

"THE EVOLUTION OF CERTAIN FEATURES"

M.C. Bishop

"My classification is based on what I regard as the evolution of certain features that recur throughout the series." ROBINSON, 1975, 46.

For better or worse, the study of Roman military equipment is inextricably linked to typological considerations. Catalogues of assemblages are almost invariably drawn into some sort of scheme of classification, however rudimentary, so that questions about the way in which typologies are formed and the objectivity with which this is done, along with the way the results are used, are as fundamental to our understanding of this particular area of artefact studies as they are to any other. The purpose of this paper is to probe some of the ways in which typological studies have influenced our present view of military equipment of the first century A.D. and to assess the validity of this approach. In doing so, alternative (in the sense of supplementary, rather than replacement) interpretations will be suggested, but it will be necessary to begin with the briefest of thumbnail sketches of some of the main issues that have come to be associated with typology.

THEORY

The theory of typology has recently been explored in considerable depth by scholars of the 'new archaeology' and it is to them that we must turn for a résumé of the basic principles involved.¹ Most prominent amongst these was David Clarke, who was largely concerned with the classification of typology, for both artefacts and societies.² Distinct from typology (the division into types) is seriation, which sees items as coming into, and going out of, fashion in a known way; a typical pattern is that known as 'lenticular', which has a fast rate of adoption, a period of maximum use, and then a long decline.³ The difference between typology and seriation is often blurred, but seriation demands good dating evidence to make it convincing.⁴

Artefacts can be defined in terms of a number of 'attributes' - perhaps the use of a certain decorative motif or a particular dimension - and it is the combination of these that serve to characterise artefacts.⁵ There are also different kinds of attribute: there are those associated with the manufacture of the item (was it cast or wrought?) and those that come from the

way in which the object was used (swords have sharp edges, decoration is aesthetically pleasing).⁶ However, when it comes to deciding which attributes are to be used to form a typology, the problems begin; there will inevitably be a large number of attributes which will be of little assistance (all swords probably have sharp edges), so useful attributes must be chosen (e.g. the shape of the sword blade) and it is that choice of 'important' attributes which introduces an element of subjectivity into the process of forming a typology.⁷ Thus Robinson, as we saw in the quotation at the beginning, was basing his typology on what he regarded as "the evolution of certain features" common to all helmets; this of course begs the question of whether a Roman would have seen such features as being of importance.⁸

Clarke saw that the best the archaeologist could do was minimise that subjective component, but it is impossible to completely eradicate it.⁹ The question of whether such a thing as a 'natural' typology can exist has been widely debated¹⁰ but, in the end, this may not be the most productive approach and eventually we shall have to consider why what we regard as typologies originated in the first instance.

There is one form of typology that approaches our objective ideal and that is one which we can call the functional typology, which depends upon practical attributes not related to the whim of the manufacturer. Such typologies are typified by von Groller's classification of lorica squamata scales from Carnuntum.¹¹ This was founded upon the arrangement of holes along the edges of these objects, which were in turn determined by the way in which the scales were attached to each other. He defined nine categories¹² and, largely because of the sheer volume of evidence available to him, he succeeded in pre-empting any subsequent classifications, since nearly all scales discovered since have adhered to his scheme.¹³ Nevertheless, it should be stressed that this is purely coincidental and that von Groller at no stage set out to produce a 'universal' typology of scales.

Ulbert's classification of gladius types¹⁴ is essentially a functional typology, with its distinction between the Mainz and Pompeii types of sword. It is a difference which may well be related to the function of the respective blades, although this is largely speculation at the moment. The wide range of sheath forms, on the other hand, is certainly not functional, apart from the fact that they have to be the right shape for their particular blades.¹⁵

Scott's examination of spearheads¹⁶ is another example of the functional approach, although this example is by no means as

straightforward as the others. It is clear that there were certain types of shafted weapon (notably the pilum, hasta, and lancea) and that these could be distinguished by their blades, but finding a meaningful way of defining blade shape and what elements are significant in forming distinctions is problematical.¹⁷ Denssem used numerical techniques to describe spearhead shape and then analysed the results by computer;¹⁸ this approach was not, however, particularly productive.¹⁹

The commonest form of typology in the past was what we might term the aesthetic kind, based upon art-historical considerations of form or decoration, such as the arrangement of a particular set of attributes, or the way in which a given attribute changed with time.²⁰ This was the kind practised by Robinson and it must be stressed that this approach is not inherently wrong, but its use does repay closer examination and we shall look at some relevant examples in the next section.

Behind any attempt at typology, it is seldom difficult to detect the influence of a model: the idea that an assemblage of artefacts should share attributes in common can mean that certain biases are implicit in both the typology and its subsequent analysis. On the one hand, we may say that there are only so many ways to fasten scales together on a lorica squamata shirt, or that there is a finite range of spear shapes that are useful for the tasks required of them, but to expect decorative attributes to behave in a certain way, especially when spatially remote, is to presuppose a particular kind of system producing them - almost invariably a centralised one.²¹ However, if we are prepared to accept that this is a prerequisite to the formation of a typology and acknowledge it as such, then it need not be a problem.

One final idea remains to be considered in this section, and that is the 'mental template'.²² With this, we suppose that the craftsman carries within his head an ideal of his finished object whilst he is working on it and that, human nature being what it is, that finished product is an imitation, but not an exact match, of that ideal: essentially the Platonic notion of mimesis.²³ If all craftsmen are working with the same ideal in mind, then their finished products will only vary according to their particular foibles and preferences, both conscious and subconscious; but if some are working with the finished products of others as their ideal, then they will not only be unable to match it exactly when they copy it, but will introduce their own personal element into it; and so on (Fig.1).

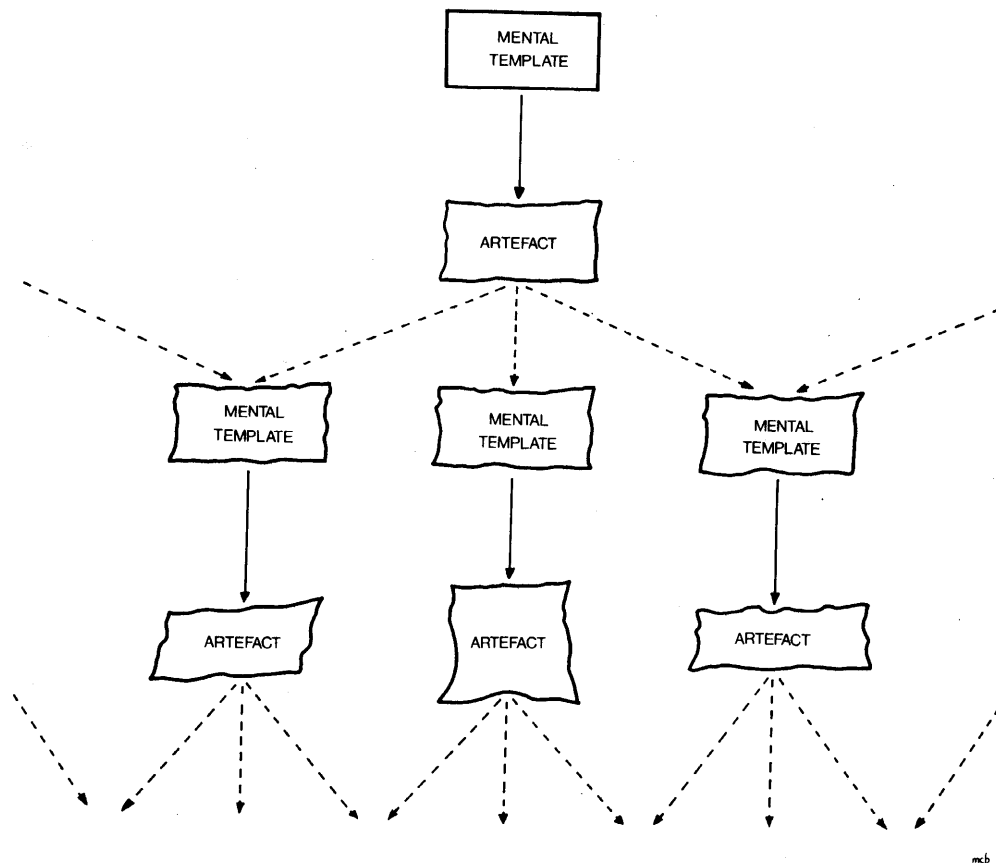


Fig.1: The mental template and the spread of ideas amongst military craftsmen

EXAMPLES OF PREVIOUS TYPOLOGIES

At this point it will be useful to examine a number of typologies of Roman military equipment, not only for what they can tell us about the artefacts in each case, but also for the information they contain about the way in which they were constructed.

H. Russell Robinson's survey of Roman armour²⁴ contains a number of typologies of different pieces of equipment, foremost amongst which was his lengthy section on helmets.²⁵ The technique he used is most clearly demonstrated in the case of Imperial-Gallic helmets: he took a number of archaeologically dated pieces and then proceeded to 'inbetween'²⁶ the remainder, and it is here that the "evolution of certain features" was used to determine the place of any one helmet within the structure of the typology.²⁷ In the case of lobate cuirass hinges²⁸ there are no sufficiently fine chronological fixed points available, so Robinson is forced to use traditional art-historical criteria to illustrate a supposed deterioration from elaborate, finely made, hinges to extremely crude and inelegant examples.²⁹ The dating

evidence for these hinges, however, is ambiguous to say the least, and since most of the hinges in question belong within a small span of time, the 'typology' can quite plausibly be inverted to show a progression from crude hinges to the more elaborate!³⁰

That being said, there is no disputing the fact that Robinson did isolate genuine trends within various kinds of equipment, but it is the interpretation of these trends with which we are primarily concerned.

