THE ROMAN FORT AT WALLSEND

(SEGEDUNUM)

EXCAVATIONS IN 1997-8

adjust spacing to match front cover

N. HODGSON

S D. Bailey?

with a contribution by R.J. Brickstock, G. Brogan, P.W. Clogg, A.T. Croom, B. Dickinson, L.J. Gidney, W.B.Griffiths, K.Hartley, R.M. McBride, J.McKelvey, R.S.O. Tomlin, M.E. Snape, C. Waddington, S. Worrell

NEWCASTLE UPON TYNE

2003

TYNE AND WEAR MUSEUMS ARCHAEOLOGICAL MONOGRAPH 2

iii

Circular stud with a disc-headed shank of rectangular cross-section. There are remains of white enamel in the central field, and a number of copper alloy raised dots in the empty outer field.

42. Stud (D:26mm B:10mm shank D:4mm). Hospital, room 3, Period 3A construction, 5547, WSCA598.
Circular stud with large hollow flat head and circular cross-section shank.

Parallel: Corbridge: Bishop and Dore 1988, Fig. 87, no 226

43. Stud (D:37mm+ B:0.5mm overall B:7mm shank D:3mm). Barrack XII, room 4, Period 4 construction, 8198, WSCA705.
Circular stud without surviving edges, with large thin flat head and a short circular cross-section shank.

Parallel: Aldborough: Bishop 1996, Fig. 34, no 371

44. Stud (D:21mm B:7mm shank L:5mm W:4mm). Barrack IX, room 6, Period 3 demolition, 7846, WSCA654.
Incomplete circular flat-headed stud, with rectangular cross-sectioned shank.
Also:
44.2 (D:20mm B:1mm overall B:8mm). Barrack XII, room 4, Period 4 construction, 8171, WSCA693.

45. Stud (D:18mm overall B:6mm shank D:6mm). *Via quintana,* fourth century?, 8114, WSCA674.
Roughly circular stud with off-centre circular cross-section shank.

46. Stud (D:31mm B:11mm shank D:3mm). *Via quintana,* Period 3 occupation, 7698, WSCA711.
Hollow conical-headed stud with circular cross-section shank.

47. Stud (D:12mm B:6mm shank L:8mm W:2mm). Hospital, room 3, Period 3A construction/occupation, 5602, WSCA590.
Small domed stud with copper alloy head and iron shank.

48. Stud (D:11mm B:4mm). Minor West Gate area, unstratified, 7009, WSCA607.
Small domed stud filled with lead. Similar lead-solder filled studs were found as fittings on a box from the Butt Road cemetery in Colchester (Crummy 1983, Fig. 90).

49. Bell-shaped stud (D:27mm B:13mm). Barrack IX, room 1, Period 2 construction, 9015 WSCA659.
Bell-shaped stud with the remains of an iron square cross-section shank. Although found used as fittings on some military equipment, these were probably generally used as box fittings (Allason-Jones 1985, Alföldi *et al* 1957, Abb. 84-5).
Also:
49.2 (D:31mm B:18mm). Barrack XII, ploughsoil, 8104, WSCA671.

50. Handle (L:40mm W:5mm B:5mm). Barrack XII, unstratified, 8100, WSCA715.
Distorted and incomplete handle with diamond cross-section. This type of handle tends to taper into a circular cross-section towards the terminal, although on this example there is a quite distinct ledge. It is impossible to distinguish between box handles and helmet handles.

Parallels: Verulamium: Goodburn and Grew 1984, Fig. 20, no. 181, AD 160-230; Waugh and Goodburn 1972, Fig. 38, no. 114, AD 85-105

51. Loop (L:24mm W:28mm B:5mm). Barrack IX, room 1, Period 2 construction, 9015, WSCA563.
Rectangular loop, possibly from a buckle.
Cf. Canterbury: Ager 1995, Fig. 437, no. 415, fourth century.

52. Tubing (L:172mm W:7mm B:4mm). *Via quintana,* Period 3 demolition, 8131, WSCA684.
U-shaped tubing of 1mm thick sheeting.

IRON (Figs. 142-45)

53. Ringmail (links D:7mm B:*c.* 1mm). Barrack XII, room 5, Period 3 demolition, WSFE710, 9123.
Ringmail shirt made of links approximately 7mm in diameter, some of which are clearly riveted shut, although the links are generally in a poor condition. X-ray revealed no copper alloy fittings. It was found within a pit, and seems to have been a complete shirt when deposited. Unfortunately it was broken into fragments during excavation.

