(Summary by Margaret Snape)

Wallsend

See the excavation report in this volume.

Washingwells Farm, Whickham.

In April and May of 1993 an excavation was undertaken by Tyne & Wear Museums Archaeological Department in a field south-east of Washingwells Farm (NZ 219602). Its aims were to investigate known crop marks and to assess the extent and condition of the surviving archaeology in advance of emergency reclamation work by Gateshead Metropolitan Borough Council's Engineering Services Department, who funded the work.

The area under investigation was sloping ground outside the scheduled area of the Roman fort discovered as a crop mark by Professor Norman McCord during aerial survey in 1970. It was thought that there may have been a good chance of encountering Roman material because of the close proximity of the fort.

Two specific crop marks were trenched. The first, consisting of two parallel lines, some 200m long and roughly 10m apart, was seen on air photographs to run obliquely from the south-east gate of the fort in the general direction of Washingwell Woods, but was found to be a geological feature. The second cropmark was one of a series of circular features about 4–14m in diameter. This particular example was of interest, as it appeared from air photographs to be lying within the corner of a rectilinear crop mark. It was suspected that these crop marks either were of prehistoric date or represented disused mine-shafts: the latter proved to be the case.

An in-filled coal shaft was found along with the remains of associated workings dating to the late seventeenth century, and including a wooden horse whim and evidence of open air-coke production. A possible trackway was also examined, which was found to run around and away from the shaft.

Medieval pottery, ranging in date from the twelfth to fifteenth century, was recovered from the ploughsoils and indicated activity in the general area before the coal mining operations. The lack of anticipated Roman material here is perhaps not too surprising when taking the topography into consideration. The extra-mural settlement is more likely to have been located to the north of the fort site, where a large area of flat ground can be found.

(Summary by G. Stobbs)

REVIEWS

***The Amateur Archaeologist* by Stephen Wass. Batsford, London, 1992. Pp 160, 92 illus. ISBN 0 7134 6896 3.**

Perhaps there is one major fault with this book: its title, an unfortunate and misleading start to an otherwise excellent volume. This may seem petty, but in the eyes of the reviewer the title evokes a less sophisticated period of field archaeology when, for example, excavation was undertaken by characters such as the notorious Dean Merryweather, who (page 16), over a period of 26 days in 1849, dug up 31 barrows or burial mounds! The golden age of archaeological incompetence thankfully has no place, other than historical curiosity, either in contemporary field archaeology or this book, which provides a good basic initiation to the subject.

It is readily apparent from its introductory chapter that the work represents a heartfelt plea for the interested lay-person to get involved. An unsurprising proposition when one considers that the author has been doing just that for the past twenty five years or so with an infectious enthusiasm which permeates through the whole of this lively, readable book. In an era of increasing professionalism and marginalisation of the amateur, this represents a salutary lesson to all in authority. The past surely does not 'belong' exclusively to the professional archaeologist, and it is perhaps this institutionalisation of it which has lead to the rise of the increasingly 'anti-establishment' metal detector enthusiasts. Surely it is better to encourage public participation in their heritage in an archaeologically acceptable way, which is where this book succeeds.

The remainder of the work demonstrates both of the major spheres of field archaeology in a lucid style with clear, informative illustrations. The second and third chapters deal with field survey and lead the reader in order of increasing complexity through all its aspects: from initial visits to archaeological sites, to the planning, execution, and eventual publication, of large scale projects which may be the culmination of years of work by a number of individuals. However, occasionally Wass deals with the more technical aspects of surveying with a brevity which the inexperienced may find misleading; it is here that the book should be used as a general starting point, and more specialist volumes such as Surveying for Archaeologists (Bettess 1984) be consulted.

The final three chapters provide an ideal introduction to excavation and are an essential read for all first time 'diggers'. They are not merely a lesson

in how to dig, but a survivor's guide to the whole excavation experience, dealing with aspects of archaeology ranging from how to join an excavation, to elsan blue site toilets, and finally, archaeologists' propensity for post-work alcohol! Juxtaposed with such lighthearted observations are valuable comments on the methods and procedures involved in excavation, and also important tips on site safety. The work is not a comprehensive excavation text book in the style of Philip Barker's Techniques of Archaeological Excavation (1993), with which it does not compare favourably. For the beginner, however, the well informed economy of synthesis which characterises The Amateur Archaeologist makes it far more preferable as an introduction to excavation.