A. Böhme published a typology of pendants from horse harness that bears consideration.³¹ Böhme's approach is based almost solely upon the evolution of shape, from the 'herzblattförmig' or bird-headed pendants, through ovoid, to 'trifid' forms. This sequence completely ignores the large numbers of lunate pendants found in military contexts, as well as many of the less common types.³² There is no chronological basis for the typology for, as with lobate hinges, the archaeological dating information is insufficiently well-defined to support it. The typology appears to present a logical sequence of development, but in fact this is an illusion.

On the more positive side, Lawson has produced a typology that does not purport to show a logical progression of any kind, but merely classifies the range of available types of pendant.³³ A similar approach was adopted by Zadoks-Josephus Jitta and Witteveen in their catalogue of lunate pendants from the Netherlands,³⁴ commenting that "they cannot be typologically dated, as they show variation but no definite development".³⁵

Whilst the method used by Robinson is, on the face of it, a reasonable path to pursue, there are dangers inherent in the assumptions that have to be made - such as the idea that the 'development', if that is what it is, is genuinely a result of chronological, and not spatial, separation. Again, this depends upon whether we chose to see a central authority dictating helmet designs, or a natural progression over time and over space (in other words, different units' helmets will show correspondingly differing trends, even if taken from a common original, as we have seen in the discussion of the mental template). Although we may just be able to accept that a central command was controlling helmet shape (and decoration?),³⁶ it is unlikely that the shape of lobate cuirass hinges should be dictated from on high; there must be another, more logical, explanation.

Two of Robinson's dated Imperial-Gallic helmets came from the Sheepen site at Colchester³⁷ and Robinson followed the traditional explanation that these entered the archaeological

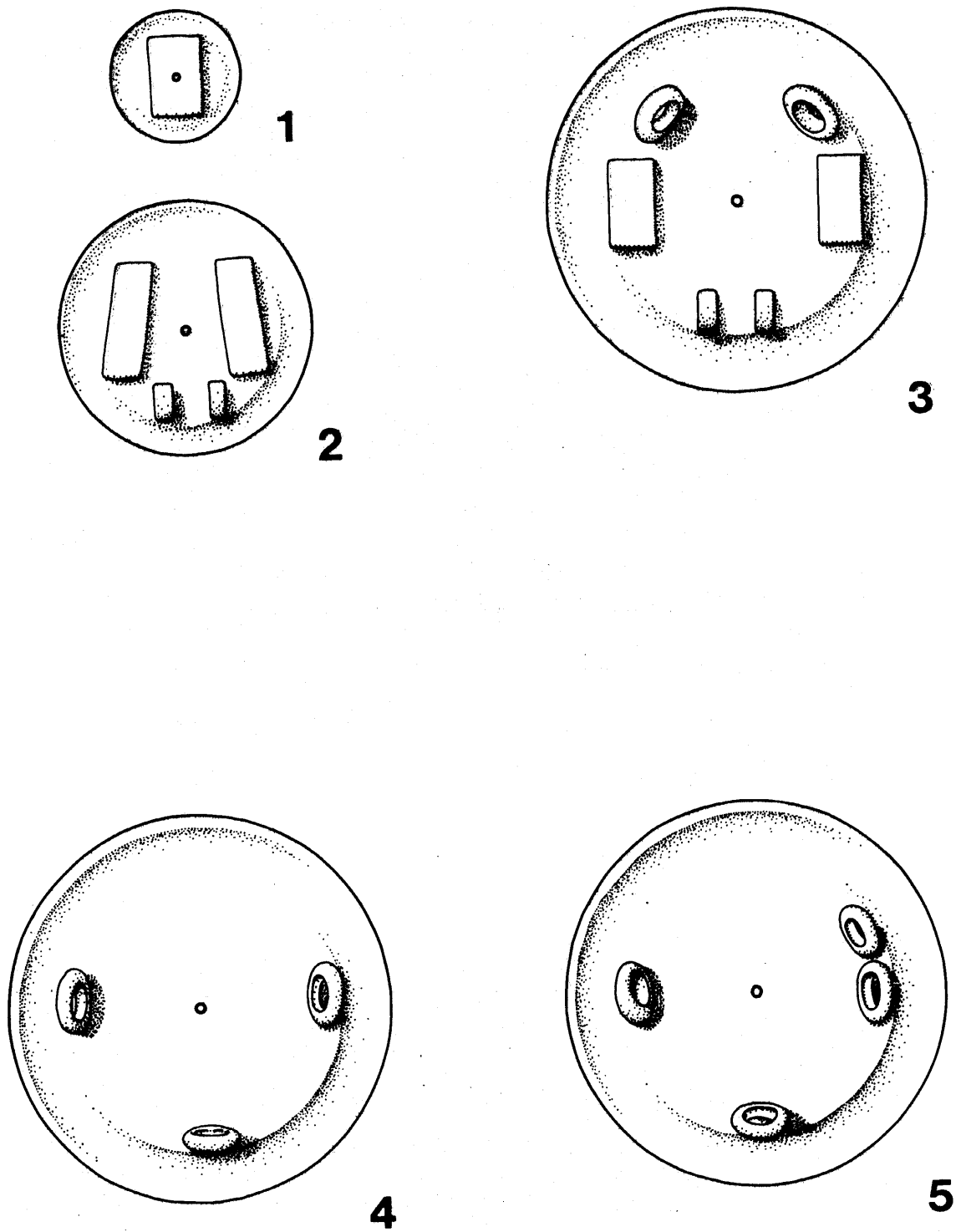
record as a direct result of colonists hurriedly producing equipment in the face of the Boudican rebellion.³⁸ The fact that Sheepen was probably a Roman military site³⁹ and that these helmet fragments need not be associated with the rebellion and might be earlier is of little help either way, but does point up the difficulties inherent in archaeological dating evidence.⁴⁰

Any attempt at seriation or the formation of a chronologically-based typology is dependent upon the quality of our dating evidence. In the first century A.D., as with other periods of Roman history, we are subject to a phenomenon that might usefully be termed chronological 'clustering'; this is a result of the way in which Roman military equipment came to be deposited in the archaeological record, at the end of a phase of occupation (in fact, at the moment of abandonment⁴¹). The first century is marked by a series of such 'events': the abandonment of sites in the Voralpenland (Bregenz, Kempten, Salzburg) in A.D.40-45⁴² and movements that followed the invasion of Britain (Vindonissa, Mainz),⁴³ the events of the civil war and subsequent Batavian revolt in A.D.68-71.⁴⁴ In the case of Vindonissa, the contents of the 'Schutthügel' probably reflect these changes, as well as the final abandonment of that fortress in A.D.101.⁴⁵ Thus, our chronological information is inconsistent and all finds are bound to fall within one of only a few categories. Quite simply, there is little basis for a chronological typology.

One of the prime requirements for decorative typologies to work is that there should be some sort of empire-wide development, but the mechanisms for this clearly did not exist in the ancient world. There was no central command in the Roman army, other than the emperor himself,⁴⁶ and matters of equipment design and manufacture were clearly a legionary (or, as with Sallustius Lucullus,⁴⁷ an army-group) concern, so trends within equipment are bound to be far more parochial than is traditionally assumed. With these thoughts in mind, it is now time to consider some new typologies.

SOME NEW TYPOLOGIES OF MILITARY EQUIPMENT

As has been pointed out, the production of typologies by archaeologists is essentially a subjective task. As Clarke has pointed out, it is possible (indeed desirable) to minimise this subjective element, but true objectivity nevertheless remains elusive. There are, however, different species of typology: the functional typology, where logical explanations are evident for the variations embodied within artefacts, or decorative typologies where such reasons can be suggested might be termed 'valid' typologies - in other words, assemblages where the



msb

Fig.2: Types of phalera fastening

process of taxonomy is worthwhile because it is defining a genuine phenomenon. 'Invalid' typologies, on the other hand, seek to do the same, but on spurious grounds; if a given attribute varies at random, then there is little point in trying to distinguish a pattern within its behaviour. The typologies that are used here as examples are not, therefore, definitive in any sense of the word, but merely illustrative of the process.

1. 'Valid Typologies'

In this investigation of valid typologies, it will be useful to begin with a simple example of the functional typology that is independent of any decorative criteria.

a) Phalera Fastenings

The recent detailed publication of two hoards of first century cavalry equipment has considerably extended our knowledge of the workings of Roman horse harness.⁴⁸ Crucial to the functioning of the harness was the strap junction, which normally took the form of either a ring or a phalera.⁴⁹ Whilst the front faces of these discs could contain a variety of elaborate decorative schemes, the suspension system at the rear always had to conform to its functional requirements.

