

ROMAN MILITARY EQUIPMENT

FROM THE PUNIC WARS
TO THE FALL OF ROME

❧ SECOND EDITION ❧

M. C. BISHOP &
J. C. N. COULSTON



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Frontispiece: Stela of P. Marcius Probus, a custos armorum. He is shown wearing a paenula and carrying a staff of office and a book of writing tablets, both perhaps symbolic of his rank. Depicted around him are (clockwise from bottom left) a small round shield, a curved rectangular shield, a crested Italo-Corinthian helmet, a dagger and belt with straps and crescentic terminals, a bundle of shafted weapons (?), and a cuirass. Probably 1st century AD, from Bergamo, Italy (not to scale).

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M. C. Bishop & J. C. N. Coulston

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To Hazel, Martha, Oliver, and Christabel

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Front cover illustration: Oberammergau dagger and sheath
(photo: Archäologische Staatssammlung, München)
Back cover: Xanten cavalry helmet
(photo: Rheinisches Landesmuseum, Bonn)

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Preface and Introduction

Before the first edition of this book, the last attempt to examine Roman military equipment from the Republic to the late Empire in a single, substantial volume was made by Couissin in 1926. Our 1989 booklet provided only a summary, within a very restricted format which precluded the use of references. Wishing to bring the field of Roman military equipment studies to a wider audience, the primary aim of the first edition of the present book was to demonstrate that the subject provides a window into the practical workings of the Roman army. Moreover, we believed that it could elucidate the place of soldiers and military institutions within Roman culture and society as a whole and thus have broad implications for an understanding of the Roman world. We have not been disappointed in this respect.¹

A study with the present title could either delineate and discuss separately the various classes of equipment (armour, shields, swords etc.), or it could adopt a more historical perspective. We have deliberately chosen the latter approach, not only because it enables us to explore various pertinent technological and sociological issues in their appropriate contexts, but also because it permits us to stand back and view the development of Roman equipment throughout our period.

We are aware that this is an ambitious project, but it is vital to attempt it because Roman military artefact studies have traditionally been subordinated to narrow art-historical discussions, or marginalized as 'typology-fodder'.

It is a commonly held view that Rome's rise to empire owed much to the efficiency and military skill of her armies. Often implicit in this opinion is the notion of Roman technical and technological superiority over 'barbarian' adversaries. One of the purposes of the present book is to investigate just how 'advanced' Roman military technology was in contemporary terms. Central to this are the origins of Roman equipment, its evolution, and the interrelationships between soldiers, the arms production 'industry' and the wider society of which the army was just a part.

What is meant by the term 'military equipment'? There is no general agreement amongst scholars and a definition is most easily formed in negative terms. There are grey areas within which objects could be either civilian or military, according to their context, which is only to be expected, since the Roman army included within its ranks many of the trades to be found in civilian life. Cart fittings are a case in point: soldiers used wagons and carts of various kinds, but these vehicles were not necessarily 'military' in design. Fittings are found in both military and civilian contexts without distinguishing features.

Thus, there is little advantage in defining a rigid specification for what is, and is not, 'military equipment'. Some readers may find our criteria to be arbitrary, but, for the purposes of the present volume, military equipment excludes the *dona militaria*, siege engines, draught harness and wagon fittings. Tools and clothing are only briefly discussed, whilst items of personal adornment, such as brooches, are generally omitted, except where they may act as representational evidence. On the other hand, we have sought to include standards and musical instruments for the first time, since further reflection has persuaded us that their role was fundamental to the operation of the Roman army.

The historical limits – from the beginning of the 2nd century BC to the beginning of the 5th century AD – accord with Rome's rise to, and decline from, dominance in the Mediterranean world. They also coincide with the bulk of the published archaeological evidence: to have started earlier or continued later would have required not only more space, but also a radically different approach to the source material.

We have assumed that the reader has a basic knowledge of the Roman army and will refer to the standard texts. No apology is made for mixing modern and ancient place-names but we have endeavoured to be consistent, and the perplexed reader will find a map and topographical list immediately after this preface. In most instances, line illustrations have been used in preference to photographs because they are capable of conveying more information than a single photograph and it is easier to scale them accurately. We have been careful to reference facts wherever possible, whilst trying to keep the notes to a manageable size. We have also sought to avoid the pseudo-technical Latin terminology which abounds in publications on the Roman army.²

A dozen years have passed between the publication of the first (1993) and second editions of *Roman Military Equipment*. This might not seem a great length of time compared, for example, with the gap between the first edition and Couissin's 1926 study, but the pace of research has accelerated amazingly in recent years. It is not much of an exaggeration to assert that military equipment studies constitute one of the most exciting, dynamic and fast-changing areas within the broad field of Roman research. Eight Roman Military Equipment Conferences met before 1993, of which five were held in England; seven have been staged since 1993, no less than six of which have met on the continent. With each new national venue a new circle of archaeologists became directly involved, often realising that hitherto localised work had an extensive international audience. Each conference followed a chosen theme, such as Republican or Late Roman or barbarian equipment, but each also included sessions highlighting newly studied old finds or entirely new discoveries. Thus the conference series has been precisely geared to bring new people into a forum for new work. And the show goes on!

Whilst the illustrations in the second edition remain substantially the same as before, the text and especially the endnotes have been completely revised and substantially extended throughout. This reflects overall research, but also reveals some of the areas of greatest change, as the reader will be able to see in the following pages. Most obviously the Republican period has seen a veritable explosion in the artefactual record, notably in swords, *pila* and artillery, largely from Spain and the Balkans. Serious rethinking on the origins and development of the '*lorica segmentata*' has been set in train by the finds from Kalkriese near Osnabrück. These are certainly Augustan, and most scholars now accept that they are associated with the events of AD 9. Major new finds made all along the northern frontiers have refined the development of the armour form almost into the 4th century. For the Antonine period there is a growing corpus of material from Transdanubian sites occupied, very conveniently for our purposes, for a short period around the Marcomannic Wars. Recently there has been a renaissance in the study of Late Roman helmets, new finds reawakening old discussions, such as the Christian nature of some helmet insignia. Publication of painted

shield leathers from Egypt has revitalised controversies over Late Roman shield blazons in the *Notitia Dignitatum*.

In addition, apart from other syntheses, there has been a steady appearance of large catalogues of finds from individual sites such as Caerleon, Xanten, Augst, Vindonissa and Siscia, as well as from ritual sites outside the empire. The appearance of the corpus of finds from Dura-Europos is itself a major event in Roman military equipment studies. Published together and to a modern standard for the first time, this group is probably the most important collection from anywhere in the Roman world for its range and degree of preservation alone. The accompanying commentary and discussion is wide-ranging, scholarly and concerned with a broad spectrum of historical, technological and cultural issues. With this volume the 'small-finds catalogue' really has come of age.³

As previously mentioned, we have included military standards and musical instruments in the chronological chapters. We have also made more of the funerary deposition of military equipment, both within and outwith the Roman empire, and maintained our emphasis on 'ritual' deposition. We have retained the term 'Antonine Revolution' to characterise the changes in equipment forms and decoration seen so vividly in the later 2nd century, not unconnected with the Marcomannic wars. The last chapter is the most altered, extended as it is to take into account developments in broader discussions and integrating more effectively (we hope) the appendix from the first edition on the nature of 'legionary' equipment. Although individual chapters originated from different pens, they were passed back and forth so often between us and rewritten so much by both of us, that the text of the first edition was truly integrated. This is even more the case with the second edition in which we both romped freely across all parts of the book. The volume of work published over the past dozen years is amply indicated by the massively enlarged bibliography of works cited (703 increased to 1205). On the model of Webster's *Roman Imperial Army* (1969 and later editions), so influential on our generation when we were 'growing up', we hope that the bibliography will be of use to students long after our text (like Lindenschmit's) has ceased to be read.

We have naturally also taken the opportunity to eradicate various errors that have been pointed out to us (and many that were not). Unfortunately, we have almost certainly unwittingly introduced new ones, for which we will have to beg the reader's indulgence. Corrigenda, detailed source information for the illustrations, and other relevant material are available on the website for the book where the reader is advised to check in the first instance.⁴

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Illustrative material has been used with the kind permission of the following: the Archäologische Staatssammlung, München (Pls. 1 and 2c); the Bibliothèque Nationale, Paris (Pl. 3a); the Bodleian Library (Pl. 6a); Jim Bowers (Pl. 5b); Peter Connolly (Fig. 10); Simon James (Pl. 4c); the Landesdenkmalamt Baden-Württemberg (Pl. 2d); Jaap Morel (Fig. 42); the Nationalmuseet København (Pl. 7a); the Rheinisches Landesmuseum, Bonn (Pl. 2a); and Roger Wilson (Pl. 6c). Yale University Art Gallery and the Arts and Recreation Division of the City of Dundee District Council very kindly allowed previously unpublished material to be illustrated. Unless otherwise stated, all line illustrations are by MCB.

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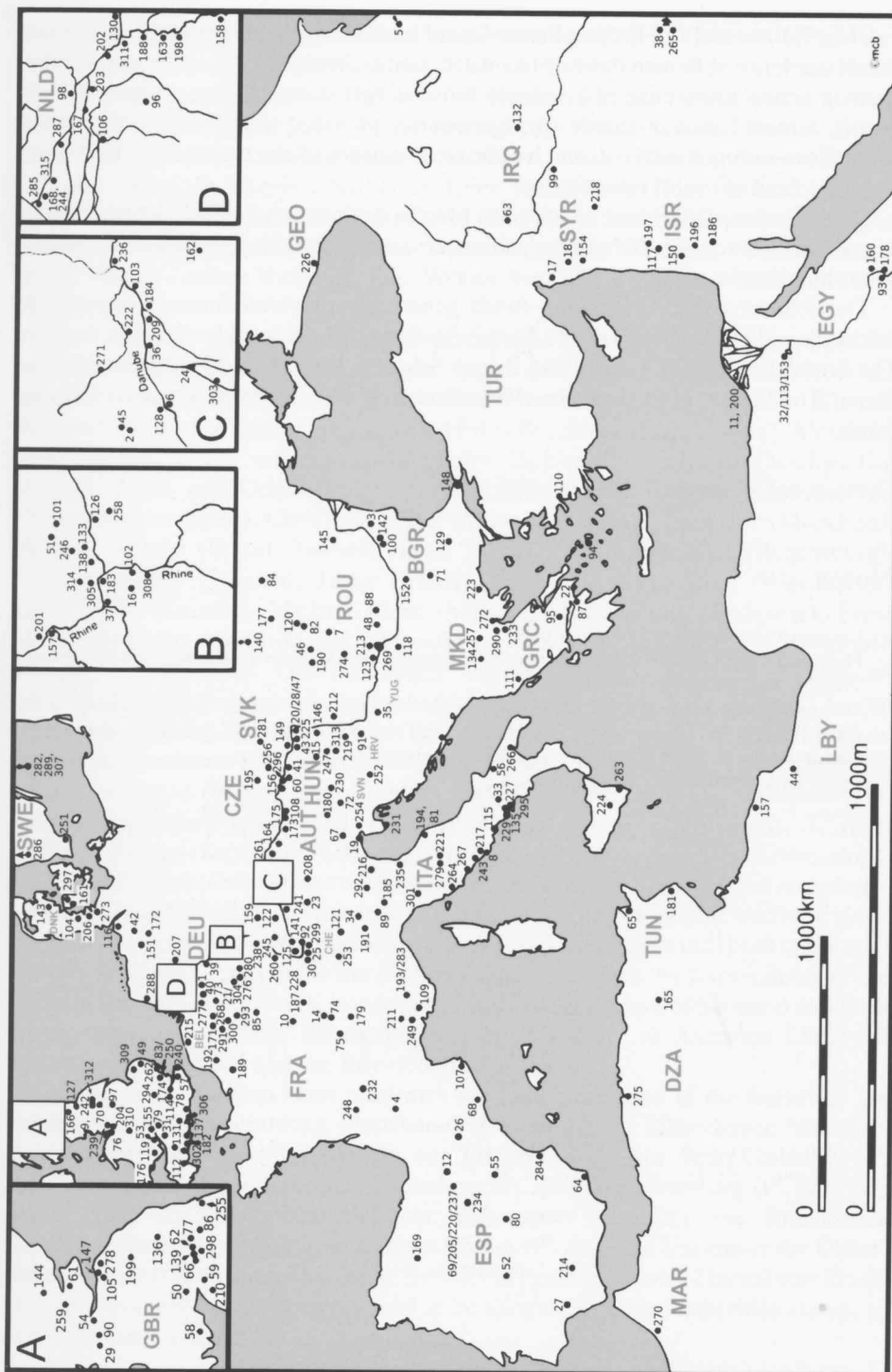
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Chirnside and St Andrews, November 2005

Notes

1. Couissin 1926; Bishop and Coulston 1989.
2. Hoffmann 1969; Connolly 1981; Maxfield 1981; Johnson 1983; Campbell 1984; Keppie 1984; Webster 1985b.
3. Other syntheses: Feugère 1993; 1994; Stevenson 1999; Coulston 1998b; 2002. Catalogues: Chapman 2005; Hanel 1995; Deschler-Erb 1999; Deschler-Erb *et al.* 1991; Radman-Livaja 2004. Outside: von Carnap-Bornheim 1991; Jørgensen *et al.* 2003. Dura: James 2004.
4. <http://www.romanmilitaryequipment.co.uk>



Map and List of Sites

1. Aachen (DEU)
2. Aalen (DEU)
3. Adamclisi (ROU)
4. Agen (FRA)
5. Ai Khanoum (AFG)
6. Aislingen (DEU)
7. Alba Iulia (ROU)
8. Albano (ITA)
9. Aldborough (GBR)
10. Alesia (Alise-Sainte-Reine: FRA)
11. Alexandria (EGY)
12. Alfaro (ESP)
13. Al-Haditha (JOR)
14. Allériot (FRA)
15. Alsóhetény (HUN)
16. Alzey (DEU)
17. Antioch (Antakya: TUR)
18. Apamea (SYR)
19. Aquileia (ITA)
20. Aquincum (Budapest: HUN)
21. Arlon (BEL)
22. Athens (GRC)
23. Auerberg (DEU)
24. Augsburg (DEU)
25. Augst (CHE)
26. Azaila (ESP)
27. Aznalcázar (ESP)
28. Badaörs (HUN)
29. Bar Hill (GBR)
30. Basel (CHE)
31. Bath (GBR)
32. Belmesa (EGY)
33. Benevento (ITA)
34. Bergamo (ITA)
35. Berkasovo (YUG)
36. Bertoldsheim (DEU)
37. Bingen (DEU)
38. Bishapur (IRN)
39. Bonn (DEU)
40. Braives (BEL)
41. Bratislava (SVK)
42. Bremen (DEU)
43. Brigetio (Szony: HUN)
44. Bu Njem (LBY)
45. Buch (DEU)
46. Buciumi (ROU)
47. Budapest (HUN)
48. Bumbesti (ROU)
49. Burgh Castle (GBR)
50. Burnswark (GBR)
51. Butzbach (DEU)
52. Cáceres el Viejo (ESP)
53. Caerleon (GBR)
54. Camelon (GBR)
55. Caminreal (ESP)
56. Canosa (ITA)
57. Canterbury (GBR)
58. Carlingwark Loch (GBR)
59. Carlisle (GBR)
60. Carnuntum (Bad Deutsch-Altenburg: AUT)
61. Carpow (GBR)
62. Carrawburgh (GBR)
63. Carrhae (TUR)
64. New Carthage (ESP)
65. Carthage (TUN)
66. Carvoran (GBR)
67. Cassacco (ITA)
68. Castellruf (ESP)
69. Castillejo (ESP)
70. Çastleford (GBR)
71. Catalka (BGR)
72. Celje (SVN)
73. Celles-les-Warennnes (BEL)
74. Chalon (FRA)
75. Chassenard (FRA)
76. Chester (GBR)
77. Chesters (GBR)
78. Chichester (GBR)
79. Cirencester (GBR)
80. Ciruelos (ESP)
81. Classe (ITA)
82. Cluj (ROU)
83. Colchester (GBR)
84. Concești (ROU)
85. Coolus (FRA)
86. Corbridge (GBR)
87. Corinth (GRC)
88. Costești (ROU)
89. Cremona (ITA)
90. Croy Hill (GBR)
91. Dakovo (HRV)
92. Dangstetten (DEU)
93. Dar al-Madinah (EGY)
94. Delos (GRC)
95. Delphi (GRC)
96. Deurne (NLD)
97. Doncaster (GBR)
98. Doorwerth (NLD)
99. Dura-Europos (Salhiyé: SYR)
100. Durostorum (Silistra: BGR)
101. Echzell (DEU)
102. Eich (DEU)
103. Eining (DEU)
104. Ejsbøl (DNK)
105. Elginhaugh (GBR)
106. Empel (NLD)
107. Emporion (Ampurias: ESP)
108. Enns (DEU)
109. Entremont (FRA)
110. Ephesos (TUR)
111. Ephyra (GRC)
112. Exeter (GBR)
113. Fayyum (EGY)
114. Fulham (GBR)
115. Gaeta (ITA)
116. Galdenberg bei Cuxhaven (DEU)
117. Gamla (ISR)
118. Gamzigrad (YUG)
119. Gelligaer (GBR)
120. Gherla (ROU)
121. Giubasco (ITA)
122. Gomadingen (DEU)
123. Gornea (ROU)
124. Grad (SVN)
125. Grafenhausen (DEU)
126. Grosskrotzenburg (DEU)
127. Guisborough (GBR)
128. Gundremmingen (DEU)
129. Hadrianopolis (Edirne: TUR)
130. Haltern (DEU)
131. Ham Hill (GBR)
132. Hatra (IRQ)
133. Heddernheim (DEU)
134. Herakleia Lynkestis (MKD)
135. Herculaneum (ITA)
136. High Rochester (DEU)
137. Hod Hill (GBR)
138. Hofheim (DEU)
139. Housesteads (GBR)
140. Hromowka (UKR)
141. Hüfingen (DEU)
142. Iatrus (Krivina: BGR)
143. Illerup (DNK)
144. Inchtuthil (GBR)
145. Independența (ROU)
146. Intercisa (Dunaújváros: HUN)
147. Inveresk (GBR)
148. Istanbul (TUR)
149. Ia (SVK)
150. Jerusalem (ISR)
151. Kalkriese (DEU)
152. Karagaach (BGR)

153. Kasr al-Harit (EGY)
154. Khisfne (SYR)
155. Kingsholm (GBR)
156. Klosterneuberg (AUT)
157. Koblenz (DEU)
158. Köln (DEU)
159. Köngen (DEU)
160. Koptos (EGY)
161. Kragehul (DNK)
162. Kraiburg am Inn (DEU)
163. Krefeld (DEU)
164. Künzing (DEU)
165. Lambaesis
(Tazoult-Lambese: DZA)
166. Lanchester (DEU)
167. Leeuwen (NLD)
168. Leiden-Roomburg (NLD)
169. León (ESP)
170. Leptis Magna (LBY)
171. Liberchies (BEL)
172. Liebenau (DEU)
173. Linz (AUT)
174. London (GBR)
175. Lauriacum (Lorch: AUT)
176. Loughor (GBR)
177. Lunca Muregului (ROU)
178. Luxor (EGY)
179. Lyon (FRA)
180. Magdalensberg (AUT)
181. Mahdia (TUN)
182. Maiden Castle (GBR)
183. Mainz (DEU)
184. Manching (DEU)
185. Mantova (ITA)
186. Masada (ISR)
187. Mavilly (FRA)
188. Mehrum (DEU)
189. Mercey (FRA)
190. Micia (Vetel: ROU)
191. Milan (ITA)
192. Misery (FRA)
193. Mondragon (FRA)
194. Montefortino (ITA)
195. Mušov (CZE)
196. Nahal Hever (ISR)
197. Nawa (SYR)
198. Neuss (DEU)
199. Newstead (GBR)
200. Nicopolis (Al-Raml: EGY)
201. Niederbieber (DEU)
202. Niedermörmter (DEU)
203. Nijmegen (NLD)
204. Northwich (GBR)
205. Numantia (ESP)
206. Nydam (DNK)
207. Oberaden (DEU)
208. Oberammergau (DEU)
209. Oberstimm (DEU)
210. Old Carlisle (GBR)
211. Orange (FRA)
212. Orgovány (HUN)
213. Orșova (ROU)
214. Osuna (ESP)
215. Oudenburg (NLD)
216. Padova (ITA)
217. Palestrina (ITA)
218. Palmyra (SYR)
219. Pécs (HUN)
220. Peña Redonda (ESP)
221. Perugia (ITA)
222. Pfünz (DEU)
223. Philippi (GRC)
224. Piazza Armerina (ITA)
225. Pilismarót (HUN)
226. Pitsunda (GEO)
227. Pompeii (ITA)
228. Port bei Nidau (CHE)
229. Pozzuoli (ITA)
230. Ptuj (SVN)
231. Pula (Pola: HRV)
232. Puy d'Issolud (FRA)
233. Pydna (GRC)
234. Quintanas de Gormaz (ESP)
235. Ravenna (ITA)
236. Regensburg (DEU)
237. Renieblas (ESP)
238. Rheingönheim (ESP)
239. Ribchester (GBR)
240. Richborough (GBR)
241. Rißbissen (DEU)
242. Roecliffe (GBR)
243. Rome (ITA)
244. Roomburg (NLD)
245. Rottweil (DEU)
246. Saalburg (DEU)
247. Ságvár (HUN)
248. Saintes (FRA)
249. St Rémy (FRA)
250. Sheepen (GBR)
251. Simris (SWE)
252. Siscia (Sisak: HRV)
253. Sitten (CHE)
254. Šmihel (SVN)
255. South Shields (GBR)
256. Stillfried (AUT)
257. Stobi (MKD)
258. Stockstadt (DEU)
259. Strageath (GBR)
260. Strasbourg (FRA)
261. Straubing (DEU)
262. Sutton Hoo (GBR)
263. Syracuse (ITA)
264. Talamonaccio (ITA)
265. Tang-i-Sarvak (IRN)
266. Taranto (ITA)
267. Tarquinia (ITA)
268. Taviere (BEL)
269. Tekije (HRV)
270. Thamusia (MAR)
271. Theilenhofen (DEU)
272. Thessalonike (GRC)
273. Thorsbjerg (DEU)
274. Tibiscum (ROU)
275. Tipasa (DZA)
276. Titelberg (LUX)
277. Tongres (BEL)
278. Traprain Law (GBR)
279. Trasimene (ITA)
280. Trier (DEU)
281. Tuchyňa (SVK)
282. Ulltuna (SWE)
283. Vachères (FRA)
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286. Vallgård (SWE)
287. Vechten (NLD)
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289. Vendel (SWE)
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291. Vermand (FRA)
292. Verona (ITA)
293. Versigny (FRA)
294. Verulamium (St Albans: GBR)
295. Vesuvius (ITA)
296. Vienna (AUT)
297. Vimose (DNK)
298. Vindolanda (Chesterholm: GBR)
299. Vindonissa (Windisch: CHE)
300. Vireux-Molhain (FRA)
301. Vulci (ITA)
302. Waddon Hill (GBR)
303. Wehringen (DEU)
304. Weiler (LUX)
305. Wiesbaden (DEU)
306. Winchester (GBR)
307. Wisby (SWE)
308. Worms (DEU)
309. Worthing (GBR)
310. Wroxeter (GBR)
311. Xanten (DEU)
312. York (GBR)
313. Zengővárkony (HUN)
314. Zugmantel (DEU)
315. Zwammerdam (NLD)

*Country codes from ISO 3166 – see
www.iso.org*

1 The Representational Evidence

Introduction

Before the 19th century, representations of soldiers in Roman art were virtually the only source for antiquarian studies of Roman military equipment. This gave rise to some curiously decorative armours when Renaissance craftsmen sought to cater to taste for the 'antique' style. Until Robinson's re-evaluation of the pictorial sources in the 1970s, stone sculpture was used to form a conceptual framework into which the artefactual evidence was fitted, often unsatisfactorily, rather than the actual objects leading the enquiry. In particular, the great propaganda monuments of Rome dominated the field, with Trajan's Column pre-eminent. After Robinson published his *Armour of Imperial Rome* in 1975, representational sources came to occupy a more subordinate position, although it may be noted that they continue to exert undue influence on cinema and television costume design. However, they remain valuable in many respects, not least because the metropolitan monuments present aspects of how the armies were viewed at the centre of power, and provincial artworks – notably funerary representations of soldiers – were executed by people intimately familiar with their subjects, thus much empirical detail was incorporated.¹

Certain questions must be asked of every representation. What was its intended function? Who was the artist involved, and what were his likely objectives? For whom would he have worked and what were their requirements? What was the artist's technical and cultural background? What type of stone was he working with and what degree of carved detail could it sustain? In individual cases some of these questions may be impossible to answer, but they help in the construction of conceptual models for production, supply, patronage and artistic intent, all of which might bear on content, and thus on interpretation of the equipment represented.

Ideally, the study of stone sculpture involves the first-hand examination of individual pieces. If this seems obvious, then it must be said that many scholars rely solely upon photographic publication without personally examining the material. Naturally, there are practical and financial limitations to field and museum work, but however 'famous' and well-published the piece, it ought to be revisited wherever possible. Indeed, it is very difficult to take one photograph of a stone sculpture which shows all of its detail. Again ideally, each sculpture should be published with a series of general and detail photographs taken in a variety of lighting conditions. Above all, it should be drawn in a manner which records all the features and deals with it as an archaeological artefact.²

A very extensive literature deals with the representational evidence. Much of it is useful for the context and dating of finds and for their present location, but only a small proportion of publications deal directly with the military equipment content. Most of the major propaganda monuments are dealt with in monographs, whilst smaller pieces are often to be found in museum catalogues or in the regional corpora. However, the geographical coverage of the latter is generally limited to western and

central Europe, with Spain, North Africa and the Levant poorly represented. This situation will doubtless improve, especially due to the *Corpus Signorum Imperii Romani*.³

For present purposes, the representational sources may be conveniently reviewed in a number of very broad categories: propaganda monuments; funerary monuments; miscellaneous and non-Roman sculptures; and minor works. These groupings are neither mutually exclusive nor to be seen in any way as an order of value. The prominence accorded to stone sculpture is of course a result of its durability in comparison with other media.

