

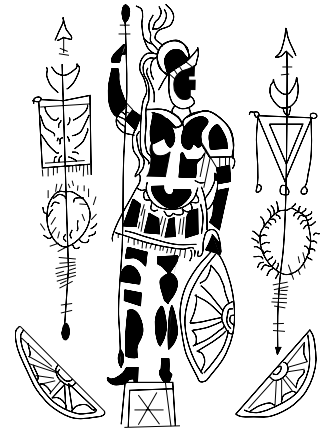
# Arma

## Newsletter of the Roman Military Equipment Conference

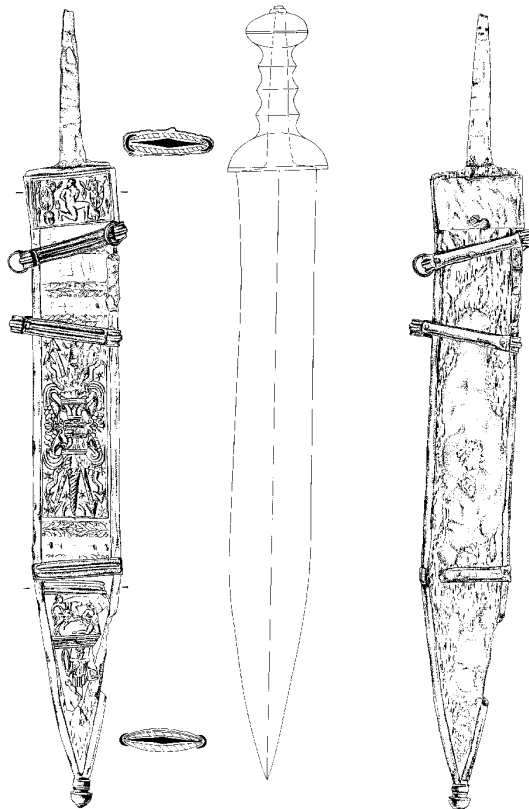
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### CVSTOS ARMORVM

The previous ROME C (the eleventh) was fortunate in being invited to visit Mainz, in many ways the home of Roman military equipment studies (although I'm sure other places could lay claim to such a distinction). The main theme of later Roman arms and armour drew out some very interesting contributions.

No sooner can I mention that, then it must be reported that ROME C XII was held in South Shields in September 1999 and concentrated on the theme of reconstruction and re-enactment. Both conferences were a great success and the next conference is already being organised for Switzerland in 2001.

Auctions of antiquities have been going on for a long time, but the advent of widespread easy internet access has led to many auction houses now advertising their wares on the Web. My attention was recently drawn to a dagger and sheath (and some lead slingshot) supposedly found on the battlefield of Munda; subsequent searches produced more material. I have to say I am unsure whether this is a good or a bad thing: the amounts of material that enter the private ownership market (by whatever means) and which never get published can cause an otherwise normal mind to boggle.

The recent amendments to the treasure trove legislation of England (Scotland has always been slightly more enlightened in such matters), and some funding to deal with increased reporting, mean that a lot of material that was once 'slipping through' is now at least known about. There are plenty of countries that do not have, or cannot implement, such legislation, however, and the few tens of thousands of artefacts that have now become accessible in England, are but the tip of a huge iceberg of evidence that is denied to students of military equipment. The question we must ask here is 'how do we motivate finders or owners to publish their discoveries'?

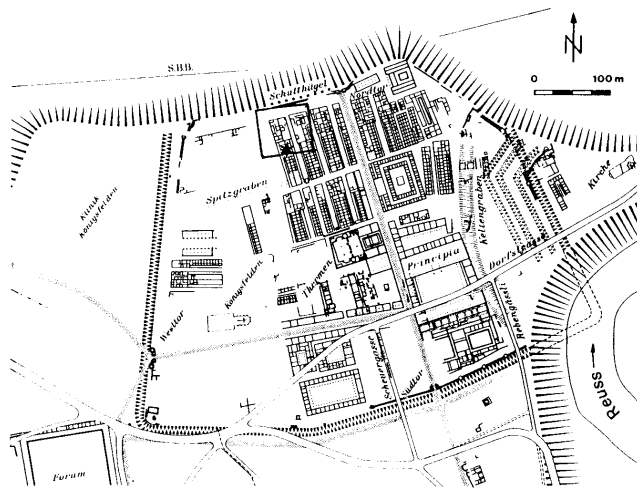
Apologies are, sadly, once again due for the late appearance of this issue. This is a result of the editor having too many things to do, and not enough time in which to do them. The next issue is, however, already in preparation and will, all things being equal, follow hot on its heels.

**Vindonissa (Windisch AG – Switzerland): A gladius with a relief decorated sheath and belt pieces from the legionary camp**

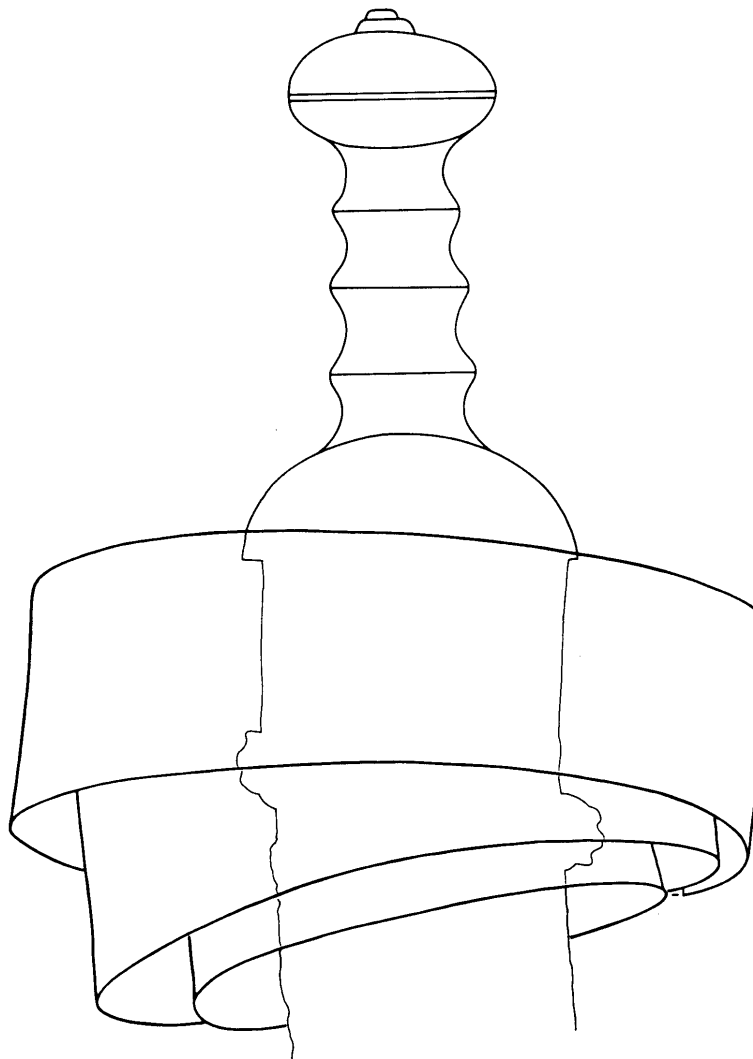
*Eckhard Deschler-Erb*

The *gladius* and belt pieces presented here were discovered in 1990 during excavations in the north of the legionary camp. They were found in a pit within the ordinary soldiers' quarters of a barrack block of the 21st Legion (45–69 AD) which was filled up at the earliest during the period of the 11th Legion (70–101 AD) (fig. 1). The exact date within this period at which the *gladius* and belt plates were deposited is unknown. The find spot in the middle of ordinary soldiers' quarters of a barrack block is unusual. Either this particularly fine weapon was supposed to be protected from theft in this way, or it was – quite the contrary – hidden here as stolen booty.