Small phalerae might use only a simple flat loop to hold them onto the leather strapping (Fig.2,1).⁵⁰ The next larger ones had, in addition, a hinge at the bottom to which a pendant could be attached (Fig.2,2).⁵¹ Even larger examples also incorporated two loops at the top to which junction-loops were fastened (Fig.2,3).⁵²

Another type of phalera does not use flat loops to attach them to straps because these are true strap junctions. These usually incorporate either three (Fig.2,4) or four (Fig.2,5) loops to which junction-loops are attached.⁵³

The arrangement of these different types of loops and hinges is related to the role played by the phalera within the harness. That is why it is a functional typology and unrelated to any decorative typologies which may also apply to one of these objects.

b) Belt plates

There are two different, but not unrelated, typological distinctions that can be made in the case of pre-Antonine belt plates. First, there are three broad categories into which all plates seem to fit: these comprise the niello-inlaid, motif-embossed, and roundel-embossed plates (Fig.3,1-3). There is a degree of overlap amongst these classes which makes it

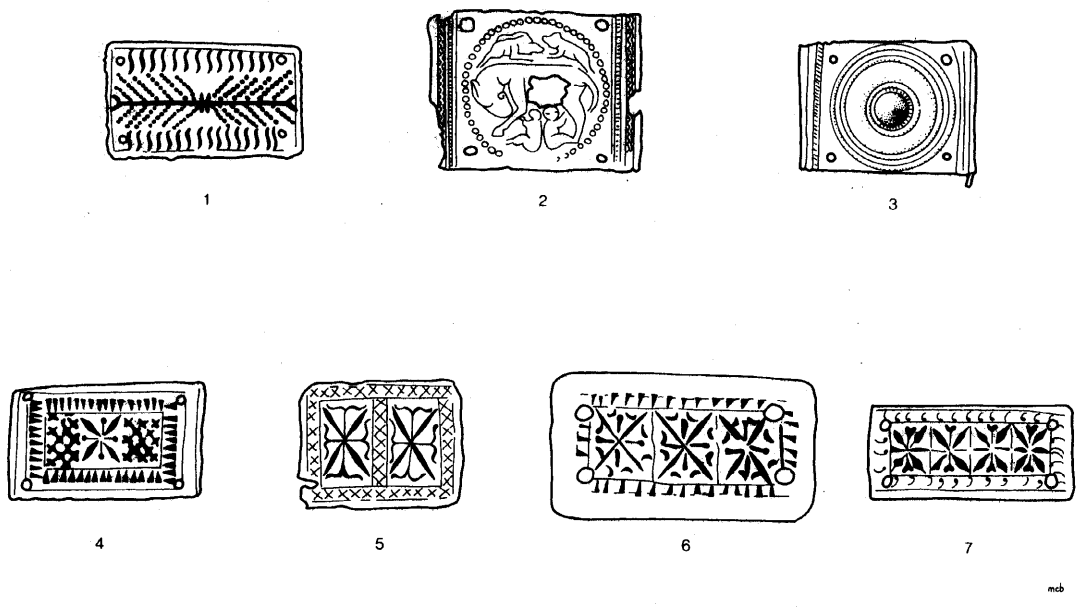


Fig.3: Belt plates (scale 1:2)

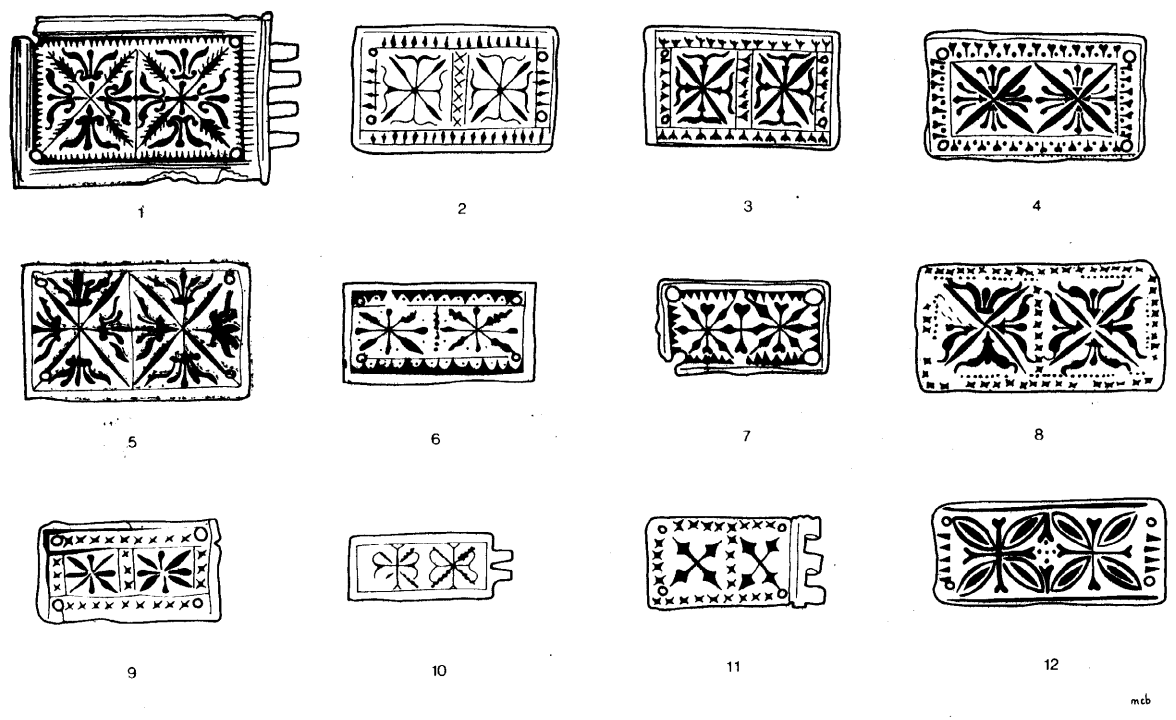


Fig.4: 'St. Andrew's Cross' belt plates (scale 1:2)

desirable to go further and break down each of them into sub-groups.

Taking just one example for the purposes of the present discussion, the niello-inlaid belt plates include a series with a varying number of 'St. Andrew's cross' motifs (Fig.3,4-7), and that within the sub-group with two 'St. Andrew's crosses' there are even more sub-types (Fig.4,1-12).⁵⁴

c) Pendants

The lunula (Fig.5,1) was one of the earliest Romano-Celtic pendant types and was probably connected with the apotropaic origin of horse harness decoration.⁵⁵ This superstitious function defines some other types of pendant, such as those incorporating a prominent phallic motif (Fig.5,2),⁵⁶ or the bird-headed pendants with their possible connection with Celtic symbolism (birds being linked with Celtic Mars - Fig.5,3).⁵⁷ Later pendants incorporated decoration associated with fertility - primarily viticulture or the acorn (and its visual and verbal pun on glans - Fig.5,4).⁵⁸ This latter, sophisticated form nevertheless betrays its origin in the humble lunula when it is examined closely (Fig.6).⁵⁹

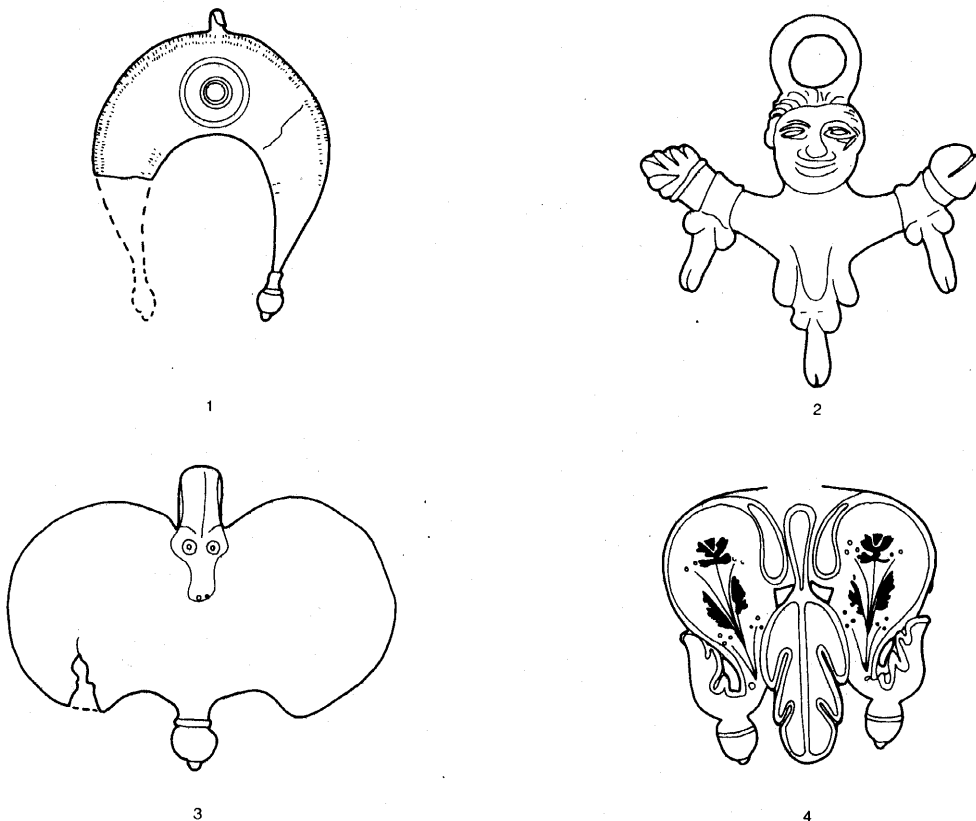
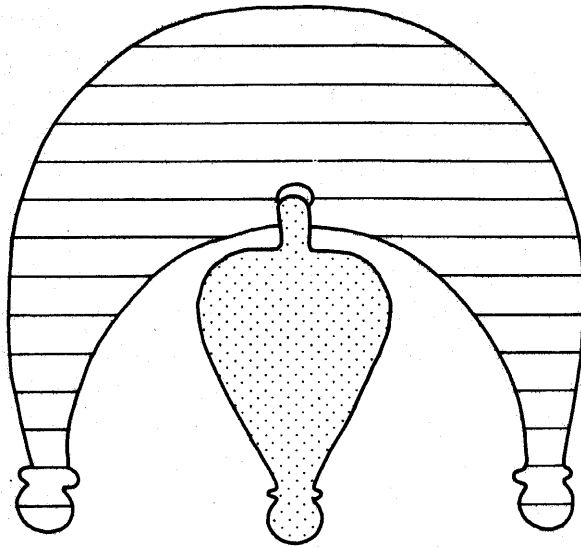
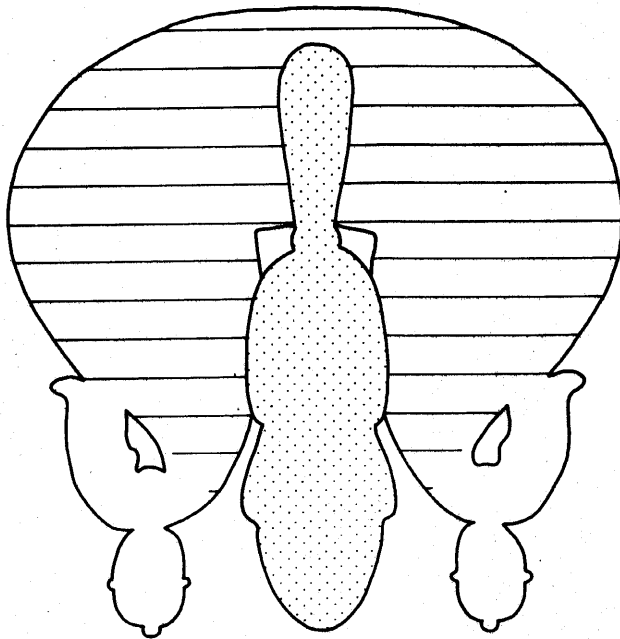