Propaganda Sculpture (Figs.1–2)

Most Roman sculptures were in some sense created with propaganda intent, whether on a triumphal arch commemorating an emperor's victory, or on a gravestone advertising the deceased man's status and achievements. In this study 'propaganda' is taken to mean works with a specific public message erected by rulers, public officials or emperors. Soldiers appear principally in representations of imperial journeys (*profectiones*, *adventus*), ritual sacrifices, the public burning of debt-records, speeches to the troops (*adlocutiones*), battles and triumphal processions. These generic scenes represented what rulers wanted to project about their achievements blended with what activities were expected of a 'good' ruler by the élites of Roman society. Naturally, the largest viewing public was in the capital, so most propaganda monuments were erected in Rome or Constantinople. Indeed, a significant proportion of that public was made up of serving soldiers, and the symbiotic relationship of emperor and army often informed the content of metropolitan propaganda sculpture.⁴

The major limitation of propaganda works for present purposes is that they were largely the product of metropolitan sculptors, often men trained in a Hellenizing style, whose knowledge of military matters was restricted to the guard units in Rome. They were concerned to display the human form unobscured, for example, by large cheek-pieces, shields or horses. Moreover, the human figures were often composed in stereotyped groupings which owed more to religious ceremony, court ritual or writhing Greek battle motifs than to the realities of Roman warfare. Even some details of Greek equipment lingered on anachronistically in Roman artworks, such as the hand-grip (*antilabe*) and sleeve (*porpax*) peculiar to the carriage of Archaic and Classical period hoplite shields. The minutely accurate rendering of military artefacts was unlikely to have been the primary objective. On the other hand, sculptors were often consummately skilled at naturalistic carving, and in Rome they invariably worked with the finest marbles, the compact structure of which took the highest degree of carved detail.⁵

In the atmosphere of public service and political rivalry of the Republic few propaganda monuments bearing military figures were erected. Exceptions are the so-called Altar of Domitius Ahenobarbus in Rome (see Fig. 21), which depicts soldiers attending ritual sacrifice (1st century BC), and the Monument of Aemilius Paullus (Fig. 1) erected by the Greeks at Delphi to commemorate the victor of Pydna (168 BC). Both show Roman mailed infantry with long, curving oval shields.⁶

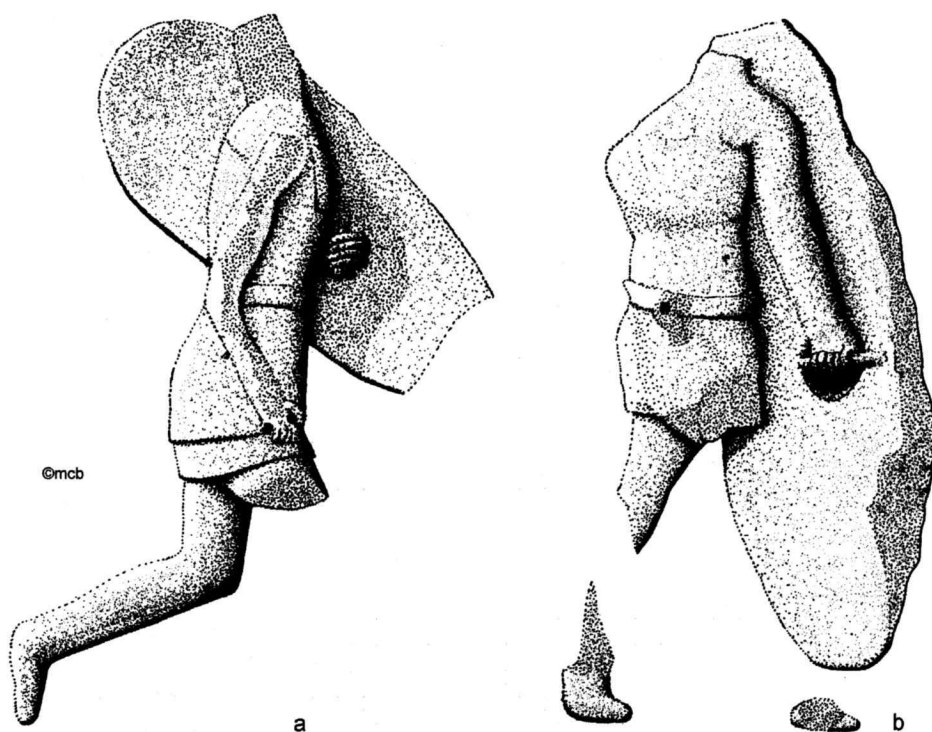


Figure 1: Details from the Aemilius Paullus monument (Delphi). a legionary running; b legionary standing. (Not to scale)

During the Julio-Claudian period there were plenty of celebrated successes but few monuments with figural sculpture, and fewer still with representations of soldiers. The arch at Orange (probably of Tiberian date) has Romans and Gauls, infantry and cavalry, in Hellenistic-style combat scenes on its attic. Mail and scale armour, contemporary helmet forms and legionary shields appear. On the piers of the arch, piles of equipment (*congeries armorum*) provide interesting 'still life' representations of shields, standards and saddlery. Other exceptional depictions of armoured soldiers were probably carved on the Arch of Claudius in Rome but, if surviving fragments are correctly ascribed, the figures were in archaizing style with Hellenistic helmets, muscled cuirasses and hoplite-grip shields. Only one group, the Louvre 'Praetorians' panel, now with an assured Claudian (not Hadrianic) dating, was affected by contemporary equipment practices.

What did develop as an important propaganda genre was the depiction of the emperor with his military escort as he would have been seen in triumph or moving around the capital. This appears first on coins (see below, p. 19), but from the Flavian period onwards also in monumental sculpture. Soldiers are equipped with military belts, shields and weapons, but hardly ever with helmets or body armour. Prime examples are the Flavian Cancellaria Reliefs (Fig. 2), as well as the 'Anaglypha Traiani', the

Hadrianic Chatsworth Relief, all from Rome, and panels on Trajan's Arches at Pozzuoli and Benevento.⁷

This unarmoured convention continued into the late Empire, but depiction of soldiers at war changed radically with, and after, the erection of Trajan's Column in Rome (AD 113). For the first time in the capital a vast number of armoured soldiers in contemporary equipment were represented on one monument. A 200 m-long spiral frieze winds up the column shaft in anti-clockwise fashion, bearing 2640 carved human figures at half life-size (Pl. 8c). These take part in a loose narrative of Trajan's two Dacian wars (AD 101–2 and 105–6). They represent citizen troops wearing the earliest indisputable '*lorica segmentata*' in Roman art, auxiliary infantry and cavalry in mail, irregular troops, and the various enemy ethnic types. Amongst the latter are Sarmatian cavalry, virtually the only armoured barbarians to appear in Roman art. Clear distinctions are made between citizens and *peregrini* in equipment, standards (the auxiliaries generally have none) and military roles. The rare involvement of citizen troops in fighting contributes to the presentation of Trajan's skilled generalship.⁸

The Column stands on a pedestal, the four sides of which are carved with approximately 525 items of captured barbarian equipment, presumably modelled on *spolia* from Trajan's triumphs. Whilst the artists may have devised their own space-filling decoration on shields and helmets, they faithfully reproduced small details of single- and double-handed Dacian swords (*falces*), *draco* standards, helmets, archery equipment and scabbard-fittings.⁹

Robinson's main contribution to Trajan's Column studies was to point out that the traditional interpretation of auxiliary armours as made of hardened leather was mistaken, and that metallic mail was everywhere depicted. Moreover, the detailed fittings of '*lorica segmentata*' prove to be useless and misleading for reconstructing this armour form. The Column's main shortcoming is that the sculptors were unfamiliar with much of their subject matter. With such a large number of figures they were forced to work in a shorthand of 'figure types' (citizen soldier, auxiliary, officer etc.). This categorization served to distinguish visually the status of individuals, but it may also have imposed an unrealistic degree of equipment uniformity. Some figure types, such as archers with long skirts, were artificially created using barbarian *spolia*.¹⁰

Until recently Trajan's Column has dominated most fields of Roman army studies, particularly where castrametation and equipment were concerned. Taking into consideration stylization, sculptors' mistakes and recent developments in artefactual studies, the Column does not offer much independent information. The latter may be summarized as the presence and equipment of certain irregular troop types and barbarians, and the visual appearance of contemporary standards, tents and artillery.

Another Trajanic monument in Rome is represented by four panels reused on the Arch of Constantine and various fragments scattered amongst museum collections. This is the 'Great Trajanic Frieze' which depicts Trajan accompanied by Roman cavalry and infantry, the latter wearing '*lorica segmentata*', identified as praetorians by their scorpion badges. There is some controversy about the sculpture's original context, but the majority view favours a position within Trajan's forum complex. Many features of horse-harness, scabbard and belt-fittings, and *falces* may be paralleled by artefacts and

non-metropolitan sculptures. Great attention to detail is a function of the more than life-size scale.¹¹

All the soldiers wear an 'Attic' form of helmet characterized by a narrow neck-guard and a plate across the front of the bowl. This type is very common in propaganda sculpture and it is quite different from the majority of contemporary artefacts, suggesting that Hellenistic artistic licence was at work. However, 'brow-plate' helmet finds do exist. Standards and unit emblems on the Frieze probably identify all the men as Praetorians, and guard units in Rome may have used such helmets.¹²

A further monument associated with Trajan's Dacian wars is the *Tropaeum Traiani* at Adamclisi, for which epigraphic evidence suggests a date of AD 108/9. It consisted of a great rotunda decorated with a metope frieze and other sculptures. Some 49 of the original 54 metopes have survived and each is sculpted with a vignette of Danubian warfare. The confinement of figures within rectangular frames imposed limitations, but the attention to verifiable equipment detail suggests that military sculptors executed these reliefs, providing a perfect foil to Trajan's Column.¹³

The metopes have most in common with military gravestone figures (see below, p. 8) and show legionary troops in mail and scale armour (see Fig. 53), not '*lorica segmentata*'. Helmets correspond with known artefacts and drilled holes were used as an unmistakable mail convention. Overall, the metopes show less uniformity of equipment than does Trajan's Column, and citizen troops bear the brunt of the fighting. However, clear distinctions between legionary and auxiliary equipment are maintained.

Trajan's Column deeply influenced 2nd- to 3rd-century sculptors in Rome. This is clearly demonstrated by some *congeries armorum* reliefs which were carved into the Antonine period with progressive stylization and diluted ethnic content. Every post-Trajanic monument in Rome depicting armoured soldiers cannot be evaluated in isolation, but must be compared with the Column to trace divergences from the original figure types. For example, on two sides of the Antoninus Pius Column pedestal a *decursio* of cavalry surrounds a group of Praetorian infantry. The latter wear '*lorica segmentata*' which differ from Trajan's Column armours in having multiple chest-plates and a scalloped undergarment. It can be argued either that these represent real differences in equipment practices, or that they are merely a slide into artistic embellishment.¹⁴

The closest emulation of Trajan's Column occurred with the erection of the Column of Marcus Aurelius in Rome, if one discounts Napoleon I's *colonne de la grande armée* in the Place de Vendôme, Paris (1810). No inscription survives on the pedestal so it is undated, and estimates for its completion range from the reigns of Commodus to Caracalla. Again, a spiral relief frieze depicts trans-Danubian warfare, in this case Marcus' Marcomannic wars. Much of the fine carved detail on Trajan's Column is invisible from more than a couple of metres away, and scenes on the frieze are very crowded. In consequence, sculptures on the Marcus Column were greatly simplified.¹⁵

The military equipment on the Marcus Column appears at first to follow the conventional citizen/non-citizen distinction but the sculptors played visual games within figure groups by alternating armour types in rhythms of scale – mail – plate. The '*lorica segmentata*' of citizen troops lack the detailed fittings of Trajan's Column but like the

Pius Column they often have multiple upper torso plates and a protruding scalloped undergarment or a skirt of protective strips (*pteryges*). Helmets are likewise increasingly stylized; shields are poorly depicted, small and flat, and generally lack detailed decorative blazons. On Trajan's Column most hand-held weapons were provided as metal inserts, but on the Marcus Column they are rendered in stone. All the shafted weapons are spears because slim, stone *pilum* shanks would have been sculpturally impractical. Of greater significance is the appearance of peltiform scabbard-chapes alongside the triangular type which is depicted on Trajan's Column. These, like the *pteryges*, may indeed reflect contemporary equipment changes. Moreover, new figure types were introduced on the Marcus Column, including an auxiliary horse archer, and unarmoured irregular spearmen and archers.¹⁶

Some of these new armour features also appear on a series of panels dating to the reign of Marcus Aurelius, and reused on the Arch of Constantine in Rome. Upper-arm and long skirt *pteryges* indicate the presence of an undergarment worn between tunic and 'lorica segmentata'. Scale and drilled mail armours correspond with those on earlier monuments, but a new representational convention consists of single drilled holes within a framework of lines. This may be an experiment in mail or a padded undergarment with *pteryges*. A strap with an ivy-leaf terminal hanging from a scabbard is a new feature. Otherwise the equipment on these panels and other fragments of Antonine sculpture is formulaic.¹⁷

The process of reducing sculpted detail continued through into the Severan period. The Arch of Severus in the Forum Romanum at Rome (AD 203) bears four huge rectangular panels depicting the operations around four cities in Severus' eastern wars. Roman soldiers wear muscled cuirasses, mail, scale or 'lorica segmentata' (the last time the latter are seen in Roman art). All the auxiliaries have armour, except some small groups in tunics alone which correspond to irregular troops on the Marcus Column. Shields are all oval and flat, and the only detail not seen on earlier monuments is a weighted *pilum*. Armoured Roman figures appear on triumphal friezes below the city panels. Despite damage, it is clear that carved detail was not lavished on equipment. In contrast, the arch's pedestal reliefs are more naturalistic and conservative in style. They include soldiers with *paenulae*, who also have short swords and triangular chapes; they would not look out of place on a Trajanic or Hadrianic monument. Overall, the arch combines the increasingly bland conventions ultimately derived from Trajan's Column and the 'unarmoured soldier' genre discussed above. Similarly, the nearby Arcus Argentariorum (AD 204) depicts unarmoured soldiers, captive barbarians and some praetorian standards.¹⁸

The Arch of Severus at Lepcis Magna (c. AD 202–4?) commemorated the eastern campaigns with one city siege scene. The same armour types appear as in Rome and a testudo of shields is copied directly from the Columns of Trajan and Marcus. Large-scale friezes with ritual and processional content include two soldiers in drilled mail and Attic helmets.¹⁹

The wars and usurpations of the 3rd century created a hiatus in propaganda sculpture between Severus and Diocletian. The latter visited Rome for the first time to celebrate his twentieth anniversary of rule, and military reliefs from two of the associated propaganda monuments survive. The first is the so-called Decennalia Base in the



Figure 2: Details from Cancelleria Relief A, Rome. *a* pilum weight; *b* pilum butt; *c* caliga and sock. (Not to scale)

Forum Romanum, which shows unarmoured standard-bearers and officers. A pedestal from the destroyed Arcus Novus (AD 293), now at Florence, shows a soldier wearing an Attic helmet and muscled cuirass, clearly demonstrating that, despite declining patronage, Hellenistic conventions continued. A third piece in Tetrarchic style, but of unknown provenance, now in the Vatican Museo Chiaramonti, may come from the same arch. This shows two soldiers with round shields, conical helmets and long-sleeved mail or scale cuirasses.²⁰

Devolution of the imperial office under the Tetrarchs involved the use of multiple, regional capitals, and thus a proliferation of propaganda monuments. Of these, the best surviving is the Arch of Galerius in the palace complex at Thessalonike. Three out of eight piers of a two-way arch still stand, two bearing a total of 28 superimposed relief registers. Genre scenes of battle, barbarian submission and imperial ceremony

commemorate both the cohesion of the Tetrarchy and the eastern campaigns waged by Galerius. Three types of soldier are figured: unarmoured with large circular shield and spear; scale-armoured with conical helmet, circular shield and spear; and muscled-cuirassed officers. The carved detail is bland and functional, apart from the shield-blazons.²¹

Although not strictly Tetrarchic, the Arch of Constantine in Rome (AD 315) has close stylistic affinities with the monuments just discussed. In the aftermath of Constantine's victorious entry into Rome, the huge arch reused a pre-existing arch of Hadrian with additional building materials and sculptures taken from earlier buildings, both known (Forum of Trajan) and unknown (Antonine panels). The heads of emperors were simply updated by recarving. The relevant 4th-century military contributions were portrait busts in the passageways, a narrow frieze running around the piers and reliefs on the facade column pedestals. The latter show muscled cuirasses and Attic helmets, in the Arcus Novus style, and large oval shields (one with a blazon). The frieze has four types of soldiers: infantry and cavalry with crested Attic helmets, occasionally 'horned', and large or small oval or circular shields, but no body armour; muscled-cuirass officers; unarmoured infantry archers; cavalry with small oval shields, scale armour and Attic helmets. The figures lack small carved details such as shield-blazons.²²

These Tetrarchic/Constantinian reliefs represent both continuity and change from the Trajan's Column tradition. Not only are details of equipment different, but so is stylistic emphasis. The concern for unobscured display of the human form is less marked, so, for example, tunics are not shortened to reveal more of the legs. In common with the Arch of Galerius, not all the Constantinian shields were scaled down in size. Now that all soldiers were citizens, armour was no longer employed to denote status. However, there was a new emphasis on scale armour which stemmed from its increasing artistic popularity during the 3rd century (see below, p. 12). On the side of continuity, the Attic helmet still appears without any reference to contemporary helmet types, and the unarmoured convention persisted. Muscled cuirasses gained a representational prominence for common soldiers that they had not enjoyed since the Julio-Claudian period. Pedestal reliefs were the most conservative parts of Severan, Diocletianic and Constantinian arches perhaps because more skilled sculptors worked on the larger-scale figures, whilst smaller work was done by less classically trained (sarcophagus?) carvers.

Imperial residence at Ravenna or Constantinople effectively ended traditional propaganda projects in Rome. Thus the last three large-scale monuments relevant to this study are all in Istanbul. These are the Obelisk Base and Column of Theodosius I, and the Column of Arcadius. The obelisk base (AD 390) has reliefs on its four sides depicting the court and public attending hippodrome games. The imperial family is accompanied by unarmoured guardsmen who wear tunics and *torques*, and carry large plain oval shields and spears.²³

The Column of Theodosius (c. AD 393) has been demolished but fragments and antiquarian sketches survive. The pieces depict Roman infantry in long-sleeved tunic, muscled cuirass with *pteryges*, a variant of Attic helmet, and carrying a large round shield with Christian *chi-rho* blazon. Sleeve length, shield size and blazon are

contemporary features, but the Hellenistic elements cannot be ignored. Furthermore, shields are seen to be carried not with a central, horizontal grip, but with the traditional Greek hoplite method with a vertical handle (*antilabe*) just inside the rim.

The Column of Arcadius (AD 402) likewise survives in a few pieces and a more useful set of 16th-century sketches. The majority of men were probably unarmoured and carried round or oval shields with geometric and Christian blazons. The main fragment is extremely weathered but the hoplite shield grip is clearly used.

Imperial portrait statues fulfilled an obvious propaganda role, but 1st- to 2nd-century cuirassed examples are too formalized to provide useful information. Some 3rd-century examples do incorporate contemporary belt types and fittings. Tetrarchic and later purple porphyry portraits, especially the cuirassed Tetrarchs at Venice and a series of cloaked (*chlamys*) statues, are much more informative about swords and belts.²⁴

Funerary Monuments (Figs. 3–4)

This class includes all representations of soldiers and military equipment in funerary contexts. Most common are gravestone figures (bust, half-length or full-length) which show the deceased in military attire to advertise his status and profession to people passing the grave. Figures are sometimes associated with larger monuments such as mausolea, and a building could also be decorated with friezes of arms. Sarcophagi might have scenes of battle and barbarian submission on their sides. With both friezes and sarcophagi there is less assurance that the deceased was a soldier in life since warfare and its attributes probably came to symbolize the struggles of life and victory over death.²⁵

Depiction of the dead on standing gravestones (*stelae*) had a long history in the Classical Greek and Hellenistic world. Roman examples appear in the later Republican period in Italy. Generally they depict half-figure officers whose rank is made clear by a sword and muscled cuirass with *pteryges*. The *stela* of a centurion from Padova most unusually shows a full-figure man (see Fig. 22). He is unarmoured and carries sword, dagger and centurial staff. In the early 1st century AD the practice of erecting figural *stelae* spread out from northern Italy (where it continued) to the Rhineland armies. Three main classes of representation developed: standing soldier (full-length and half-figure); riding cavalryman (*Reitertyp*); funerary banquet (*Totenmahl*).²⁶

The first of these main classes shows the deceased standing frontally, commonly unarmoured, but wearing military belts and side-arms (see Fig. 150). Sometimes he carries a scroll, sometimes his shield and shafted weapons. This is the equivalent of the 'unarmoured' genre of propaganda sculpture. When a *lorica* is shown it is sometimes carved with scales, as on two examples at Verona. More commonly the stone was smoothed off ready perhaps to take a fine plaster (*gesso*) and paint coating on which scales or mail rings could be delineated. Robinson convincingly disproved the traditional view that the smooth garments were leather 'jerkins'. To be protective, leather had to be hard and stiff; but the large shoulder-pieces of the gravestone garments indicate that they were flexible. Drilled holes were almost never used as a mail convention

on provincial gravestones, but gesso and paint could have allowed a high degree of detail to be applied to locally available stones. The latter were often softer than the fine-grained marbles used in the capital, but this did not prevent some features being carefully decorated, in particular the belts, scabbards and sheaths. Helmets are seldom worn in order that the man's face be unobscured, but the *stelae* of C. Valerius Crispus (Wiesbaden) and C. Castricius Victor (Aquincum) are two exceptions of the late 1st to early 2nd century AD (Fig. 3).

Rank could be indicated by a muscled cuirass for senior officer, *vitis* for centurion, long staff for *optio*, *signum* for standard-bearer, or horn for musician. Some soldiers carry a knobbed staff (*fustis*), not to be confused with the centurial *vitis*, which was used to brutal effect on civilians.²⁷

The cavalry gravestones often depict an *eques* riding down a barbarian (Fig. 4,1). The deceased is usually armoured in the plain convention, but is occasionally depicted in scale, and wears a belt, scabbarded sword and helmet. A shield and shafted weapon are carried. Great care is often taken in depicting the horse-harness and saddle. *Totenmahl* stones (Fig. 4,2) employed the old Greek motif of the deceased reclining on a banquet couch in one panel, and his horse being led by a groom (*calo*) in a second. The *calo* sometimes wears the dead man's armour and carries his shield and spare shafted weapons.²⁸

The taste for these gravestone types spread from Germany to Britain with the Claudian invasion army. Erection was a regional phenomenon with smaller numbers occurring away from these areas and Italy. There are some in Gaul, fewer still along the Danube and in North Africa, and hardly any in Spain and the eastern provinces.

Examination of 82 figured 1st-century tombstones surviving from Britain and the Rhineland, although doubtless hampered by various unknown depositional biases, reveals that 38 per cent belonged to infantrymen (13.5 per cent legionary, 13.5 per cent auxiliary, 11 per cent uncertain) and 56 per cent to auxiliary cavalrymen.²⁹

Military *stelae* provide an important foil to metropolitan sculpture because so many details of sword-fittings and horse-harness, for example, are verified by artefacts. The gravestone sculptors were certainly familiar with military equipment, and it is likely that a significant proportion of sculptors were serving soldiers or veterans. The knowledge of artist and client could itself engender mutually understood conventions which mislead modern observers. Horses, shafted weapons and shields were scaled down to fit them into the confines of niches. Belt-plates, scabbards and sheaths were decorated with squared rosette motifs – shorthand for the much finer floriate inlaid 'St Andrew's Cross' designs on actual objects.

Numbers of figural *stelae* decrease in the 2nd century, though they seem to gain a wider geographical currency. However, the sculpting of small equipment details declined. Examples from Corinth and Philippi continue the standing soldier and *Reitertyp* genres respectively. Several gravestones occur in northern Britain along the Walls of Hadrian and Antoninus Pius, with a particularly fine example at Croy Hill (see Fig. 73). A group of stones from Tipasa in Algeria belonged to Danubian troops campaigning in North Africa during the reign of Pius (see Fig. 76).³⁰

The situation changed completely in the early 3rd century when increasing numbers of *stelae* appear (see Figs. 93 and 109). They are most densely distributed in the

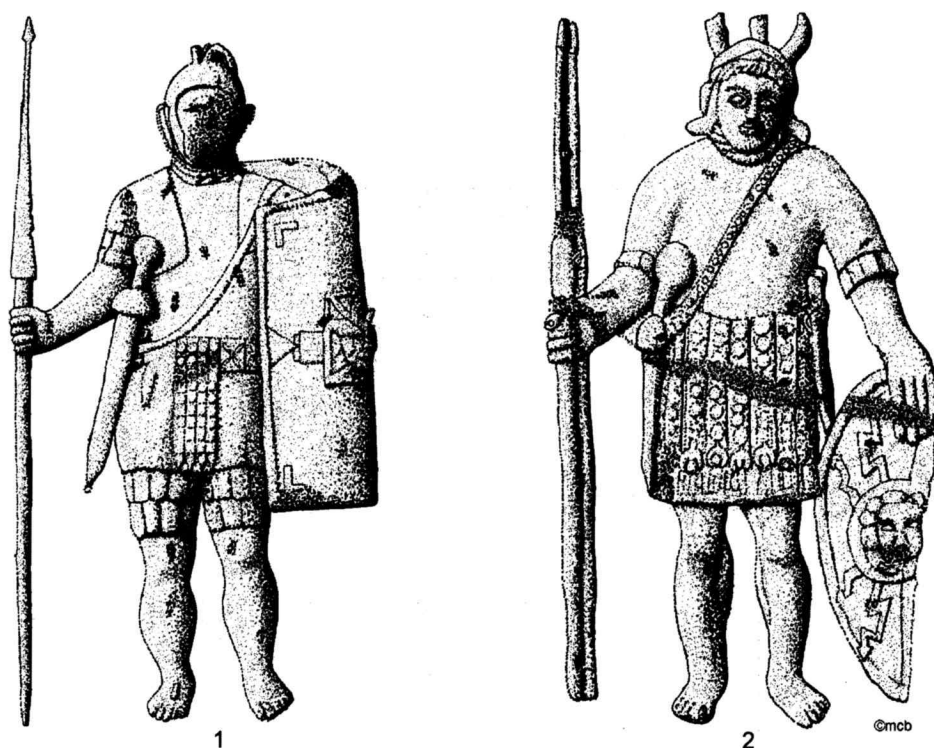


Figure 3: Infantry tombstones of the early Principate. 1 Valerius Crispus, legio VIII Augusta (Wiesbaden); 2 Castricius Victor, legio II Adiutrix (Aquincum). (Not to scale)

Upper and Middle Danubian region, and in Rome. It is tempting to ascribe the renaissance of figural gravestones to the political and economic rise of the Danubian soldiery. These men were favoured by Severus' reform of Praetorian Guard recruitment, hence the erection of many *stelae* in Rome. Third-century figural gravestones occur all over the Empire with concentrations at bases of particular strategic importance, such as at Nicopolis near Alexandria in Egypt, and around Byzantion on the land-bridge between Europe and Asia. They are very sparse in some other areas, notably Spain, along the Lower Danube and, interestingly, in the Rhineland.³¹

Standing soldiers predominate, and some rider *stelae* are associated especially with the *equites singulares Augusti* in Rome. The latter had traditionally been recruited largely from the Lower Rhenish and Danubian provinces, and scenes of *calo* and horse(s) appear in Rome, Germania and Pannonia. The vast majority of figures follow the 'unarmoured' convention and the most characteristic feature on 3rd-century stones is the circular ring-buckle at the waist. This is often prominently displayed and, in the absence of an inscription, it is sufficient to identify the wearer as a soldier and the *stela* as a military gravestone. On the best ring-buckle gravestones, care was taken in carving belt- and sword-fittings. However, even with these, there are stylistic simplifications,

notably the translation of hinged, heart-shaped baldric terminals into ivyleaf pendants (see Chapter 7).³²

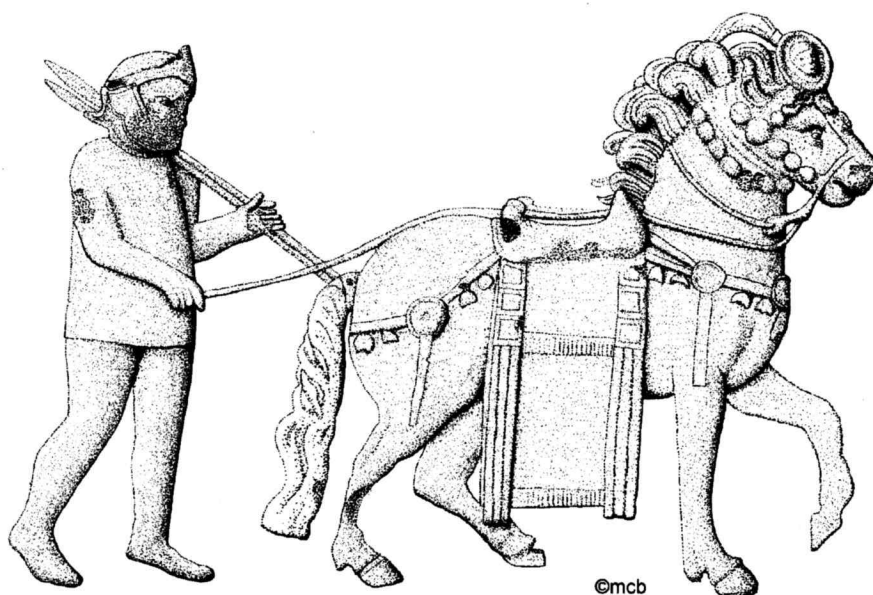
Gravestone figures continued to be carved in the Tetrarchic period, after ring-buckles went out of use. Thereafter *stelae* decline in quality, quantity and geographical distribution. They are also less easily datable. Exceptionally, an incised figure at Aquileia has an inscribed consular date of AD 352 (see Fig. 133). A standing soldier from Strasbourg is crudely carved, but wears a helmet and carries the large circular shield seen in metropolitan sculpture. A few rider *stelae* relate to *catafractarii* but show the men unarmoured. The practice of erecting figural *stelae* appears not to have outlasted the 4th century.³³

Few figural *stelae* represent equestrian officers. Notable exceptions are an 'unarmoured rider from Ephesos and a full-figure with muscled cuirass from Sitten in Switzerland (see Fig. 52). Soldiers could also aspire to a funerary altar. An extraordinary group of some 54 figural funerary altars was erected at Apamea in Syria, a base often used by *legio II Parthica* during Severan wars with Parthia. The inscriptions are extremely concerned to situate the deceased both by position within specific century and cohort of the legion, but also by acquired personal skills. These western legionaries in the Greek east seem to have been unusually determined to advertise their ranks and achievements. The altar form was imported from Rome, and the auxiliaries at Apamea were distinguished by the use of rider *stelae*. A Praetorian centurion is represented flanked by *signa* on a 2nd-century altar in the Vatican Galleria Lapidaria, and a 3rd-century Praetorian holds a *pilum* on a small altar in the Museo delle Terme (Rome). Presumably equestrians were usually interred in mausolea and military imagery was employed in reliefs on these monuments. The mausoleum of Munatius Plancus at Gaeta has a metope frieze with the earliest representations of curving rectangular shields (c. 20–10 BC). Fragmentary reliefs, probably from mausolea at Arlon and Saintes respectively show cavalry in the *Reitertyp* style and infantry in helmets and, possibly, some sort of segmental body armour. The Augustan mausoleum of the Iulii at St Rémy depicts combat between Romans and Gauls in interlocked Greek style, but *pila*, some armour details and saddlery are informative. Even depictions of gladiatorial equipment on mausolea bear upon discussions of military plate-armour.³⁴