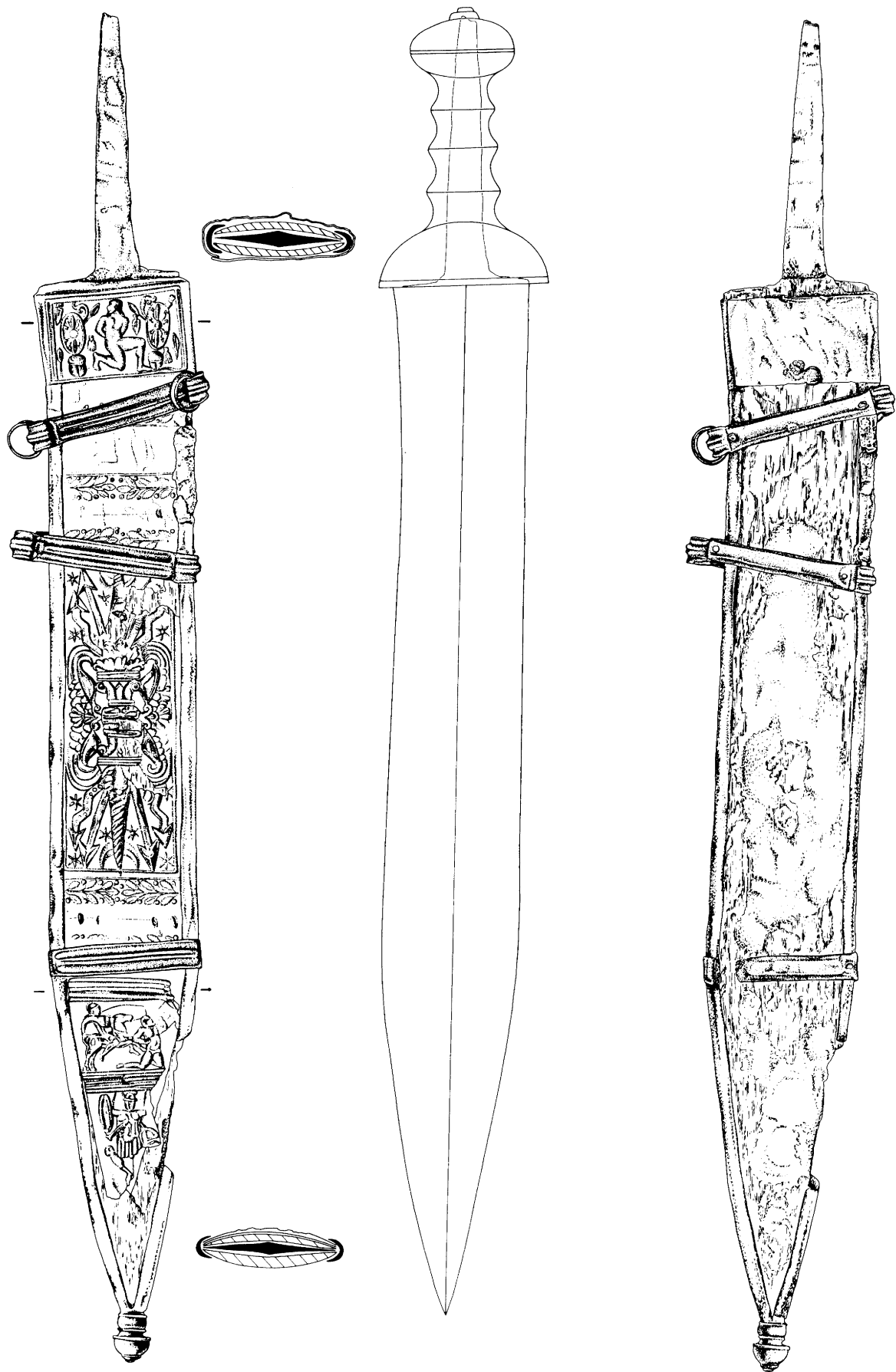
When found, the *gladius* was still in its sheath. Due to the position of the find, it was possible to reconstruct that it had been deposited with a belt, mounted with metal plates, slung round the upper part of the weapon (fig. 2).



*Fig. 1: Windisch-Vindonissa. The legionary camp around the middle of the 1st century AD showing the area of excavation and the exact find spot of the gladius (star).*



*Fig. 2: The gladius as it was found with the belt wrapped around it. Reconstruction not to scale.*



*Fig. 3: Front and back view of the gladius. Between a reconstruction drawing of the blade and handle. Scale 1:3.*

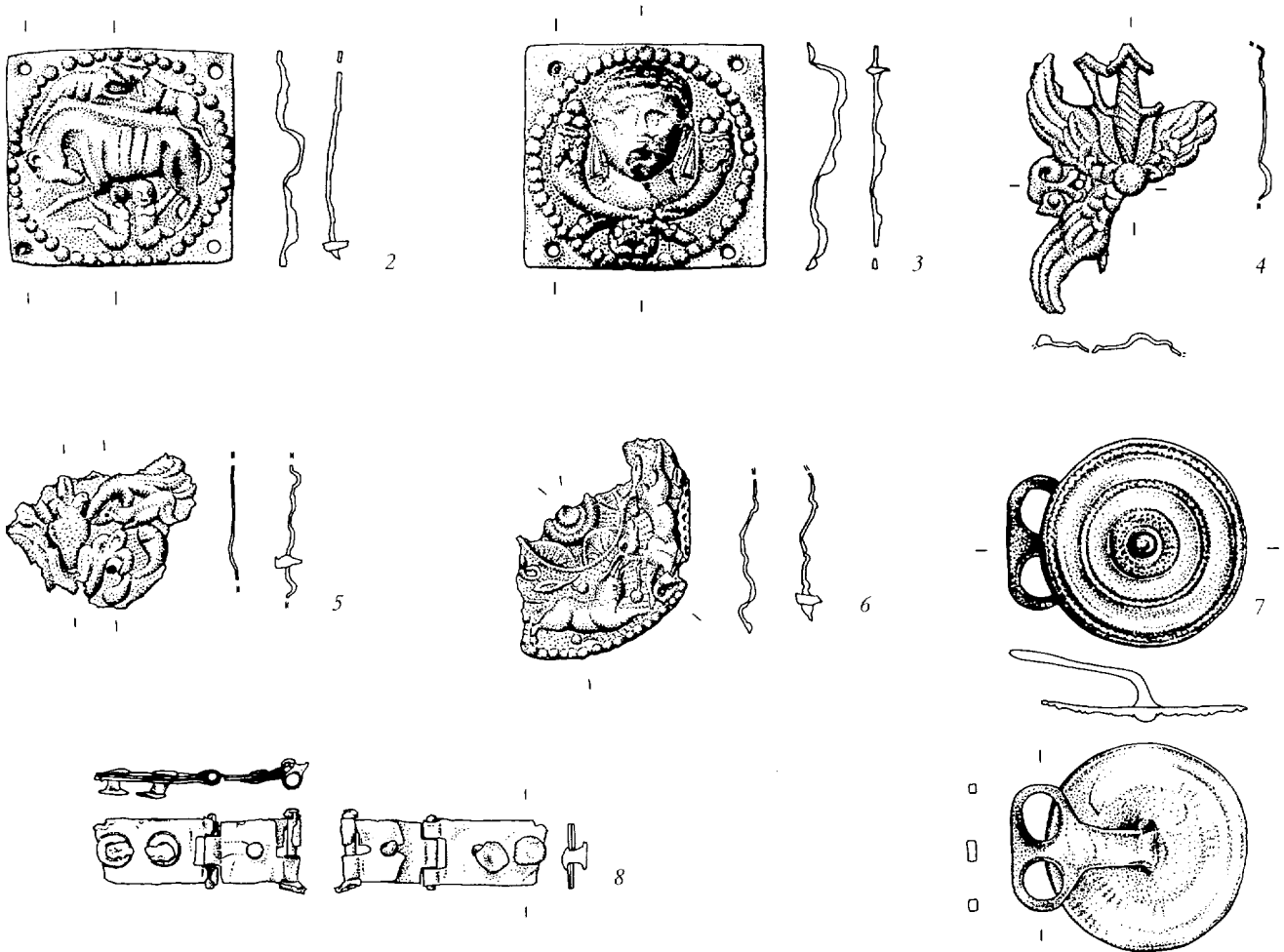


Fig. 4: Belt plates (2–8), strap hinges (8) and double loop fastener (7). Scale 2:3.

The *gladius* itself, which could not yet be taken out of the sheath, is of the Mainz type. The sheath is constructed of several layers (fig. 3):

The actual casing comprises front and back of a board of lime wood. Over this, on the front, is a fairly large metal sheet, which is partly silver-plated and decorated with relief, and a smaller tongue of metal sheet which is also decorated with relief. These pieces were held together by iron rims and a knobbed chape terminal. Over the basic construction are three sheath clamps and a mouth-plate, the latter also decorated with relief. The reliefs along the length of the sheath show from top to bottom a chained barbarian between two trophies, oakleaf wreaths, a thunderbolt with Jupiter's hand, a mounted combat, another trophy and a helmet.