Before conservation the fragments weighed approximately 6.754kg, including some soil and stones. Due to the poor quality of preservation, only a number of the larger fragments were fully conserved; the weight of both conserved and unconserved pieces is now 5.788kg. This weight of course gives only a rough estimate of the weight of the shirt when new, but it can be compared to the 6.600kg of a replica shirt of 7mm (unriveted) links and the 5.440kg of the well-preserved shirt from South Shields. (Croom 2001, 55).

The shirt was found in a shallow pit dug before the construction of the Period 4 barrack. The size and value of a ringmail shirt suggests that the shirt was not simply overlooked and abandoned by the soldiers in the *contubernium,* so it is likely that it was a deliberate deposition, presumably ritual in nature. Votive offerings of ringmail are known from the first century temples at Woodeaton and Hayling Island and from the third century bog and pool deposits of Thorsbjerg and Vimose (Gilmour 1997, 31-32).

The 1975-84 excavations also produced a couple of large finds from the end of Period 2/3 and the start of Period 4, namely a *patera* from the decurion's quarters in Barrack IX, and three mess tins from by the decurion's quarters of Barrack XII (Allason-Jones forthcoming). All of these examples may have been some form of foundation deposit for the new construction, as even if all were in poor condition when deposited, they would have had some scrap value and cannot have simply been thrown away.