Fig.5: Pendants (scale 1:2)



1



2

Fig.6: The relationship between lunula and trifid pendants

2. 'Invalid Typologies'

'Lorica segmentata' fittings

To be able to follow Robinson in defining a typological sequence amongst cuirass fittings (in other words, to categorise them as a 'valid typology'), we need to be able to describe the mechanism whereby they achieved their various degrees of similarity to each other. There is little sense in having a central authority dictate such variations in shape to the manufacturers of the objects themselves, especially in the case of purely decorative items such as lobate hinges. An alternative approach is to ascribe variations in shape or crudeness to the abilities of craftsmen concerned. Whatever the reasons, it is certainly possible to isolate attributes that can be used to classify some of these objects, at the same time as exercising caution with others.

a) Lobate hinges

It would seem that the form of the lobes and the shoulders of these objects cannot be used to classify them; they had to be cut from a double thickness sheet of copper alloy (usually an 85/15 brass⁶⁰), so variations in such attributes may be solely due to the skill and experience of the craftsman concerned (Fig.7,1-9). Likewise, the presence or absence of stamped rings around the rivet holes does not appear to be very useful in this respect (Fig.7,5 & 11).⁶¹ The triangular openings between the shoulders of these hinges may be significant, but it is difficult to say in what way this might be so (Fig.7,10-15).⁶² However, there is definitely a distinction between most hinges and those from Carnuntum (Fig.7,13-15), particularly in overall size and the pointed nature of the lobes.

b) Hinged strap fittings

Again, these form a fairly homogeneous group by and large, but there seems to be a definite Danubian style similar to that hinted at in the lobate hinges. Fittings that are larger and fatter than those commonly found in the Rhineland and Britain may be one type (Fig.8,1-4), whilst examples with the suggestion of a lobate origin may be another (Fig.8,5-7). There may be another unusual form from Strasbourg (Fig.8,8). Again, decorative rings and the roundness or squareness of the more common varieties (Fig.8,9-16) do not appear to be diagnostic.

c) Hinged buckle fittings

Two main types may be discerned here, once again possibly reflecting a difference between Rhineland and Danube army-group equipment. The more common rectangular forms (Fig.9,1-4), again from the Rhineland and Britain, differ notably from the Danubian examples which have a lobate plate attached to the cuirass (Fig.9,5-8). Other, more minor, variations such as decorative

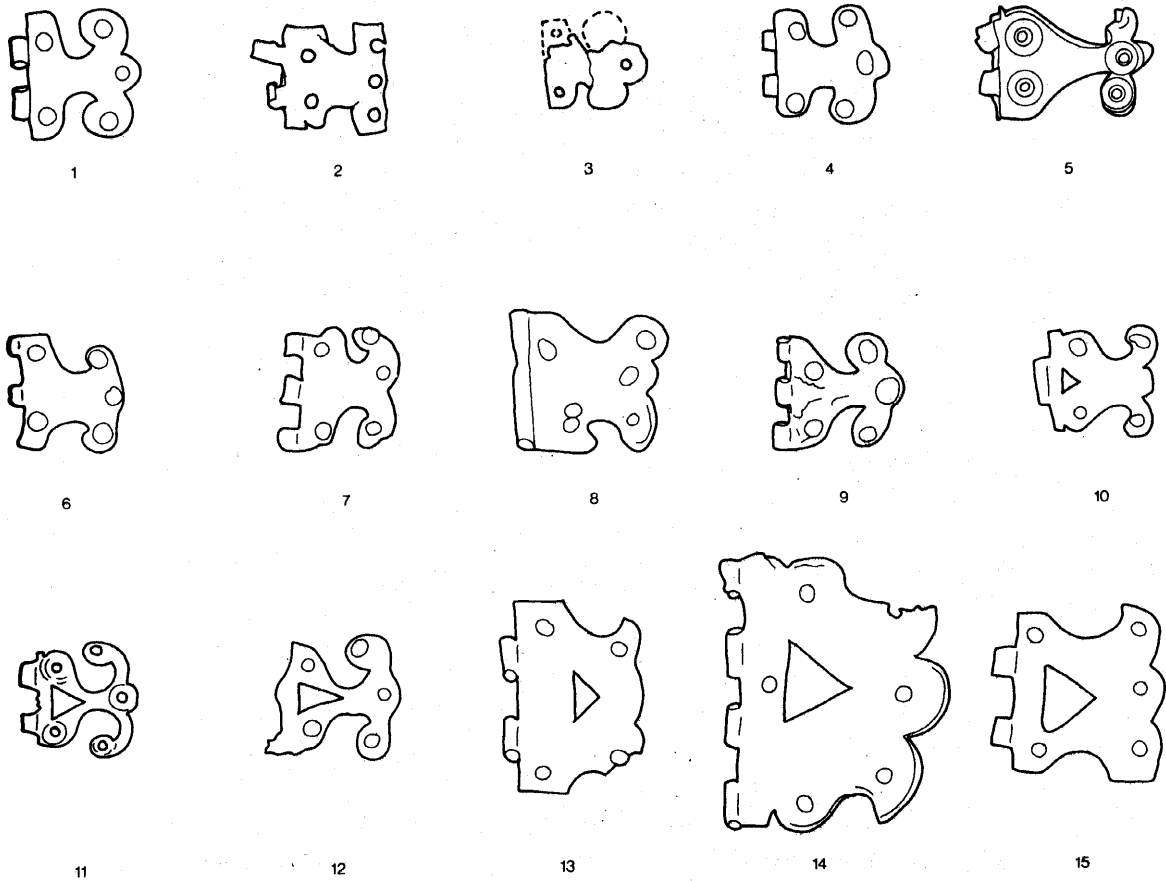


Fig. 7: 'Lorica segmentata' lobate hinges (scale 1:2)

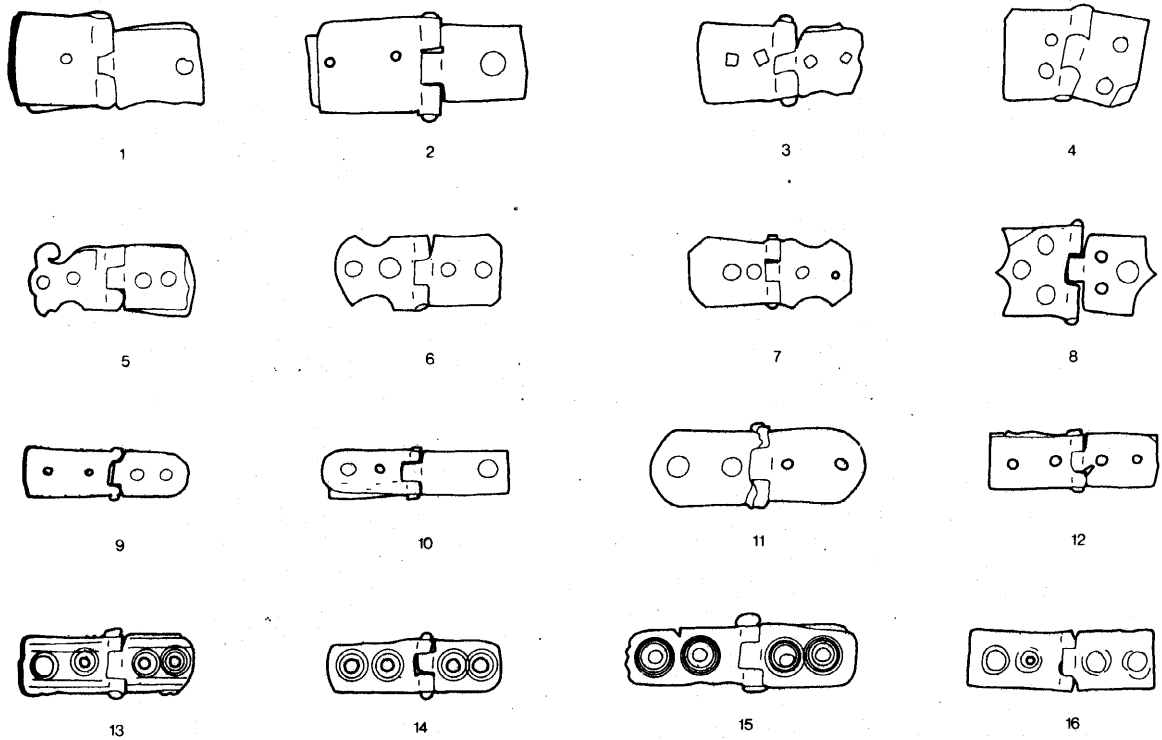


Fig. 8: 'Lorica segmentata' hinged strap fittings (scale 1:2)