Among the other pieces from the pit was a two-part strap buckle (fig. 4). Rather than being allocated to other parts of the armour, it can be presumed that in this case the strap buckle served to secure the *gladius* onto the belt (fig. 5).

Belonging to the belt itself are five belt-plates and a double loop fastener (fig. 4). The pieces, some of which have only survived as fragments, show the wolf and twins, an imperial portrait (Tiberius) between two *cornucopiae*,

a thunderbolt between crossed wings, a fragment with an animal and acanthus shrubs, and a roundel with an animal pursuit.

Remains of a buckle could not be found. If it is assumed that the *gladius* and belt pieces were deposited in the pit complete, then here is evidence for the first time of a Roman military belt being fastened with a double loop fastener. The leather strap at one end of the belt was passed around the double loop fastener at the other end (fig. 6).

Decorated sheaths and belt-plates with relief ornamentation have been known to researchers for a long time. Here for the first time, however, these two types appear together as an ensemble. All the themes that early imperial military propaganda had to offer are represented here: state mythology (the thunderbolt on the sheath and belt-plates, belt-plate with the wolf), dynastic propaganda (belt-plate with imperial portrait), historical scenes (relief decoration on the sheath showing prisoners and mounted combat) and scenes from nature (belt-plates with animal pursuit and acanthus).

In all likelihood the sword and belt were made in workshops within the camp. On the basis of the images on the relief decoration and of the *gladius* form, this must

## Militaria de Gaule méridionale, 7 Mèze (Hérault) et environs

M. Feugère et Chr. Pellecuer\*

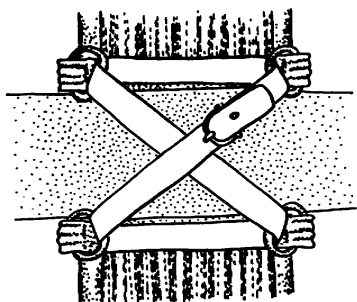


Fig. 5: Method of fixing the sheath to the belt using the strap buckle. Reconstruction not to scale.

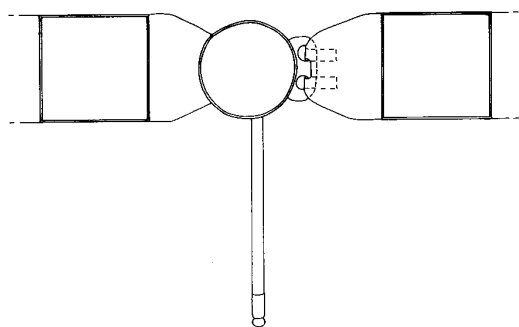


Fig. 6: Reconstruction of the belt fastening with the leather loop passed round the double loop fastener. Not to scale.

have been done in the reign of Tiberius. Since the ensemble was deposited at the earliest around 50 AD, and more likely in the 60s or even 70s of the 1st century, the 'life' of the sword and belt can be determined as at least 30 or more probably 40–50 years.

### Illustration Credits

Fig. 1: Hermann Huber

Fig. 2–6: Sybille Erni

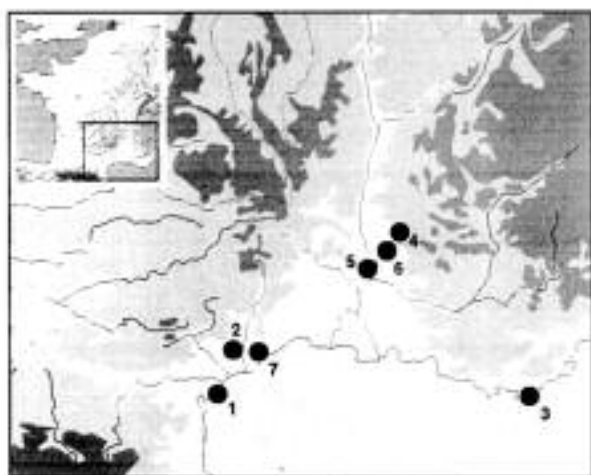


Fig.1 – Localisation des sites concernés par les notices «Militaria de Gaule meridionale» publiées à ce jour: 1, Narbonne; 2, Espondheilhan; 3, Hyères; 4, Vaison; 5, Roquemaure; 6, Bollène; 7, Mèze

Cette note regroupe les militaria actuellement répertoriés sur la commune de Mèze (fig. 1), au nord de l'Étang de Thau (Hérault) et dans ses environs, soit dans l'ordre alphabétique sur le territoire des communes suivantes: Loupian, Marseillan, Mèze et Poussan. Dans cette zone, le site majeur ou, du moins, le mieux exploré, demeure la villa gallo-romaine des Prés-Bas, à Loupian. D'autres sites d'égale importance, comme la villa de Mas-Lavit à Mèze, demeurent très mal connus, faute de fouilles (Lugand, Pellecuer 1994).

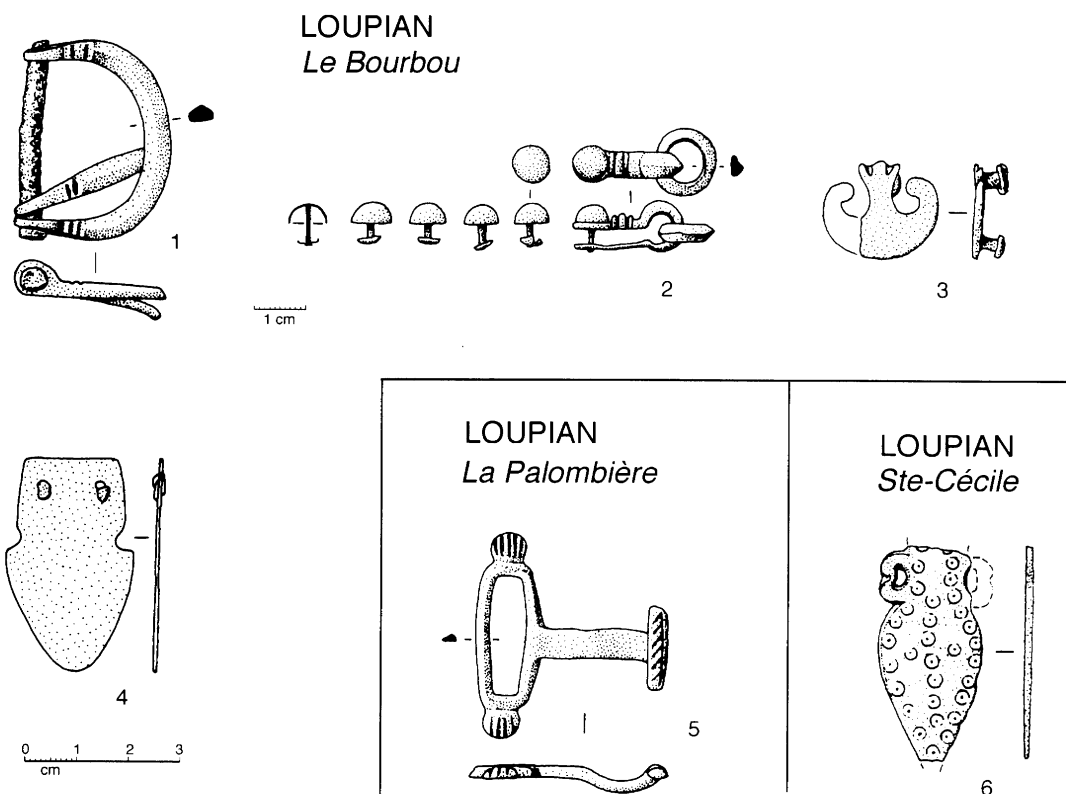
### Loupian, Le Bourbou

En bordure de l'étang de Thau, à l'aplomb de la villa des Prés-Bas, ce site a connu une occupation longue, peut-être intermittente, dont certaines phases (un atelier d'amphores ayant fonctionné du troisième quart du Ier s. au IIer s. de n. ère), sont en relation directe avec l'activité viticole de la villa.