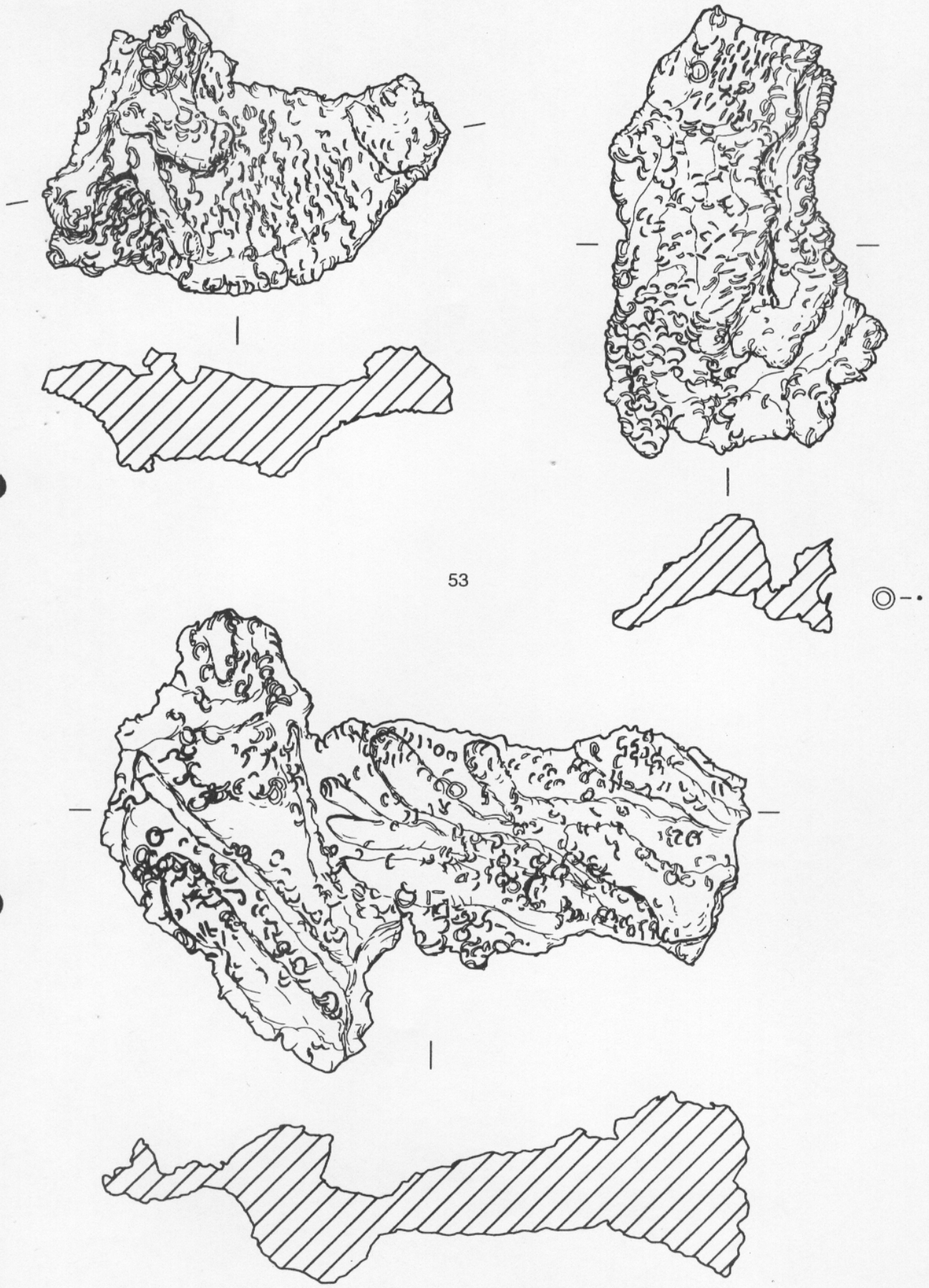

Fig. 142 *Fragments of ringmail shirt. Scale 1:2*

A RING MAIL SHIRT FROM SOUTH SHIELDS ROMAN FORT *by A. T. Croom*

(with contributions by D. Sim and K. Barker).

During 1997 excavations at the fort concentrated on Barrack II of Period 6, constructed in the early third century and destroyed by fire in the late third or early fourth century (Figs 3 and 5). The remains of the building were covered by a thick layer of burnt daub from the collapsed internal walls of the barrack. During the removal of this layer, a complete ring mail shirt (Figs 1-2) was uncovered in a lobby area containing a hearth, immediately in front of two doors leading into residential rooms (Figs 3-4). A fragment of a decorated greave was also found in the same barrack.

Construction of the shirt

The shirt is of standard Roman construction with four links looped onto one and with alternate lines of riveted and solid links. There is some random variation in the thickness of the wire used, from 1-1.8mm diameter, but all the broken links show a circular cross-section (Fig. 6).

The solid links have an external diameter of 7mm and are possibly closed by welding. There are no signs of butt-joins or of the D-shaped cross-section of stamped links. The riveted links are often slightly larger (8mm in external diameter) and are frequently oval rather than circular. The rivets have domed heads c.1mm in diameter and are fastened through the flattened terminals of the links which are approximately 1.75mm across (Fig. 7). A number of the links have lost their rivets and the terminals have sprung slightly apart (Fig. 8).

Condition

The fire that had destroyed the barrack had generated temperatures hot enough to melt the inclusions in the daub walls. The shirt had been sandwiched between layers of hot, very dry daub and, thus sealed, was in remarkably good condition when recovered. Although there was little metal left in the core of the links, the shirt was covered with a surface layer of iron oxide that left many of the details of construction visible even before cleaning.

Deposition

The suite of rooms in which the shirt was found had been divided into three rooms and a lobby rather than two rooms and a passageway, and was possibly accomodation for junior officers. The shirt was found in the entrance lobby

Figure 1. Mail shirt after conservation, upper surface (as found, north would be approximately towards the top right).

Figure 2. Mail shirt after conservation, lower surface.

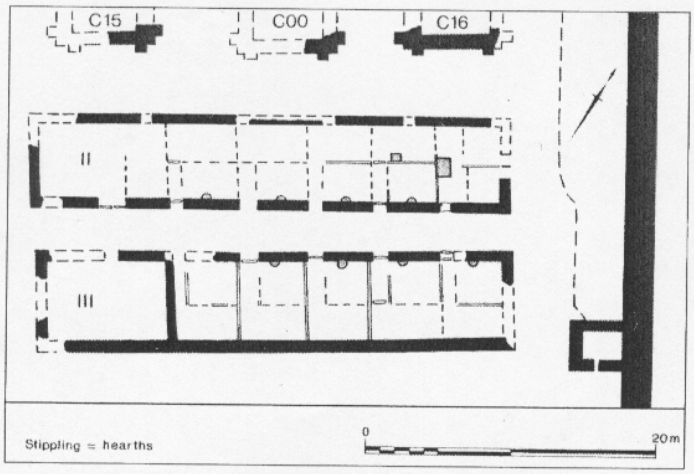

Figure 3. Part of the Period 6 fort at South Shields, showing location of Barrack II (cf. p.33, Fig. 6).