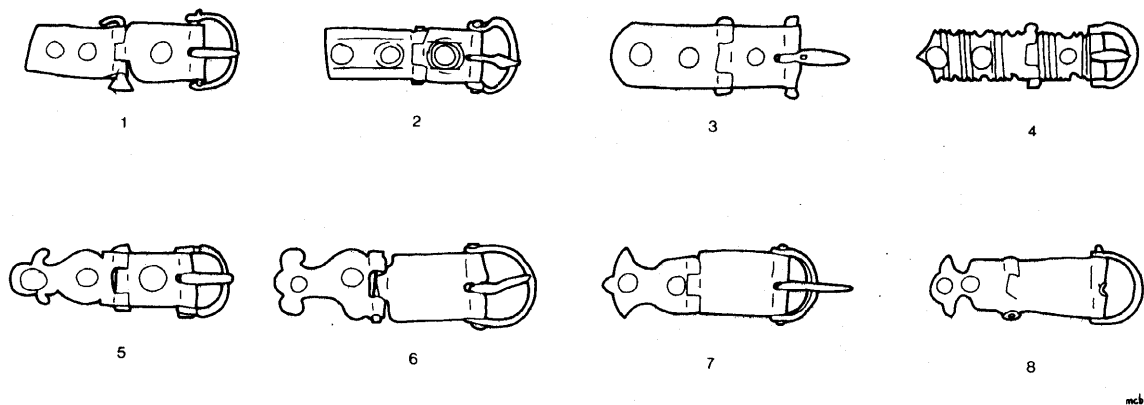


Fig.9: 'Lorica segmentata' hinged buckle fittings (scale 1:2)

rings and the rounding of corners are probably once again of little importance.

d) Cuirass tie-hooks

A variety of forms are found, the most common being the straight (or slightly tapered) plate with rounded shoulders (Fig.10,1-4), but a group from the Danube (mainly Carnuntum again) have a remarkable 'waisted' form similar to a Coca-Cola bottle; they also have very gently sloping shoulders (Fig.10,5-8).

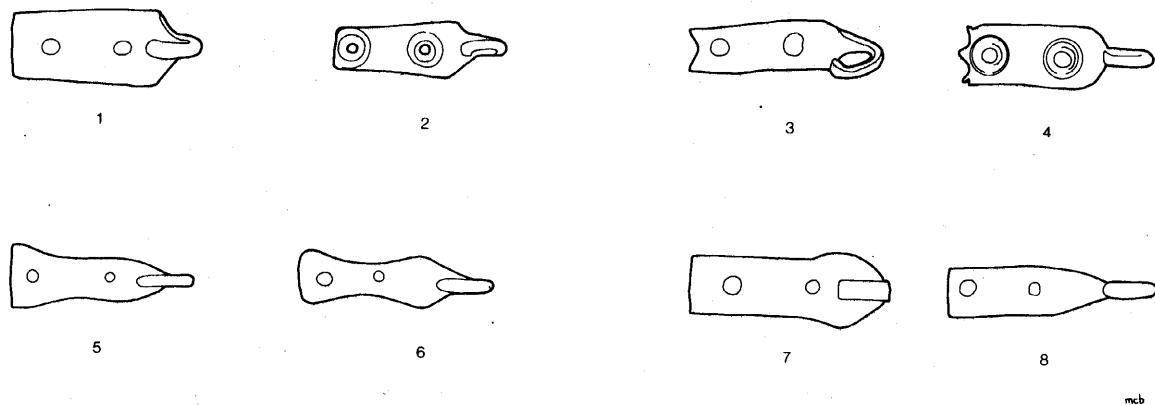


Fig.10: 'Lorica segmentata' tie hooks (scale 1:2)

TYPOLOGICAL STUDIES AND THEIR USES

The embossed belt plates mentioned above are one example of the way in which these typologies may be of use to us.

Examination of a distribution map shows that they are mainly found in Upper Germany, with a few outliers in Britain and Lower Germany (Fig.11). The dating of these particular belt plates is fairly well known, given their presence in the Schutthügel at Vindonissa (c.A.D.45 - abandonment of legio XIII Gemina),⁶³ associated with the end of Phase Ia at Valkenburg (c.A.D. 40/1)⁶⁴, and (less certainly), the abandonment of Ribtissen and Oberstimm in A.D.69⁶⁵ and of the south-western forts of Waddon and Hod Hill at some point between A.D.55 and 75.⁶⁶

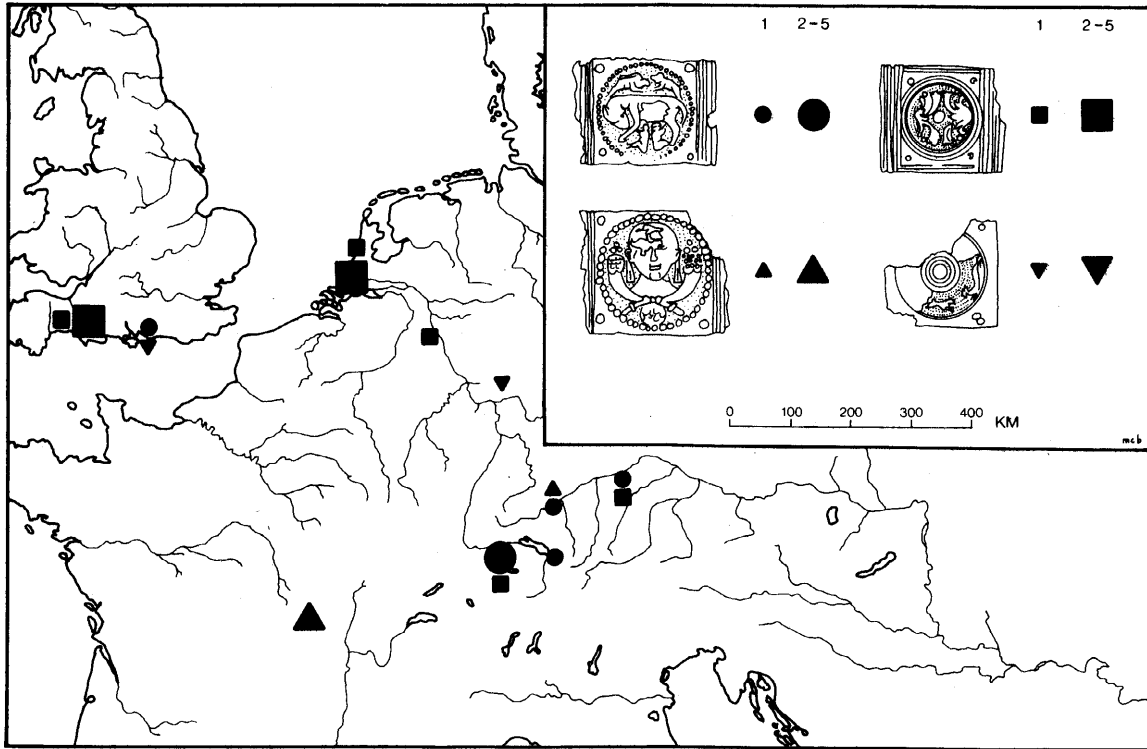
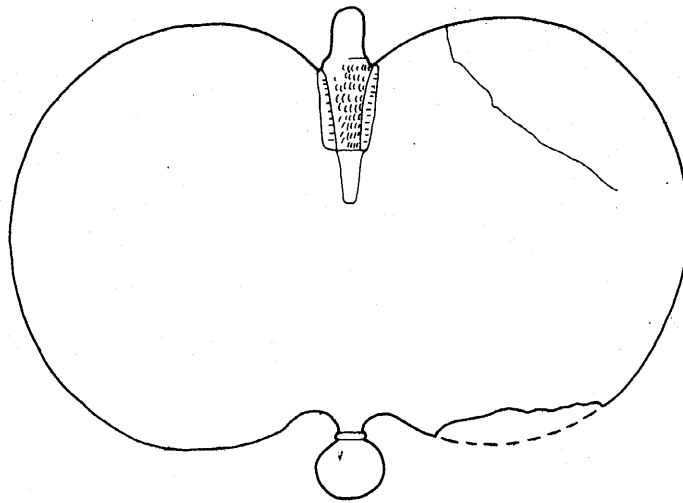


Fig.11: The distribution of embossed belt plates

By far the most interesting characteristic of these plates is their geographical spread: most are known from Upper Germany and it was a legion from that army-group (II Augusta) that was involved in the south-western campaigns in Britain; moreover, Valkenburg has been directly associated with preparations for the invasion of Britain (either because Gaius planned to use it as a starting point, or more likely, as an intermediate stage on the way to Boulogne).⁶⁷ The fact that these plates are apparently found only at sites with a pre-Boudican foundation date⁶⁸ may indicate that they enjoyed a degree of popularity with the Upper German troops some time before the invasion of Britain, but that their popularity was waning by the time of the conquest and they eventually disappeared.