- Fig. 2, 1; us 10023, fouilles 1998, vers 50-80 ap. J.-C.  
Boucle en bronze, axe en fer, 38,5 × 29mm (les extrémités de l'axe ont dû recevoir de petites rondelles de bronze); section épaisse, avec une arête sur la face externe, décor de sillons transversaux vers l'articulation, ainsi qu'à la base de l'ardillon. Ce type de boucle épaisse, de fabrication assez soignée avec son décor d'incisions, connaît de nombreux parallèles au Ier s. (Vindonissa: Unz 1997, pl. 70, 2049–2057).
- Fig. 2, 2, us 1064, 1996, iso 271 et 276, vers 50-80 ap. J.-C.  
Cinq petits boutons hémisphériques et une agrafe de fixation avec anneau. Ces six objets constituent l'extrémité d'une lanière de cuir, de longueur inconnue, articulée sur l'anneau: leur position in situ, alignés côte à côte, sans espacement, indique que c'est la lanière elle-même qui a été enfouie dans le sol. Un alignement de boutons similaires a été observé par Chr. Sireix à Vayres (Gironde), associé à une applique en forme de pelte (comme ci-dessous), dans le dépotoir d'un four de potier comblé vers 250–320 ap. J.-C. (rens. Ch. Sireix). De telles lanières, surtout à cause de l'attache caractéristique (cf. par ex. à Velsen: Bosman 1995, fig. 6, 38), peuvent être rapportées au harnais de cavalerie.

- Fig. 2, 3, us 7028, 1997, iso 720, vers 400–425 ap. J.-C.  
Applique en forme de pelte surmontée d'un fleuron: ces ornements assez répandus (v. ci-dessous l'exemplaire de Poussan, fig. 5, 9) se retrouvent à la fois dans les harnais des IIIe–IVe s., et sur les ceintures des IVe–Ve s. (Argeliers: Cathala 1903; Héron de Villefosse 1903).
- Fig. 2, 4; us 5065, iso 730, vers 400–425 ap. J.-C.

Dos de ferret de ceinture, reproduisant la forme de la face antérieure probablement décorée (L. 41mm); l'un des rivets de bronze assurant la fixation sur l'extrémité de la ceinture est encore en place. La construction du ferret en deux plaques distinctes, connue par quelques objets



du Nord de la Loire (par. ex. Böhme 1974, pl. 147, 8), semble relativement fréquente sur les ferrets méditerranéens.

#### Loupian, La Palombière

- Fig. 2, 5; boucle de type «pasador en T»; L. 36,5mm.  
Découverte fortuite, effectuée par D. Rouquette en 1985, à env. 300m à l'Ouest de la villa des Prés-Bas: la trouvaille peut être mise en relation avec l'intense occupation de ce bassin-versant durant l'Antiquité. Ces boucles de ceinture, de facture ibérique (Palol 1955-56; Villaverde 1993), principalement répandues dans le centre et le Sud-Est espagnols, sont peu diffusées en-dehors de la péninsule; on les a néanmoins signalées au Maroc (Boube 1994, n°89-96). La chronologie est incertaine, allant selon les trouvailles du Ier s. av. n. ère à l'Antiquité tardive.

#### Loupian, Sainte-Cécile

Site à vocation religieuse, caractérisé par l'implantation précoce (fin IVe s.) d'une église dans l'architecture de laquelle on retrouve les mêmes procédés de construction que dans la villa des Prés-Bas. Le pendant provient d'une zone probablement funéraire, au sud de ce monument.

- Fig. 2, 6; surface (prosp. Chr. Vidal), 1991.  
Pendant en bronze en forme d'amphore, L. act. 41mm (Feugère 1993, fig. p. 253, 17; 1996, 277, fig. 17). La forme est classique, avec les deux anses en forme de pelte, mais le décor couvrant d'ocelles l'est nettement moins. Ce traitement est cependant très répandu, en Languedoc, notamment sur les boucles de la fin du IVe et du Ve s. (Feugère 1996, 277) et sur d'autres pendants

de ceintures (trouvailles inédites de Roujan et St-Saturnin par exemple). Ces rapprochements peuvent suggérer l'existence d'une production régionale.

#### Loupian, Prés-Bas

Importante villa, créée sous une forme modeste au Ier s. av. n. ère et progressivement transformée au début du principat en établissement viticole, puis, vers 400, en véritable palais rural aux sols richement décorés de mosaïques. Les transformations ultimes qui précèdent l'abandon de la luxueuse résidence et de l'établissement agricole sont plus mal connues: des traces d'occupation sont encore discernables au début du haut Moyen Age (VIe s.).

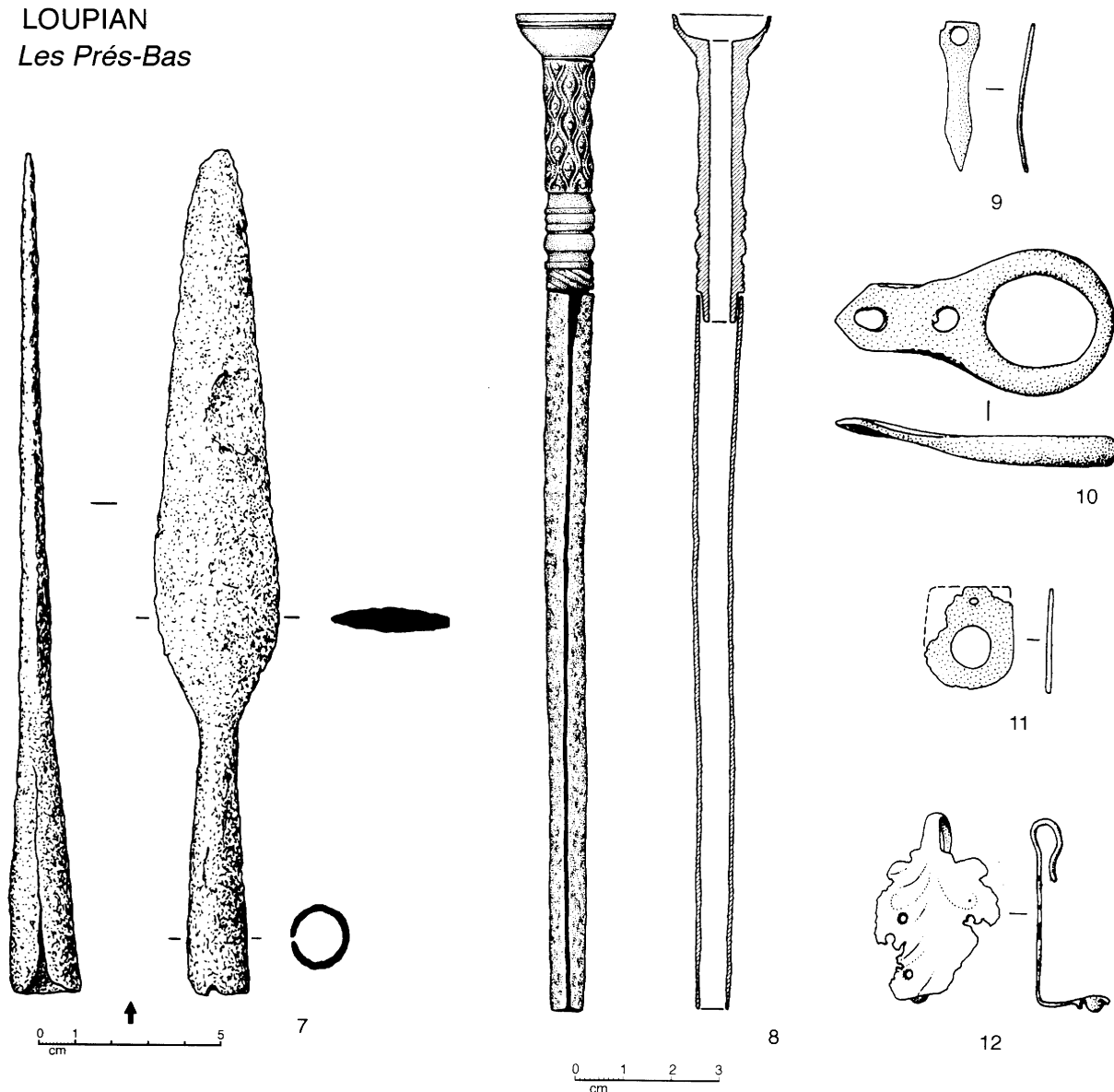
- Fig. 3, 7; us 1236, fouilles 1994, iso 1158, vers 300-350 ap. J.-C. (Pellecuer 1998, fig. 8, 2).  
Pointe de lance en fer, L. 231mm; la pointe, à bords rectilignes, ne permet pas de caractériser cette arme qui, dans le contexte de la villa, a dû être utilisée au cours de parties de chasse.