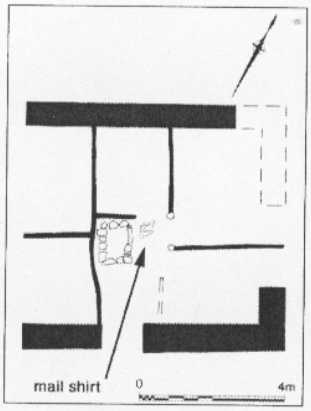

Figure 4. Findspot of the ring mail shirt.

Figure 5. General view of Barrack II.

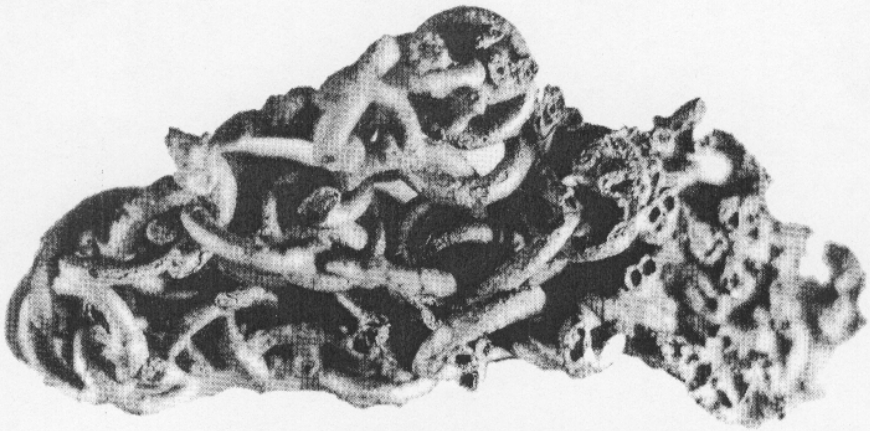

Figure 6. Fragment of mail, showing cross-section of rings.

that had doorways into at least two (and probably all three) of the other rooms as well as the main entrance. It probably also acted as a kitchen as it contained a large rectangular hearth. The shirt was found between hearth and doorways (Fig. 4). The floor of the barrack was covered with a thin layer of carbonised material which in turn was covered by a layer of burnt orange daub 300mm deep. The shirt when found had a layer of daub underneath it as well as around and over it, so it had not already been lying on the floor before the fire, but it is not clear where it had come from.

Ring mail can be stored in a number of ways. Experience with replica mail shirts belonging to the re-enactment group *cohors V Gallorum* has shown that it is convenient and easy to store shirts piled in heaps on a shelf, or placed in helmets sat on a shelf. Storage in a bag either on a shelf or hanging from a peg could help protect it from damp if necessary. A shirt would not be hung on a peg from the nape of its neck in the manner of a coat as this would put unnecessary pressure on a very small section of links, but it could be slung over a peg so that half of it hung down either side. Another alternative manner of storage would be to thread a pole through both arms, which could then be used as a hanger.

The shape that the ring mail had formed is also of interest. A shirt that was in a heap or in a bag, when dropped vertically by a person, forms a small, roughly circular heap. A shirt that was hung, either from a horizontal pole or by being held up by the shoulders of the shirt, forms a long, roughly rectangular shape when dropped. The South Shields example is roughly diamond-shaped. It is assumed that it has not been disturbed since it fell (for example, by people stirring through the debris of the building for salvage) but whether the shape was a result of the way it was stored, or the way that the building collapsed is impossible to say.

In the room where it was found there was little available wall space for shelves or pegs, although it could possibly have been hung from the rafters. However, neither entrance lobby nor kitchen seems a likely place to store a ring mail shirt. It is possible that it was in the room temporarily for some reason, or may perhaps have been stored in the roof space above. If the shirt was dropped whilst the rooms were being cleared, the walls must have already started to collapse to account for the daub underneath it.

Design of the shirt

From the late second century, Roman mail shirts were generally mid-thigh- to knee-length and generally had short sleeves, although long sleeves may have come into use sometime during in the third century. Shoulder-doublings were no longer used, but the shirts were often fastened at the neck by decorated copper alloy plates. When dropped, however, ring mail is so flexible that it forms a featureless pile of folds and any details of the openings, size of sleeves and design of neckline are lost. Very little, therefore, can usually be said about the design of a shirt even when found complete.