Amongst the many types of pendant, one of the most striking is the bird-headed and particularly the larger specimens. They are very distinctive, with their looped 'feathered' heads with stylised beaks and eyes (Fig.12). Once again, studying a



mcb

Fig.12: A large 'bird-headed' pendant from Cirencester (scale 1:2)

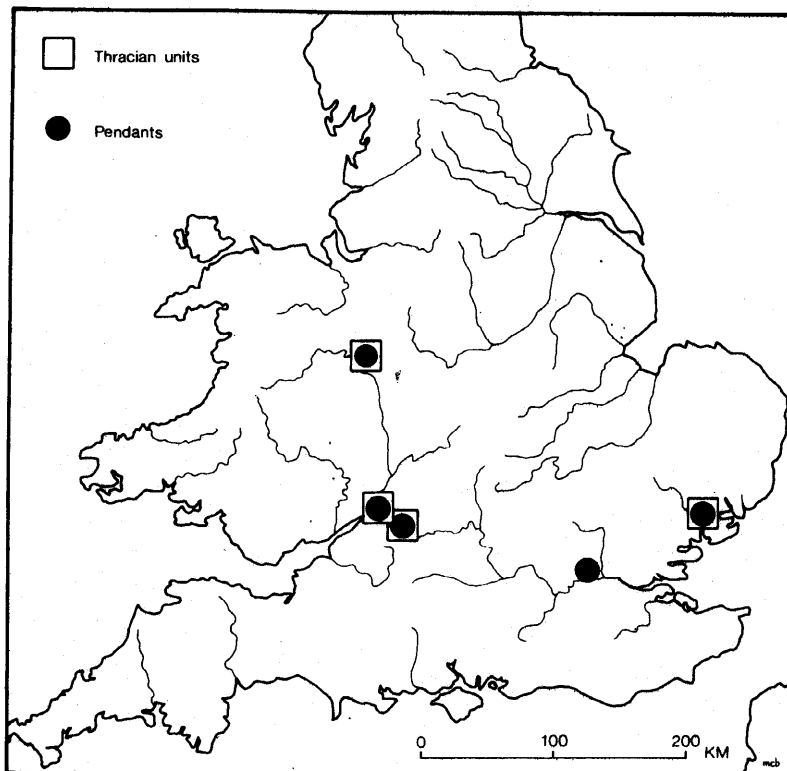


Fig.13: The distribution of figured Thracian cavalry tombstones and 'bird-headed' pendants in Britain

distribution map hints at some interesting conclusions, especially in connection with Britain. Comparison of the distribution of the few samples known from this province with that of early tombstones associated with Thracian units reveals a certain degree of coincidence in the pattern (Fig.13). There are far too few examples of either pendants or tombstones to allow anything concrete, but we might see this as a possible indication of ethnic specificity amongst the Thracian auxiliary cavalry.⁶⁹

This is all very well, and some of the suppositions put forward here may even be true, but there are a number of warnings that must be re-emphasised. First, the size of our sample, even for relatively common items like pendants, is seldom large enough to form a statistically viable sample and are thus suspect. Next, as was admitted earlier, the present interpretations are, like Robinson's, dependent upon the model selected for use to interpret the first century army's perception and use of military equipment. Thus these are alternative suggestions and not replacements: the objective interpretation of typological data remains elusive for the time being.

FUTURE WORK

Specificity - relating certain variants of a given piece of equipment to certain units - would seem to be an idea that deserves further research. More realistically, it is probably best to treat it as just one possibility to be kept in mind as the corpus of known (and published) military equipment of this period grows steadily, as it must do in the foreseeable future. If it can be shown to be a genuine phenomenon, however, the possibilities are extremely exciting: army-groups, possibly even particular legions, could be traced from their material detritus, even when more definite evidence, especially the epigraphic kind, is lacking. Such a tool would profoundly affect our understanding of the army's movements and, hopefully, of the way in which its craftsmen thought. It might be possible to isolate 'masters' working in a particular style at a particular time, as can be done with Samian ware to a certain extent.⁷⁰

An interesting development in the field of typological studies and taxonomy may be presented by 'artificial intelligence'. Even the most cursory examination of the structure of an 'expert system', a program that makes decisions (or logical deductions) based upon the information supplied to it, reveals that the essential elements for forming a typology are present.⁷¹ Past types could be fed into the machine, along with the rules that define the type-groups, and the machine

would then theoretically be able to classify new items automatically. Although data-entry is clumsy at the moment and dependent upon the entry of a digitised description of an object, the development of artificial sensing devices and shape recognition are fundamental to current work in artificial intelligence and are directly relevant to such a proposal.⁷²

Whilst this is unlikely to lead to computers performing all necessary typological analyses without the need for human intervention, it may prove to be a useful aid for the archaeologist to use to draw up rules for his own typologies and test them on the data, modifying them as appropriate. The ability to define rules in this way can only benefit typological work on Roman military equipment.⁷³

Even with the aid of artificial intelligence, it will probably not be possible to achieve the ultimate objectivity. Clarke said⁷⁴ "the real basis of objectivity is to be arbitrary in a narrowly confined and defined manner" and that is surely the best we can hope for.

ACKNOWLEDGEMENTS

I am extremely grateful to Lindsay Allason-Jones, Jon Coulston, and my wife, Martha Andrews, who all read and commented upon earlier drafts of this paper. Although I have usually acted upon their advice, they should in no way be held responsible for the contents.

NOTES

1. A thumbnail sketch can be found in GREENE, 1983, 32-4 and 100-3; the process of 'building a typology' is outlined in SMITH, 1976, 205-13. See also DORAN & HODSON, 1975, 161-7.
2. CLARKE, 1978.
3. Ibid. 151-2. CLARKE likened this to birth, maturity, and death, calling it the "ontogeny of the entity" (ibid. 180).
4. Cf. ibid. Fig.47.
5. Ibid. 153-4.
6. Ibid. 153.
7. Ibid. 155.

8. We may legitimately wonder, for instance, whether the evolution of 'eyebrows' on Imperial-Gallic helmets (ROBINSON, 1975, 46 Figs.52-61) is a real or perceived phenomenon. Would a Roman craftsman have been aware of this?
9. CLARKE, 1978, 154.
10. HILL & EVANS, 1972.
11. RLÖ II, 86.
12. Ibid. Taf.XV,I-IX.
13. A scale from 1st century A.D. Longthorpe (FRERE & ST.JOSEPH, 1974, Fig.27,35) is of von Groller's Type V, whilst some from early 3rd century A.D. Carpow (WILD, 1981, Fig.7) are of Type IV.
14. ULBERT, 1969a.
15. A classified catalogue of sheaths is presented in ETTLINGER & HARTMANN, 1984, 40-3. I am grateful to Prof. W.H. Manning for bringing this paper to my attention.
16. SCOTT, 1980.
17. Terms like 'leaf-shaped' are unhelpful, since leaves are found in an extraordinary variety of shapes. The botanical metaphor can be pursued, however, and terms such as 'pinnate' or 'lanceolate' adopted, but some sort of numerical description seems unavoidable - see BARKER, 1975.
18. DENSEM, 1976.
19. ORTON, 1980, 54-62 provides a useful review of the main results.
20. Cf. GREENE, 1983, Fig.13.
21. Consider 'lorica segmentata' lobate hinges: they are all similar, but few excavated examples (if any) are identical - why? The processes governing the invention, retention, and dissimulation of even such a simple object as this hint at a degree of a complexity about which the archaeologist can only begin to guess.
22. CLARKE, 1978, 153 with Fig.48; cf. ibid. 202-3 n.1 for Chapman's comments on the description by Hill & Evans of this approach as 'empiricist'.

23. Republic X, 1.
24. ROBINSON, 1975.
25. Ibid. Part 1, 11-144.
26. A term used in computer animation techniques: presented with two dissimilar images, the computer proceeds to produce the linking sequence of frames that converts the first into the second, thus providing smooth animation without the necessity to redraw each frame manually.
27. ROBINSON, 1975, 46.
28. Ibid. Fig.182.
29. Ibid. 181-2.
30. The wide range of shapes from any one site hints at the difficulties inherent here, and the range on the armour from the Corbridge Hoard (report forthcoming) serves to underline this impression.
31. A. Böhme in SCHÖNBERGER, 1978, Abb.73.
32. Other types include lunulae, teardrop, phallic forms and these constitute a not inconsiderable proportion of pendants recovered from the archaeological record.
33. LAWSON, 1978,
34. ZADOKS-JOSEPHUS JITTA & WITTEVEEN, 1977.
35. Ibid. 176.
36. Cf. BISHOP, 1985, 13 with n.113.
37. ROBINSON, 1975, Figs.84-92.
38. HAWKES & HULL, 1947, 39-40; G. Webster in NIBLETT, 1985, 114.
39. FITZPATRICK, 1986.
40. C.F.C. Hawkes (in TODD, 1985, 192-5) has pointed out that at least one phase of the military occupation could post-date the Boudican rebellion.
41. BISHOP, 1985, 8-9; 1986, 721-2.

42. Bregenz: WELLS, 1972, 80-81; Kempten: ibid. 81-3; Salzburg: SCHÖNBERGER, 1969, 151. For a useful map of these dispositions, see FILTZINGER, 1983, frontpapers.
43. Vindonissa: SCHÖNBERGER, 1969, 153; Mainz: loc. cit.
44. Ibid. 155.
45. It seems that material from the occupation of legio XIII Gemina was deposited in the 'Keltengraben' (HARTMANN, 1986, 43) before their second fortress was constructed, whilst the Schutthügel contained material from the legiones XIII, XXI Rapax, and XI Claudia, apparently dumped progressively from east to west (ibid. 94). It is not clear whether these deposits accumulated gradually or in a number of distinct 'events'.
46. CAMPBELL (1975; 1984) has considered the so-called virii militares and shown that there was a strong element of amateurism in the Roman military system.
47. Suetonius Domit. 10,3.
48. Doorwerth: BROUWER, 1982; Xanten: JENKINS, 1985.
49. The functions of the various elements of horse harness are considered in BISHOP, forthcoming.
50. BROUWER, 1982, Taf.1,106b; JENKINS, 1985, Fig.11.
51. BROUWER, 1982, Taf.3,147b; JENKINS, 1985, Fig.8.
52. BROUWER, 1982, Taf.1,138b; JENKINS, 1985, Fig.4.
53. Three rings: BROUWER, 1982, Taf.2,140b; JENKINS, 1985, Fig.5; four rings: BROUWER, 1982, Taf.2,144b; JENKINS, 1985, Fig.6.
54. Needless to say, since so few examples of belt plates survive compared to the presumed original population, many sub-types are represented by only one plate.
55. Cf. BISHOP, forthcoming.
56. JOHNS, 1982, 63-4 & 73.
57. ROSS, 1967, 342 - the horse and the goose symbolized Celtic Mars.