- Fig. 3, 8; us 63, fouilles 1985, iso 6, vers 100-175 ap. J.-C.

Embouchure d'instrument à vent, en bronze (L. tot. 203mm); elle se compose d'une partie coulée, longue de 63mm, au corps soigneusement orné de bourgeons et de moulures, venant s'emboîter dans un tube en tôle, ouvert, long de 147mm et d'un diamètre interne de 6mm. L'extrémité ne semblant pas brisée, cette partie a pu jouer le rôle de joint de transition entre la pièce à bouche et le corps de l'instrument, nécessairement fabriqué d'un seul tenant.

Dans ces conditions, il n'est pas facile d'identifier l'instrument auquel cette embouchure a pu appartenir.

LOUPIAN  
Les Prés-Bas



Mentionnons simplement la présence d'une embouchure similaire (antique?) en Arles (British Museum, anc. coll. Morel, n<sup>o</sup>inv. 1904.2.4.81, L. 49mm), ainsi que la découverte, plus caractéristique, d'une armature de cornu à Murviel-les-Montpellier (Soc. Arch. Montpellier). D'un point de vue fonctionnel, enfin, un tel instrument a pu connaître une utilisation militaire (Feugère 1993a, 69–72), mais le cadre de la villa ne permet pas d'exclure un emploi ludique.

- Fig. 3, 9; us 1160, fouilles 1994, iso 1218, vers 325–375 ap. J.-C.

Pendant foliacé, peu épais: ce type de pendant très léger est relativement fréquent, sous diverses variantes, notamment près du limes rhéno-danubien (Köngen: Luik 1996, pl. 47, 11–13; Dacie: Dawson 1990, pl. 1, 23–24; fig. 2, 22–24). Bien que les avis sur la nature de ce petit pendant différent (Bishop 1992,99) sa présence dans plusieurs tombes de Romula en Dacie (Petculescu 1995, pl. 1, 3–4; pl. 2, 2) permet de l'attribuer au ceinturon d'infanterie militaire du II<sup>e</sup> siècle.

- Fig. 3, 10, us 1042, fouilles 1993, iso 837, vers 200–300 ap. J.-C.

Robuste anneau coulé, présentant d'un côté de fortes traces d'usure, prolongé de l'autre par une languette percée de deux trous de fixation: il s'agit probablement d'un élément de harnais.

- Fig. 3, 11, HS, iso 548.

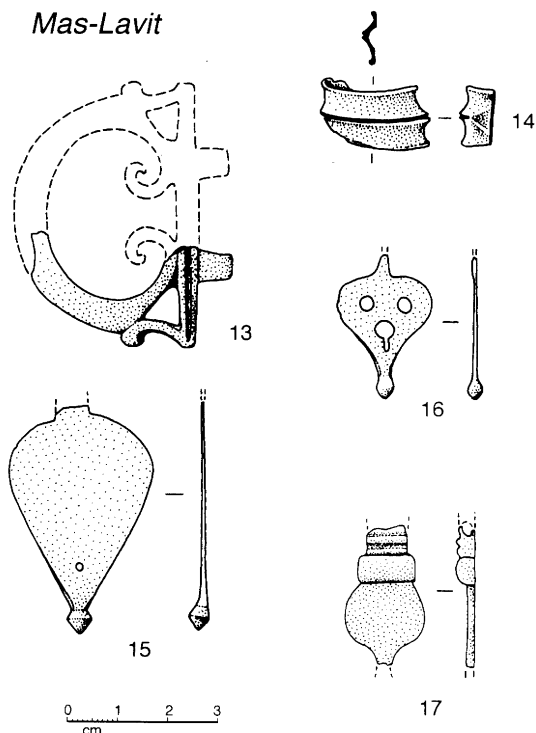
Attache de pendant de harnais; cette plaquette était clouée sur la sangle en cuir du côté rectiligne, tandis que l'extrémité arrondie servait à la suspension des pendants à crochet (v. ci-dessous). L'association, conservée sur quelques trouvailles, permet l'identification de telles attaches, même isolées.

- Fig. 3, 12; us 1199, fouilles 1994, iso 1144, vers 100–175 ap. J.-C.

Pendant foliacé à contour découpé, décor poinçonné et ajouré; le lest en forme d'oignon est tordu vers l'arrière. Ce type de pendant à crochet, appartenant au harnais, est placé dans la première moitié du I<sup>er</sup> s.

## MÈZE

### Mas-Lavit



### Mèze, Mas-Lavit

Importante villa gallo-romaine implantée, comme celle de Loupian, à quelques centaines de mètres seulement des rives nord de l'Etang de Thau (Lugand, Pellecier 1994).

- Fig. 4, 13; surface, prosp. P. Brandelet (M. Patr., Montagnac, inv. 993.47.5) (Feugère 1994, fig. 24, 2).

Fragment de boucle de cingulum en bronze, d'un type connu à Hod Hill (Brailsford 1962, fig. 4, A.81), Rißtissen (Ulbert 1970, pl. 1, 6; pl. 33, 506), Vindonissa (Unz 1997, n° 1144–1163), Camulodunum, Richborough, Aislingen, Königsfelden, Straubing, Ampurias ainsi qu'au Maroc (Boube 1994, ni51, réf. p. 66) et daté de la période Claude-Néron.

- Fig. 4, 14; surface, prosp. P. Brandelet (M. Patr., Montagnac, inv. 993.47.6) (ibid., 3).

Fragment de barrette de fourreau de glaive, bien reconnaissable à sa section, malgré le caractère très fragmentaire (cf. par ex. Unz 1997, pl. 6 et 7). Les éléments de glaives (arme et fourreau n'étant normalement pas dissociables) sont très rares sur les habitats antiques. On peut néanmoins rapprocher de cette trouvaille une bouterolle de glaive de l'oppidum d'Aumes (Feugère 1993, 146).

- Fig. 4, 15; surface, prosp. P. Brandelet (M. Patr., Montagnac, inv. 993.47.4) (ibid., 6).

Pendant de harnais, L. act. 45mm, de forme simple mais pourvu du lest caractéristique; la perforation vers la pointe signale l'existence d'un décor riveté (cf. Unz 1997, n°1478).

- Fig. 4, 16; surface, prosp. P. Brandelet (M. Patr., Montagnac, inv. 993.47.3) (ibid., 4).

Petit pendant cordiforme, percé de trois trous dont un en entrée de serrure. Un parallèle exact a été observé à Aspiran (Feugère 1994, fig. 24, 5).

- Fig. 4, 17; surface, prosp. ArchéOfactory, 1987. Fragment de pendant de harnais ? L. act. 28mm.

### Poussan, Le Mas-Blanc

Villa gallo-romaine connue par les seuls ramassages de surface.

- Fig. 5, 18; surface, prosp. A. Rougerie.

Lunule émaillée, larg. 29,5mm; objet de facture soignée, légèrement creux à l'arrière, pourvu d'un décor émaillé à inclusions de pâte de verre dont on rencontre peu d'exemples en Gaule du Sud. La loge centrale est occupée par un point blanc sur fond rouge foncé, alors que sur les côtés subsiste une partie du remplissage orange (les cubes de verre rapportés ont disparu). Des lunules émaillées selon cette technique se rencontrent à partir du milieu du IIe s. ainsi qu'au IIIe s.

- Fig. 5, 19; surface, prosp. A. Rougerie.

Applique en forme de pelte, comparable à celle de Loupian (fig. 2, 3), mais dont un rivet disparu semble avoir été remplacé par une perforation. (v. ci-dessus).

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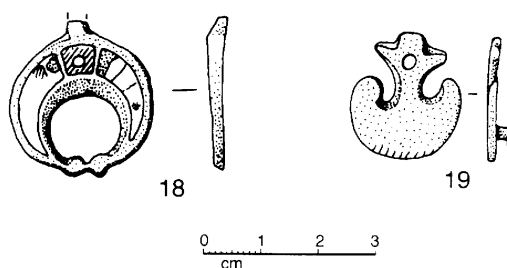
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## Report on Two Sections of Lorica Segmentata found at Vindolanda

David Sim

### Introduction

*Lorica Segmentata* is a form of body armour made of strips of ferrous metal sheet articulated on leather straps. It came into use in the Roman army in the first century AD. Two specimens of *Lorica Segmentata* have been analysed and published by A.R. Williams (1977 and 1978).