Lastly, there are the sculpted stone sarcophagi which came into fashion from the Hadrianic period onwards. Antonine 'battle' sarcophagi were inspired by the Marcomannic Wars and are identical to the Marcus Column in both style and equipment depicted. The only additional detail of interest is the first depiction of *draco* standards in Roman use, on the 'Portonaccio Sarcophagus' in Rome. '*Loricæ segmentatae*' on several sarcophagi are meaninglessly fanciful. In the 3rd century, lion-hunt scenes predominate, but soldiers do participate. The depiction of scale armour was popular, as were the eagle-headed helmets seen on contemporary hunt gravestones. Unarmoured men sometimes wear accurately represented ring-buckle belts. The mid(?)–3rd-century 'Great Ludovisi Sarcophagus' in Rome quite unexpectedly has one of the most realistic portrayals of mail in Roman art, plus a ring-buckle, and another fine Roman *draco*. Fourth-century Christian sarcophagi ape the Arch of Constantine Milvian Bridge frieze to depict Pharaoh's army crossing the Red Sea. His troops wear the same scale



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Figure 4: Cavalry tombstones of the ala Noricorum from the early Principate. 1 T. Flavius Bassus (Köln); 2 M. Sacrius Primigenius (Köln). (Not to scale)

armour and Attic helmets, thus a new contaminatory tradition had replaced Trajan's Column by this time.³⁵

Finally, it must be recognised that figural funerary monuments honouring Roman soldiers form an extraordinarily large, rich and varied corpus. Including gravestones, grave-altars and other similar representations, such as statues and mummy-portraits (see below), there is a minimum of 750 surviving depictions ranging from Late Republic to Late Empire. This is immense by any pre-modern standard, even compared with, for example, 5th- to 4th-century BC Attic figural grave *stelae*, or 12th–16th century AD knightly effigies. Such an iconographic record of individual soldiers is not surpassed until the extant photographic portraiture of enlisted men going off to the American Civil War. Naturally, any study of ancient funerary representations comes with the customary series of health warnings. In the Roman corpus there are obvious biases towards wealth and rank, statistics further skewed by patterns of survival, collectability and modern recording. It must also be appreciated that however arresting and immediate are the images of deceased Roman soldiers, they probably represent a small proportion of the artworks originally commissioned. Moreover, some 750 examples certainly constitute a tiny sample of the minimum of five million deceased Roman soldiers who served over 350 years. Nevertheless, apart from their depiction of military equipment, these representations may be valuably studied for their shifting geographical and chronological distributions, and their social and cultural constituents. Above all they tell us much about the soldiers' position within a wider military community and within Roman society in general, and about soldiers' personal pride in loyal service and career achievement.³⁶

Miscellaneous and Non-Roman Sculpture (Fig. 5–6)

This category covers all stone sculpture which did not have Roman state propaganda or funerary functions. For example, a large scale, high relief sculpture from Alba Iulia depicts a legionary(?) with scale and segmental torso armour, a segmental arm-guard, and a curved rectangular shield. *Dona militaria* were shown on honorific statue bases of prominent soldiers.³⁷

Pedestals found reused in the Roman town wall at Mainz are thought to have come from colonnades in the Flavian legionary *principia*. Their sides bear carved single or paired figures representing legionaries, an auxiliary and barbarian prisoners. The small, square spaces available cramp the subjects, but attention to detail betrays the soldier-sculptors' intimate knowledge of military equipment (Fig. 5).³⁸

Military equipment details creep into the depiction of deities whose attributes include armour, swords, shields and shafted weapons. Naturally this occurs principally in frontier regions, probably at the hands of military sculptors. A Mars figure in a relief from Mavilly wears a well-depicted mail cuirass with large shoulder-pieces and a chest fastening-hook, and a Mars from Alzey holds an unweighted *pilum*. Mars statues from Old Carlisle and Aalen have 3rd-century sword-fittings. Equestrian statues topping 'Jupiter Columns' in the north-western provinces sometimes have accurately modelled saddlery and harness. Temple friezes with battle scenes also come within this

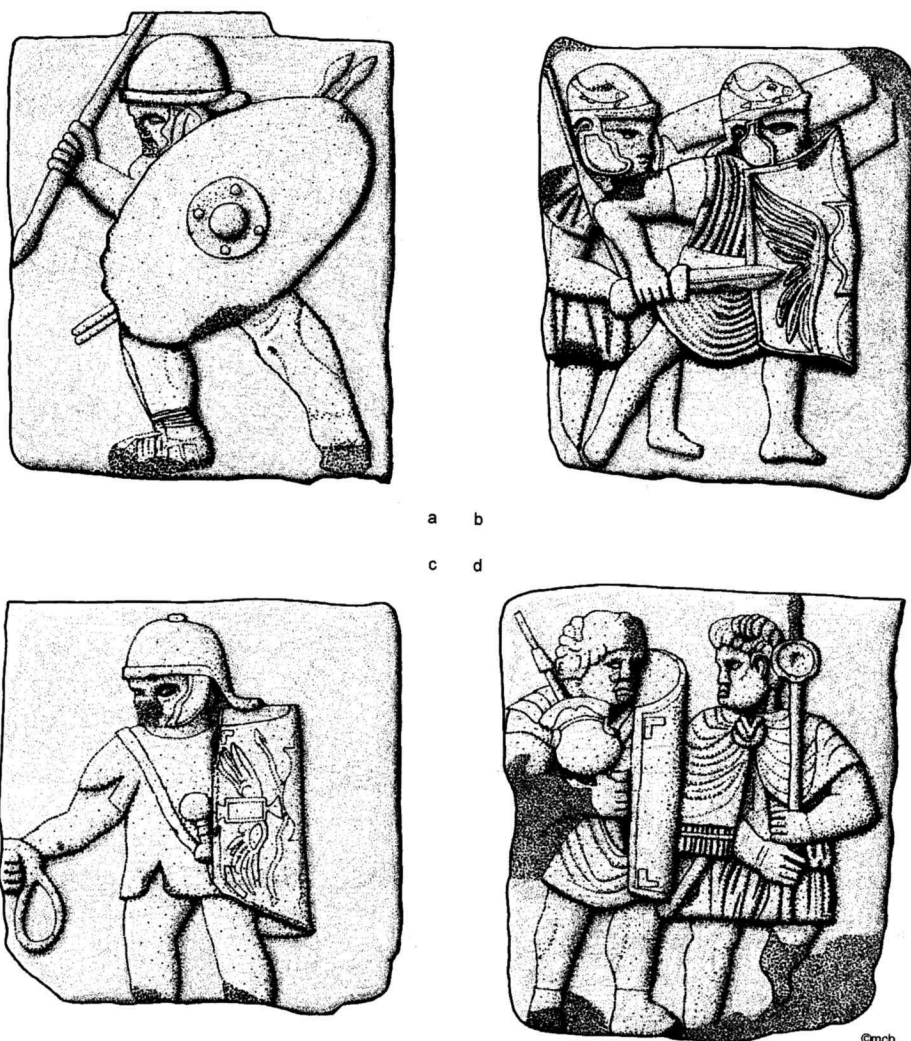


Figure 5 Column base reliefs from Mainz. Traditionally thought to show a an auxiliary in combat; b legionaries in combat; c legionary (centurion?) with tethered prisoners (not shown); d legionaries on the march. (Not to scale)

religious sphere. Examples in museums at Palestrina and Mantova (both from Rome?) show early Imperial Roman cavalry assaulting barbarians, and exhibit some interesting armour details. Certain altars also bear military figures such as the mail-clad soldier from Cluj. Officers with ring-buckle belts appear on altars from Intercisa and Eining, the latter being the earliest datable depiction of this equipment form (AD 211).³⁹

Some classes of non-Roman or questionably Roman sculptures portray either Roman equipment or equipment used by irregular elements within Roman forces. The



Figure 6: The Vachères warrior. (Not to scale)

student of archery and eastern armoured cavalry may profitably employ comparative representational sources from the Levant, Central Asia and China.⁴⁰

First-century AD gravestones in the Crimea depict the Sarmaticized local urban elite on horseback, with their armour for man and horse, archery equipment and weaponry. Parthian and Sassanid rock reliefs represent archers and armoured cavalry, and the 3rd-century propaganda reliefs of Shapur I show the belt and sword fittings of defeated Romans in faithful detail (see Fig. 103). Amongst the immense body of Palmyrene sculpture, 1st-century AD deities wear native lamellar armour and carry Roman swords with four-ring suspension, but in the later 2nd century they change over to Hellenistic muscled cuirasses and scabbard 'slides'. Caravan gods carry Palmyrene cavalry weapons and pages hold their masters' archery equipment.⁴¹

In the West, Republican period reliefs from Osuna depict Celt-Iberian infantry and what may be Roman legionaries. A series of statues from central and southern France depict Gallic warriors in mail (Entremont) or unarmoured (Mondragon, Alesia). Some of these sculptures predate the Roman conquest and may be the earliest representations of such armour. *Stelae* depicting Numidian riders in North Africa correspond well with Roman sources for native cavalry and a figure from Vachères (Fig. 6), long thought to be a Gallic warrior, may in fact depict a nobleman serving as a Roman cavalryman.⁴²

Minor Works (Figs. 7–9)

Representations of military subjects occur in a wide range of media in addition to stone sculpture. They are equally varied in scale, from life-size paintings to minute coin de-

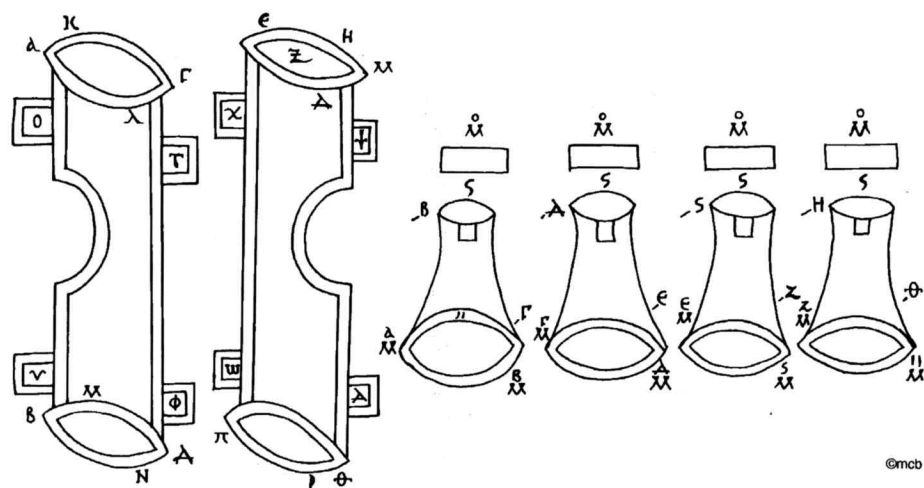


Figure 7 Manuscript illustration of field frame (kambestriion) and washers from Heron's Cheiroballistra.

signs. The great advantage of paintings is the good chance of naturalistic colours being reproduced. This is vital for textile studies, given the paucity of military clothing finds. Third- to 2nd-century BC frescoes from a tomb on the Esquiline Hill in Rome depict historical scenes and include curved oval shields of a type seen in Republican sculpture (see above, p. 2). A fresco from Pompeii (pre-AD 79) shows a soldier in a brown cloak (*paenula*) being offered a drink, otherwise soldiers appear in crowded mythological scenes. Some 1st to 2nd century painted mummy portraits from Egypt depict the deceased with studded baldric and sword, marking them as soldiers or ephebes. All the other painted representations of soldiers date to the 3rd to 4th centuries AD. At Dura-Europos paintings in the synagogue (see Fig. 112), the Temple of the Palmyrene Gods and several houses depict Roman or biblical soldiers in contemporary attire. Other paintings have been preserved by similarly dry conditions in Egypt. A 3rd(?) -century mummy portrait from Dar al-Madinah shows an unarmoured soldier with a sword, and Diocletianic military frescoes were recorded in the Dynastic temple complex of Luxor before their partial destruction. In the West, the Villa Maria Catacomb at Syracuse has a painted 4th-century soldier with helmet and shield (Pl. 6c), while soldiers appear in the roughly contemporary Via Latina Catacomb in Rome (Pl. 6b).⁴³

Floor and wall mosaics also provide information about clothing and its colours. Men on the Constantinian mosaics at Piazza Armerina are identified as soldiers by their flat-topped caps and broad belts with metallic fittings (see Fig. 138). Mosaics in Istanbul, Syria and Jordan are notable also for the fine depictions of horse-archers and archery equipment from the 3rd to 6th centuries AD. Although strictly outside the period of the present study, the wall mosaic of Justinian I in S. Vitale at Ravenna represents armed, but unarmoured, richly attired guardsmen with large oval shields and torques, in the manner of the Obelisk of Theodosius (see above, p. 8).⁴⁴



0 20cm

Figure 8: The Geneva silver missorium. The inscription shows that it depicts an Emperor Valentinian (probably Valentinian III).

Manuscript figures and illuminations sometimes show military equipment. The most important is the late 4th- to early 5th-century AD *Notitia Dignitatum* with its officials' insignia of office and shield-blazons for late Roman army units (Pl. 6a). Of similar date, though of less practical use, are the illustrations with the anonymous *De Rebus Bellicis* (c. AD 368–9?). Treatises on siege-warfare (*poliorketika*) and artillery provide diagrams for various engines (Fig. 7). All these manuscripts are limited by their having been transmitted through medieval copies. Less technical, and surviving in the 5th-century original, are the illuminations accompanying copies of the *Iliad* and the *Aeneid*. Unlike the frescoes, their colours are stylized.⁴⁵

Representations in metal include copper-alloy statuettes of single standing or mounted soldiers. Their cuirasses and helmets are very much in the style of Trajan's Column and the Great Trajanic Frieze. Similar, but smaller, copper-alloy figurines were also used perhaps as harness appliqué or as decoration on equestrian statues. Embossed military figures decorate helmets and tableware, notably a legionary on a 2nd-century AD helmet from Nawa in Syria, and soldiers on a Trajanic (if genuine) vessel which were directly copied from the Great Trajanic Frieze. A small auxiliary cavalryman is embossed on a lead coffin from Glamorgan.



Figure 9: Coins as representational evidence. 1 Praetorians with rectangular curved shields on sestertius of Gaius (AD 39–41); 2 daggers on denarius of Brutus (42 BC).

Fourth-century silver plates (*missoria*) show emperors surrounded by their unarmoured guardsmen who wear jewelled necklets (*torques*) and carry shields. Quite exceptionally, a Valentinianic example at Geneva has helmeted guards with enormous shields displaying blazons (Fig. 8). Some 1st- and 2nd-century AD coins depict soldiers, often listening to an emperor's speech (*adlocutio*). An astounding degree of detail was achieved by die-cutters so that armour and standard types, and even shield-blazons can be distinguished (Fig. 9). A growing class of cloak brooches takes the form of weapons, helmets, shields or the insignia of detached troops (*beneficiarii*). Some even represent soldiers, as with a 3rd-century brooch depicting a cavalryman from Kraiburg am Inn. The man wears a 'Phrygian' helmet and carries sheathed javelins behind his saddle in the manner suggested by Josephus.⁴⁶

This covers the main media. In addition, ivory furniture panels from Ephesos seem to show Trajan with barbarians and soldiers. The latter have feather-crested helmets and one wears a *lorica hamata*. A wood sculpture from Egypt, now in Berlin, represents armoured late Roman soldiers and barbarians around a city. Republican period cinerary urns and temple terracottas show Roman soldiers in mail, whilst terracotta figures from Canosa represent Numidian cavalry. Small ceramic horse-and-groom figurines depict saddlery and harness in useful detail and the same medium also encompasses Gallic warriors, and plaques showing eastern horse-archers and armoured lancers.⁴⁷

Small bone or metal model weapons found on military sites perhaps had a votive function. Bows, spears, axes and swords occur, and some, especially of the latter, incorporate authentic details.⁴⁸

Lastly, there are scratched or drawn graffiti of horse-archers and cataphracts from Dura-Europos (see Fig. 125) and various North African sites. The latter include a 3rd-century standing soldier from Bu Njem exhibiting a circular scabbard-chape.⁴⁹

Some of this welter of minor works have a value in terms of colour (paintings, mosaics) or content rarity value (manuscript and metalwork shield-blazons, graffiti). Many are too diminutive or too stylized to be of more than cumulative value and it is sometimes the case that the smaller the object the less reliable it is as a source of information.

Notes

1. Cf. Couissin 1926 and Robinson 1975; Coulston 1983. Antique style: Soler del Campo 2000, 49–50, 70–1. Cinema: Solomon 2001, 83–95, 191.
2. E.g. full publications: Bishop 1983b; Noelke 1986; Coulston 1988b.
3. E.g. Amelung 1903; Barkóczi 1944; Benseddik 1979; Esp; Esp. *Germ.*; Franzoni 1987; Hofmann 1905; Kieseritzky and Watzinger 1909; de Lachenal *et al.* 1984; Pfuhl and Möbius 1977; Schleiermacher 1984; Schober 1923; Seltzer 1988; Speidel 1994a.
4. Hamberg 1945; Scheiper 1982; Campbell 1984, 47, 65–7, 72–84, 120–1, 142–8, 182–5; Hannestad 1986. See Koepfel 1982. Public and soldiers: Coulston 2000.
5. Robinson 1975, 7, 64–5; Waurick 1983; 1989; Coulston 1983, 24–5. Hoplite shields: Hanson 1989, 65–71; Snodgrass 1999, 53–5; Van Wees 2004, 48.
6. Ahenobarbus: Robinson 1975, Pls. 463–6. Aemilius Paulus: Kähler 1965.
7. Orange: Amy *et al.* 1962. Claudian arch: Koepfel 1983b. Cancellaria: Magi 1945; Koepfel 1984, No. 7–8. Anaglyphs: Koepfel 1986, No. 2. Chatsworth: Koepfel 1985, No. 8. Pozzuoli: Kähler 1951; Flower 2001. Benevento: Hassel 1966; Fittschen 1972; Andreae 1979.
8. Cichorius 1896–1900; Lehmann-Hartleben 1926; Lepper and Frere 1988; Settis *et al.* 1988; Coulston 1989; 1990b; 2001a; 2003a; 2003b; forthcoming a; Koepfel 1991; 1992; Coarelli 2000.
9. Gamber 1964; Polito 1998, 192–8; Coulston forthcoming a.
10. Robinson 1975, 170; Bishop 2002, 2–5. Figure types: Coulston 1989, 31–4; Coulston forthcoming a.
11. Koepfel 1985, No. 9–16; Leander Touati 1987; Coulston 2000, 92, 99.
12. Attic helmets: Robinson 1975, 27, 64–5; Waurick 1983, 292–8; Dintsis 1986, 105–12.
13. Florescu 1965; Richmond 1982.
14. *Congeries*: Smith 1904, No. 2620; Stuart Jones 1926, Pl. 8; Spannagel 1979, Fig. 2; cf. Crous 1933; Polito 1998. Pius Column: Vogel 1973.
15. Petersen *et al.* 1896; Becatti 1957; Birley 1987, 267; Scheid and Huet 2000.
16. Waurick 1983, 296–7; 1989, 46–58. Horse-archer: Petersen *et al.* 1896, Scene LVII. Irregulars: *ibid.* XV, XXVII, XXXIX, LXXVIII.
17. Koepfel 1986, Nos. 23, 26–31; cf. Nos. 17, 35–6.
18. Arcus Argentariorum: Haynes and Hurst 1939; Brilliant 1967, Fig. 61; Koepfel 1990; Elsner 2005.
19. Bandinelli *et al.* 1966, 67–70, Fig. 32, 46; Brilliant 1967, Fig. 98; Andreae 1977, Pl. 557–60.
20. Decennalia: Kähler 1964; Koepfel 1990. Pedestal: Brilliant 1982. Chiaramonti: Koepfel 1986, No. 48.
21. Devolution: Srejič 1993; Rees 2004, 27–30. Thessalonike: Laubscher 1975.
22. L'Orange and von Gerkan 1939; Koepfel 1990; Pensabene and Panella 1999; Conforto *et al.* 2001.
23. Obelisk: Delbrück 1933, 185–92, Pls. 86–8. Column of Theodosius: Becatti 1960, 83–150, Pls. 48–55. Column of Arcadius: *ibid.*, 151–264, Pls. 56–63, 73–80; Freshfield 1922; Liebeschütz 1990, 273–8, Pls. 1–7.
24. Cuirassed statues: Vermeule 1959–60; Robinson 1975, 147–52. Porphyry statues: Delbrück 1932, Pls. 31–5, 47–51.
25. See Cumont 1942.
26. Officers: Keppie 1984, Pl. 5; Franzoni 1987, Pl. VII, 3. Padova: *ibid.* No. 26. *Stela* types: Schober 1923; GR III; Gabelmann 1972; Anderson 1984; Schleiermacher 1984; Tufi 1988.

27. Verona: Franzoni 1987, No. 30. Robinson 1975, 157–9, 164–70. Wiesbaden: Esp. *Germ.* 11; Robinson 1975, Pl. 469. Aquincum: *ibid.*, Pl. 470; Schober 1923, No. 162. *Fustis*: Suetonius, *Gaius* 26.4; Speidel 1993.
28. Schleiermacher 1984.
29. Britain: Anderson 1984. Africa: Benseddik 1979. Tombstone proportions based on Esp., Esp. *Germ.*, and *RIB*.
30. Corinth: Kos 1978. Philippi: Schleiermacher 1984, No. 98. Croy Hill: Coulston 1988b. Tipasa: Benseddik, 1979, Figs. 1–3, 5; Schleiermacher 1984, Nos. 65–7.
31. Third-cent. *stelae*: Noeike 1986; Coulston 1987. Alexandria: Breccia 1914, Fig. 41; Bernand 1966, Pls. 13–15; Castiglione 1968, 114–15.
32. *Equites singulares*: Schafer 1979, Figs. 5–8. Cf. Speidel 1981–82; Speidel 1994a; Coulston 2000, 94–7; Busch 2001.
33. Aquileia: Franzoni 1987, No. 22. Strasbourg: Esp. 5496. Linz: Eckhardt 1981, No. 57. Cf. Esp. 3943 (Amiens); Franzoni 1987, Nos. 12–17, 20–1, 23 (Aquileia). *Catafractarii*: Schleiermacher 1984, Nos. 49, 88, 90, 93; Nuber 1997.
34. Ephesos: Schleiermacher 1984, No. 122. Sitten: Lehner 1986. Vatican: Amelung 1903, No. 163, Pl. 30; Bandinelli 1971, Pl. 65. Terme: de Lachenal *et al.* 1984, V.20. Apamea: Balty 1987; 1988; Balty and Rengn 1993; Coulston forthcoming b. Gaeta: Fellmann 1957. Arlon: Esp. 4021; Gabelmann 1973. Saintes: Robinson 1975, Pl. 203. St Rémy: Esp. 114. Gladiators: e.g. Grant 1967, Pls. 6, 9, 12, 28–9, 31.
35. Portonaccio: Koch and Sichtermann 1982, Pl. 76; Bertinetti *et al.* 1985, No. IV.4. *Loricae*: Robinson 1975, 184. Hunt sarcophagi: Koch and Sichtermann 1982, Pls. 79–92. Ludovisi: *ibid.*, Pls. 77–8; Andreae 1977, Pl. 144. Red Sea: Strong 1980, Pl. 222.
36. Attic *stelae*: Clairmont 1993; Osborne 1997. Photographs: Ward 1991, 44–7, 250–1. Roman corpus: Coulston 2004; forthcoming b.
37. Alba Iulia: Coulston 1995; Bishop 2002, 62–7. Condurachi and Daicoviciu 1971, Fig. 117. *Dona*: Maxfield 1981, Pl. 5.
38. Esp. 5822; Robinson 1975, Pls. 196–9. See Büsing 1982; Frenz 1992, Nos. 5–6.
39. Mavilly: Esp. 2067. Alzey: Künzl 1975, No. 6. Old Carlisle: Wright and Phillips 1975, No. 238. Aalen: Filzinger 1983, Fig. 5. Jupiter Columns etc: Esp. 4696, 5251, 8437; Cf. No. 1623. Palestrina: Bandiera 1977, No. 31. Mantova: Robinson 1975, Pls. 450–1, 472; Koeppl 1983a, No. 33. Cluj: *Rumänien* 1969, G191. Intercisa: Barkóczi *et al.* 1954, Pl. LXXXI, 8. Einig: Wagner 1973, No. 477.
40. Coulston 1985; 1986; 2003a.
41. Crimea: Kieseritzky and Watzinger 1909. Parthian/Sassanid: Herrmann 1980; 1983; Herrmann and Mackenzie 1989; Vanden Berghe and Schippmann 1985; von Gall 1990. Palmyra: Colledge 1976; Tanabe 1986.
42. Celt-Iberians: Stary 1994; Quesada Sanz 1997a. Osuna: García y Bellido, 1949, No. 428. Gauls: Esp. 35–6, 2372, 7833–7, 8613, 8652–6, 9155. Numidians: Horn and Rüger 1979, Pl. 107; *Encyclopédie Berbère* I, 1984, s.v. 'Abizar'; Vachères: Esp. 35.
43. Esquiline: Lehmann-Hartleben 1926, Figs. 8, 12. Pompeii: Frölich 1991, Pl. 19.2. Mythology: Robinson 1975, Fig. 18. Baldric: Walker and Bierbrier 1997, No. 87–8. Dura: Cumont 1926, Pls. XLIX–L; Baur *et al.* 1933, Fig. 16, Pl. XVII; Rostovtzeff 1934, Pl. XXXVI, 3; Rostovtzeff *et al.* 1936, Pl. XLII, 1; Kraeling 1956; James 2004, Pl. 1–5, Fig. 18, 20. Dar al-Madinah: *Luxor* 1981, No. 290. Luxor: Kalevrezou-Maxeiner 1975. Syracuse: Wilson 1990, Pl. XII. Via Latina: Tronzo 1986, Fig. 92.
44. Piazza Armerina: Carandini *et al.* 1982; Wilson 1983. Archers: Coulston 1985, 238, Figs. 36–8; Piccirillo 1992, 59, 154–5, 187, 191, 256. Ravenna: Volbach 1961, Pl. 234; Paolucci 1971, 46–7.
45. *Notitia*: Goodburn and Bartholemew 1976; Berger 1981. *De Rebus Bellicis*: Hassall and Ireland 1979; Liebeschuetz 1994. Treatises: Marsden 1971; Lendle 1975; Blyth 1992; La Regina 1999. *Iliad* and *Aeneid*: *Vergiliana* 1945; Becatti 1960, Pls. 66–8.
46. Figures: Robinson 1975, Fig. 122, Pl. 474, 501; Traiana 1981; pers. obs. Kunsthistorische Museum (Vienna), Bologna Museo Civico, Luni Museum (Italy), Colonia Sarmizegethusa Museum (Romania). Nawa: Abdul-Hak 1954–55, Pls. IV–VII. Vessel: Schafer 1989. Coffin: Murray Threipland 1953. *Missoria*: Delbruck 1933, Pl. 57, 79, 94–7. Coins: e.g. *RIC* I, *Gaius* No. 48; *Nero*, No. 68, 130–6, 491; *Galba* No. 297–304, 462–8; Brilliant 1963. Brooches: Wamser 2000, Cat. No. 226b, 229. Cavalryman: *ibid.*, Cat. No. 226a. Josephus, *Jewish War* 3.96.
47. Ephesos: Önen 1983, 119. Wood sculpture: Alf 1941, Fig. 9; Casey 1991, 21. Terracottas: Bandinelli and Giuliano 1973, Figs. 344, 366, 372; Eichberg 1987, Pl. 18; van Boeckel 1989. Canosa: Rostovtzeff

1946. Figurines and plaques: Eichberg 1987, Pls. 4–8; Baur and Rostovtzeff 1931, Pls. XXIV–V; Gamber 1968, Fig. 40; Herrmann 1989, Pl. V.
48. *RLÖ* VI, Figs. 69,6; 70,1; IX, Fig. 44; Raddatz 1953, Fig. 1; Oldenstein 1976, Nos. 353–87, 951–2; Allason-Jones and Miker 1984, No. 3.129; Fischer and Spindler 1984, Fig. 40,1; Beal and Feugère 1987; James 2004, No. 1, 100–1, 321.
49. Dura: Cumont 1926, Pl. XCVIII; Baur and Rostovtzeff 1931, Pl. XLI, XLIII; Baur *et al.* 1933, Figs. 15, 22–3, Pl. XX–XXII; Rostovtzeff 1934, Pl. XXXV; Rostovtzeff *et al.* 1936, Fig. 8; 1939, Pl. LVI; 1952, Fig. 6; James 2004, Fig. 17, 21–3, 117. Africa: *CIL* VIII, 17978 (pers. comm. Dr Alan Rushworth). Bu Njem: Rebuffat 1989, Fig. 5.