58. Pendants such as those from Doorwerth or Xanten have relief decoration of oakleaf and acorn motifs, but inlaid designs recalling viticulture.
59. The lunula is dealt with by ZADOKS-JOSEPHUS JITTA & WITTEVEEN, 1977.
60. Orichalcum; the zinc/copper mixture probably varied according to the method of manufacture of a fitting.
61. Most rings appear to be stamped. It is worth noting that many objects published with no rings in their illustrations will sometimes reveal that such rings did exist upon examination of the actual item.
62. It is not a temporal feature, as ROBINSON thought (1975, Fig.182); one of the cuirass elements in the Corbridge Hoard had been repaired with such a hinge (report forthcoming).
63. RE 'legio' 1713.
64. GLASBERGEN & GROENMAN-VAN WAATERINGE, 1974, 39.
65. Cf. SCHÖNBERGER, 1969, 155.
66. For doubts about the traditional terminal date of Hod Hill, see TODD, 1982, 53-4.
67. But see DE WEERD, 1977 for a strong case against the direct involvement of Valkenburg I in the British expedition.
68. Which may suggest that they only enjoyed a brief spell of popularity.
69. These pendants, or parts of them, are known from Cirencester (WACHER & MCWHIRR, 1982, Fig.36,100), Kingsholm (LYSONS, 1817, Pl.XV,10), London (WEBSTER, 1960, Fig.6,141), Colchester (ibid., Fig.4,69), Wroxeter (ibid., Fig.8,256), Aislingen (ULBERT, 1959, Taf.21,17), and Oberstimm (SCHÖNBERGER, 1978, Taf.23, B189).
70. BULMER, 1980, 38-42.
71. Cf. BISHOP & THOMAS, 1984.
72. BLAKE, 1985.
73. BISHOP & THOMAS, 1984, 61.

74. CLARKE, 1978, 154.

APPENDIX: SOURCES OF ILLUSTRATIONS

Fig.3: Belt plates

1. Hod Hill (BRAILSFORD, 1962, Fig.4,A112)
2. Rißtissen (ULBERT, 1970, Taf.1,1)
3. Rheingönheim (ULBERT, 1969b, Taf.27,3)
4. Hod Hill (BRAILSFORD, 1962, Fig.4,A109)
5. Hofheim (RITTERLING, 1913, Taf.XII,7)
6. Vindonissa (FELLMANN, 1954, Abb.28,b)
7. Vindonissa (UNZ, 1973, Abb.7,38)

Fig.4: 'St. Andrew's cross' belt plates

1. Colchester Sheepen (HAWKES & HULL, 1947, Pl.C,39)
2. Rheingönheim (ULBERT, 1969b, Taf.27,21)
3. Hofheim (RITTERLING, 1913, Taf.XII,4)
4. Colchester Sheepen (HAWKES & HULL, 1947, Pl.CII,17)
5. Strasbourg (FORRER, 1927, Taf.LXXVII,29)
6. Strasbourg (FORRER, 1927, Taf.LXXVII,28)
7. Mainz (BEHRENS, 1912, Abb.4,23)
8. Vindonissa (FELLMANN, 1954, Abb.28,c)
9. Rheingönheim (ULBERT, 1969b, Taf.27,20)
10. Ham Hill (WEBSTER, 1960, Fig.5,120)
11. Rheingönheim (ULBERT, 1969b, Taf.27,18)
12. Oberstimm (SCHÖNBERGER, 1978, Taf.22,B146)

Fig.5: Pendants

1. Baden (UNZ, 1971, Abb.5,44)
2. Mainz (BEHRENS, 1918, Abb.10,5)
3. Besançon (FEUGERE, 1983, Fig.25,a)
4. Doorwerth (BROUWER, 1982, Taf.3,147)

Fig.7: 'Lorica segmentata' lobate hinges

1. The Lunt (HOBLEY, 1973, Fig.23,36)
2. Rheingönheim (ULBERT, 1969b, Taf.33,17)
3. Rheingönheim (ULBERT, 1969b, Taf.33,16)
4. Longthorpe (FRERE & ST.JOSEPH, 1974, Fig.26,17)
5. Neuß (NISSEN et al., 1902, Taf.XXX,81)
6. Oberstimm (SCHÖNBERGER, 1978, Taf.20,B81)
7. Oberstimm (SCHÖNBERGER, 1978, Taf.20,B78)
8. Carnuntum (RLÖ II, Taf.XVII,23)
9. Rißtissen (ULBERT, 1970, Taf.4,83)
10. Rißtissen (ULBERT, 1970, Taf.3,63)
11. Hofheim (RITTERLING, 1913, Taf.XI,6)

12. Hod Hill (RICHMOND, 1968, Fig.56,9)
13. Carnuntum (RLÖ II, Taf.XIX,57)
14. Carnuntum (RLÖ II, Taf.XIX,58)
15. Carnuntum (RLÖ II, Taf.XIX,59)

Fig.8: 'Lorica segmentata' hinged strap fittings

1. Carnuntum (RLÖ II, Taf.XIX,48)
2. Carnuntum (RLÖ II, Taf.XVIII,36)
3. Carnuntum (RLÖ II, Taf.XIX,47)
4. Carnuntum (RLÖ II, Taf.XIX,58)
5. Carnuntum (RLÖ II, Taf.XIX,54)
6. Carnuntum (RLÖ II, Taf.XIX,46)
7. Carnuntum (RLÖ II, Taf.XIX,49)
8. Strasbourg (FORRER, 1927, Taf.LXXVII,25)
9. London (WEBSTER, 1960, Fig.6,162)
10. Ham Hill (WEBSTER, 1960, Fig.5,126)
11. Ribtissen (ULBERT, 1959, Taf.61,9)
12. Ribtissen (ULBERT, 1970, Taf.3,49)
13. Oberstimm (SCHÖNBERGER, 1978, Taf.20,B88)
14. Oberstimm (SCHÖNBERGER, 1978, Taf.20,B89)
15. Hod Hill (RICHMOND, 1968, Fig.56,12)
16. Rheingönheim (ULBERT, 1969b, Taf.33,1)

Fig.9: 'Lorica segmentata' hinged buckle fittings

1. London (WEBSTER, 1960, Fig.6,159)
2. Rheingönheim (ULBERT, 1969b, Taf.33,23)
3. Chichester (DOWN & RULE, 1971, Fig.8.15,21)
4. Vindonissa (UNZ, 1973, Abb.9,90)
5. Ribtissen (ULBERT, 1970, Taf.3,44)
6. Sisek (HOFFILLER, 1912, Sl.11)
7. Carnuntum (RLÖ II, Taf.XVIII,44)
8. Carnuntum (RLÖ II, Taf.XVIII,41)

Fig.10: 'Lorica segmentata' tie hooks

1. Hod Hill (RICHMOND, 1968, Fig.56,13)
2. Rheingönheim (ULBERT, 1969b, Taf.34,51)
3. Ribtissen (ULBERT, 1970, Taf.3,72)
4. Hod Hill (RICHMOND, 1968, Fig.56,14)
5. Carnuntum (RLÖ II, Taf.XVII,255)
6. Carnuntum (RLÖ II, Taf.XVII,258)
7. Carnuntum (RLÖ II, Taf.XVII,256)
8. Carnuntum (RLÖ II, Taf.XVII,253)

Fig.11: The distribution of embossed belt plates (based on SCHÖNBERGER, 1978, Abb.76)

Fig.12: Large 'bird-headed' pendant (after WACHER & MCWHIRR, 1982, Fig.36,100)

BIBLIOGRAPHY

BARKER 1975: P.C. Barker, 'An exact method of describing iron weapon points' in S. Laflin (ed.), Computer Applications in Archaeology, (Birmingham 1975), 3-8

BEHRENS 1912: G. Behrens, 'Neue Funde aus dem Kastell Mainz', Mainzer Zeitschrift, 7, 1912, 82-109

BEHRENS 1918: G. Behrens, 'Neue und ältere Funde aus dem Legionskastell Mainz', Mainzer Zeitschrift, 12-13, 1917-18, 21-46

BISHOP 1985: M.C. Bishop, 'The military fabrica and the production of arms in the early principate' in M.C. Bishop (ed.), The Production and Distribution of Roman Military Equipment: Proceedings of the Second Roman Military Equipment Research Seminar (BAR International Series 275), (Oxford 1985), 1-42

BISHOP 1986: M.C. Bishop, 'The distribution of military equipment within Roman forts of the first century A.D.' in Studien zu den Militärgrenzen Roms III. Vorträge des 13. internationalen Limeskongresses, Aalen 1983, (Stuttgart 1986), 717-23

BISHOP forthcoming: M.C. Bishop, 'Cavalry equipment of the Roman army in the first century A.D.', in Proceedings of the Fourth Roman Military Equipment Conference

BISHOP & THOMAS 1984: M.C. Bishop & J. Thomas, '"BEAKER" - an expert system for the BBC micro' in S. Laflin (ed.), Computer Applications in Archaeology 1984: Conference Proceedings, (Birmingham 1984), 56-62

BLAKE 1985: A. Blake, 'Ways of seeing', Practical Computing, 7:10, October 1984, 127

BRAILSFORD 1962: J.W. Brailsford, Hod Hill 1: Antiquities from Hod Hill in the Durden Collection, (London 1962)