### *Lorica Segmentata* Vindolanda reference number 5767

The piece of *lorica* is in good condition, oxidisation has taken place on the outer layers but there is still a substantial section of the un-corroded metal at the centre of the piece. Due to corrosion the metal thickness varied from 1.80mm to 2.90mm.

A small section of the *lorica* was polished and etched with nital (2%) then studied with a metallurgical microscope. Figure 1 is a cross section of the *lorica* showing two bands. The band shown in the top half of the picture contains ferrite and pearlite corresponding to a carbon content of perhaps 0.3%. The lower band is predominately ferrite but there are rows of slag inclusions within this ferrite band as well. There are numerous slag inclusions

in both bands as well as some slag inclusions on the interface between the two bands.

The interface is not a simple division because there is some segregation of the pearlite into rows parallel to the interface. This may be due to some peculiarity in the forging process, forging may have continued into the critical range (700–900 C) This section of *lorica segmentata* has evidently been made by a process involving either the joining of several pieces of billet together or by folding and forging a heterogeneous bloom. Experiments by the author are currently underway to try to establish the precise sequence of operations during fabrication. From the curve of the *lorica* the section containing the pearlite would be on the outside of the armour with the softer ferrite on the inside (that is the side closest to the body). Which suggests that the Roman armour manufacturers were perhaps aware of the weakness of armour made of wrought iron and tried to improve its effectiveness by providing a piece of armour with a harder outside to deflect missiles.

There has been no attempt to heat treat the sample, the pearlite seems to be in the normalised condition. Vickers hardness tests were carried out on both sides of the strip. The section containing ferrite had an average VPN of 113 and the pearlite a VPN of 160. This strip is reminiscent of many medieval banded steels. (e.g. Piaskowski 1969 specs 5 & 6).

### *Lorica Segmentata* Vindolanda reference number 2199

A second piece of *lorica segmentata* was examined it is in good condition, oxidisation has taken place on the outer layers but there is still a substantial section of the un-corroded metal at the centre of the piece. Due to corrosion the metal thickness varied from 1.60mm to 2.30mm.

The cross-section consists of ferrite with a band near one surface where ferrite grains are smaller and mixed with a small amount of pearlite (less than 0.1% carbon). There are numerous elongated slag inclusions, particularly along a line running down the mid section suggesting this may have been made by a process involving a bloom folded and forged into strip or even two pieces welded together then forged into strip.

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### Acknowledgements

I would like to thank Dr Robin Birley for his permission to examine pieces of *lorica segmentata* from Vindolanda and Dr Alan Williams for his help in the preparation of this article.

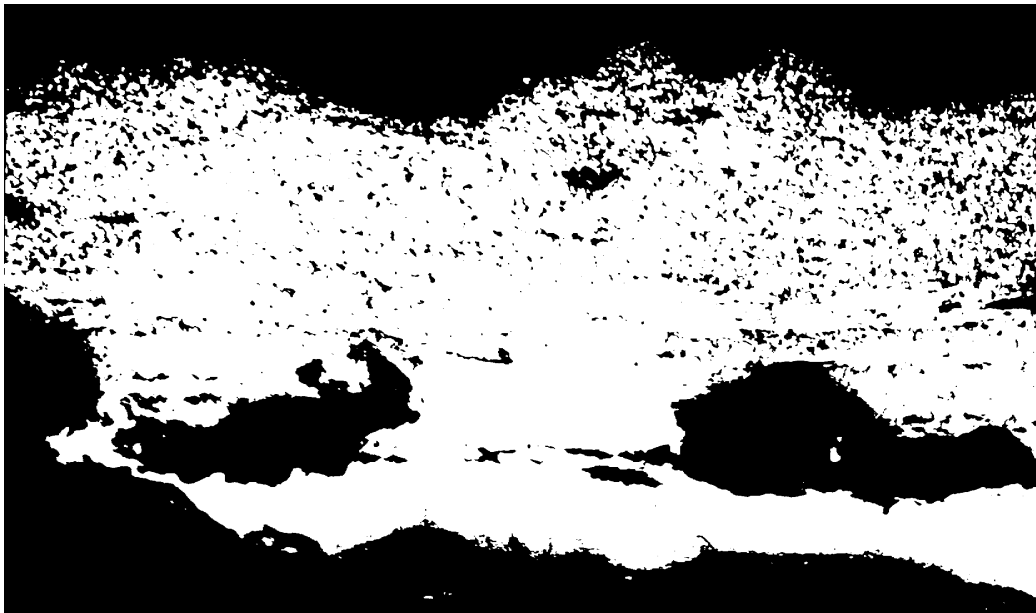


Fig.1 Cross section of Lorica Segmentata (Vindolanda reference number 5767)

## **The Development Of 'Lorica Segmentata': Recent Advances And Old Work Re- Assessed**

M.C. Bishop

Few will deny that, despite the revelations provided by the discovery of the Corbridge Hoard, there is much we do not understand about Roman segmental body armour. As recently as 1993, it was possible to suggest that 'the first time the Romans came into contact with this armour may have been during the revolt of Florus and Sacrovir in AD21' and stand at least a reasonable chance of being right. However, in the last few years, new discoveries have produced dramatic revelations about the origins of 'lorica segmentata', whilst re-examination of older finds in the light of this new work provides some hints about the morphology of 'lorica segmentata'.

It is hoped that this brief review will serve to outline some of the ideas which will appear in greater detail in a forthcoming monograph devoted to the subject of segmental Roman armour, so it should be borne in mind that this is very much a work-in-progress and any conclusions presented here are, at best, tentative.

Robinson's simple classification of segmental body armour into two types, the 'Corbridge' (with its three subtypes A-C) and 'Newstead' has stood for over twenty years without any attempt at refinement.<sup>1</sup>

However, recent finds have now made it feasible to attempt such a task and the system proposed here uses breastplates to categorise the main types of cuirass and follows Robinson's scheme in using type-site names. These may now be demonstrated to run in a putative chronological sequence: Kalkriese (types A and B: Augustan), Corbridge (A-C: Tiberio-Claudian to Antonine), and Carlisle/Newstead (Antonine). It should perhaps be stressed that the differences between the types should not

be allowed to outweigh the similarities in our eyes; we probably have only a few pieces in the jigsaw as yet and the picture will almost certainly change again.

### The Kalkriese type

The discovery of a complete breastplate of 'lorica segmenta' at the so-called *Varusschlacht* site at Kalkriese<sup>2</sup> is just one of the pieces that has provided conclusive proof of an Augustan date for the use of this type of body armour.<sup>3</sup> In the light of these finds, it is now possible to identify similar fittings from contemporary sites<sup>4</sup> and, more importantly, Kalkriese-type fittings from other, later, sites.<sup>5</sup>

### Type A

It is the breastplate from Kalkriese that provides the principle piece of evidence for this type, but it is possible that this *may* have been an aberration brought about by an improvised repair and the discovery of further complete examples of this type will be necessary before we can be confident of our classification.

The horizontal and vertical breast fastenings are provided by leather straps riveted directly to the breastplate, each by means of two large disc-headed rivets. The buckle is riveted directly to the strap with two small side-by-side rivets.<sup>6</sup> The breastplate was attached to its collar plate by means of a hinge (but it is interesting to note that no lobate hinges have yet come from Augustan-period contexts).<sup>7</sup> Such hinges are known from a number of sites,<sup>8</sup> including some British ones (Chichester<sup>9</sup> and Waddon Hill<sup>10</sup>), implying that the Kalkriese type of cuirass lasted at least into the 40s of the 1st century AD (Fig.1). The final significant element of the Kalkriese breastplate is the copper alloy binding to the neck opening,<sup>11</sup> a feature that disappears with the Corbridge type (being replaced by rolled or thickened edges instead).