X-rays showed that the South Shields shirt did not have any decorated fastening plates. Due to the way that the shirt fell, the mail is sometimes two layers thick (ie front and back of the shirt) and sometimes four layers thick. In a few areas, only a single layer of mail was seen, most noticeably on the outer edge of the lowest section of the mail as shown in Figure 2. A study of the fragments also revealed a few areas where the links are only connected to two others, which presumably represent the borders of openings. Experiments with a replica shirt has shown that it is usually impossible to distinguish between the wide lower opening and the combination of sleeves and neck opening (when, that is, the openings are visible at all). It is possible that the projection at the top of the mass in Figure 1 is a sleeve, which would suggest that the other end was the lower opening. If this is correct it is possible that the lower end of the shirt was folded under the main body of the shirt, and one arm was flung out. It is further possible that the neck-hole opening lay to the right of this arm, but folded back over the top of the body. This is, of course, only one interpretation of the remains and cannot be proved.

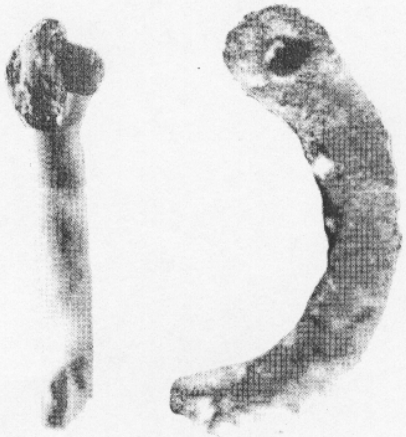

Figure 7. Fragments of two rings, one with a rivet and the other with an expanded and pierced terminal.

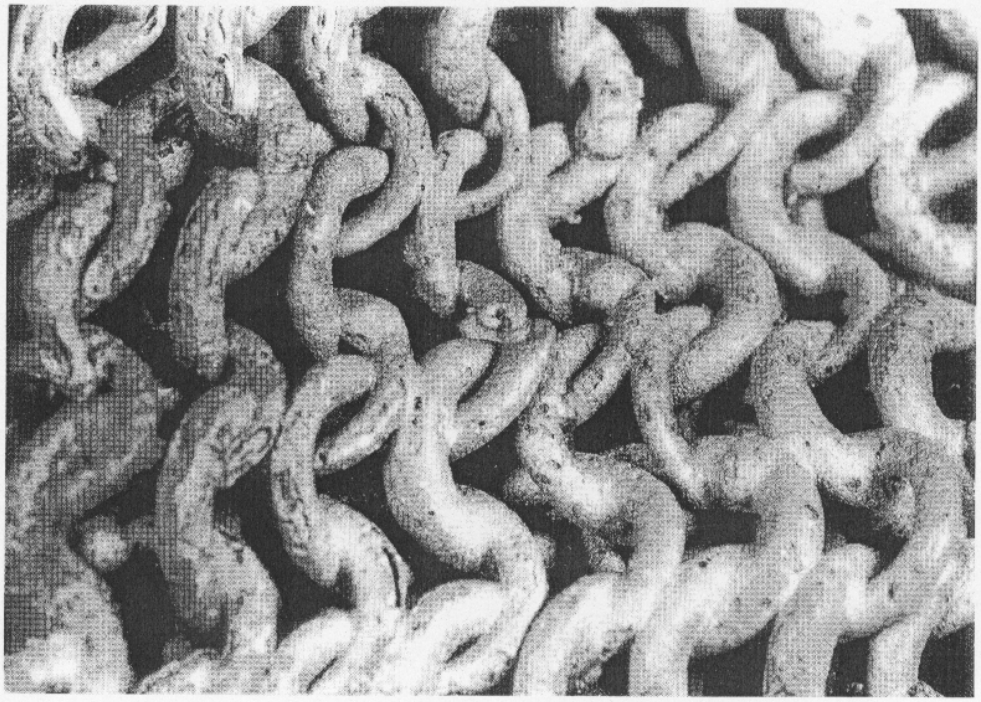

Figure 8. Rings in the shirt, showing variety of wire diameter, rows of rivetted rings and a ring that has lost its rivet (centre).