2 The Archaeological Evidence

Introduction

It ought to be simple enough: artefacts survive in the archaeological record, they are recovered in some way, and then we study them. Unfortunately, nothing is ever that simple. The circumstances in which those objects came to be deposited in, and form part of, that record can greatly affect how we interpret them, so it is essential that, as with representational evidence, the student of military equipment is aware of the strengths, weaknesses, and pitfalls of the archaeological evidence.

Great advances in archaeological methodology have been made in the 20th century, although artefactual studies have, until quite recently, tended to concentrate on the unusual or the attractive, rather than the routine or mundane. At the same time, the important collections of excavated military equipment were usually those recovered with little or no archaeological information. Nowadays, artefacts have their precise location in three dimensions noted, along with the deposit in which they were resting, enabling the student to refer to the dating evidence, such as pottery or coins, that may have been associated with it.¹

This sort of detailed recording was presaged by Curle's excavations at Newstead, where a series of pits produced whole ranges of artefact classes, stratified together with pottery and coin evidence. Curle's publication of the pit contents, although lacking the sort of detailed section drawings that would be the practice today, nevertheless enables equipment from these deposits to be placed within one of the two major abandonment episodes. By contrast, equipment recovered from within the fort itself comes with no such information and, whilst in many cases it is likely that the objects belong to the latest phase, this assumption cannot automatically be made without any record of the stratigraphical conditions pertaining. Thus Newstead lies at the threshold between the older way of regarding artefacts, and the newer methods of recording. What sets Curle's report apart is his synthetic treatment of the material he excavated: few directors since have displayed quite such a sympathetic approach to artefacts nor given them the same prominence.²

The most common problem encountered by the student of Roman military equipment is the poor quality (or even total lack) of publication of much of the archaeological evidence, and this is true of all countries producing objects (although, admittedly, some are worse than others). Many important collections of material, such as the objects found at Alesia in the mid-19th century, still await full publication.³

Archaeologists' neglect of small finds, arguably a reaction against the more artefact-oriented antiquarianism of past centuries, means that oblique photographs, hasty or over-stylized line-drawings (frequently lacking a drawn scale), and a complete refusal to relate the artefacts to their stratigraphic contexts are all too common, as is a marked reluctance to state dimensions (relying on illustrations alone is a recipe for disaster). The practice of illustrating only a proportion of items is equally pernicious (although understandable, given the cost constraints on many projects), but not nearly

so deplorable as the (thankfully now diminishing) fashion for placing small find reports on microfiche: publication is about the dissemination, not concealment, of information. It is not necessarily true that a specialist has to see the object itself in order to make an identification, since good line drawings are usually sufficiently diagnostic, although such inspections are essential to reveal small details about manufacture, use, or damage.

It is surely the duty of the excavator to ensure that not only is the largest feasible sample of equipment fully illustrated with line drawings (with a drawn scale, of course), but that each piece can be traced back three-dimensionally to its original provenance on the site (whether that be securely stratified in a pit, or a stray find in topsoil). Only then does military equipment become a dynamic part of the wider archaeological picture, rather than just an embellishment for the pages of the final report.

The trade in illicitly acquired military equipment has become an increasing problem in recent decades. Illegal metal-detecting on known archaeological sites, tomb-robbing, and the ransacking of sites in war-zones has led to a disturbingly large number of equipment artefacts for sale on the internet and through unscrupulous art-dealers. In particular, decorated pieces, such as belt-plates or horse-harness fittings, command inflated prices and individual collectors have been known to create and warp markets for ancient arms and armour. Many see this trade as pernicious for a number of reasons. It is often in contravention of national antiquities laws regarding excavation, trade and export. Improper removal of finds divorces them from archaeological context, site identity, and sometimes even country of origin, as, infamously, with the Sevso treasure of Late Roman silver plate (which, incidentally, includes on one dish details of Late Roman saddlery). Moreover, once a market is established, demand may be met by the production of forgeries, complicating typological and other academic studies. Helmets are a good case in point. The Toledo Helmet (Toledo, Ohio, Museum of Art) is a fairly obvious *falsum* based as it is so closely on details derived from metropolitan Roman sculpture. However, helmets in the Axel Guttman Collection, which have recently been sumptuously published, present more complex difficulties in the absence of a rigorous programme of metallurgical analyses. On the other hand, it might be argued that it is unsatisfactory and frustrating to ignore as potential forgeries all black market items, but nevertheless a healthy amount of scepticism must be employed, assuming guilt until innocence is proven.⁴

One of the most persistent notions to be found in Roman military archaeology is that of accidental loss. To some extent, it is borrowed from the study of ancient coins, for it is well-known that people of any money-using economy will, by virtue of the very nature of their currency (e.g. small, easily-misplaced coinage), lose it occasionally. This paradigm of artefact loss has also been applied quite freely to military equipment, without too much thought for the validity of such an assumption. However, it is one thing to drop a small denomination coin and be either unwilling or unable to find it, but quite another to 'lose' a spearhead or sword. Nevertheless, accidental loss is seriously suggested by some writers as a reason for the presence of Roman military equipment, particularly helmets, in water.⁵

This is not to say that some items of military equipment might not be lost by accident – small decorative studs, for instance, are one case where this is a possibility, or even matériel found in a shipwreck or associated with a catastrophic event like the eruption of Vesuvius. However, it is important to stress that this cannot have been a major factor in the deposition of equipment in the archaeological record. So how did it get there, if not by accident?⁶

Understandably, scholars could not resist the hunt for ancient battlefields, traditionally invoking the longed-for goal of finding vast deposits of weapons and equipment as the true indicator of the physical location of a battle. In fact, this is a normally a quite unrealistic expectation. In the pre-industrial world few cultures could afford to throw away valuable metal resources (even broken weapons could be re-forged), rendering any such deliberate deposits all the more significant. When Augustus' general Vinnius made a grand gesture of depositing spoils of war in a river, it was noted that the normal Roman practice was to burn them (presumably meaning burning the wooden shafts of spears or boards of shields, having first removed the metal fittings). Stripping the dead on battlefields is depicted for example, at Hastings (AD 1066) on the Bayeux Tapestry and in Native American illustrations of the Battle of Little Big Horn (AD 1876). The site of Kalkriese, now generally accepted as associated with the defeat of Varus by the German tribes in AD 9, has yielded small items plus the skeletal remains of humans and pack-animals, but very few substantial artefacts, such as the face mask from a Roman cavalry sports helmet. This should now come as no surprise, not least because the site was subject to a series of event horizons after conflict ceased: movement, torture and execution of prisoners; search for booty (especially all metalwork) and gathering up for division between the tribal groupings involved; Roman return to the site six years later to dispose of human remains and erect a monument; presumed subsequent German disturbance of mass-graves and monument. Indeed, the destruction of Varus' army on the march occurred over several days and a large area, and as in many other historical cases, the term 'conflict landscape' is far more fitting than 'battlefield', although the latter has more popular appeal. The archaeological record may have been influenced far beyond the formal, relatively small-scale ancient field-of-battle, by foraging, laying waste and strategic or grand-tactical movements of forces. Mass-graves rather than masses of artefacts seem to be the clearest indicator of a conflict landscape, but even these rarely contain large numbers of artefacts because of stripping when bodies were moved. At Towton in AD 1461 the dead were buried with very little clothing or armour; at Wisby in AD 1361 a small number of cuirasses were included in the graves perhaps only because they were noisily soiled and the hot summer's day demanded swift burial. At the attested Roman battlefield site at Krefeld-Gellep (Gelduba), the site of an engagement between the Romans and the rebellious Batavians in AD 69, cavalry horses have been found buried where they fell (horses, once dead, are difficult to move, so are most easily rolled into a conveniently-dug pit), but only a handful of artefacts were recovered from over 70 horse burials.⁷

Mass graves or the remains of funeral pyres are the only likely indicators of a battlefield site, since it does not seem to be the case that military equipment was deposited in any quantities. Sites of sieges offer more substantial structural archaeology and are

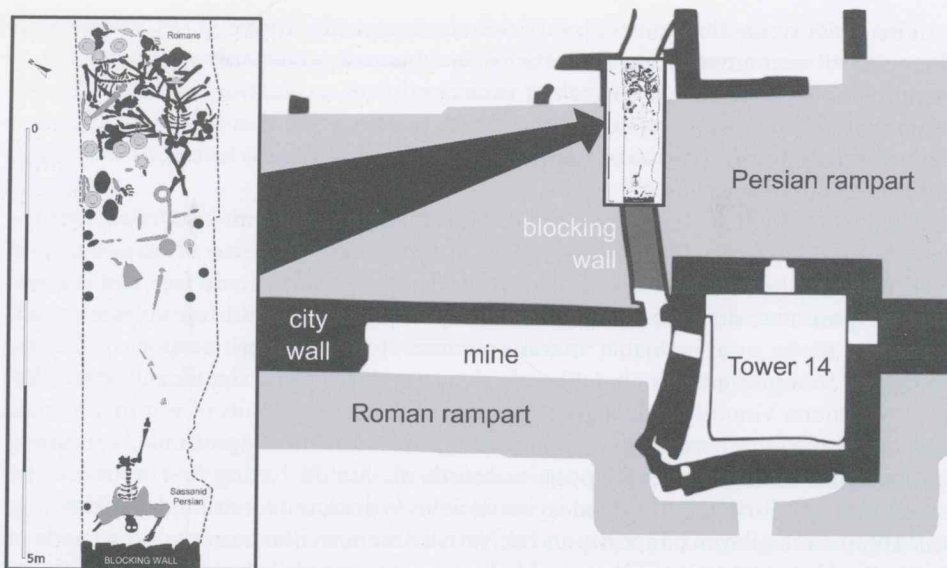


Figure 10: Plan of mine at Dura-Europos.

more easily identified than open battles because they often involved fixed positions, named locations, and such features as vallations, siege-ramps and mines. In artefactual terms finds of the most numerous and least easily recoverable items are to be expected: scatters of projectiles such as arrow-heads, sling-bullets, artillery missiles and stone balls. Distributions of lead bullets, manufactured in haste on site and shot at insurgent Frisians in AD 28, have been plotted at Velsen. If a locale continued to be occupied after a siege then the same 'tidying up' processes would have applied as in other conflict landscapes. Rarely were substantial masses of equipment abandoned, as for example in ditches during Caesar's siege of Alesia (52 BC). At first sight Dura-Europos also seems to contradict this model because of its mass of recovered equipment and its depopulation after being captured by the Sassanid Persians in the mid-AD 250s. However, apart from the predictable projectile scatter, almost all the substantial finds such as weapons, cuirasses, shields and horse-armours were preserved in discrete and unusually sealed contexts: under the reinforcing bank behind the west wall, in collapsed tower chambers, and in siege-mines. Nevertheless, conflict landscape archaeology is a new and burgeoning field which is now beginning to receive due, specialist attention. Recent work on conflicts involving gunpowder projectile scatters, such as Palo Alto (AD 1846), has produced spectacular results, and future application of developing methodologies to Roman landscapes holds great promise.⁸

Site Deposition

An important clue to how military equipment usually entered the archaeological record on Roman military sites was provided by the excavations at the legionary base of

Inchtuthil in Scotland. In a pit, in the building usually identified as a workshop, were found ten tons of iron nails and nine cart tyres. Richmond, following a hint in the historian Herodian, suggested that these had been buried to deny valuable iron to the Britons once the Roman army had retreated (since iron could be re-forged into weapons to be used against the Romans). This is only one of many indications of the army clearing a site before abandoning it. At Newstead, a large number of pits were excavated outside the fort, within the area of the annexe, and many of these contained broken and damaged pieces of equipment, as well as a wide range of other rubbish. A number of possible reasons for the Newstead pit deposits have been suggested, including enemy destruction and 'ritual' purposes, but Manning has shown that deliberate clearance by the army must be considered, going on to propose that the objects were 'surplus and damaged equipment buried because it could not easily be transported by a fully laden force about to retreat through hostile country.'⁹

The evidence of deliberate site clearance and demolition has been accumulating over the years. For a long time interpreted as destruction due to enemy action, archaeologists now suspect that much of the burning carried out on Roman military sites was the result of the systematic dismantling of structures. Any available receptacles – ditches, wells, latrine pits, water tanks – were used to deposit the rubbish cleared out from the buildings, and this would comprise not only scrap equipment, but also domestic refuse of various organic and inorganic types.¹⁰

These two examples are exceptional only in the scale of the deposition. The discovery of equipment in circumstances which suggest abandonment is common on most Roman military sites, and the vast majority of such material has quite clearly been damaged before loss. Moreover, items which appear to be undamaged may in fact have suffered what we might term 'invisible attrition': a spearhead may be in immaculate condition when deposited, but it would be useless if its wooden shaft were broken (and many spearheads in the Corbridge Hoard had broken shafts still attached to them – Fig. 11). This is also true of larger and more complex artefacts, particularly those with a number of component types ('*lorica segmentata*', for example, although mostly iron and brass, depended upon leather to make it functional). In fact, some artefacts, such as '*lorica segmentata*' fittings, that were particularly vulnerable to damage, are probably over-represented in the archaeological record.¹¹

The retention of broken objects points towards one thing: recycling. For precisely the same reason that the Romans buried the nails and tyres at Inchtuthil – namely the value of the scrap metal – they would need to recycle every piece of metal that was no longer in use; failure to do so meant that new metal had to be mined, processed, and then manufactured into artefacts. Recycling scrap kept the demand for resources low (particularly important when we bear in mind the fact that the nearest source for zinc in Roman Britain may have been Aachen, in Germania Inferior). Thus it does not take long to work out that the Romans took most of their metal with them when they left a site. In most cases, the proportion of artefacts found compared with even the minimum proposed duration of occupation, shows how few items per year would be lost by any 'accidental' mechanism.¹²

Ironically, one of the best pieces of evidence for the sort of things the army took with them when they departed comes from a collection that was left behind: the

famous Corbridge Hoard (Fig. 11). Consisting of portions of '*lorica segmentata*', spear-heads, and a whole range of items carefully packed in a wooden chest (with the armour wrapped in cloth), this looks very much like a group of objects packed for transport and then abandoned for some unknown reason (although it may well have been a last-minute decision).¹³

The main implication is that the archaeologist is presented not with a picture of everyday life in a military establishment, but a snapshot of a few hours' hectic and heterodox activity. Moreover, this is all tied in with wider military strategic considerations and events – such as the invasion of Britain – which necessitated large army movements, frequently led to the abandonment of sites (and possibly their subsequent reoccupation). Thus military equipment excavated on Roman sites was usually deposited because of some strategic move, so if there were no great military operations in hand, no equipment would be deposited.

Two major episodes of military equipment deposition are detectable in the West. First, there was the expansionism of the early Principate, with the abandonment of the Voralpenland military bases and the move to the Danube, the invasion of Britain and the rearrangements brought about by that, then the consequences of the events of AD 69. The second major event was the abandonment of large tracts of land in the 3rd century AD: Dacia and the Antonine frontier in Germania and Raetia, producing another rich haul of material (see Chapter 7). However, we know little about the equipment of the 2nd century AD, because there was comparatively less military activity in this period that might lead to the sort of deposition we have been discussing. Repeated annual campaigning would normally leave little trace by way of military equipment, and excavation of 'temporary' camps has often shown how these were left almost bare of artefacts. Artefacts from urban sites, on the other hand, may be due either to the presence of an earlier military installation beneath the civil site (usually the case in the West in the early Principate), or because troops were actually stationed in a town, as happened in all periods in the East, and from at least the 2nd century AD onwards in the West. Apart from some impressions made by pressing items of 2nd- to 3rd-century AD military equipment into bricks before firing, and some finds made in recent skilled urban excavations, very little artefactual evidence has been recorded for Rome. This is predictable, even despite the huge concentration of troops stationed in the imperial capital.¹⁴

It is axiomatic that, with a few notable exceptions, little material is known from the eastern provinces of the Empire, but this need not be purely a result of the shortcomings of archaeological methodology in these areas. Considerable amounts of equipment are known from Mauretania, so other processes (hindering the entry of equipment into the archaeological record?) may have been at work.¹⁵

Theoretically, the distribution of finds of equipment within military sites ought to be informative, but the reality of the situation is that the publication of archaeological excavations of the period all-too-seldom provides the sort of detail about the provenance of material to permit such a study, as was the case with Dura-Europos (see above). Nevertheless, in the few cases where it has proved possible, we see that equipment tends to be found in the barrack area of fortlets, forts, and fortresses and not in the administrative block. Presumably this was due to soldiers keeping any damaged

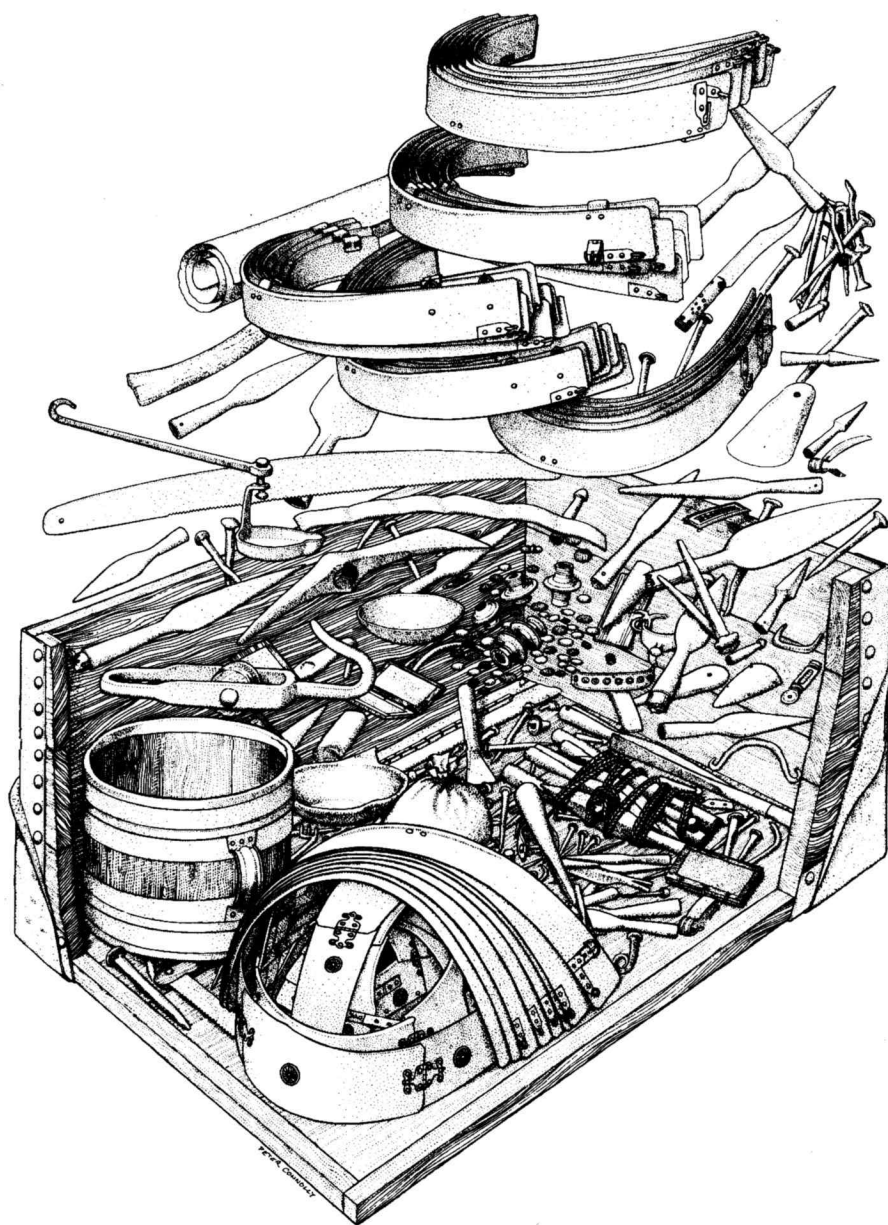


Figure 11: Corbridge Hoard reconstruction drawing (by Peter Connolly).

equipment until they could get it repaired (Chapter 9), when it could be moved to the workshop for reprocessing. Careful recording has allowed the excavators at Augst to plot equipment distributions both spatially and temporally to revealing effect. Temporary camps are notorious for the fact that they seldom produce any finds.¹⁶

Hoard (Fig. 11)

A number of hoards of equipment have made important contributions to the study of military matériel. Some of these (especially a notable 3rd-century AD group from the German and Raetian frontiers) may have been booty, whilst others (like the Corbridge or Ribchester hoards) were perhaps concealed in an attempt to prevent the raw material falling into the wrong hands.

Those from Straubing and Künzing included fine cavalry sports equipment, as well as more mundane tools and fittings. Hoards were not infrequently buried in a container of some kind (presumably because it made them easier to carry), often a large vessel as at Alfaro (Republican) or Straubing (3rd century), but the finds circumstances of other deposits, like the 160 items of Republican weaponry found in the rampart of the hillfort at Šmihel, are less clear-cut. Although there may appear to be a superficial resemblance with the deposition of coin hoards, it seems likely that there is a greater range of explanations for these unusual deposits of military equipment, some at least of which we can never know.¹⁷

Water Deposits and Votive Offerings (Figs.12–13)

It has recently been calculated that a high proportion of early Imperial helmet finds – about 80% – come from watery contexts of some kind, usually major European rivers such as the Rhine and Danube. Swords and daggers (both often still in their scabbards) are also frequently found in this way. At one time, it was suggested that soldiers lost such equipment during difficult ferry or bridge crossings, but this seems eminently unlikely. When the penalties for loss of equipment were so severe, there was every incentive for a soldier to keep a tight grip on his helmet, sword, and dagger as he crossed a river. We have already seen how the notion of ‘accidental loss’ does not work for site finds of equipment, and a diachronic examination of finds evidence from watery contexts suggests that the same is true.¹⁸

Torbrügge showed how finds from many eras tended to cluster around certain points on major rivers like the Rhine and suggested that these deposits might be interpreted as votive. The practice of dedicating finds to the gods was certainly well-established in the Greek world (helmets being popular), although many of these appear just to have been left in temples. An inscription on a bronze plaque, found near Tongres in Belgium, records Q. Catius Libo Nepos, a centurion of *legio III Cyrenaica* dedicating a shield and a spear to the goddess Vihansa (Fig. 12). Another inscription of AD 297, from Durostorum, records a probable votive offering of silvered shields and swords. An assemblage from a temple site at Empel may also fall within this category of deposit. This practice certainly

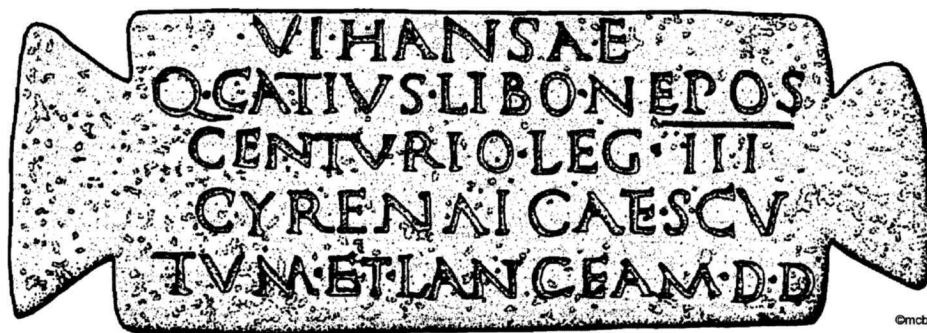


Figure 12: Votive plaque recording the offering of a spear and shield by a centurion of legio III Cyrenaica (Tongres).

fits into our picture of the contract religion practised by the Celtic peoples and the Romans, whereby some material price was paid in exchange for a favour. This is typified by the finds from the springs feeding the Roman baths at Bath (which, curiously, included a washer from a catapult). Thus it is not difficult to imagine a soldier, in the heat of battle, vowing some item of personal value (and soldiers had few things of greater value than their equipment) to a deity in exchange for his safety. This need not imply, as some have suggested, that it was the higher ranks indulging in this (the fine nature of the objects does not necessarily indicate that they must have belonged to officers). However, the assumption that such a practice did indeed take place presents some problems for us, one of which is a legal one: soldiers were forbidden to discard their equipment and were required always to possess a helmet, sword, and shield. Perhaps they bought replacements before discarding the old items.¹⁹

This phenomenon was almost certainly not a purely Roman one. The deposition in the Rhine of a hoard of cavalry equipment and metal vessels at Doorwerth, possibly also a neighbouring hoard from Xanten, may have been due to its having been acquired as booty and deposited as a votive offering by rebels during the Batavian revolt.²⁰

Closely akin to water deposits are those assemblages of material found in bogs (once sacred lakes), particularly in area outside the formal boundaries of the Roman Empire. More than twenty sites are located in Sweden, Denmark and Schleswig-Holstein. They contained both Roman and native material, as well as a proportion of Romanized native artefacts (notably swords). There has been much debate as to precisely how this material came into the possession of northern barbarian peoples. The one thing that is certain is that the extraordinarily good conditions of preservation mean that some of the finest surviving Roman military equipment comes from these bog deposits (Figs.13, 95). The bulk of this material seems to have accumulated during the period from the 3rd to the 5th centuries AD (with some outliers: Hjortspring *c.* 350 BC; Vimose, three depositions *c.* AD 70–150, *c.* AD 150, *c.* AD 210–60; Kragehul, four depositions over *c.* AD 150–450; Ejsbøl, *c.* AD 200; Illerup Ådel, *c.* AD 200–500; Nydam, four or more depositions *c.* AD 240–475). Again, this material may represent booty.²¹

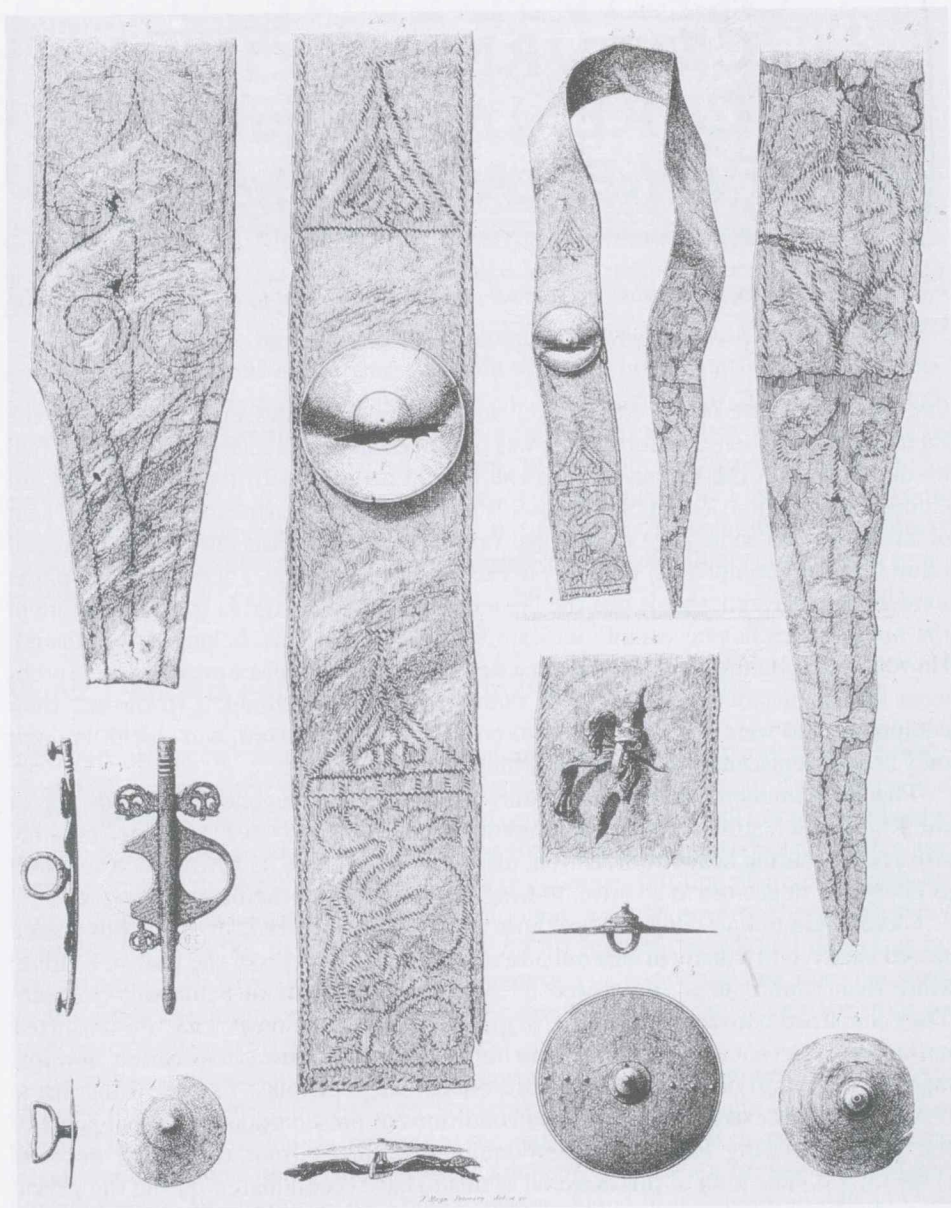


Figure 13: Baldric fittings from Vimose (from Engelhardt 1869).