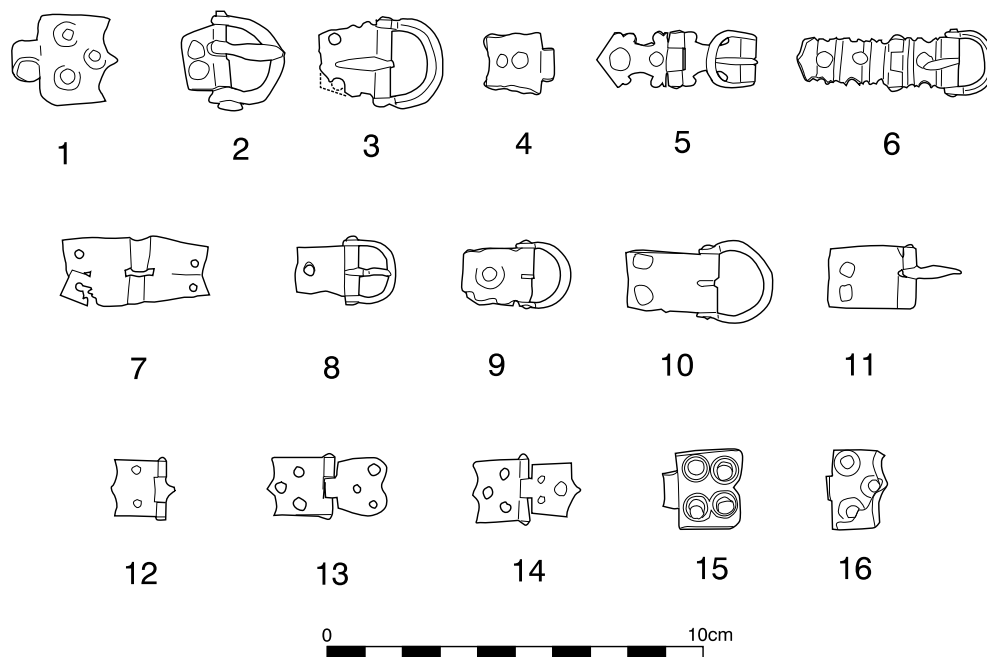


Fig.1 Kalkriese-type fittings. 1–6 Kalkriese; 7–9 Dangstetten; 10–12 Vindonissa; 13–14 Strasbourg; 15 Chichester; 16 Waddon Hill. Scale 1:2

### Type B

This is a variation that replaces the all-leather fastening straps with the more familiar hinged copper alloy strap fittings, but of a particularly elaborate kind (Fig.2). Rolled and thickened edging, rather than copper alloy binding, seem to have been introduced too.<sup>12</sup> This type is thus much closer to the Corbridge type, but the absence of lobate hinges mentioned above would make it more likely that this is a form of Kalkriese cuirass, rather than a true Corbridge type.

### Other details

Although we know nothing as yet of the girth hoops or shoulder guards for this type of cuirass, an upper shoulder guard from Chichester (unhinged, not hinged in three pieces like the Corbridge type, and with double central leathering rivets) may be relevant here.<sup>13</sup>

### Some Corbridge sub-types?

A number of fittings exist which hint at sub-types amongst the overall Corbridge classification, not least the use of lobate fittings above and beyond the familiar lobate hinges.<sup>14</sup> In many ways, the identification of such sub-types may be a chimaera, the result of different regional army groups favouring different styles of decorative fitting.<sup>15</sup> One detail of the Corbridge B/C cuirasses that has largely escaped comment is the unusual decorated bosses, each of which has a broad border and this is a feature that is very seldom paralleled, except in a fitting from Vindonissa.<sup>16</sup>

Many plates that are clearly of the Corbridge type nevertheless display some unusual characteristics, particularly in their proportions. Such a collar plate is known from Chichester and is especially noteworthy as it is of double thickness plate.<sup>17</sup>

### The *Waffenmagazin* and the Corbridge and Carlisle types

The Corbridge type of armour now seems to have been introduced in the Tiberio-Claudian period,<sup>18</sup> but its last appearance in the archaeological record is still difficult to pinpoint. However, a re-examination of the *Waffenmagazin* deposit from a rampart-back building at Carnuntum may provide some answers.<sup>19</sup> It was this deposit that first produced large amounts of segmental armour, during von Groller's excavations at the end of the 19th century,<sup>20</sup> but the dating of the deposit has always been seen as one of the major obstacles to the proper understanding of the find.<sup>21</sup>

In the light of recent work on the phasing of the site and the identification of a mid-2nd century abandonment of the neighbouring site of Petronell,<sup>22</sup> an Antonine date might now be suggested as appropriate for the deposit. Once the deposit is viewed in this light, a number of rather unusual elements of the assemblage begin to make sense, notably the presence of Corbridge type armour<sup>23</sup> and Imperial-Gallic/Weisenau helmets<sup>24</sup> alongside ring-buckles,<sup>25</sup> peltate chapes,<sup>26</sup> and semi-rigid scale armour.<sup>27</sup> The deposit is transitional, capturing the changeover characteristic of the 'Antonine revolution' in military equipment.<sup>28</sup>

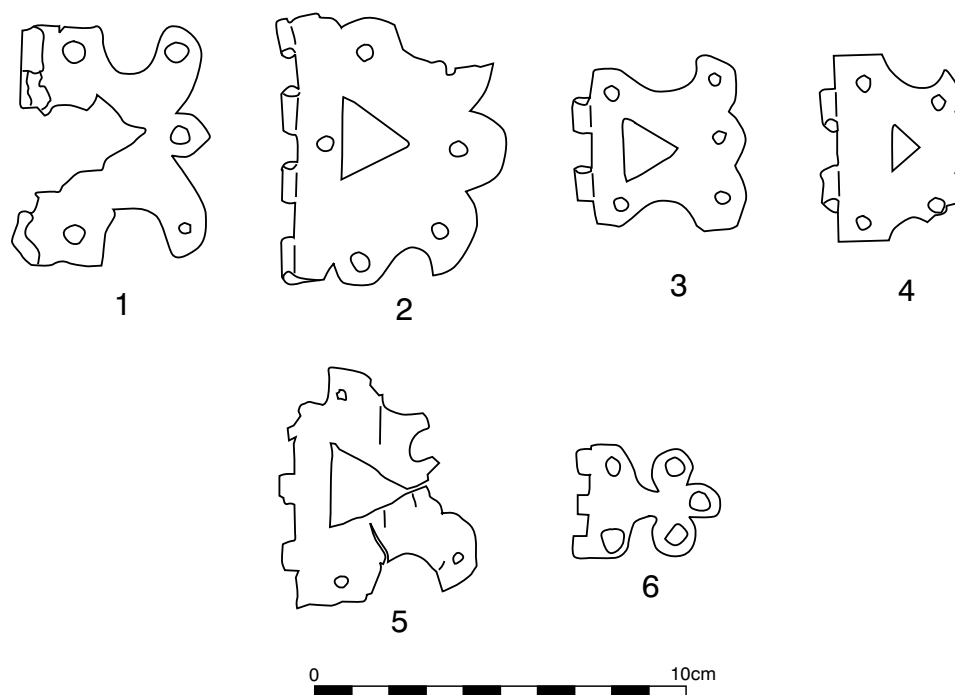


Fig.2 Carlisle-type hinges from 1 Carlisle; 2–4 Carnuntum; 5 Great Chesters; 6 a Corbridge-type fitting from the Corbridge Hoard for purposes of comparison. Scale 1:2.

One of the problems in von Groller's report, quite apart from the small amount of material illustrated out of the vast quantities recovered,<sup>29</sup> is the wide range of scales used in the drawings, often on the same page. This has tended to mask the presence of non-Corbridge type armour within the assemblage, most significantly the group of abnormally large lobate hinges<sup>30</sup> that can now be paralleled from Great Chesters<sup>31</sup> and, crucially, the Carlisle breastplate (Fig.3).<sup>32</sup> Although the Carlisle find dated to the 4th century AD,<sup>33</sup> it may have been from a residual deposit, so rendering the uncharacteristically late date irrelevant.<sup>34</sup> The Carlisle type of armour resembles the (near?) contemporary Newstead type in many ways, but differs in the retention of the use of lobate hinges – admittedly unusually large ones – to fasten elements of the cuirass. The presence of both Corbridge and Carlisle types in the *Waffenmagazin* thus suggests a direct line of thinking between the design of the two types that is not evident if the 4th century date of the original Carlisle piece is accepted.