BROUWER 1982: M. Brouwer, 'Römische Phalerae und anderer

Lederbeschlag aus dem Rhein', Oudheidkundige Mededelingen uit het Rijksmuseum van oudheden te Leiden (nieuwe reeks), 63, 1982, 145-87

BULMER 1980: M. Bulmer, 'An introduction to Roman samian ware with special reference to collections in Chester and the north west', Journal of the Chester Archaeological Society, 62, 1979 (1980), 5-72

CAMPBELL 1975: J.B. Campbell, 'Who were the "viri militares"?', Journal of Roman Studies, 65, 1975, 11-31

CAMPBELL 1984: J.B. Campbell, The Emperor and the Roman Army 31 B.C. - A.D.235, (Oxford 1984)

CLARKE 1978: D.L. Clarke, Analytical Archaeology, ed.2 revised by Bob Chapman, (London 1978)

DENSEM 1976: R. Densem, Roman Military Spearheads and Projectiles from Britain (unpublished undergraduate dissertation, Institute of Archaeology, University of London), (1976)

DE WEERD 1977: M.D. De Weerd, 'The date of Valkenburg I reconsidered: the reduction of a multiple choice question' in B.L. van Beek, R.W. Brandt, & W. Groenman-van Waateringe (eds.), Ex Horreo (Cingula IV), (Amsterdam 1977), 255-89

DORAN & HODSON 1975: J.E. Doran & F.R. Hodson, Mathematics and Computers in Archaeology, (Cambridge 1975)

DOWN & RULE 1971: A. Down & M. Rule, Chichester Excavations Vol.1, (Oxford 1971)

ETTLINGER & HARTMANN 1984: E. Ettliger & M. Hartmann, 'Fragmente einer Schwertscheide aus Vindonissa und ihre Gegenstücke vom Grossen St.Bernhard', Jahresbericht Gesellschaft Pro Vindonissa, 1984, 5-46

FELLMANN 1954: R. Fellmann, 'Die Grabungen im Legionslager im Jahre 1953', Jahresbericht Gesellschaft Pro Vindonissa, 1953/54, 5-60

FEUGÈRE 1983: M. Feugère, 'L'équipement militaire romain dans le Département de la Loire. Contribution à l'étude de la romanisation en pays ségusiave', Cahiers archéologiques de la Loire, 3, 1983, 45-66

FILTZINGER 1983: P. Filtzinger, Limesmuseum Aalen, (Stuttgart 1983)

- FITZPATRICK 1986: A. Fitzpatrick, 'Camulodunum and the early occupation of south-east England. Some reconsiderations' in Studien zu den Militärgrenzen Roms III. Vorträge des 13. internationalen Limeskongresses, Aalen 1983, (Stuttgart 1986), 35-41
- FORRER 1927: R. Forrer, Das römische Straßburg, Argentorate, 2 vols., (Strasbourg 1927)
- FRERE & ST.JOSEPH 1974: S.S. Frere & J.K. St.Joseph, 'The Roman fortress at Longthorpe', Britannia, 5, 1974, 1-129
- GLASBERGEN & GROENMAN-VAN WAATERINGE 1974: W. Glasbergen & W. Groenman-van Waateringe, The Pre-Flavian Garrisons of Valkenburg Z.H. (Verhandelingen der Koninklijke Nederlandse Akademie van Wetenschappen, afd. Letterkunde, nieuwe reeks 85. Cingula II), (Amsterdam-London 1974)
- GREENE 1983: K. Greene, Archaeology: An Introduction, (London 1983)
- HARTMANN 1986: M. Hartmann, Vindonissa, (Windisch 1986)
- HAWKES & HULL 1947: C.F.C. Hawkes & M.R. Hull, Camulodunum. First Report on the Excavations at Colchester 1930-1939 (Reports of the Research Committee of the Society of Antiquaries of London, No.XIV), (Oxford 1947)
- HILL & EVANS 1972: J.N. Hill & R.K. Evans, 'A model for classification and typology' in D.L. Clarke (ed.), Models in Archaeology, (London 1972)
- HOBLEY 1973: B. Hobley, 'Excavations at the Lunt Roman military site, Baginton, 1968-71. Second interim report', Transactions of the Birmingham and Warwickshire Archaeological Society, 85, 1971-3 (1973), 7-92
- HOFFILLER 1912: V. Hoffiller, 'Oprema rimskoga vojnika u prvo doba carstva', Vjesnik Hrvatskoga Arheoloskoga Drustva (Zagreb), N.S. 12, 1912, 16-123
- JENKINS 1985: I. Jenkins, 'A group of silvered-bronze horse-trappings from Xanten (Castra Vetera)', Britannia, 16, 1985, 141-64
- JOHNS 1982: C. Johns, Sex or Symbol. Erotic Images of Greece and Rome, (London 1982)
- LAWSON 1978: A.K. Lawson, 'Studien zum römischen

Pferdegeschirr', Jahrbuch des Römisch-Germanischen
Zentralmuseums Mainz, 25, 1978, 131-72

LYSONS 1817: S. Lysons, Reliquiae Britannico-Romanae, Vol.2,
(1817)

NIBLETT, 1985: R. Niblett, Sheepen: an Early Roman Industrial
Site at Camulodunum (CBA Research Report No.57), (London
1985)

NISSEN et al. 1902: H. Nissen, C. Koenen, H. Lehner, M.L.
Strack, & J. Hagen, 'Novaesium. Das im Auftrag des
rheinischen Provinzialverbandes vom Bonner Provinzialmuseum
1887-1900 ausgegrabene Legionslager', Bonner Jahrbücher,
111/2, 1904, 1-462

ORTON 1980: C. Orton, Mathematics in Archaeology, (London 1980)

RE: G. Wissowa (ed.), Paulys Realencyclopädie der classischen
Altertumswissenschaft, (Stuttgart 1893-)

RICHMOND 1968: I.A. Richmond, Hod Hill 2: Excavations Carried
Out Between 1951 and 1958 for the Trustees of the British
Museum, (London 1968)

RITTERLING 1913: E. Ritterling, 'Das frühromische Lager bei
Hofheim i.T. Ausgrabungs- und Fundbericht', Annalen des
Vereins für nassauische Altertumskunde und
Geschichtsforschung, 40, 1913, 1-416

RLÖ: Römische Limes in Österreich

ROBINSON 1975: H.R. Robinson, The Armour of Imperial Rome,
(London 1975)

ROSS 1967: A. Ross, Pagan Celtic Britain. Studies in Iconography
and Tradition, (London 1967)

SCHÖNBERGER 1969: H. Schönberger, 'The Roman frontier in
Germany: an archaeological survey', Journal of Roman
Studies, 59, 1969, 144-97

SCHÖNBERGER 1978: H. Schönberger, Kastell Oberstimm: die
Grabungen von 1968 bis 1971 (Limesforschungen 18), (Berlin
1978)

SCOTT 1980: I.R. Scott, 'Spearheads of the British limes' in
W.H. Hanson & L.J.F. Keppie (eds.), Roman Frontier Studies
1979. Papers Presented to the 12th International Congress of
Roman Frontier Studies (BAR International Series 71),

(Oxford 1980)

SMITH 1976: J.W. Smith, Foundations of Archaeology, (London 1976)

TODD 1982: M. Todd, 'Dating the Roman Empire: the contribution of archaeology' in B. Orme (ed.), Problems and Case Studies in Archaeological Dating (Exeter Studies in Archaeology 1), (Exeter 1982), 35-56

TODD 1985: M. Todd (with a contribution by C.F.C. Hawkes), 'Oppida and the Roman army. A review of recent evidence', Oxford Journal of Archaeology, 4, 1985, 187-99

ULBERT 1959: G. Ulbert, Die römischen Donaukastelle Aislingen und Burghöfe (Limesforschungen 1), (Berlin 1959)

ULBERT 1969a: G. Ulbert, 'Gladii aus Pompeji', Germania, 47, 1969, 97-128

ULBERT 1969b: G. Ulbert, Das frühromische Kastell Rheingönheim (Limesforschungen 9), (Berlin 1969)

ULBERT 1970: G. Ulbert, Das römische Donau-Kastell Rißtissen, Teil 1: die Funde aus Metall, Horn und Knochen (Urkunden zur Vor- und Frühgeschichte aus Südwürttemberg-Hohenzollern Heft 4), (Stuttgart 1970)

UNZ 1971: C. Unz, 'Römische Militärfunde aus Baden - Aquae Helveticae', Jahresbericht Gesellschaft Pro Vindonissa, 1971, 41-58

UNZ 1973: C. Unz, 'Römische Militärfunde aus Windisch im ehemaligen Kantonalen Antiquarium Aarau', Jahresbericht Gesellschaft Pro Vindonissa, 1973, 11-42

WACHER & MCWHIRR 1982: J.S. Wacher & A.D. McWhirr, Cirencester Excavations 1: Early Roman Occupation at Cirencester, (Cirencester 1982)

WEBSTER 1960: G. Webster, 'The Roman military advance under Ostorius Scapula', Archaeological Journal, 105, 1958 (1960), 49-98

WELLS 1972: C.M. Wells, The German Policy of Augustus. An Examination of the Archaeological Evidence, (Oxford 1972)

WILD 1981: J.P. Wild, 'A find of Roman scale armour from Carpow', Britannia, 12, 1981, 305-6

ZADOKS-JOSEPHUS JITTA & WITTEVEEN 1977: A.N. Zadoks-Josephus
Jitta & A.M. Witteveen, 'Roman bronze lunulae from the
Netherlands', Oudheidkundige Mededelingen uit het
Rijksmuseum van oudheden te Leiden, 58, 1977, 167-95