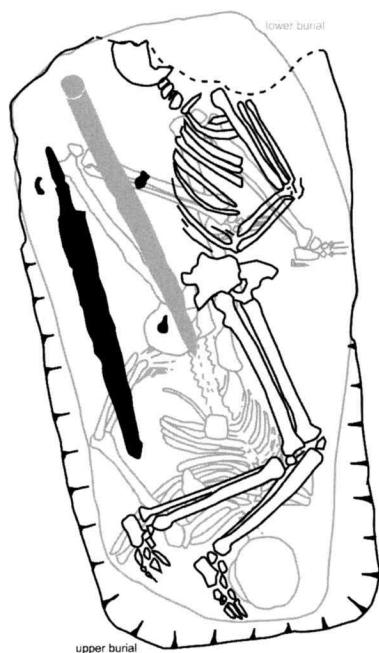


Figure 14: Burials with weapons at Canterbury

Burials with Weaponry (Fig. 14)

Although it was not the normal practice for Roman soldiers to be buried with their military equipment, examples of military equipment deposited as grave goods do sometimes occur. The fact of their existence should itself be taken as a reason for caution on the part of the student of arms and armour, precisely because of their unusual nature. Burials like those at Camelon and Mehrum may well be 'native' troops serving as irregulars with the Roman army, but neither the thoroughly Romanized burial from Lyon (thought to be associated with Septimius Severus' victory there in AD 197), nor the curious Canterbury double burial (Fig. 14), are so easily classified in this way. More complex mechanisms may lie behind cavalry burials such as those from Chassenard, Catalka, or Nawa. In each case, it has been suggested that a Romanized member of the indigenous nobility was signalling his affiliations by his adoption of Roman military equipment. In the case of the Catalka burial, however, there is more than one cultural influence at play, with Chinese jade scabbard fittings and steppe openwork decorated metal fittings alongside the more familiar Roman items.²²

The practice increases in the later Roman period, although it is far from clear whether this is due to its increasing popularity with 'Romans' (however such a group may be defined), or because of the influx of peoples from outside the empire who customarily practised weapons burial. Some burials outwith the bounds of the empire included Roman or Roman-influenced military equipment. These may be due to booty, trade, or any number of other explanations, reflecting attacks on, or service with,

the Roman authorities. There certainly seems to be some evidence of Roman military equipment appearing as trinkets in Anglo-Saxon burials in Britain (a not unreasonable interpretation of military artefacts found in female burials).²³

Excavation and Publication

Until quite recently, it would have been true to say that the bulk of military equipment recovered from the archaeological record came either from casual finds or from older excavations where the archaeological techniques lacked refinement. However, the attitude of more recent excavators to their artefactual evidence has been uneven to say the least.

In fact, the publication of military equipment is dogged by the art-historical obsessions of many commentators, often leading to exaggerated claims about the relative merits of a piece. A classic example of this latter phenomenon is the so-called Sword of Tiberius (Fig. 41,3), found at Mainz on the banks of the Rhine and now in the possession of the British Museum. The famed propaganda scene on the scabbard mouth plate, featuring the Emperor Tiberius, has led to this piece being considered as a one-off gift, or one of a series of presentation swords. The assertion that this must have been the weapon of an officer has seldom been called into doubt, except when the piece has been considered in context against the background of similar classes of item. Moreover, the imprecise use of language has fuelled the myth of this weapon: variously described as 'silvered' and 'gilded', scientific analysis has shown the decorated plates to have been made of tinned brass, the usual material for any embossed military decoration. This is just one example of attempts to impose questionable modern sets of values on ancient artefacts.²⁴

Whilst the trend today is towards a more functional appreciation of artefacts, it is not inconceivable that this too will seem a questionable approach in only a matter of a few years. The one thing that does not change about archaeological scholarship is its periodic mutations.

Reconstruction Archaeology (Figs. 15–16)

The path through the mire of reconstruction (or 'experimental') archaeology is very narrow and even the most reputable of scholars can easily be led astray. That is not to say that it is not a thoroughly respectable and worthwhile pursuit, but merely to emphasize that it is all too easy to lose sight of one of the prime tenets of reconstruction work: it can only show how something might have been done, not how it was done. In the end, the results achieved may be so convincing, and the alternatives too implausible, for there to be little room for doubt over the conclusions reached, but even then 100% certainty is not possible. We are always dealing in likelihoods and probabilities.²⁵

Reconstruction work is so often an interdisciplinary effort: a specialist in some field with no particular knowledge of the Roman army can shed surprising and informative

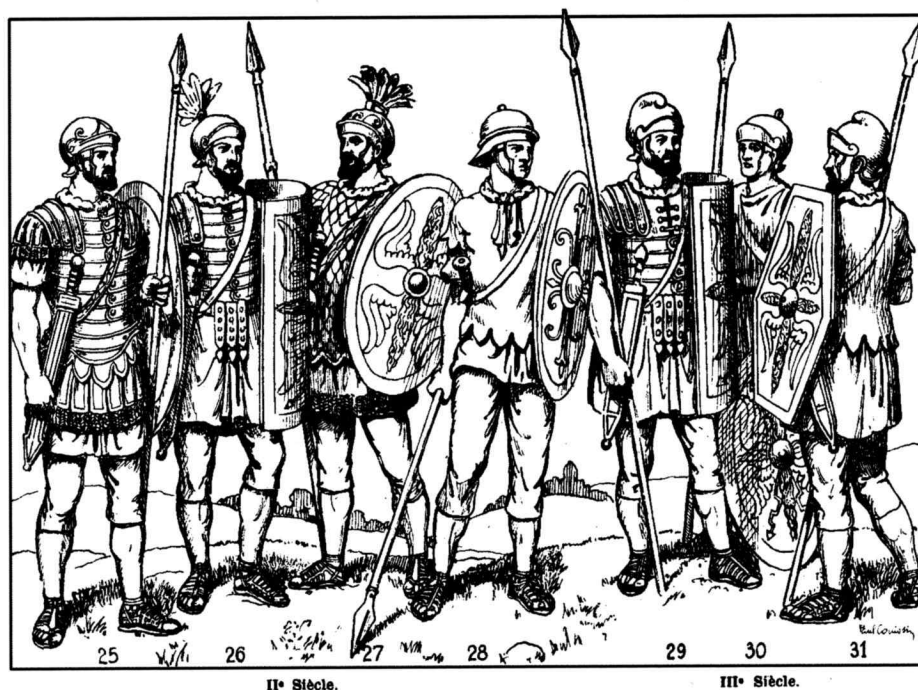


Figure 15: Reconstructions of 2nd- and 3rd century AD military equipment (from Couissin 1926).

new light on old problems from what they would regard as common sense and everyday practise.

Re-enactment and display societies, prime amongst whom have been the Ermine Street Guard (Pl. 5c), followed by more recent groups such as Junkelmann's *ala II Flavia*, or the *legio XIII Gemina*, seek to convey to the general public some impression of what life in the Roman army may really have been like. To date, however, only a few societies, such as *cohors V Gallorum*, have preferred the 3rd century over the 1st. Through diligent study of the source material, such groups reconstruct the weaponry and kit of the Roman soldier of their chosen arm and period with an efficiency that is laudable. However, this is not reconstruction archaeology in its strictest sense, for (ironically enough) much of the equipment is too well-made and, understandably, not field-tested to destruction under observation.²⁶

Thus there are limitations in using the experience of such groups as 'evidence' for the study of military equipment. Nevertheless, the reader will find reference to the work of these bodies within the pages of this book and that should speak for itself.

One of the most famous instances of the use of reconstruction archaeology was the struggle of scholars to understand the workings of the segmental cuirass (Fig. 16). Most early attempts were firmly based on the images on Trajan's Column and so doomed to failure, given the representational limitations of that monument. When von Groller published the collection of material excavated from the *Waffenmagazin* at

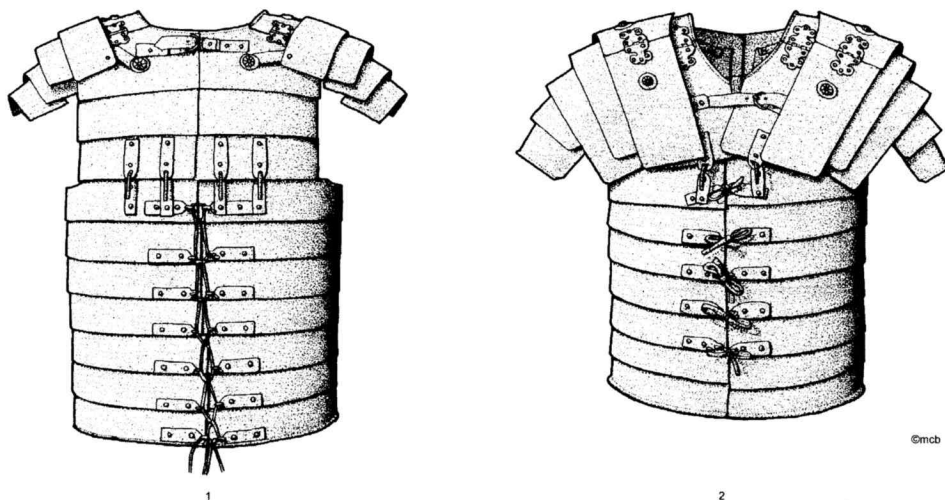


Figure 16: Reconstructing the Corbridge cuirasses (front views). 1 Robinson's first attempt; 2 the final version. (Not to scale)

Carnuntum, it was to the Column that he turned in order to make sense of the many *lorica* pieces recovered. The main elements of the cuirass – girth hoops, shoulder strips, and hinged fittings – were known, but the manner of their use not understood. Even as late as 1960, it was still possible for scholars to misplace pieces of the cuirass in attempting such reconstructions. The discovery of the hoard of military equipment and other objects at Corbridge in 1964 (Fig. 11) provided the final clues to the form of this type of armour, and the involvement of Robinson, a practising armourer, led to the now familiar and fully functional reconstructions.

Understanding that the armour was articulated on leather straps, rather than the less-flexible leather under-jerkin previously preferred by scholars, was an important step in the right direction, but even Robinson's first attempts to understand the Corbridge armour were misdirected (Fig. 16a), because he initially allowed himself to be influenced by those earlier writers. Ultimately, the archaeological evidence was the only viable means of understanding the segmental cuirass (Fig. 16b), and this was also true of the Newstead finds. With the benefit of hindsight, it may well be that involvement, at the time of the Carnuntum find, of an expert on medieval European or oriental armour (Robinson's particular speciality) could have provided a solution much earlier, since both these traditions produced articulated armour.²⁷

Some reconstruction archaeology is, however, more heavily dependent on sources other than the archaeological evidence. The study of ancient artillery requires detailed understanding of often obscure technical treatises, which provide formulae for producing weapons of varying calibres. These texts, together with their often corrupt manuscript illustrations (Fig. 7), provide some means of identifying the components of artillery pieces, and some notable successes have been achieved. Major Erwin Schramm was an early pioneer of artillery reconstruction in Germany during and after

the First World War. Modern studies have to combine the interpretation of archaeological, literary, and representational sources, a good example being the identification of *kambestria* belonging to bolt-shooting engines from Lyon (Fig. 82), Orșova, and Gornea (Fig. 132), and, moreover, distinguishing between a smaller, portable *manuballista* and its larger companions of a type similar to those depicted on Trajan's Column.²⁸

Notes

1. Harris 1979, 92–9; Barker 1993, 203–5.
2. Newstead pits: Curle 1911, 104–39. Curle's approach: *ibid.* viii.
3. Alesia: Sievers 1997.
4. Black market: Brodie *et al.* 2000; Brodie and Walker Tubb 2002. Sevso: Mundell Mango and Bennett 1994, Fig. 1.4, 1.10, 1.37. Toledo: Vermeule 1960; Robinson 1975, 65; Kondoleon 2000, Cat. No. 42. Guttman: Junkelmann 2000a.
5. Accidental loss: Bishop 1986, 717–19; 1989a, 5–6. Helmets in rivers: Robinson 1975, 58, following Klumbach 1961, 98–100. Cf. Künzl 1999–2000.
6. Shipwrecks: Baatz 1985; Feugère 1998. Vesuvius: Gore 1984; Orti 2005.
7. Battlefields: Bishop 1989a, 3–4; Coulston 2001b; 2005. Vinnius: Florus 2.24. Bayeux: Wilson 1985, Pl. 71–3. Little Big Horn: Fox 1993; 1997. Kalkriese: Schlüter 1993; 1999; Schlüter and Wiegels 1999. Towton: Fiorato *et al.* 2000. Wisby: Thordemann 1939. Krefeld: Pirling 1971; 1977; 1986; Reichmann 1999; Fahr 2005. Horse-burial: A. Hyland, pers. comm.
8. Sieges: Coulston 2001b; 2005. Velsen: Bosman 1995b. Alesia: Reddé 1995. Dura: Leriche 1993; James 1985; 2004, 29–39; 2005. Gunpowder: Fox 1993; Freeman and Pollard 2001; Haecker and Mauck 1997.
9. Inchtuthil: Taylor and Wilson 1961, 160; Angus *et al.* 1962; Pitts and St Joseph 1985, 105–15, 289–99. Herodian: *Hist.* III, 14, 7. Newstead: Manning 1972, 243–6; Clarke and Jones 1994. Deliberate clearance: Manning 1972, 246.
10. Demolition: Hanson 1978, 302–5. Clearance: Bishop 1986, 721–2. Cf. Deschler-Erb 2005.
11. Corbridge: Allason-Jones and Bishop 1988, 103. Over-representation: Coulston 1988b, 12–13; Bishop 1989a, 2.
12. Recycling: Bishop 1985b, 9. Zinc: Horn 1987, Fig. 90.
13. Allason-Jones and Bishop 1988, 109–10.
14. Army movements: Schönberger 1985, 355 (Voralpenland); 347–8 (c. AD 43); 359–65 (after AD 70); 423–4 (German and Raetian frontiers). Dacia: Dawson 1989, 355. Towns: MacMullen 1988, 209–17; Hodgson 1989; Dawson 1990; Bishop 1991; Fischer 2001. Cf. Veg. III, 8. Rome: Broise and Scheid 1987, 130–46; Coulston 2000, n.149; Consoli 2000, 52.
15. Mauretania: Boube-Piccot 1964; Mackensen 1991.
16. Distribution: Bishop 1986, 719; Mackensen 1987, 44. Dura: James 2004, 235–6, Fig. 139. Augst: Deschler-Erb 1999, 80–98. Temporary camps: Bishop 1985b, 13; Welfare and Swan 1995, 21–2.
17. Hoards of equipment: Allason-Jones and Bishop 1988 (Corbridge Hoard), Edwards 1992 (Ribchester), Keim and Klumbach 1951 (Straubing), Fischer 1991 (Künzing), Iriarte *et al.* 1997 (Alfaro), Horvat 1997 (Šmihel). Coin hoards: Casey 1986, 51–67.
18. Helmets: Oldenstein 1990, 36. Diachronic: Bradley 1982; 1990, 200–1.
19. Torbrügge 1972. Tongres: *CIL* XIII, 3592. Durostorum: *CIL* III, 14433. Empel: van Driel-Murray 1994. Bath: Cunliffe 1988, 8–9 with Fig. 4, Pl. V. Laws on equipment: *Digest* 49, 16, 3–13; Ruffus 29 and 56.
20. Doorwerth: Brouwer 1982. Xanten: Jenkins 1985. Booty: Bishop 1989a, 4–5. Cf. Künzl 1996, 438–49; von Carnap-Bornheim 1991; 1994; Randsborg 1995; Jørgensen *et al.* 2003.
21. Bog finds: Engelhardt 1863; 1865; 1867; 1869; Ilkjaer and Lønstrup 1982; Rald 1994.
22. Burials in general: Schönberger 1953. Camelon: Breeze *et al.* 1976. Mehrum: Gechter and Kunow 1983. Lyon: Wullemier 1950. Canterbury: Bennett *et al.* 1982, 185–90. Chassenard: Déchelette 1903. Catalka: Bujukliev 1986; Werner 1994. Nawa: Abdul-Hak 1954–55.
23. Late burials: Petculescu 1995. Burials outwith empire: Nylen 1963; Czarnecka 1992. Anglo-Saxon burials: Hawkes 1974, 393.

24. Sword of Tiberius: Lippold 1952; Klumbach 1970; Walker 1981. Context: Brown 1976, 37. Imprecise language: Lippold 1952, 4. Scientific analysis: Klumbach 1970, 130.
25. Coles 1979, 47–8.
26. Ermine Street Guard: Constable 1984; Leva and Plumier 1984; Haines 1998. Cf. Junkelmann 1986; 1989; Peterson 1992.
27. *RLÖ* II; Robinson 1974; 1975, 174–86.
28. Schramm 1980; Marsden 1969; Baatz 1978.

3 The Documentary Evidence

Introduction

Whilst representational evidence can reveal much about the way in which equipment was worn, and perhaps even give a narrow social context, the broader historical picture must derive from the written word. The study of documentary sources is a quest for a brief mention of some otherwise ignored item, but this has to be allied with qualitative assessment of the merit of each 'fact' gained in this way.

The Literary Sources

Literary evidence has to be treated with caution and it is essential that the social conditions under which texts were produced is allowed for in any consideration of what ancient writers had to say about military equipment. Most writing in Roman society was an elite, dilettante pastime, with only the best practitioners being preserved for posterity. Artistic licence and the generous use of anachronisms means it is usually hazardous to treat the material too literally.¹

However, the literary evidence falls into two broad categories, which can be defined as direct and indirect description. Direct description is normally found in technical manuals, of the sort produced to describe the subject of artillery (arguably one of the pinnacles of classical technological achievement), but it can occur in less specialized writings where an author is attempting to describe an aspect of the Roman army with which his audience might not be familiar. Heron wrote an important treatise on torsion artillery, and the architectural writer Vitruvius included machines of war in his book (he had been in charge of artillery whilst serving with Octavian).²

At the same time, it is important to distinguish between true technical works and those produced as works of literature, the latter being far more common than the former. Many of the accounts of military exploits, such as Frontinus' *Strategemata* or Caesar's *Commentarii*, were intended primarily as literature (although in Caesar's case, it was also a carefully contrived piece of propaganda), their main advantage being that they were written by men with a distinguished military career behind them. On the other hand, Tacitus was too involved in his own rhetorical technique for us to use him without extreme care. Arrian is another military figure whose writings survive, and two of his works, the *Techne Taktike* and the *Ektaxis kat'Alanon*, both record details of military equipment in use.³

The late-4th- or early-5th-century AD writer Vegetius compiled a work intended to show his emperor how to restore the army to its old virtues. Although writing at a comparatively late period, Vegetius was using earlier sources, some of whom he names (Cato, Celsus, Frontinus, and Paternus, along with the laws of Augustus and Hadrian), and scholars have gone a long way towards deducing precisely which passages derive from which earlier writer. His *Epitoma Rei Militaris* preserves a number of important

references to military equipment, both descriptions and examples of its use (it is Vegetius who tells us that centurions wore transverse crests on their helmets, a fact confirmed by sculptural evidence). His work is also an underexploited source for the study of the legion of the later Principate and Dominate: his *antiqua legio*, which has for so long perplexed scholars, is now beginning to look more like a genuine 3rd-century legion than a confused blending of its Republican and early Imperial predecessors – witness the discovery of light-armed *lanciarri* and legionary *sagittarii* amongst the epitaphs from Apamea (see Chapter 7).⁴

Legal works such as the *Digest* and *Codex Theodosianus* can occasionally be of help. For instance, it is recorded in the *Digest*, citing the jurist Paulus, that a soldier who sold his weapons was punished according to what he had sold. The *Leges Militares* of Ruffus are particularly enlightening on military laws concerning the ownership and disposal of arms, such as the fact that a soldier who threw away his weapons on the battlefield was punished both for disarming himself but also for arming the enemy. Likewise, a soldier who stole the equipment of a comrade was reduced in rank (also noted in the *Digest*). The *Notitia Dignitatum* implies a great deal about the production of equipment in large specialized workshops (*fabricae*) placed at strategic points around the Empire.⁵

The study of Republican military equipment is heavily dependent upon the *Historia* of Polybios. Having served as a Greek cavalry commander and been denounced to the Romans after the defeat of Perseus in 168 BC, he joined the household of Scipio Aemilianus and followed him on campaign in Spain and North Africa. He was thus in a unique position to observe the Roman army in operation and wrote an account of what he had seen for a largely Greek audience, an aspect of his work that is valuable because he takes trouble to explain details that would be familiar to a Roman readership.⁶

A similar set of circumstances mean that the Jewish writer Josephus (Joseph ben Matthias) is important to the study of the Roman army of the early Principate. Initially fighting against the Romans in the Jewish revolt of AD 66–70, he surrendered to them after the siege of Jotapata (where he had been commander) and became a rapid convert to the Flavian cause. Writing first in Aramaic and then Greek, he produced accounts of the Jewish War and recent Jewish history which also benefit (in our eyes) from his being an outsider describing Roman arms for non-Roman readers.⁷

Indirect description is gleaned from writers who may recount a fact in the course of their narrative which, by virtue of its being unusual, merited their attention. A famous instance of this is Caesar's description of how, on one occasion when fighting the Nervii, his troops did not have time to take off their shield covers or affix their *insignia* before going into battle (implication: soldiers normally took off their shield covers and put on *insignia*). Caesar did not generally describe the equipment of his army and it is unusual situations which prompt these little asides. Another occurs when he recorded how the *pila* of his legionaries pierced several enemy shields at once, pinning them together (implication: *pila* did not normally fix shields together in this manner). These snippets occur in most of the historians (such as Tacitus, the *Historia Augusta*, Cassius Dio, Ammianus Marcellinus, and Zosimus) and are all the more valuable when they come in the form of incidental asides.⁸

An example of the problems posed by Roman historians is a phrase used by Tacitus in describing the battle between the Romans and Caratacus' supporters. He says that

the Britons were trapped between the *gladii* and *pila* of the legionaries, and the *spathae* and *hastae* of the auxiliaries. Rather than arguing that all auxiliaries used the long sword, we must realise that Tacitus was aiming at a rhetorical effect here, at the expense of accuracy (this shows the danger of dogmatic arguments based on one piece of unverifiable text). Similarly, Plutarch appears to have been confused over the significance of developments in *pilum* design, fabricating a tale of what was evidently a mythical wooden rivet and associating it personally with Marius, a typical instance of ancient historians' fondness for ascribing aspects of technological development to prominent historical figures. Bearing this in mind, how should the statement of the *Historia Augusta* that Hadrian improved the military equipment of the Rhine armies be assessed? Could one man actually institute anything more than a limited, local change to equipment, or is this in fact literary shorthand to illustrate Hadrian taking an interest in his army, confirming the image of him as a fellow-soldier (*commilito*)? We do not know and can only guess.⁹

The Sub-Literary Sources (Fig. 17)

Literacy was a skill which could aid a soldier's promotion through clerical employment, and the Roman army not only functioned with a high degree of bureaucratic paperwork and an active commemorative epigraphy, but was also a major agent spreading language and literacy through the provinces.¹⁰

Personal letters and official documents sometimes survive from the ancient world, written on papyri (normally only surviving in dry eastern provinces) or wooden tablets (surviving in wet, anaerobic conditions in the West). Amongst personal letters are those of the so-called Tiberianus Archive, where Claudius Terentianus, a recruit in the navy in the early 2nd century, with aspirations to join a legion, wrote:

'I ask and beg you, father, for I have no one dear to me except you, after the gods, to send to me by Valerius a battle sword (*gladius pugnatorius*), a [...], a pickaxe (*dolabra*), a grappling iron (*copla*), two of the best spears (*lonchae*) obtainable, a [...] cloak (*byrrus castalinus*), and a girdled tunic, together with my trousers...'¹¹

His father, Tiberianus, was evidently still serving with a legion at the time of writing this. All did not go quite according to plan, however, for Terentianus subsequently wrote to his father

'I beg you, father, if it meets with your approval, to send me from there boots (*caligae*) of soft leather and a pair of socks (*udones*). *Caligae nucleatae* are worthless; I provide myself with footwear twice a month. And I beg you to send me a pickaxe. The *optio* took from me the one that you sent me, but I am grateful to him for furnishing me...'¹²



Figure 17: Papyrus P. Berlin inv. 6765
detailing production in a legionary fabrica

0 5cm

Similar requests for items to be sent to soldiers are known from the Vindolanda writing tablets and provide an added dimension to the whole issue of the procurement of equipment by soldiers (see below, Chapter 9). At the end of the 3rd century AD, Paniskos wrote to his wife asking her to send his helmet, shield, five spears, breastplate, belt, and tent fittings to him.¹³

The Roman army seems to have generated documentation in prodigious amounts, although only a tiny proportion of this survives in favourable conditions. An important document of the 2nd or 3rd century AD from Egypt preserves a record of two days' production in a legionary workshop (Fig. 17), showing what it was producing (swords, shields, bows, and parts for artillery) and the staff working there (legionaries, auxiliaries, civilians, and soldiers' slaves). Another text from Egypt and dating to the reign of Antoninus Pius, records a mother receiving the property of her deceased son, a soldier of *cohors II Thracum*, including sums '*in armis*' of 21 *denarii* 27½ *obols* (presumably payment for handing in his weapons), along with '*papilio*' 20 *denarii* (possibly his share of a tent). The ink-on-wood tablets found at Vindolanda include a number of pertinent references, not least those to the fort workshops or the British use of weaponry, whilst some from Carlisle include a report containing a list of missing cavalry equipment.¹⁴

Epigraphy (Figs.18–20)

The evidence of inscriptions (on stone and other media) is only rarely of direct use in the study of military equipment. The Romans' love of the 'epigraphic habit' as it has been called means that a vast amount of information has come down to us first-hand, although it is usually abbreviated (assuming some prior knowledge on the part of the reader) and frequently abrupt in tone and neglectful of detail. There are a handful that refer to the production of equipment (see below, Chapter 9), as well as unusual pieces, such as dedicatory plaques.¹⁵

Official monumental inscriptions can occasionally be of help, but more often that not, are equivocal sources. Such is the case with *armamentaria* or *ballistaria* inscriptions; for although these texts, erected to commemorate the construction (or reconstruction) of these structures, confirm their existence, they do not tell us what *armamentaria* or *ballistaria* might have been. Thus, they are of little direct assistance in military equipment studies.¹⁶

Career inscriptions of middle-ranking military officials provide some insights, such as those mentioning the supervision of arms manufacture in the territory of the Aedui or the commissioning of equipment from the city of Milan.¹⁷

Funerary inscriptions provide a context for depictional evidence, as with the series of tombstones from the 1st and 4th centuries AD discussed elsewhere (Chapter 1). Not only can they supply information about the name and unit of the deceased, they often provide valuable dating evidence, either by referring to events which can be placed historically (such as the existence of a particular garrison at a particular period) or by stylistic indicators (the use of certain formulae in the text of the inscription, or even the style of lettering employed by the mason).