Connected with this type of armour, one suspects, is the problematic question of cast copper-alloy 'tie loops'.<sup>35</sup> Although there has been doubt over their identification as cuirass fittings<sup>36</sup> (and there certainly seem to be good grounds for doubting their *exclusive* use in this role<sup>37</sup>), the presence of girth hoops fitted with these objects simply cannot be completely dismissed.<sup>38</sup> The possibility cannot be ignored that these were used with the Carlisle type of cuirass, replacing the tie loops characteristic of Corbridge type armour,<sup>39</sup> and paving the way for the sheet 'paper fastener' loops of the Newstead cuirass.<sup>40</sup> The fact that these cast loops are comparatively common finds may be a sign of their ineffectiveness (and the concomitant ease with which they entered the ar-

chaeological record), rather than an indication of how common they were in everyday use.<sup>41</sup>

### The Newstead type

The Newstead cuirass itself has now been joined by the important find from Eining<sup>42</sup> and these finds may be comparable with the Zugmantel fragments.<sup>43</sup> Poulter has cast doubt upon the turnkey-and-pin breastplate fastening favoured by Robinson and it has been suggested that the Carlisle and Newstead pieces may indicate the use of copper alloy binding around the neck opening once again.<sup>44</sup> By far the most difficult aspect of Newstead type armour lies in demonstrating some of the chief characteristics Robinson used to define it: the rivetting together of the upper shoulder guards and the breast- and backplates with the collar guard. Examination of the Eining and Zugmantel fragments by the author, and the Newstead cuirass by the author and Peter Connolly, have produced no unambiguous evidence for the rivetting together of plates, largely because the crucial areas are, in each case, missing. In fact, the Carlisle plate is the *only* example to preserve this area – and this still has a lobate hinge attached. This all begs the question of whether there really is a difference between the Carlisle and Newstead types, or if instead our 'Newstead' type is in fact pieces of Carlisle type armour which lack the crucial diagnostic fittings through happenstance.<sup>45</sup>

So it is that we can now see that '*lorica segmentata*' was probably in use between the last decade of the 1st century BC (Dangstetten) through to the first quarter of the 3rd century AD (Eining and, perhaps, Zugmantel), a period of about 220 years. During that time, the most long-lived

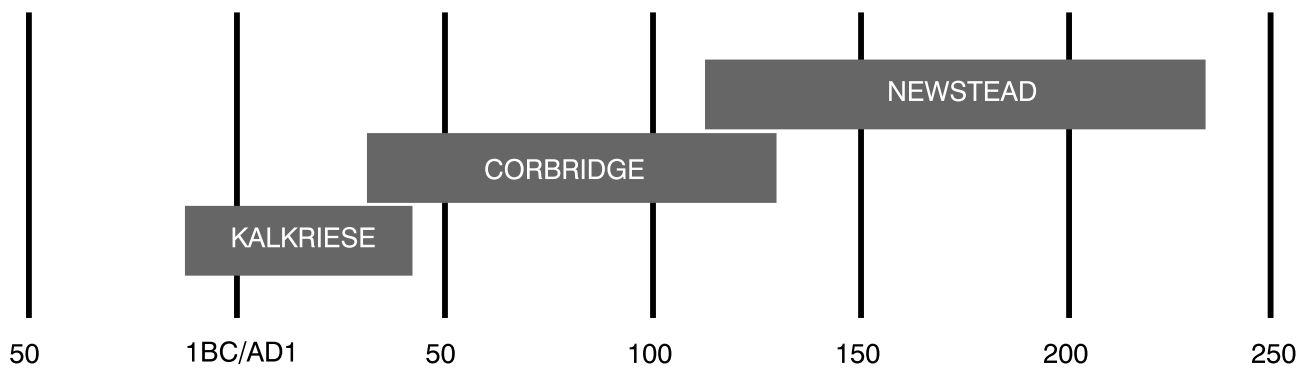


Fig.3 'Lorica segmentata' time-line

variant was the Corbridge type, which probably lasted for over 100 years.

### Acknowledgements

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### Notes

1. ROBINSON, 1975, 174–86.
2. FRANZIUS, 1995, Abb.2.
3. *Ibid.* Abb.7,3 and 5; 1992, Abb.9,1, 4, and 6–7.
4. Dangstetten: FINGERLIN, 1986, 285.5; 448.1; 1998, 681.2 Augsburg-Oberhausen: HÜBENER, 1973, Taf.13,7; 14,22.
5. Kaiseraugst: DESCHLER-ERB, 1991, Abb.39,9 and 12; Vindonissa: UNZ & DESCHLER-ERB, 1997, Taf.30,615; 33,764; 775; 779; Baden: UNZ, 1971, Abb.4,25; Chichester: DOWN, 1989, Fig.27.5,80; Waddon Hill: WEBSTER 1964, Fig.6,13.
6. FRANZIUS, 1995, Abbn.2; 7,3 and 5; cf. *Idem* 1993, Abb.9.
7. Haltern, Oberaden, Kalkriese, Rödgen, and Dangstetten are the prime Augustan sites without later deposits to confuse matters.
8. Oberwinterthur: DESCHLER-ERB, 1996, Taf. 22,312; Strasbourg: FORRER, 1927, Taf. LXXVII,25–6; Velsen: BOSMAN 1997, Fig.5.9,3; Vindonissa: UNZ & DESCHLER-ERB, 1997, Taf.30,615.
9. DOWN, 1989, Fig.27.5,80.
10. See above, note 5.
11. Also found on fragments from Dangstetten (FINGERLIN, 1986, 268.17) and Vindonissa (UNZ & DESCHLER-ERB, 1997, Taf.30, 619).
12. FRANZIUS, 1995, Abb.7,3 and 5. Cf pieces from Vindonissa (UNZ, 1973, Abb.9.,90; UNZ & DESCHLER-ERB, 1997, Taf.32,731), Kaiseraugst (DESCHLER-ERB, 1991, Abb.39,9), and Magdalensberg (DEIMEL, 1987, Taf.76,27). For rolled and thickened edging on iron plates see the following from Dangstetten: FINGERLIN, 1986, 494.4; 1998, 819.4, 977.5, and 1220.11.
13. DOWN, 1978, Fig.10.36,iv.
14. Lobate hinged buckles: e.g. The Lunt, Baginton (HOBLEY 1971–73, Fig.23,36); Vindonissa (UNZ & DESCHLER-ERB, 1997, Taf.33,746); Carnuntum: VON GROLLER 1901b, Taf.XVIII,40–1, 44; hinged strap fittings: Carnuntum: *ibid.*, Taf.XIX,46, 50, 54.
15. BISHOP, 1987, 123.
16. UNZ & DESCHLER-ERB, 1997, Taf.31,656.
17. DOWN, 1981, Fig.8.28,2.
18. Cf. BISHOP & COULSTON, 1993, 85–7, now largely out-of-date.
19. VON GROLLER, 1901a.
20. *Idem* 1901b.
21. BISHOP & COULSTON, 1993, 200.
22. JILEK, 1994, 393 pointing out the absence of comparable burnt deposits (apart from the *Waffenmagazin?*) in the main fortress (citing *inter alia* KANDLER, 1974, 39).
23. VON GROLLER, 1901a, Tafn.XVII–XIX.
24. *Ibid.* Taf.XXI,5.
25. *Ibid.* Taf.XXIV,7.
26. *Ibid.* Taf.XXII,5.
27. *Ibid.* Taf.XVI,6, 17.
28. BISHOP & COULSTON, 1993, 109.
29. VON GROLLER, 1901b, 43 for the totals of material recovered from the deposit.
30. *Idem.* 1901a, Taf.XIX,57–9.
31. ALLASON-JONES, 1996, Fig.12,50.
32. CARUANA, 1993, Fig.1.
33. *Ibid.* 15.
34. See COULSTON, 1990 for a discussion of later types of armour and the disappearance of segmental body armour (and its retention on iconographic monuments).
35. ROBINSON, 1975, 181. Cf Webster in EVANS & METCALF, 1992, 118–19 for a useful discussion of finds from Caerleon.
36. Peter Price, in an unpublished paper presented to the 2nd Roman Military Equipment Research Seminar in 1984.
37. See a fitting from Augsburg-Oberhausen: HÜBENER, 1973, Taf.9,11.
38. VON GROLLER, 1901a, Taf.XVIII,27–8. Cf BISHOP, 1996, 67, who conveniently forgets these pieces!
39. E.g. ALLASON-JONES & BISHOP, 1988, 43–51.
40. CURLE, 1911, Fig.11,8 and 10.
41. BISHOP, 1989, 1–2.
42. REINECKE, 1927, 115.
43. Zugmantel: ORL B8, Taf. XIV, Fig.50.
44. Carlisle: CARUANA, 1993, 16–17; Newstead: POULTER, 1988, 34–6.
45. Much of what has been briefly summarised here will be explored in greater depth in forthcoming papers on the Newstead and Zugmantel fragments, and the above-mentioned 'lorica segmentata' monograph.

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