This work is, in short, an ideal beginner's guide to field archaeology: a book which all those new to the discipline should be encouraged to read. For the newcomer it provides a veritable 'mine' of information which relays concisely the reality of modern archaeology. Had I read it before my first dig, standing ankle deep in water in the bottom of a ditch, trying to distinguish colour changes in two near identical shades of mud, then excavation would not have come as the profound shock that it did to one reared on the illusion that classical archaeology took place in countries and climates far removed from the wet Yorkshire mud into which I was rapidly sinking! For the professional this book conveys the important message that archaeology is for all. In all this is a valuable work, it's just a pity about the title!

D.J. Robinson

***Roman Britain* by T.W. Potter & Catherine Johns. British Museum Press, London, 1992. Pp.239, 12 colour plates & 90 plates/illus. ISBN 0 7141 2045 6.**

This is the fourth volume in the 'Exploring the Roman World' series, which is gradually covering the Roman Empire province by province. It is also the latest in a long tradition of scholarly books on Roman Britain. The chapters follow the standard format for works on the province, beginning with a review of the situation prior to the Claudian invasion, followed by a chapter outlining the general military history of the province up to the end of the third century AD. Four themed chapters on aspects of life in Britannia follow; 'The Romanisation of town and country', 'Architecture and art', 'Personal possessions', and 'Pagan gods and goddesses', with a final concluding chapter on late Roman Britain. Each chapter is followed by a short, but scholarly, reading list, which will certainly be of use to people at all levels of interest, although there is perhaps a bias towards other

British Museum publications.

This is without doubt an 'up-to-the-minute' work, incorporating many recent excavations and theories. The authors also neatly cover at least the basics of the major topics, noting areas of academic uncertainty and avenues for future work. For instance, there is a spirited attempt, made in the light of the discovery in recent years of a fistful of fortresses and vexillation fortresses, to summarise the movements of the legions in the first years of the conquest (p.46). Acknowledgement is made of the possibility of a more complicated picture of the garrisoning system for Roman forts, as indicated by excavation (p.57). The potential of landscape studies for elucidating the impact of the Romans on Britain is also discussed (p.96). Unfortunately such points are touched on only fleetingly; disappointing, if inevitable in a book with such a wide remit.

It is the latter three themed chapters that cause this book to differ from other volumes on Roman Britain and the other volumes in the 'Exploring the Roman World' series, with their preoccupation, especially in 'Personal Possessions', with high quality finds from the province. Indeed, of the twelve colour plates in the book, only two are not of finds. This concentration on artefacts can perhaps be explained by the fact that both authors work for the British Museum, which also publishes the volume. However, to this reviewer at least, artefacts standard throughout the Empire, such as a lead glazed flagon from Gaul (pl.VI), need not be discussed at length in a book about Roman Britain. A similar charge can be levelled at the chapter on 'Pagan gods and goddesses' which, although a clear and competent summary of pagan religions in the Roman period, has little discussion of the implications and effects of pagan religion on the Romano-British population in particular.

The reason this volume is unlike the others in the 'Exploring the Roman World' series is that, as the authors freely admit, it is written for a British readership, so matters such as geography and the like are taken for granted. The authors state in their introduction that they felt free to 'stray... into specialist interests', which is reflected in part in the inordinate amount of attention paid to finds. Given that this series has been produced for a British readership this decision is understandable, but it is a shame that the volume on Britain in an integrated series on the provinces of the Roman Empire, is not laid out in a format which allows a direct comparison of Britannia to the other provinces. This is something which has never been attempted before, and would have added greatly to the uniqueness and appeal of both the volume and the series.

Nevertheless, this book is an impressive addition to an important series. It also is a stimulating read, and brings readers up to date on some of the newest thinking on the province, while retaining due respect for the older established themes as well. It also avoids the tendency all too prevalent in such works to present the subject as cut and dried, preferring simply to chart the current state of affairs. This is very wise for, as the authors state: 'The last word on Roman Britain can surely never be written' (p.11).
W.B. Griffiths

***Walking the Wall* by Tony Hopkins. Keepdate, Newcastle-upon-Tyne, 1993. Pp. 148, illus. ISBN 0 9520494 0 6.**

Hadrian's Wall has often been an inspiration for authors, especially experiences of walking its course. William Hutton was the first to do this in 1802. Many others have done so since: recent ones of note being David Harrison (1956) and the renowned journalist Hunter Davis (1974). Now, Tony Hopkins has added his contribution, a story of a week's walk of the Wall from coast to coast, beginning at South Shields and ending at Bowness on Solway.