A good illustration of this is the tombstone of P. Flavoleius Cordus from Mainz. The inscription informs the reader that he was a *miles* in the *legio XIII Gemina*; we know that this unit was based at Mainz (together with *legio XVI Gallica*) from c. 13 BC to AD 43, when it left to take part in the invasion of Britain. The legion returned c. AD 70, moving on to Pannonia some time after AD 89. It is generally accepted that *legio XIII Gemina* earned the honorific titles *Martia Victrix* for its part in suppressing the revolt of Boudica whilst serving in Britain, so this would appear to suggest that Flavoleius' stone belongs during the unit's first sojourn in Mainz.¹⁸

Dedicatory inscriptions are another class of epigraphic evidence that merits consideration. An important example is the plaque recording the gift of a *scutum* and *lancea* to Vihansa by a centurion of *legio III Cyrenaica* (Fig. 12).¹⁹

Punched or scratched ownership inscriptions on equipment were used in the same way that name-tags are employed on modern clothing. Usually punched into metal (Fig. 18,3–4; 6–8) with an augur (a technique known as *punctum*), although they could sometimes be scratched into the surface using a sharp object (Fig. 18,1), they were simple enough for the ordinary soldier to be able to execute in a matter of minutes. The study of these inscriptions, particularly those on helmets, can help in dating pieces, particularly when reference is made to a specific unit. Such ownership inscriptions characteristically only mention the name of the owner and his centurion (or decurion, if in the cavalry), occasionally adding the unit to which he belonged.

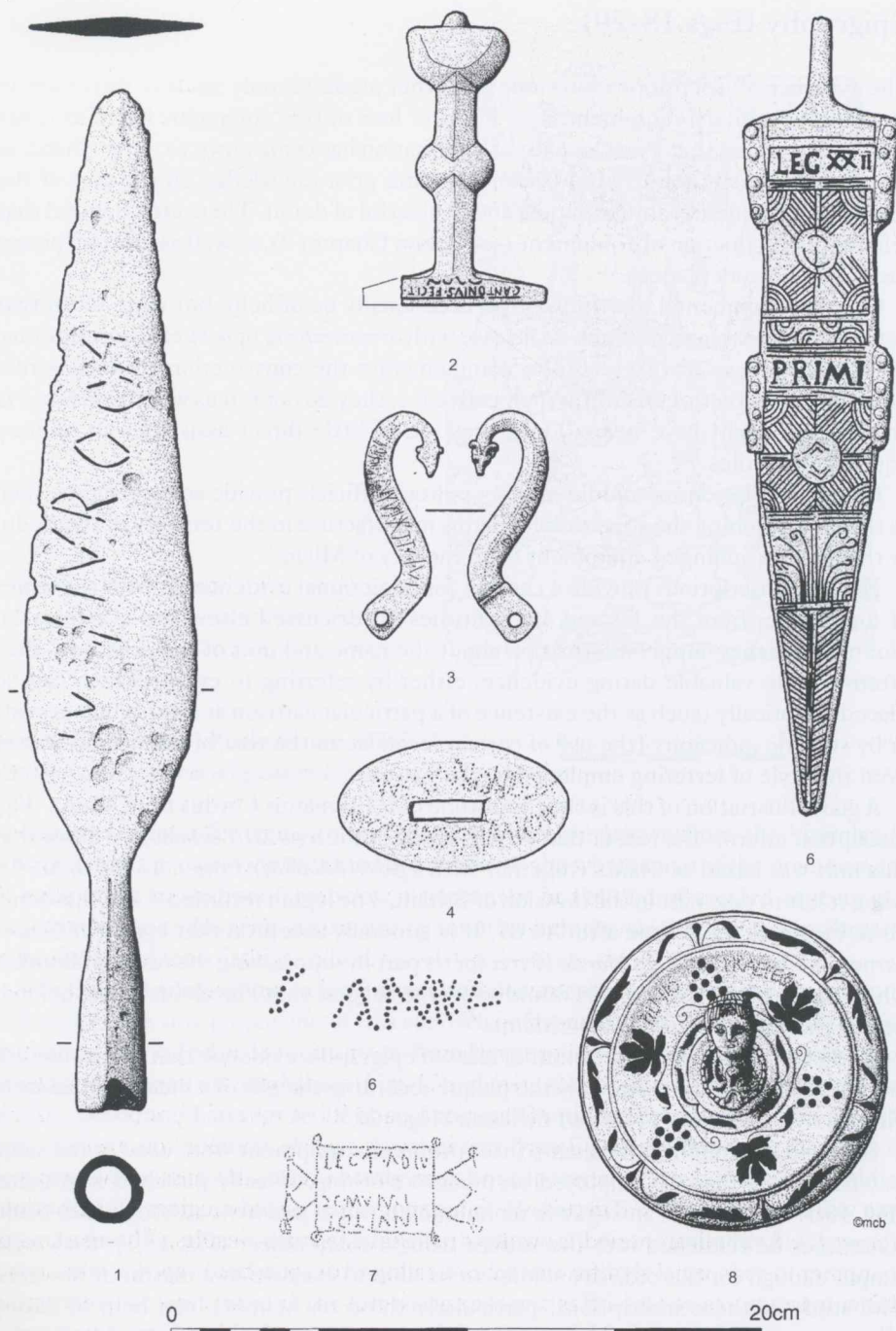


Figure 18: Inscriptions on military equipment. 1 Gomadingen; 2 Oberammergau; 3 Neuss; 4 Rheingönheim; 5 Rhine at Mainz; 6 Buggenum; 7 Rhine at Mainz; 8 Xanten.

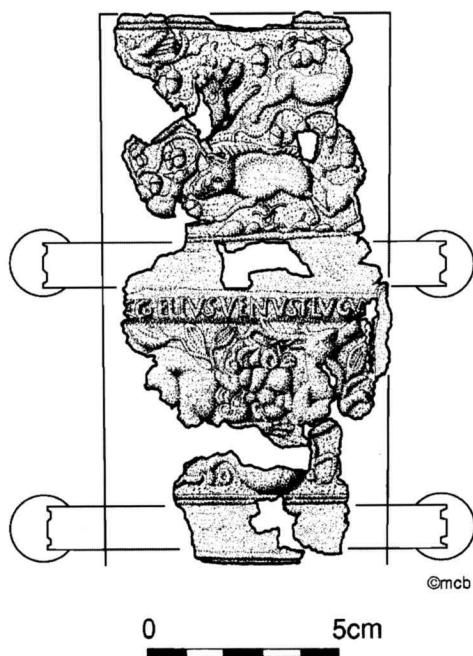


Figure 19: Embossed sword scabbard with manufacturer's (?) name inscribed on it (Vindonissa).

Nevertheless, the form of the name can often be of some help, as *cognomina* seems to have been rare amongst soldiers before the time of Claudius. Absence of a *cognomen* helped Oldenstein to assign an early Imperial date to the helmets from Eich.²⁰

Some helmets had multiple ownership inscriptions, suggesting long service, and confirming the practice of recycling equipment once the owner had finished with it. A Coolus type helmet from Köln had an interesting variety of inscriptions which showed that it had belonged to several men, one of whom at least (Fig. 18,6) was in *legio XVI* (moved from Mainz to Neuss in AD 43 and disbanded in AD 70). Interestingly, none of these inscriptions seem to offer any confirmation for the notion that legionary equipment was handed on to auxiliary troops.²¹

The helmet from Deurne not only carried an inscription recording the unit to which it had belonged, the *comitatensis Stablesiana vi*, but also a name, M. Titus Lunamis (possibly the manufacturer or owner of the piece), and its weight of 1 pound 1½ ounces (368.4g, which compared favourably with its weight of 359.9g upon discovery).²²

Apart from armour and personal (and sometimes even unit) possessions, we also find weapons being marked in this way. Sling shot were cast with legionary attributions during the Republican period, as well as political slogans or insults. The marking of equipment is of special significance when dealing with spearhead types, a notoriously difficult area of study. Debate as to what constitutes the best cavalry or infantry spear is to some extent tempered by inscriptions on some spearheads which indicate that the owner belonged to a *turma*, and was thus a cavalryman in either an *ala* or a *cohors equitata*. Spearheads from Newstead and Gomadingen (Fig. 18,1) bear names with a

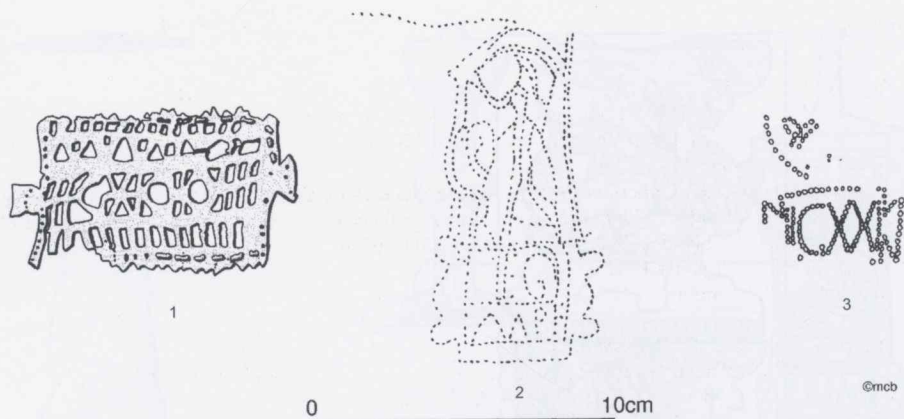


Figure 20: Inscriptions on leather shield covers. 1 Vindonissa; 2 Bonner Berg; 3 Vindonissa.

turma mentioned, whilst a piece from London, very similar to that from Newstead, has a centurial inscription: > • VER • VICT (possibly 'Victor's, in the century of Verus'). Of course, one could either argue that this represents the spearhead of a legionary cavalryman, carried on century strength, or that auxiliary infantry and cavalry used similar forms of spearhead!²³

Beyond ownership inscriptions, however, we occasionally find texts by the manufacturers of the equipment. These are very important, for they are often used in discussions about the degree of private production of equipment. At the simplest level, items might be stamped, as with the Pompeii-type sword blade from the Rhine with the word SABINVS ('of Sabinus') on the tang and SVLLA on the blade, or, more commonly, the manufacturers' stamps on *paterae* (in one case counterstruck with a unit's identifier). More elaborate examples of manufacturer inscriptions can be found on swords and daggers. A Mainz-type sword scabbard from Vindonissa includes the phrase C. COELIVS VENVST LVGD – *C(aius) Coelius Venust(us) Lugd(uno) (fecit)* – within its design (Fig. 19), whilst one from Strasbourg has Q NONIENVS PVDES AD ARA F – *Q(uintus) Nonienus Pudes Ad Ara(m) (fecit)*. Likewise, the dagger found together with its sheath at Oberammergau (Plate 1) has C ANTONIVS F – *C(aius) Antonius (fecit)* (Fig. 18,2). The Rheingönheim sword records the weight of its silver coating in a punched inscription beneath the handguard (Fig. 18,4), but apart from these few cases, such inscriptions are extremely rare.²⁴

Finally, pieces of equipment were sometimes adorned with inscriptions that actually incorporated the name of the unit as part of its decoration. A dagger scabbard found in the Rhine at Mainz, prominently displayed the name of *legio XXII Primigenia* (Fig. 18,5). Some leather shield covers, such as those from Vindonissa, have appliqué panels with the legion's name picked out in openwork (Fig. 20).²⁵

Notes

1. Ogilvie 1980, 11–17.
2. Heron: Marsden 1971, 206–33. Vitruvius: *ibid.*, 185–205. Vitruvius as *architectus*: *ibid.*, 3–4.
3. Military manuals: Campbell 1987; Syv  ne 2004, 12–26. Caesar: Welch and Powell 1998. Arrian: Kiechle 1965; Stadler 1980.
4. Vegetius: Milner 1993;   nnerfors 1995. Sources: Schenk 1930. Transverse crests: II,13. *Antiqua legio*: e.g. Parker 1932; Sander 1939; cf. Baatz 2000. Apamea: Balty 1987; 1988; Balty and van Rengen 1993; Casey 1991, 11–12; Speidel 1992, 14–22; Tomlin 2000, 167–8.
5. *Notitia*: Seeck 1962; James 1988, 257–9.
6. Walbank 1972; Champion 2004.
7. Rajak 2002.
8. Nervii: Caesar *BG* II,21. *Pila*: *ibid.* I,25.
9. Tac. *Ann.* XII,35. Wooden rivet and Marius: Connolly 2001–2, 2. *Commilito*: Campbell 1984, 32–59.
10. Harris 1989 253–5; Bowman 1991; Woolf 1998, 77–105.
11. Terentianus' demands: Youtie and Winter 1951, No.467.
12. Further demands: *ibid.* No.468.
13. Vindolanda: Bowman and Thomas 1983, No.38. Paniskos: Winter 1936, Nos.214–21.
14. Workshop papyrus: Bruckner and Marichal 1979, No.409. Deceased son: Gilliam 1967. Vindolanda: Bowman and Thomas 1983; 1987. Carlisle: Tomlin 1998.
15. Epigraphic habit: MacMullen 1982. Epigraphy in general: Sandys 1927; Keppie 1991a.
16. *Ballistaria*: Campbell 1984; 1989; Donaldson 1990.
17. Aedui: *CIL* XIII, 2828. Milan: *CIL* XIII,6763.
18. Esp.5835.
19. *CIL* XIII,3592.
20. Inscriptions: MacMullen 1960, 33–40. Eich: Oldenstein 1990, 35–6.
21. K  ln helmet: Klumbach 1974, 23.
22. Deurne helmet inscriptions: Klumbach 1973, 60–1. Auxiliary use: Robinson 1975, 82.
23. Slingshot: Keppie 1984, 123–5, Fig. 36. Newstead: Curle 1911, 188, Pl. XXXVI,5. Gomadingen: Heiligmann 1990, Fig. 26,1. London: Webster 1958, No.157, Pl. XI,D.
24. Pompeii-type sword: *CIL* XIII,10028,9. *Patera*: *RIB* 2415,39. Vindonissa: Ertlinger and Hartmann 1984. Strasbourg scabbard: *CIL* XIII,10027,197. Oberammergau: Ulbert 1971. Rheing  nheim: Ulbert 1969a, Pl. 32,2–3.
25. Mainz: *AuhV* 4, Pl. 11,3. Vindonissa shield covers: Gansser-Burckhardt 1942, 73–88.

4 The Republican Period

Compared to later periods, our knowledge of Republican military equipment has for a long time been sadly deficient. Lacking detailed archaeological evidence, dependent upon literary accounts of dubious merit, and occasional pieces of representational evidence, it is only comparatively recently that significant finds of artefacts from secure archaeological contexts have begun to appear. Even so, it is not until the Punic Wars that we begin to find artefacts not deposited in funerary contexts.¹

The number of sites producing Republican material is small in comparison with later periods, but increasing exponentially. We have long depended upon finds from the bases around the town of Numantia. The camps at Renieblas (on the hill of La Gran Atalaya) range in date from 195 to 75 BC, with camp iii being identified with that of the consul Fulvius Nobilior, dating to 153 BC. The site of Castillejo was used in 137 BC by Caius Hostilius Mancinus and then again by Scipio Aemilianus in 134–133. The camp at Peña Redonda also dates to Aemilianus' siege of Numantia. The hoard of weaponry from Šmihel probably dates to the middle of the 2nd century BC, while an assault by the army of Caius Sextius on the Gallic stronghold of Entremont in 124–123 BC evidently led to the deposition of Roman equipment, including *pila* and *ballista* bolts. The Sertorian wars (82–72 BC) were responsible for one major excavated site, at Cáceres el Viejo, thought to be the *Castra Caecilia* constructed by Caecilius Metellus. The series of sieges mounted on Italian towns by Cornelius Sulla is well attested by finds of projectiles and damage to walls, notably at Pompeii, whilst Grad in Slovenia has produced a range of projectiles from an unknown siege of the 40s BC.²

Most of these sites were excavated at the beginning of the 20th century, but more recent work in the Iberian peninsula and elsewhere has provided not only a wealth of artefacts, but often also the badly-needed contextual information lacking from earlier excavations. The oldest dated Roman *pila* (late 3rd century BC) so far known have come from work at Castellruf, whilst excavations at Caminreal have revealed a range of late-2nd-century BC weaponry, including a catapult frame. Since the first certain find of a Republican sword of the *gladius Hispaniensis* type at Delos, more have come to light or been recognised amongst existing collections.³

Finally, the discovery of large amounts of Roman material from the Roman circumvallation at Alesia provides us with artefacts from the middle of the 1st century BC. Stoffel's excavations for Napoléon III produced a considerable quantity of equipment from the ditches just below Mont Réa and these have now been supplemented (and placed in context) by modern work, at the same time as the original material has been re-assessed. Some of the artefacts have been used to argue for a Gallic origin for items like the dagger, but there seems little doubt that this is Roman, not Gallic, equipment. Finds from Puy d'Issolud (probably Uxellodunum) and a collection of material from Osuna may also be Roman and belong to about the same time.⁴

If our image of the early Imperial Roman soldier is shaped by Trajan's Column, then the Altar of Domitius Ahenobarbus (Fig. 21) – with just four infantrymen, one cavalryman, and an officer – and the Aemilius Paullus monument (Fig. 1) provide our

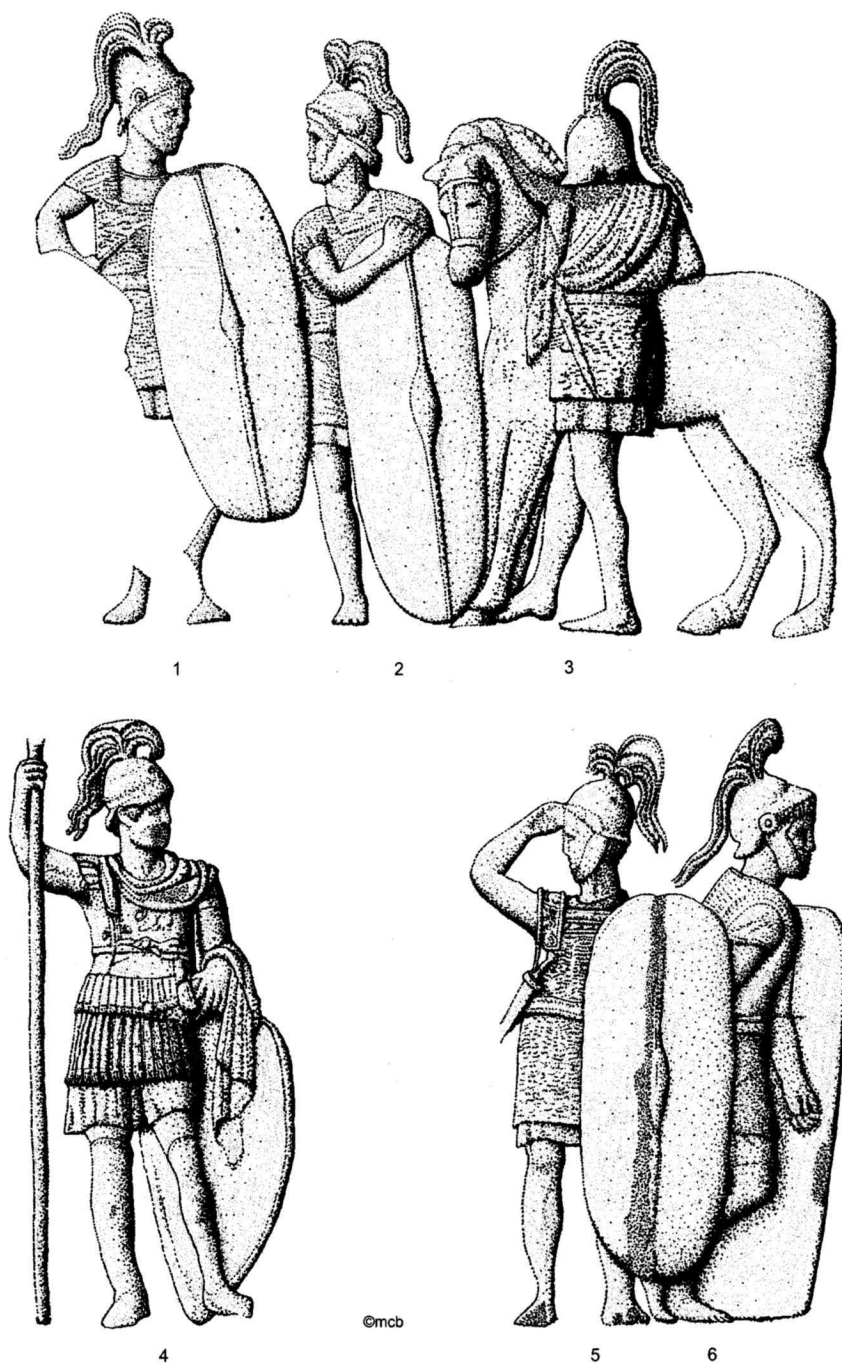


Figure 21: 'Altar of Domitius Ahenobarbus'. 1-2, 5-6 Legionaries; 3 cavalryman; 4 officer (tribunus?). (Not to scale).



Figure 22: Tombstone of legio Martia centurion Minucius (Padova). (Not to scale)

Republican soldier. There are so few iconographic reference points for this period, that it is hardly surprising that the soldiers depicted on these should prove so enduring in subsequent reconstructions of Republican soldiers. There are only a handful of representational tombstones; only one of these, depicting a centurion (Fig. 22), is really informative. Given the paucity of evidence for this period, it is all too easy to generalize from the particular, but the temptation to over-simplify the equipment of the Republic is best kept at bay by reference to the immensely complicated picture archaeology has given us of a comparatively short period in the early Principate (see Chapter 5).⁵

Weapons

Pila (Fig. 23)

It is often said of the *pilum* that it was designed to bend upon impact, thus rendering it incapable of instant re-use, but this is only one side of the story. This was not a function of the *pilum*, merely a useful consequence of its design. The *pilum* existed as a

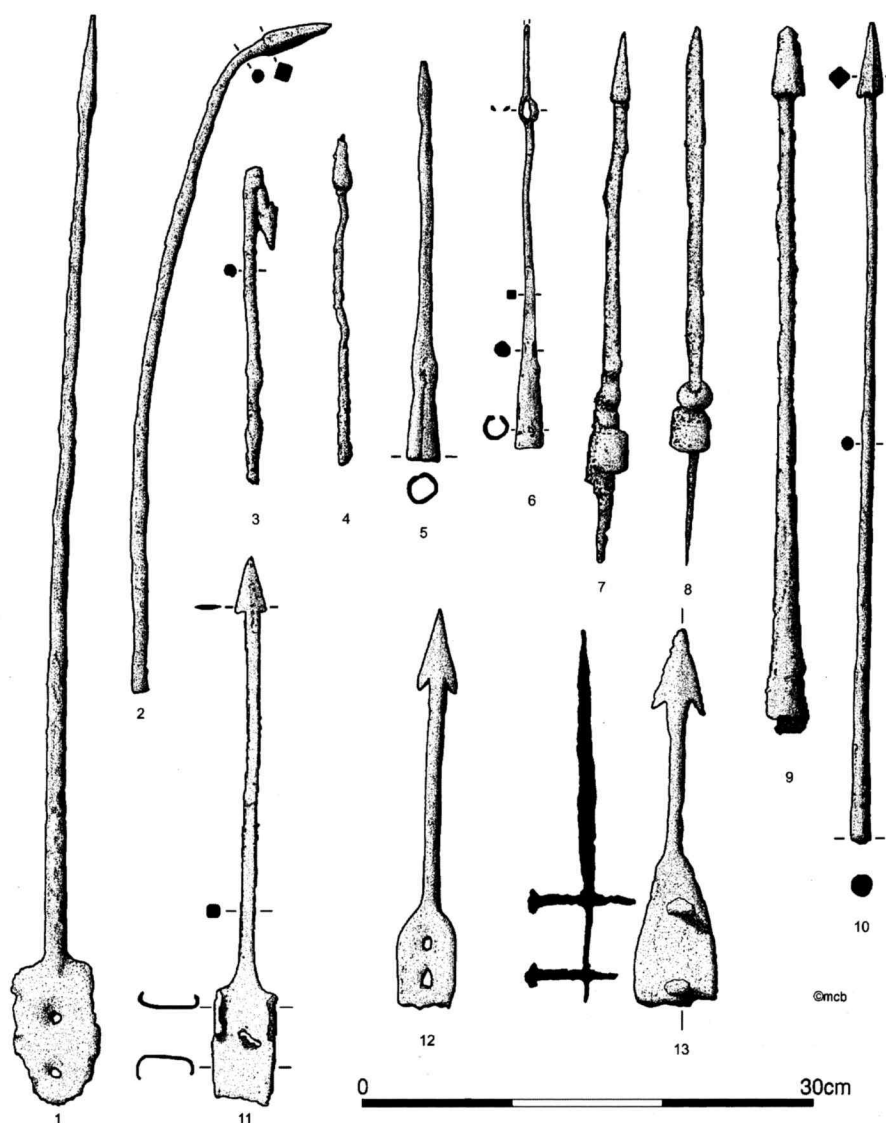


Figure 23: Republican pila. Tanged: 1, 3–4 Numantia; 2 Cáceres; 11 Šmihel; 12 Kranj; 13 Entremont. Socketed: 5 Numantia; 9 Montefortino. Socketed incendiary: 6 Šmihel. Spike-tanged: 7–8 Alesia.

close-range javelin that used weight, as opposed to velocity, to provide its penetrative power. Moreover, careful consideration of the most common form suggests that it was designed as an armour-piercing missile, a fact witnessed by the pyramidal bodkin-head (a feature that medieval armour-piercing missiles, such as the crossbow quarrel and the English longbow arrow, were to exploit). As such, its prime function was firstly to

pierce an enemy shield and then, carried by its own impetus (and with the narrow shank continuing unobstructed behind the larger head), assail the body of the enemy. Thus the long iron shank did not exist just to bend, but to provide the reach for the weapon between punching a hole in the shield and striking the bearer. Modern experiments with reconstruction weapons have shown the bodkin head capable of piercing 30 mm of pine wood, or 20 mm of ply, when thrown from a distance of 5 m, and that a barbed head was far less effective.⁶

Nevertheless, it was characteristic of the *pilum* that the shank could suffer partial failure upon impact, disabling the weapon. It has been suggested that this was achieved in a variety of ways, for example using a wooden rivet to attach the shank to the shaft, or not tempering the iron of the shank below the head. More likely it was simply a result of the form of the weapon and the whole notion of a wooden rivet has been dismissed as a misunderstanding on the part of Plutarch or his source. Again, modern experiments in throwing *pila* have succeeded in reproducing the sort of bending seen on the shanks of excavated examples.⁷

Since it has always been readily identified with the Roman legionary soldier, the *pilum* has attracted a considerable amount of scholarly attention, largely focusing upon the problem of its origin. Arguments in favour of a Samnite, Spanish, or Etruscan origin have been advanced, but no satisfactory conclusion has been reached. There certainly seem to be representations of it on 4th century BC frescoes from the Giglioli tomb at Tarquinia, whilst a socketed example in the Vatican is claimed to have come from a 5th-century BC tomb at Vulci in Etruria. However, the fact that two versions of the weapon existed, the heavy and the light, may be indicative of separate traditions that finally converged in Roman armament.⁸

The classic description of the Republican *pilum* comes down to us in Polybios' writings, providing the interesting detail that *pilum* heads were apparently barbed and solidly constructed. Heavy and light types are recognisable amongst specimens surviving in the archaeological record. The heavy *pilum* tended to be tanged, whilst its lighter cousin was socketed, but socketed heavy *pila* are also known from this period.⁹

Actual examples of the weapon are now known from a number of sites, the earliest possibly being those recorded from Castellruf in Spain and Talamonaccio in Italy (thought to date to the last quarter of the 3rd century BC), but the best known remain those from the Roman camps around Numantia. There are likewise examples from Cáceres el Viejo, Caminreal, and both Alesia and Entremont. Most of the published examples have pyramidal heads and circular-sectioned shanks, although examples with barbed heads are known from Talamonaccio, Ephyra, Alesia, and possibly Renieblas.¹⁰

The early heavy *pila* have barbed heads (recalling Polybios' description) and figure-of-eight-shaped tangs. However, the finds from Talamonaccio, Castellruf, and Ephyra show that once the tang was fitted into the rectangular wooden block above the shaft and secured by one or two rivets, its excess lobes were bent over at either side to provide additional security for the metal component of the weapon.¹¹

Complete examples of the heavy *pilum* with pyramidal heads come from Renieblas, Valencia, and Caminreal. With a head 60 mm long, a shank 554 mm, and a tang 90 mm long and 55 mm broad, the best-preserved example from Renieblas was fastened to its shaft by means of two rivets through the tang, 35 mm apart. Other shanks of similar

length also survived, at least one of which had a socket, but there were several other examples with the flat tang with rivet holes, and all probably had circular-sectioned shanks. A tanged weapon from Peña Redonda is rectangular in section at the tang, square in the lower part of the shank, and circular towards the head, which appears to have had a flat head. Intriguingly, it has been suggested that some headless sharpened *pila* may have been intended to be used that way (perhaps a field adaptation of damaged weapons).¹²