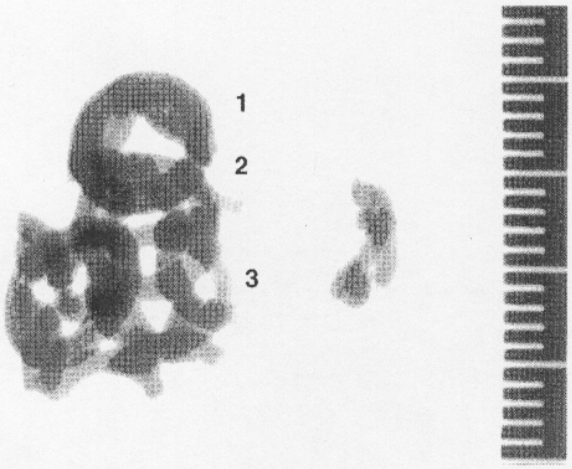

Figure 9. An x-ray of a sample of rings from the shirt (scale shows 1cm divisions).

Parallels

Fragments of ring mail are found frequently on military sites, but the great majority of pieces are small fragments cut from shirts.[1] Because of their value and size few complete shirts have been found. Some were found at Dura-Europos, on the unclaimed bodies of Roman soldiers in the siege mine, at Tower 19 and five or six were recovered from the votive pool or bog deposit of Thorsbjerg.[2] Another possible votive offering is the folded shirt from Bertoldsheim while another folded shirt, inside a helmet, was found in the first century burial at Chassenard.[3] A helmet and shirt were also found in a well at Buch.[4] Other complete, or near complete shirts, come from the Small North Baths at Banasa and the fort at Zugmantel.[5]

Few complete Roman mail shirts have been recovered from this country. There is a complete shirt in poor condition from Wallsend fort,[6] but there is no trace now of the shirt from Housesteads mentioned by Robinson.[7]

After conservation, the complete shirt weighed 5.440kg. This can be compared with 10.200kg for the St Albans Iron Age shirt,[8] 5.788kg for the Wallsend shirt, and 3.496kg for the Bertoldsheim shirt (probably incomplete). The other possibly complete ring mail shirts have not been weighed. These weights are of course only approximate since metal loss and corrosion products have to be considered, but they give at least an approximate figure for comparisons. The replica shirt with rings 7mm in diameter and 1mm thick (unriveted) belonging to *cohors V Gallorum* weighs 6.600kg and has 54,000 rings.

A huge amount of work goes into the manufacture of a mail shirt. Using the timings suggested by Sim[9] a shirt of 54,000 links, half of which are riveted, would take approximately 215 man-days to manufacture. The result is worth the investment, however, because of the shirt's versatility and durability.[10] A shirt could have a very long life if protected from rust, as there are no fastenings to fail, no organic elements to rot, and the mail is so flexible it is difficult to crush or put under stress. *Lorica segmentata* and scale mail both have to be stored with some care, but a ring mail shirt can be left heaped in a pile, slung across a peg or hung in a soft cloth bag without ill effect. An individual link can fail – and on the South Shields shirt there are a number of sprung rivets – but even if it drops out completely, the links it was joined to are still attached to three others, and the shirt is not noticeably weakened. For major damage to a shirt to occur, a large number of individual links would have to fail at the same time.

[1] See Gilmour 1997, table 1; Croom and Griffths 1996, table 1; van der Sanden 1993, table 1.
[2] Gilmour 1997, table 2.
[3] Bertoldsheim: Garbsch 1984; Chassenard: Robinson 1975, pl. 338).
[4] Bishop and Coulston 1993, 141.
[5] Banasa: Boube-Piccot 1994, pls 59-61; Zugmantel: Oldenstein 1997, Abb. 138.
[6] Record number WSFE710; Croom forthcoming.
[7] Robinson 1975, 172; *pers. Comm.* G. Plowright.
[8] Gilmour 1999, 160.
[9] Sim 1997, 370.
[10] O'Connor 1992, 1078.

Report on the mail rings

by D. Sim

A small fragment of mail rings from Arbeia was examined; they had become detached from the main body of the mail shirt before any conservation could be done. Using a jeweller's piercing saw a small section from the broken ends of three different rings was removed but on examination the metal was found to be completely mineralised. X-rays were taken which showed light lines within the rings (Fig. 9). These are probably slag inclusions that run through the length of the ring. Using a shadow graph, measurements were taken on three different rings. The rings selected (Fig. 9) were those that showed a clear outline.