His book is divided into seven chapters, each covering a day's walk; with a very brief but poignant introduction and a small information section at the end.

Chapter one, the first day, starts on the seafront at South Shields, from where he makes a visit to Arbeia Roman Fort. Off next to Jarrow, then to Wallsend with the help of the pedestrian tunnel. From Wallsend, he takes the line of the Wall along the modern Fosse Way, rather than the proposed Hadrian's Wall National Trail route along the banks of the Tyne. He reaches Newcastle at the end of the day.

Day two starts in Percy Street and involves a digression to visit the medieval city walls and the Keep. From there, he avoids the course of the Wall and heads off instead to the Quayside and along the riverside to Scotswood. The A69 is reached via Denton Dene, but is soon abandoned for Lemington and the riverside again. From here he cuts across to Throckley, Heddon next, then Harlow Hill.

Day three follows the line of the Wall past Whittle Dene reservoirs, passing Haltonchesters fort and on to Portgate. His journey continues to Chollerford, taking in Brunton and the Roman bridge abutment on the east bank of the North Tyne.

Day four begins on the riverbank at Chollerford, from where a detailed visit to Chesters (and the excavations taking place there) is made. On next

to Carrawburgh for a spot of mole hill bashing – the prize, some Roman pot sherds. A quick visit to Mithras and then back onto the line again. A further divergence onto the Stanegate is made, leading to Barcombe and then Vindolanda. From here the central sector is reached ending the day, with a transient mention of Housesteads.

Day five takes in the impressive Whin Sill ridge, with the remains of the Wall, its milecastles and its turrets. A short stop at the Twice Brewed pub prepares the author for further ups and downs, and the ruins of Great Chesters fort in all its innocence. Next comes Walltown, Thirlwall Castle and, finally, Greenhead. Day six finds him leaving Greenhead heading for Birdoswald. Passing the remains on the way, he braves the River Irthing for a climb to Harrow's Scar. Birdoswald done, on further west to Lanercost Priory, Castlesteads and Stanwix.

Day seven, the final day and a look around Carlisle, the Border City. Then on, where not many venture, to Bowness, through Burgh Marsh, Drumburgh and Port Carlisle. Finally, an anti-climax at Bowness, where to quote the author's disappointment 'there was no concession to history in the whole village; no signs or notices, no shops selling leaflets, not a word of interpretation'.

As the author himself says, this book is a personal interpretation of the Wall and indeed for me it has been a pleasant and informative one. What makes this book stand out and shine is its descriptions of the fauna and flora found along the way. Tony Hopkins is an expert in natural history and wildlife and his eyes see so much along the course of the Wall that I felt that I had missed so much on my own numerous visits.

The text contains a mixed balance: archaeology, history and descriptions of the wildlife, with the odd anecdotal story thrown in. More than that there are, injected practically onto every page, magnificent water-colour drawings of everything from a section of Wall, a landscape, to the flower of a wild plant or a Woodcock's feather. The centre of the book carries a bonus, eight pages of colour paintings.

Summing up, this book is a gem, a treasure trove of information about the varied countryside through which the Wall passes. There are a few minor discrepancies in the background information, too few to mention though. All in all, this is a worthy addition to the collection of any Wall scholar, professional or amateur.

Graeme Stobbs

***The Roman Legions Recreated in Colour Photographs* (Europa Militaria Special 2) by Daniel Peterson. Windrow & Greene, London, 1992. Pp 96, 125 colour plates. ISBN 1-872004-06-7.**

Daniel Peterson is the director of the museum of the Third Armoured Division of the US Army, based in Germany. In 1982 staff from the Museum set up a Roman re-enactment group based on the Roman legions of the late first century AD. Several such groups of re-enactors now exist throughout Europe (The group based at Arbeia, 'Quinta', portrays auxiliary soldiers of the early third century AD – a period to which less attention is generally paid). This book includes some excellent colour photographs of members of the various re-enactment groups displaying the fine detail of their reconstructed kit.