The lighter *pilum* was usually socketed; in Spain, complete examples are known from Renieblas, Castillejo, Osuna, and Caminreal. The length of the head of the weapon from Renieblas measured 20 mm to its broadest point, whence it was 232 mm to the socket base, which was 20 mm in diameter. The head of the example from Castillejo was 22 mm long, and the shank 250 mm to the base of the socket (again 20 mm in diameter).¹³

A number of *pila* were found by Stoffel at Alesia in the circumvallation ditches below Mont Réa. Some were large but most were fairly small by comparison with the largest of the Spanish pieces, presumably belonging to the lighter variety of the weapon.¹⁴

Some socketed *pila* from Šmihel were clearly designed for use as incendiary missiles, akin to later arrow- and boltheads. Apparently headless, these weapons incorporated a small container within the shank, designed to contain the burning material. Given their obviously short range, they may have been designed for use against siege engines. Another unusual form has a single-barbed head which, although from Augustan sites, may be Republican in origin.¹⁵

Spears (Fig. 24)

The spear was primarily a weapon for close-order fighting. Unlike the *pilum*, it was not designed to be thrown in a shattering volley before combat was joined, although it could be used this way), but instead gave a distinct advantage when fighting against sword-wielding foes. Its unwieldiness was a disadvantage, however, and most Roman spear-armed troops probably also had a sword or dagger. The rear rank of the pre-Marian legion, formed from veteran troops known as *triarii*, were equipped with spears and not *pila*.¹⁶

The three chief elements of the spear were the wooden shaft (see Chapter 9), the iron head and butt. The head came in a variety of shapes and sizes and its function is self-evident, but the butt would not only have provided a secondary weapon in the event of the head breaking off, but also protected the shaft when it was stuck into the ground. Whilst the range of spearhead forms and sizes found in this and later periods might appear to indicate a range of types of weapon for different circumstances, the preferences of individual craftsmen must also have played a part in determining the final form.¹⁷

The spearheads of the period are unremarkable and it is impossible to distinguish Roman from allied or enemy weapons. Many forms regularly occur in later periods, such as the curious triangular-sectioned stiletto blades, the function of which is unclear (although some sort of armour-piercing purpose similar to that of *pilum*- or

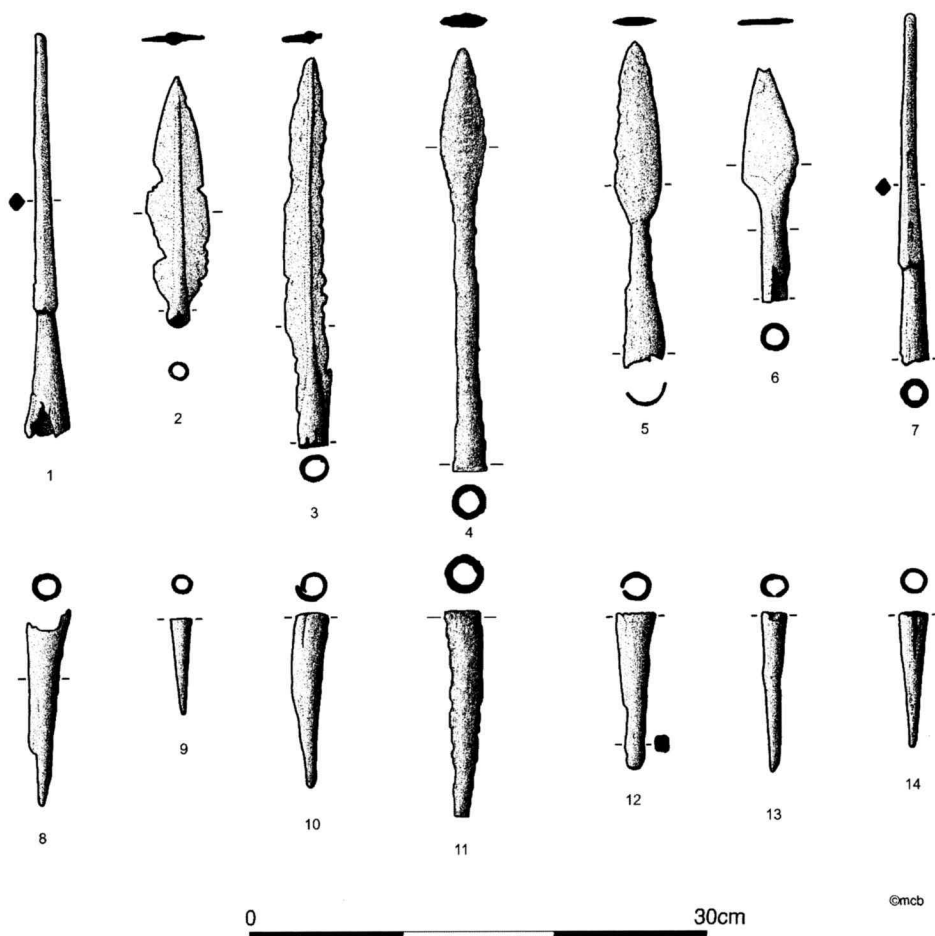


Figure 24: Republican spears. 1–7 spearheads (1–2, 6–7 Numantia; 3, 5 Cáceres; 4 Caminreal); 8–14 butts (8, 10, 12 Cáceres; 9, 13–14 Numantia; 11 Caminreal).

catapult bolt-heads seems likely here). The conical shape of Republican spear butts was, as later, dictated by ease of manufacture.¹⁸

Polybios stated that the older Roman cavalry spear was too slender and pliant, frequently breaking through nothing more than the motion of the horse, and lacked a spike on the butt. In contrast, the adopted Greek spear was sturdier and its butt could be used as an effective secondary point.¹⁹

Swords (Fig. 25)

The origin of the *gladius Hispaniensis*, as it has come to be known (the term *gladius* could refer to any sword), is often thought of as quite straightforward: the Romans, encountering the weapon in Spain for the first time, were so impressed that they adopted it. Indeed, the *Suda* stated that it was the form, not the elaborate method of manufac-

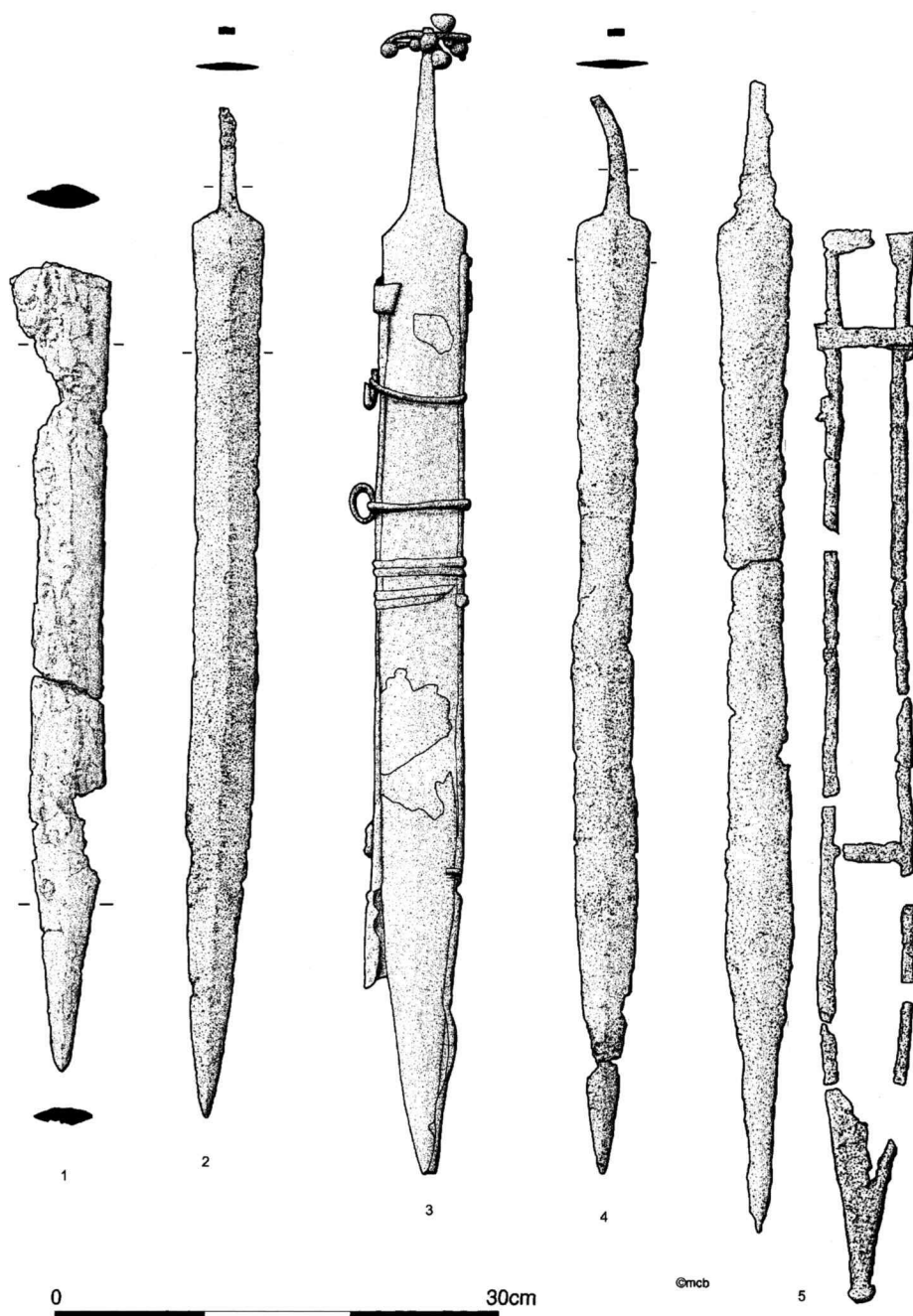


Figure 25: Republican swords. 1 Alfaro; 2, 4 Šmihel; 3 Delos; 5 Giubiasco.

ture, that the Romans copied (see Chapter 10). Allied to the blade shape, however, is an implied style of combat, for this is a short sword for close-order fighting, not slashing in the manner of the Celtic longsword. Adoption of this sword, even without its elaborate manufacturing processes, marked the development of new tactics. We may, therefore, presume that it is this Spanish-derived weapon that is worn by the Padova centurion.²⁰

Several examples of the Republican *gladius Hispaniensis* are now known. The first to be recognised was found in excavations on the island of Delos, and was associated with destruction by pirates in 69 BC. Measuring 760 mm in length (including the tang) and around 57 mm wide, the sword was still in its scabbard with suspension rings and two buckles. Remains of a charred wooden pommel, held in place by seven rivets, were still evident. The pommels of swords, apparently similarly adorned with rivets, are shown on some Republican officers' tombstones.²¹

Other examples are now known from certain European sites, but among the earliest are probably those from Šmihel (with a suggested date of around 175 BC). Between 622 and 661 mm in length, the blades (which range from 40 to 45 mm at their broadest) have rounded shoulders and long tapering points. One of the Šmihel swords has a slightly waisted blade, and this feature can also be seen on weapons from Giubiasco (one of which had a blade of 690 mm in length), as well as examples from Vrhnika, Caminreal, and Alesia, along with other characteristics like long tapering points and sloping shoulders. One of the longest swords, with a blade length of 760 mm, was found in a tomb in Jericho together with parts of its iron-framed scabbard in a context that suggested it was a 2nd-century BC Roman-influenced Hellenistic weapon.²²

Finds of Celtic long swords in apparently Roman contexts on Spanish sites suggest the use of this weapon by some elements of the Roman forces. Similarly, examples of the Spanish single-edged *falcata*, a more common, native 'Spanish sword', have come from Cáceres el Viejo and Caminreal.²³

Much has been made, both in ancient and modern literature, of the stabbing action necessary to use the Roman short sword successfully, aiming for the stomach or face and coming in under the guard of an enemy brandishing a longer sword overarm. However, Polybios pointed out that the 'Spanish sword' was equally good for chopping as it was for stabbing, and we ought not to allow the fervour of later writers for the stabbing action to mislead us into seeing the sword as unifunctional.²⁴

Daggers (Fig. 26)

The dagger as a sidearm for the Roman soldier seems, once again, to have had Spanish ancestry. It was not mentioned by Polybios, but examples from Cáceres el Viejo, Castillejo, and Caminreal have close parallels amongst native weapons from the peninsula. The waisted blade (L. 150–200 mm) had a midrib and a long tip. The handle had a bulbous, almost circular, terminal and a central swelling on an otherwise straight (square-sectioned) handgrip. The hand of the user was protected by a straight handguard riveted through the top of the blade. Precisely this form of dagger is depicted on coins commemorating the assassination of Caesar in 44 BC (Fig. 9,2). It is quite conceivable that the dagger was not in widespread use by Roman troops before

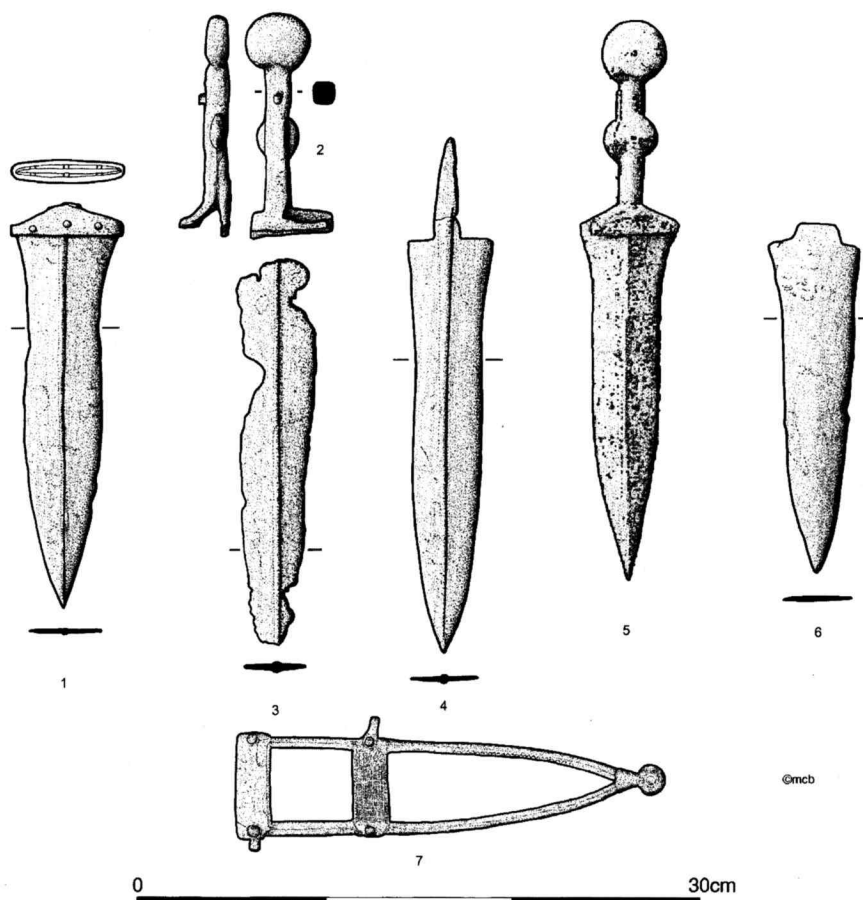


Figure 26: Republican daggers. 1, 4, 6 Numantia; 2–3 Cáceres; 5 Oberaden; 7 Titelberg.

the 1st century BC, given that Polybios ignored it, but it was favoured by their allies (hence its presence on Roman sites). By the time of the destruction of the *legio Martia* in 42 BC, the Padova centurion was wearing it (Fig. 22). Indeed, the Padova relief further reveals that the dagger could be worn horizontally, directly below the waist belt, over the belly. Iberian daggers had frame scabbards, and an example from Ciruelos is closely matched by a 1st-century AD sheath from the legionary base at Exeter, perhaps a survival from the Republican period. A dagger from Taranto, found in its scabbard and thought to be late Republican or early Augustan, had a slightly different handle with a cruciform pommel and no pronounced central swelling.²⁵

It has been argued that the Roman-type daggers from Alesia might be Gallic, but, given the quantities of demonstrably Roman material found there, and the usual absence of such weapons from Gallic contexts, a Roman identification of this weapon appears secure.²⁶

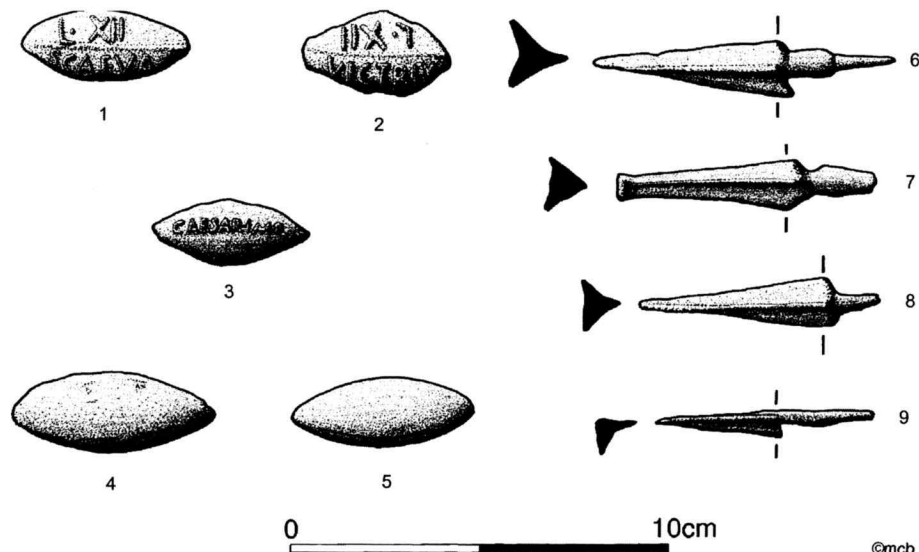


Figure 27: Republican archery and sling missiles. 1–3 Lead slingshot (Perugia); 4–5 baked clay slingshot (Numantia camps); 6–9 trilobate tanged iron arrowheads (Numantia camps).

Bows, Slings, and Artillery (Figs.27–9)

Arrowheads, catapult bolts and stone shot, and slingshot are all archaeologically attested. The last often bore inscribed insults and political slogans cast onto them during manufacture, as with a large group from Perugia. Arrowheads were mostly tanged and of both flat-bladed (some barbed) and trilobate (triple-bladed) forms, and a number of single-barbed Celtic-style arrowheads from Roman contexts may indicate the use of auxiliary archers. Socketed catapult bolts had pyramidal heads and have been recovered from both Spanish and French sites, as well as from Šmihel.²⁷

The Romans employed many peoples who traditionally specialized in archery or slinging, whilst they adopted artillery technology wholesale from the Hellenistic Greeks (who became the major enemy after the Carthaginians). Throughout the Roman period, artillery technology was spread by knowledgeable defectors, and this is probably how the Romans acquired it in the first place.²⁸

Part of the frame of an artillery piece was excavated at Ampurias (Emporion) in Spain, probably dating to the 2nd century BC and possibly associated with the campaigns of Cato. Regardless of whether it was Roman or used against them, it seems to be representative of the artillery in use at the time. Another, similar, frame was excavated at Caminreal, this time associated with a range of Roman weaponry and equipment, and this has been dated to the first third of the 1st century BC. Washers of this period also come from Ephrya, Azaila, and from a shipwreck at Mahdia.²⁹

Stone shot were found in the circumvallation camps at Numantia, or where they had been hurled against the walls of the town itself (indeed, some split shot may be the result of direct impact). They were made from local sandstone and Schulten

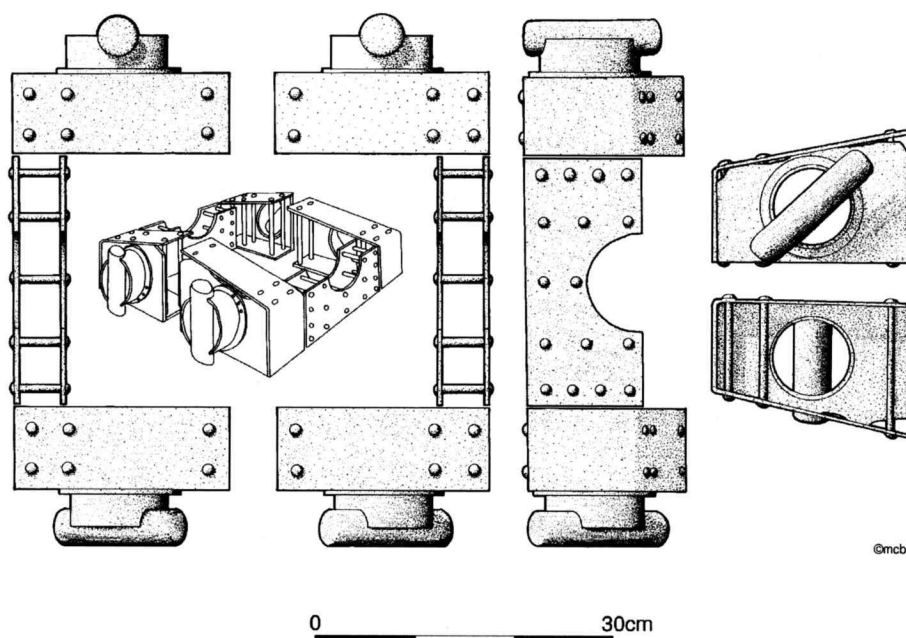


Figure 28: Republican artillery. Frame and washers from a catapult (Emporion).

identified four specific calibres: 10 *mina* (4360 g), 3 *mina* (1308 g), 2 *mina* (872 g), and 1 *mina* (436 g). Ten *mina* shot were not found in Numantia itself, and Schulten speculated that these may only have been used in the defence of the Roman camps. By contrast, the shot from Cáceres el Viejo were much heavier, ranging from 31 to 88 *mina*, leading Ulbert to suggest that they were designed to be dropped from the walls of the camp, rather than shot from a weapon. Examples from Athens may date to the siege of Sulla in 86 BC.³⁰

It has been suggested that smaller stone missiles may have been intended as hand-thrown stones, but whilst this may well have formed a secondary function under certain circumstances (such as sieges), there is no evidence of stones being made exclusively for such a role. Vegetius mentioned large pieces of stone being used in the defence of city walls.³¹

Catapult bolts, like the *pilum*, had square-sectioned pyramidal heads, reflecting their armour-piercing function. Whereas the *pilum* used its weight to provide the impetus for penetration, the catapult bolt relied upon its velocity, and it was precisely this which would militate against the use of a 'leaf-shaped' blade, since any slight inaccuracy in manufacture might lead to the missile diverging from its intended course. It is indeed appropriate that Plautus should refer to the *pilum catapultarium*. The heads of excavated examples normally form about one-third of the length of the metal portion of the missile, although examples have been found where this proportion can be as little as 25%. Socket diameters also vary widely (15–28 mm) and, as with the size of stone shot, this may reflect the differing calibres of the machines that shot them.³²

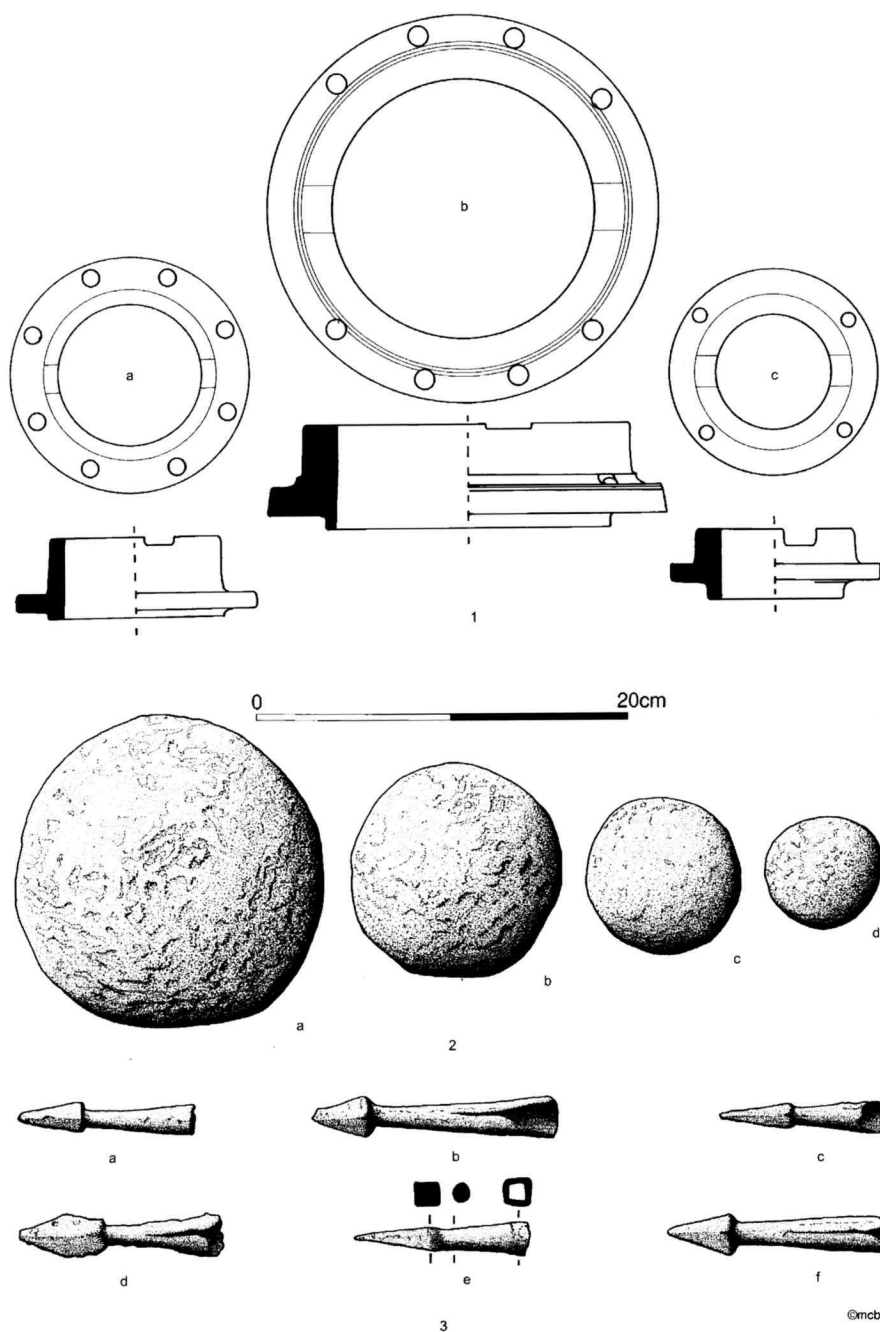


Figure 29: Republican artillery. 1a–c Washers (Ephyra); 2a–d ballista balls of weights of 10, 3, 2, and 1 mina (Numantia camps); 3a–f catapult bolts (a–d, f Numantia camps, e Cáceres).