Table 1 Diameter of wire used in links

Ring	position	D of wire (mm)
Ring 1		
Position 1	top of picture	1.799
Position 2	120° to position 1	1.830
Position 3	120° to position 2	1.832
Ring 2		
Position 1	approx. 2 o'clock	1.640
Position 2	100° to position 1	1.644
Position 3	120° to position 2	1.682
Ring 3		
Position 1	top of picture	1.865
Position 2	120° to position 1	1.828
Position 3	120° to position 2	1.828

The conservation of the ring mail shirt

by K. Barker

Condition

The ring mail shirt is one of the best surviving pieces of Roman iron to be found at Arbeia. The main bulk of the object had not corroded in the ground and grey metal was visible through the soil. The edges and thinner areas had corroded to form a solid mass. The ring mail shirt, in one piece in the ground, broke into four pieces on recovery; the two larger pieces were in very good condition with a good join, while the two smaller pieces had undergone considerable corrosion and had definite but weak joins to the main body.

Treatment

Initially the ring mail was X-rayed from a range of directions. This revealed that the mass was links of iron with no solid areas of iron indicated. The soil was removed from the surface using slightly compressed air from an air abra-

sive unit. As clear uncorroded rings could be seen on the main body of the ring mail, the corroded areas were only cleaned to reveal their basic shape. The corrosion products were harder than the surviving corroded rings, making cleaning slow and difficult so as not to lose fragile rings. It was felt that fragile rings protruding from the surface were liable to be broken by handling and by any physical support required during storage or display, so the corrosion was removed using an air abrasive machine with grade 1 (29 micron) aluminium oxide powder but the centre of the rings were left filled for support.

The ring mail is porous in nature with many air gaps in the matrix: for this reason the iron was not desalinated as the drying process would have caused corrosion and future stress in the interior which would have been impossible to remove or counteract. As the ring mail was not desalinated the display case and storage needs to be kept at a constant low humidity of less than 15% to prevent further corrosion.

An attempt was made to join the two large pieces using Paraloid B72 acrylic resin in acetone while a two part epoxy resin was used to re-adhere the smaller pieces to the main body. This made the object very difficult to handle and the epoxy joins were weak and liable to break during handling, so the treatment was reversed and all adhesive removed.

At the end of the cleaning treatment the ring mail was washed in separate baths of acetone and industrial methylated spirits to remove any grease from prior handling and residual aluminium oxide powder from the interior.

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TORC BEADS FROM SOUTH SHIELDS ROMAN FORT *by A. T. Croom*

Excavations immediately to the north-east of the Period 4 (mid-Antonine) *principia* at South Shields produced three copper-alloy fragments described as fittings or settings when originally published.[11] They can now be identified as beads from a native British beaded torc. One fragment was found in an occupation layer in Building II, a turf-walled structure dating to Period 3 (late Hadrianic or early Antonine to mid-Antonine). The other two fragments were found in the metalling of a Period 4B (mid-Antonine) street and a levelling dump beneath the street; these deposits partly covered the remains of Building II and the finds incorporated in them might well have been re-deposited from levels of Period 3 in Building II. It is therefore likely that all three fragments were originally lost at the same time.

Beaded torcs

Beaded torcs are only found in Britain and usually in the north.[12] They are made up of two separate elements, held together by mortise and tenon joints when complete: a nape section made of a solid bar or rod and a beaded section at the front. The torcs can be divided into two basic forms:

1. *Strung beads*. The nape bar tends to have a rectangular or H-shaped cross-section, and makes up approximately half of the complete torc. The beaded section is made up of individual beads, separated by smaller spacer beads, usually threaded onto a thick iron wire (Fig. 10).
2. *Cast beads*. The nape section is more often circular in cross-section, and usually makes up two-thirds of the torc. The throat bead section is cast in one piece.

There is, however, at least one example, from Lambay Island, Co Dublin, that has features of both categories, with a long, circular cross-sectioned nape section and strung beads.[13]

The South Shields beads

The South Shields examples are relatively plain and simple in design (Fig. 11). They are fragmentary, and some details are lost to corrosion, but there are at least two separate beads and almost certainly a third, plus a fragment that could belong to any of the three. The beads are flat, with

[11] Croom 1994, 184, no. 25.
[12] MacGregor 1976, map 15.
[13] Kilbride-Jones 1980, fig. 41, 3.