Peterson has made a noble attempt to show that such groups take their research very carefully, and it is clear from the photographs that all concerned pay minute attention to detail. Unfortunately the text lets the whole thing down by falling very neatly between two stools. On the one hand, there is not enough detail for the academic reader, with no footnotes or references that could be followed up. On the other hand, to the 'lay' reader, not too well versed in the study of Roman military equipment, the book contains many academic terms which are often not explained satisfactorily in the text – a failing which could be rectified by the inclusion of a reasonable glossary. The main thrust of the book is towards the equipment of the first and second century Imperial legionaries, with further sections on Republican legionaries, third century and later Imperial legionaries, centurions, standards, auxiliaries, and legionary cavalry. Personally I thought the 'auxiliaries' section was of no benefit to the book. A second book with auxiliaries as the main subject would perhaps be more appropriate; after all they were no less important within the Roman armies in terms of numbers and function. Their inclusion as a kind of appendix to a book on legionaries tends to reinforce their 'secondary' image in the minds of readers, which is unfortunate.

A second problem is the way that attention is focussed on the first and second centuries AD, with comparatively little attention being given to the Republican and third-fifth century armies.

It is only fair to the author to note that these elements of bias reflect the interests of re-enactors – who have tended to concentrate on legionaries of this period to the detriment of other aspects of the Roman army. Perhaps this is due to the perceived lesser uncertainty in academic knowledge for the period, and also the understandable preference towards portraying the

legions at their height.

In its favour, the work does achieve a great deal. Photographic illustration rather than reconstructional drawings or paintings does bring the material to life, and the narrative format – short nuggets of text with more detailed descriptive captions for the photographs – allows the reader to dip in and out with ease. In addition, the work is a good advert for the re-enactment hobby. It shows that there is much more than merely 'dressing up' involved, and if it is to be carried off well, re-enactment demands the same academic standard of research as any other branch of study.

However, I would have preferred more detail on specific experimental findings from re-enactment. For instance – for how many marching hours does an average pair of *caligae* last? What is the most comfortable and durable method of lining a helmet? What is the most comfortable method of arranging the marching pack? What thicknesses of wood can various weights of *pila* penetrate? All these questions, I am sure, could be answered by tapping the collective experience of the many groups involved, and they would have added much to our understanding of the legionary and his working environment. In going exclusively for the 'coffee table' market I feel the author has lost an opportunity to demonstrate what a valuable contribution re-enactment can make to Roman military equipment studies.

But having said this, it is nevertheless impressive as a 'coffee table' book. The high price for a paperback is justified by the number of colour plates, many of which are highly atmospheric. My favourite is the double page spread of Junkelmann's Legio XXI Rapax on their trek across the Alps; a study of exhaustion, and a sight no doubt familiar in first century northern Italy! If the book is taken in this light, it is well worth investigating.

P. Mullis

THE ARBEIA SOCIETY

Aims

The Arbeia Society is based at Arbeia (South Shields) Roman Fort, and has five principle aims:

1. To promote interest in/the study of Arbeia Roman Fort and other Roman sites, especially those in north-east England.
2. To carry out archaeological fieldwork in the region.
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.
5. To raise funds to help with the cost of excavations at Arbeia.

Publications

The Society produces two magazines a year in addition to the Journal. These are available at Arbeia fort at a cost of 60p each, plus 34p p&p per copy (except issue 5 which costs £1). They are available to members at a reduced cost of 40p (apart from issue 5 at 60p) each, plus 34p p&p per copy. Please note Issues 1–3 are out of print, but 4–8 are still available.

Volume I (1992) of the Arbeia Journal is available for £5 (non members) or £4 (members), plus 60p p&p.

Membership

The membership fees for the Society stand at the following levels for 1994:

Individual £8.50; Family £10.00; Associate (Publications Only) £7.50

For individual and family members please add £1 if you wish to be a member of the re-enactment group Cohors Quinta Gallorum also.

Concessions (OAPs, UB40s, Full Time Students) – the rates stand at:

Individual £8 (£9 for Quinta); Family £9.50 (£10.50 for Quinta)

Membership runs from January 1st each year. Please forward membership applications to:

The Secretary, The Arbeia Society, Arbeia Roman Fort, Baring Street,
South Shields, Tyne & Wear, NE33 2BB