Modern reconstructions achieve maximum ranges by shooting at an angle approaching 45°, but both bolt and stone-throwing weapons were probably used in direct shooting, unless it was desirable to lob missiles over a city wall.³³

Armour

Shields (Fig. 30)

The curved oblong legionary shield (often called the *scutum*, although this term was used for all shields) was an enduring feature of the Roman battle line. Although the shape evolved, it remained basically the same, presumably because it was ideal for the function required of it. Livy stated with this type of shield was first adopted for all three classes of legionary troops by the Romans during the Latin Wars of the 4th century BC, replacing the round shields previously in use. Representational evidence is now thought to confirm an Italian origin.³⁴

A large, curved plywood shield excavated at Kasr al-Harit in the Egyptian Fayyum was originally identified as having belonged to a Celtic mercenary serving with the Ptolemaic forces. However, it is remarkably similar to the sculptural representations of shields carried by soldiers on the altar of Domitius Ahenobarbus and the monument of Aemilius Paullus (Fig. 1).³⁵

Polybios was intrigued by the Roman infantry shield and he stated that it was convex, and measured four feet (1.18 m) long by two-and-a-half (0.74 m) broad, with a thickness of a palm's breadth at the rim. He described its construction as follows:

It consists of two layers of wood fastened together with bull's hide glue; the outer surface is then covered first with canvas and then with calf-skin. The upper and lower edges are bound with iron to protect the shield both from the cutting strokes of swords and from wear when resting on the ground. In the centre is fixed an iron boss, which turns aside the heavy impact of stones, pikes and weighty missiles in general.³⁶

By comparison, the shield found in 1900 at Kasr al-Harit, in the Fayyum, was 1.28 m long (4.3 Rft) and 0.635 m wide (2.1 Rft), was fashioned from plywood of three layers of wooden strips, possibly birch wood, laid with the outer ones horizontal. The nine or ten vertical strips were between 6 and 10 cm in breadth, the forty horizontal ones 2.5–5 cm. An interesting aspect of the shield's form, and one which directly affected the dynamic of its behaviour, was the fact that it was thicker in the centre than at the edges (giving it strength near the boss and flexibility near the rim). Both inner and outer surfaces were covered with lamb's wool felt (the inner covering overlapping that on the outer face by 5–6 cm); the edges were not bound with metal. The shield had a wooden 'barleycorn' boss with a vertical rib (*spina*) attached with iron nails above and below it on the shield face, and a horizontal handgrip behind the boss. The remains of rings, probably used for attaching carrying straps, were also found inside the shield. Fragmentary iron bosses of similar form are known from Renieblas and Caminreal.³⁷

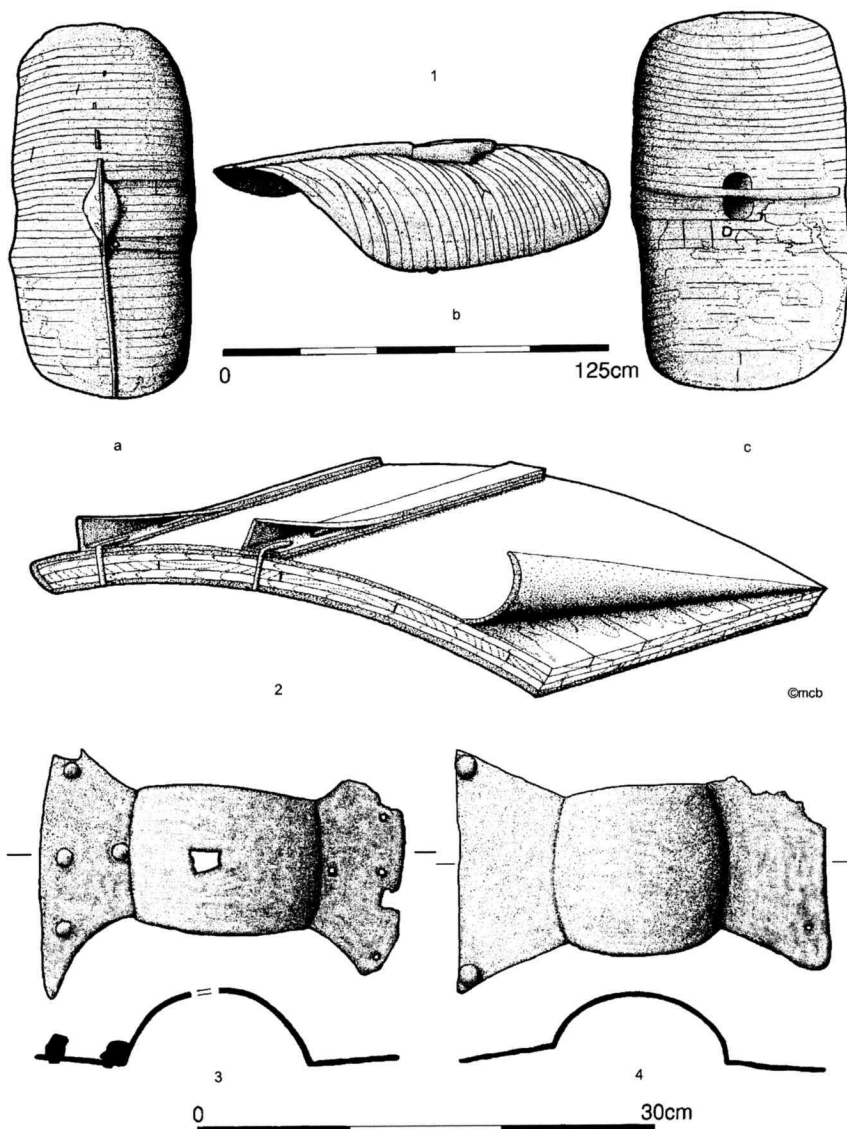


Figure 30: Republican shields. 1a-c Example found at Kasr al-Harit; 2 diagrammatic cross-section (not to scale); 3-4 bosses from Caminreal.

Allowing for the sort of variations in detail that circumstances demanded, there seems to be little doubt that the shields described by Polybios, found at Kasr al-Harit, and depicted in monumental sculpture are of a common type. Reconstructions of this type of shield have suggested a weight of around 10 kg, heavy but not impossible for a trained soldier to wield.³⁸

Roman cavalry seem originally to have used circular ox-hide shields, described as resembling sacrificial cakes, typified by the famous relief from the Lacus Curtius.

Polybios mentioned, however, that they changed over to the Greek pattern ('firmly and solidly made') because this was superior. It is unclear from his comments when this change occurred.³⁹

Body Armour (Fig. 31)

Before the 1st century BC, body armour was very closely linked with social status and wealth. Polybios mentioned a brass breastplate, or *pectorale*, saying it was a span (c. 230 mm) square and used by the poorer legionaries. Such breastplates had long seen use in the Italian peninsula in single disc, triple disc and rectangular anatomical forms, well attested by finds from Campania, Puglia and Abruzzo-Molise. A possible example was found in the 'Camp of Marcellus' near Numantia, but this was circular (diameter 170 mm), not square (fragments of others are recorded from the fortifications around the town, up to 250mm diameter). It consisted of an embossed, circular, copper-alloy plate with a raised central boss surrounded by lesser concentric circles, the whole object originally having 25 evenly-spaced rivet holes around its periphery. These apparently served to attach some sort of backing to the plate. At the bottom was a rectangular plate, riveted to the rim and supported by a reinforcing strip, the whole having the appearance of a rather makeshift repair. This was presumably part of the suspension arrangements, and two dome-headed rivets at the end of the plate may have been for attachment of a leather strap.⁴⁰

Those legionaries who met the property qualification wore mail body armour (*lorica hamata*). Ring mail (erroneously 'chain' mail) was developed by Celtic peoples and adopted by the Romans, as Varro asserted, although there seems to have been a change in those habitually using it, perhaps with it being worn by a greater social range than in barbarian societies. Fragments of what might have been copper-alloy mail were recovered from Renieblas, but since mail is so rarely deposited in the archaeological record, it is not surprising that we do not have much surviving from the Republic. Other pieces were reported to have been found in the Tomb of the Scipios in Rome. In all periods, a padded undergarment would have been worn beneath mail (sometimes with *pteryges*), of the type described in the *De Rebus Bellicis* (the *thoracomachus*) and possibly known as the *subarmalis*. Whether *pteryges* were made of leather or stiffened linen is unknown, but at least one fresco (the Sacrifice of Iphigenia in the House of the Vettii at Pompeii) depicts them as being white, so the latter is at least possible.⁴¹

One of the reasons for this comparative scarcity, even in later periods, lies in the simplicity of this type of armour. With only interlinking rings to give it form, there was little wear of the component parts and, even when quite severely damaged, it could easily be repaired. In fact, small pieces of mail in the archaeological record may represent damaged fragments which had been replaced.⁴²

Sculptural depictions are slightly more promising, once the conventions used for showing mail in Roman art (see Chapter 1) are taken into account. At Delphi, the monument of Aemilius Paullus shows Roman soldiers wearing belted, thigh-length cuirasses with shoulder doubling. This last feature is found on Celtic, as well as Roman, mail and reflects the fact that the shoulders are particularly vulnerable to the long Celtic slashing sword, and in need of reinforcement. In form, such doubling

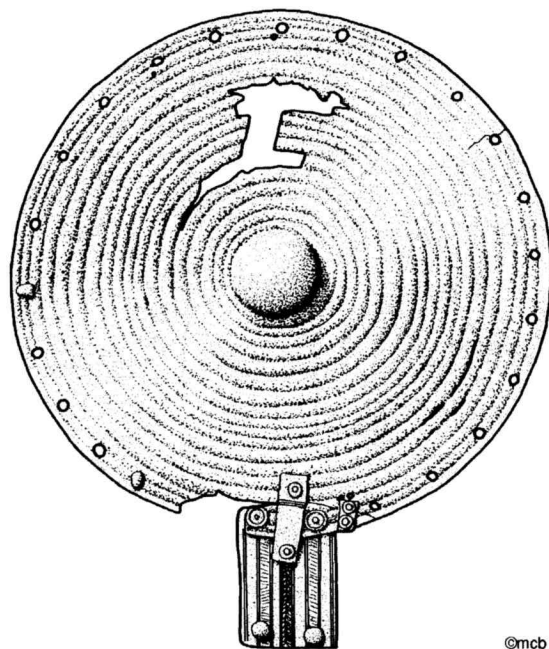


Figure 31: Republican armour. Breastplate (Numantia).

usually harked back to the shoulder pieces of Greek cuirasses. The Altar of Domitius Ahenobarbus shows soldiers in similar cuirasses, although this time the sculptors represented mail by surface-chiselling. In both sets of reliefs, Roman cavalrymen also wear thigh-length mail armour. An undated relief from Osuna in Spain, thought to be Republican, apparently shows legionaries equipped with rectangular shields with central ribs, helmets, and mail.⁴³

Scale armour (*lorica squamata*), was made up of small sections of metal sheet, wired to their neighbours and sewn to a fabric backing. Less flexible than mail, it was nevertheless popular throughout the Roman period, possibly because it was easier to manufacture (although presumably more difficult to maintain). A cuirass in the Royal Ontario Museum has been assembled from pieces of scale said to come from Lake Trasimene, but the association of military equipment with battlefield sites is very unusual and, in this case, perhaps a little suspicious. No examples of scale have yet been recognized in the archaeological record from the Republican period, nor are there representations of Roman soldiers wearing it.⁴⁴

No examples of Republican greaves are known, but two intriguing devices found at Cáceres have been suggested as presses for shaping them from copper-alloy sheet. Polybios mentioned greaves as in use in his time, although it has been suggested that each man only wore one, on his left leg, and this is illustrated by the Osuna relief. This practice finds a parallel in gladiatorial combat, where a greave was frequently worn on the left. The stance of the soldier (or gladiator) with a thrusting sword was with the left foot forward, so that weight could be put behind the blow as it was delivered. By

wearing a greave, he presented a complete armour coverage to any enemy attacking his left side: his greave protected his lower leg, his shield the area up to his shoulders, and a helmet guarding his head.⁴⁵

Helmets (Fig. 32)

Whilst many helmets survive from the Republican period, paradoxically, only a minority can be directly connected with the Roman army. Most of the 'Montefortino' helmets (named after the type-find) are from funerary deposits. These are thought to have been the helmets commonly in use by Roman infantry from the Punic Wars through to the end of the Republic, since they are the only type from Italy dating to this period, and very similar helmets are later used by the Roman army. However, for much of this period, Rome had no standing army and, since equipment was the personal property of those in military service, it is scarcely surprising that helmets are found in 'non-military' contexts. Moreover, given the limited amount of excavation, and the comparative rarity with which helmets are found on excavated sites, even in the early Principate, this funerary context becomes more credible.⁴⁶

Nevertheless, examples and fragments have been found in excavations in the Iberian peninsula that are not exclusively funerary contexts, as at Caminreal, Alfaro, and Quintanas de Gormaz. Moreover, a helmet from Pizzighettone in northern Italy bears a Latin ownership inscription, the style of which suggests a date in the second half of the 3rd century BC, thus apparently confirming the use of this type of helmet by Roman soldiers in this period.⁴⁷

The Montefortino helmet had its origins as early as the 4th century BC, amongst the same Celtic helmets that were to spawn the Coolus type. With a hemispherical copper-alloy bowl beaten to shape, it was sometimes finished with a crest knob at the apex. Broadly speaking, the evolution of the Montefortino helmet saw the neck-guard increasing in size down to the early Principate, although the basic shape remained much the same. What did change was the method of manufacture, with much cruder workmanship first becoming apparent in the late 2nd century BC, perhaps after the Marian army reforms, compounded by the appearance of spinning in the early Principate (see Chapter 9).⁴⁸

As Rome expanded into Celtic cultural regions, she came into contact with more helmet types, such as the Coolus and the Agen/Port. It is true to say that many of the Imperial Roman helmet types owe their genesis to this turbulent period, for various native elements began to provide a large portion of the auxiliary infantry and cavalry. The origins of the Coolus and Montefortino helmets are much the same, the copper-alloy Montefortino being taken into northern Italy by Celtic peoples (the Senones in this region); the Agen and Port helmets exploited iron and dispensed with the hemispherical bowl of the other types, preferring instead an oval shape more suited to that of the human head. Also, whilst the earlier helmets generally had cheek-pieces that were triangular with three decorative bosses (recalling Italian-style breastplates), the Agen/Port cheek-pieces provided better protection: projections at the front gave additional cover to the cheekbone and jaw without hindering the wearer's field of vision. It was this type of cheek-piece that became standard on subsequent Roman helmets.⁴⁹

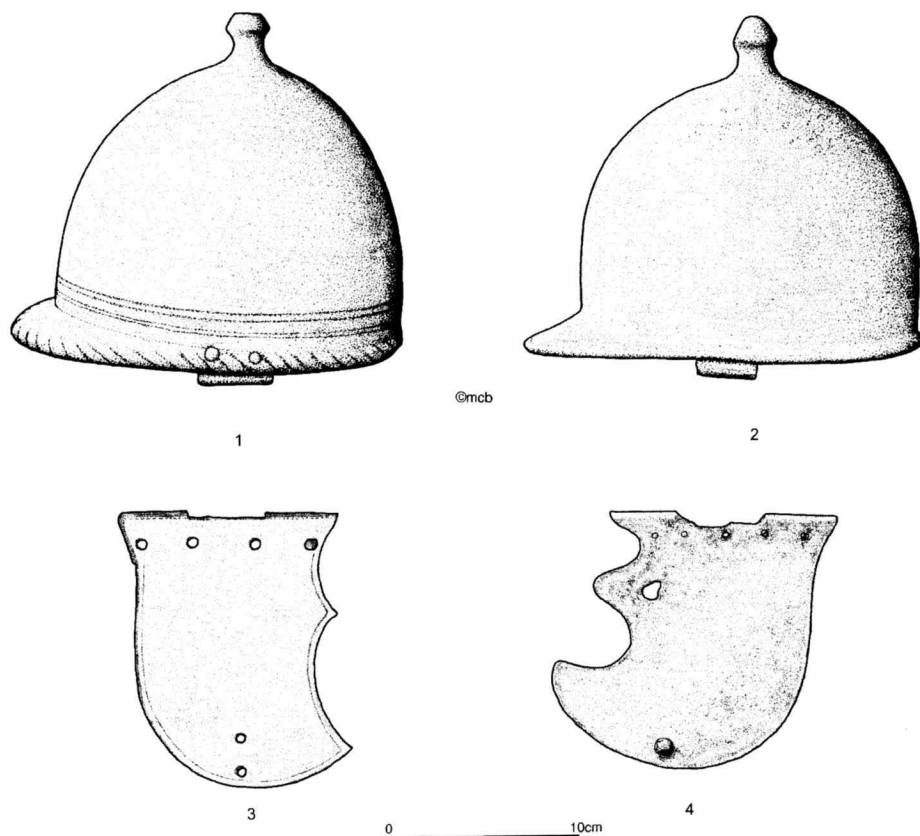


Figure 32: Republican helmets. 1 Unknown (British Museum); 2 Castellani (Not to scale). Cheekpieces. 3 Olympia; 4 Dodona.

Polybios recalled that legionaries wore a plume of three purple or black feathers 1½ feet (0.45m) high; although specifically referring to the *hastati* at the time, he implied that all three lines of heavy infantry (*hastati*, *principes*, *triarii*) were equipped in similar fashion. Some soldiers on the Ahenobarbus relief wear long (horse-hair?) crests that hang down the rear of the helmet to the shoulders. Caesar described an attack by the Nervii which was so rapid that his legionaries did not have enough time either to remove their shield covers or put on their *insignia*, a term which in this case may refer to helmet crests. At least one of Caesar's legions, the *legio V Alaudae*, appears to have had a distinctive cresting arrangement, giving rise to the *cognomen* ('Larks') of that unit.⁵⁰

The depiction of helmets on sculpture is notoriously variable in quality, but the infantrymen on the altar of Domitius Ahenobarbus seem to be wearing the Montefortino type of helmet. This monument also depicts a cavalryman wearing what is clearly a Boeotian helmet, a broad-brimmed type dating back to Hellenistic times and recalling Polybios' comment about Roman cavalry being equipped in the Greek manner.⁵¹

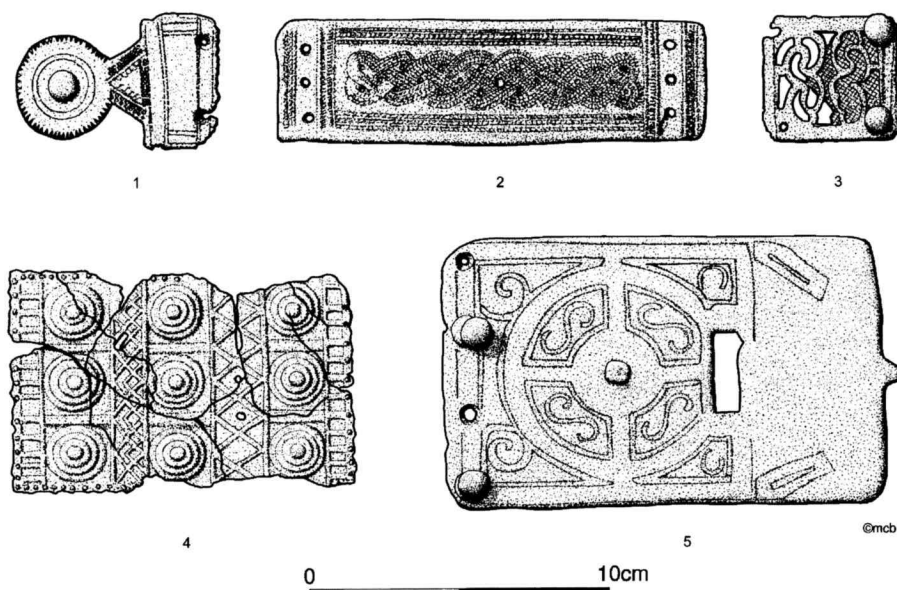


Figure 33: Republican belt-plates. 1–3 Castilloje; 4 Renieblas camp III; 5 Cáceres el Viejo.

Other Equipment

Belts (Fig. 33)

Beyond the fact that soldiers wore belts (they are visible on both the Altar of Domitius Ahenobarbus and the Aemilius Paullus monument), we are unable to say much about Republican forms. Nevertheless, the very fact that belts were worn with mail armour is significant, because modern experiments demonstrate that belting a mail cuirass at the waist transfers some of its weight onto the hips, thus relieving the shoulders of some of their burden. With the thigh-length mail of the Republic, this would be particularly beneficial to the wearer.⁵²

Whilst it is not known how widely belt-plates were used (and their scarcity may indicate that they were the exception rather than the rule), some are known from the Spanish sites around Numantia and from Cáceres el Viejo. An openwork design was featured on a copper-alloy example from Castilloje, with a metal backing and four dome-headed rivets, one in each corner. This plate was 40 mm wide and 45 mm long. Of a similar width, but much longer, was another piece (45 mm by 148mm) from the same site which exhibits a pounced interwoven design within rectangular borders. It was attached to the belt by three rivets at either end. Castilloje also produced part of a similar width plate (49 mm) with a triangular projection terminating in a large disc with a central rivet of uncertain purpose. Although the latter bore more than a passing resemblance to later dagger frogs, unlike them it in fact had a spike behind the disc, indicating that it was originally attached to leather.⁵³

Whilst these items can quite reasonably be identified as belt-plates, two further pieces are open to question. A rectangular plate from Renieblas camp, embossed with three groups of three circular motifs, separated by decorative borders, and possessing no obvious means of attachment, must remain dubious. An intriguing plate from Cáceres el Viejo had four rivet holes on one of its narrow sides, a central hole, and then a rectangular slot. It was decorated with a circular design with S-motifs.⁵⁴

Cloaks, Capes, And Boots

Our ignorance of the equipment and garb of Republican soldiers is almost total: for not only is the archaeological evidence lacking, but also there is hardly any representational material to help fill in the gaps. The Padova centurion certainly seems to be wearing a *sagum* (Fig. 22), the rectangular cloak draped around the neck and fastened at the front (on the right shoulder, as is usual) with a brooch, but his tunic is fairly formless and his boots not rendered in any great detail.⁵⁵

On the altar of Domitius Ahenobarbus, the soldiers wear short-sleeved tunics that reach to just above the knee (Fig. 21), but only the cavalryman seems to be wearing a cloak (perhaps a *sagum*). The officer figure has a *paludamentum* draped over his left shoulder and looped over the left arm. The *paludamentum* was the traditional attire of a high-ranking officer and, as such, is often shown on statues of emperors in later periods, but it was also worn by centurions in the 1st century AD.⁵⁶

The *caligae* of later periods are nowhere shown on Republican military depictions, so we have no idea at what point this type of footwear was introduced into the Roman army: the soldiers on the Ahenobarbus relief are depicted barefoot. The Padova centurion wears plain boots, although detail could obviously have been added in paint, as happened on later tombstones (Chapter 1).⁵⁷

Standards and Musical Instruments (Fig. 34)

No examples of Republican standards survive, Polybios barely mentioned them, and – with the exception of the later Republic – there are few representations. Pliny the Elder stated that the eagle was first adopted as the principal legionary standard in 104 BC under Marius, replacing the wolf, minotaur, horse, and bull. A *denarius* of C. Valerius Flaccus seems to be the earliest dated representation (82 BC) and shows one flanked by two other standards, the eagle itself being depicted perched on a thunderbolt with wings raised. The accompanying standards are adorned with alternating crescents and discs, have pendant straps hanging from a (missing) crossbar, and capital letters H and P, presumed to stand for *h(astati)* and *p(rincipes)*, the eagle being in the care of the *triarii*. Coins continue to bear similar representations down to the famous 32–31 BC legionary issue of M. Antonius.⁵⁸

No examples of Republican musical instruments have been found in a military context but literary sources state that the *cornu*, *tuba*, and *bucina* were used for signalling and watch calling. The early *cornu* was a curving brass horn, with or without a cross-brace, smaller than the instrument which is well represented in the imperial period. It appears in paintings and as both actual examples and terracotta votive models.



Figure 34: Republican standards. 1 denarius of C. Valerius Flaccus; 2 aureus of M. Antonius.

The clearest representation of the instrument and how it was held to be blown is on a sculpture from Osuna.⁵⁹

Cavalry Equipment

Little is known about Republican cavalry equipment, so the adoption of the horned saddle from Celtic designs can only be speculated about. Spurs were found at sites around Numantia and at Cáceres el Viejo, as well as at Caminreal, and snaffle bits came from Renieblas and Caminreal.⁶⁰

Tools and Implements (Fig. 35)

Some tools and implements have been excavated, and a pickaxe, which bears a very close resemblance to its much more numerous Imperial descendants, was found at Peña Redonda. One comparatively common find from Republican sites is a range of sturdy iron spikes with loops through which a ring is passed. Weighing around 320 g each, these are fairly substantial, but their function is far from certain. Often identified as tent pegs, they are more plausible as tethering pegs for animals for, as Schulten pointed out, a legion would have needed 35 pack animals just to carry them if they were tent pegs! Moreover, a fragment of Polybios recorded that the Celt-Iberians tethered their horses to just such an iron peg. Wooden tent pegs were used in the Principate and have the advantage of being both easy to manufacture and light (see Chapter 5). No examples of Republican leather tents are as yet known.⁶¹

Caesar described various obstacles used by his army during the siege of Alesia, including *stimuli*, short double-ended spikes inserted into foot-long logs sunk into the

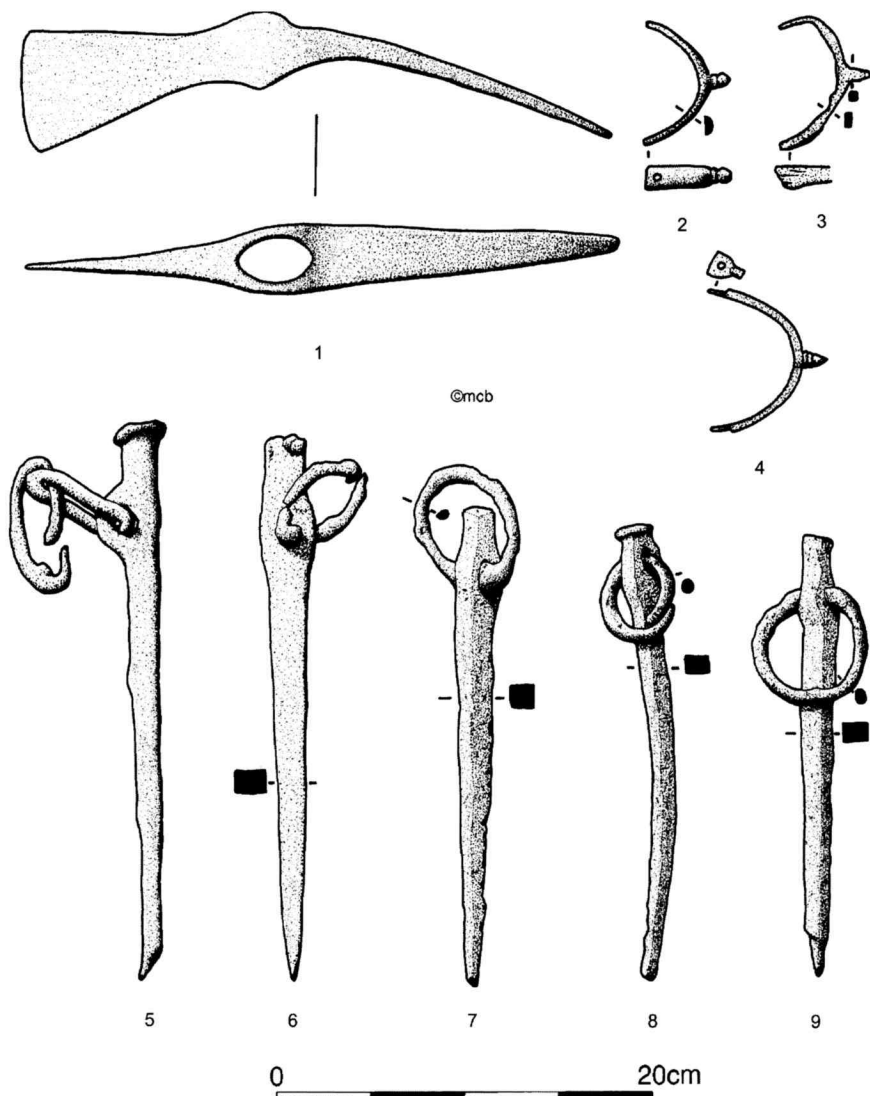


Figure 35: Republican tools, pegs, and spurs. 1 Pickaxe (Peña Redonda); 2–3 spurs (Cáceres); 4 spur (Numantia camps); 5–6 pegs (Numantia camps); 7–9 pegs (Cáceres).

ground. Examples of these were excavated by Stoffel. More recent excavations have found examples of caltrops (*tribuli*), four-pointed iron objects arranged so that, whichever way they fell, one spike was always pointing upwards.⁶²

Notes

1. Equipment before the Punic Wars: Connolly 1981, 91–112; 1989a; Adam and Rouveret 1988; Bottini 1994; Small 2000; Burns 2003.
2. Numantia: Curchin 1991, 34–9. Renieblas: Keay 1988, 36; Gómez-Pantoja and Morales 2002. Castillejo: *ibid.* 38. Peña Redonda: *ibid.* 40. Šmihel: Horvat 1997. Entremont: Coutagne 1987, 64–5; Rivet 1988, 40. Cáceres el Viejo: Keay 1988, 43. The archaeological sources are Numantia and the Roman sites in its vicinity (Schulten 1927; 1929), along with Cáceres el Viejo (Ulbert 1985). Sulla: Benvenuti 2005; Russo and Russo 2005. Pompeii: Burns forthcoming. Grad: Istenič 2005.
3. Castellruf: Álvarez Arza and Cubero Argente 1999. Caminreal: Vicente *et al.* 1997. Delos sword and others: Connolly 1997.
4. Alesia: Verchère de Reffye 1864. Modern French work: Reddé *et al.* 1995; Brouquier-Reddé 1997. Modern re-assessment: Sievers 1995. Dagger: Couissin 1926, Fig. 87; Connolly 1981, 227 Fig. 8. Puy d'Issolud: Girault 2002. Osuna: Sievers 1997.
5. Domitius Ahenobarbus: Coarelli 1968; Robinson 1975, Pls. 463–6. Aemilius Paullus: Kähler 1965.
6. *Pilum* action: Webster 1985b, 11; 21; Connolly 1989b, 162. Medieval missiles: Edge and Paddock 1988, 35; 91. Experiments: Junkelmann 1986, 188. Barbed head: Connolly 2000b, 46.
7. Wooden rivet: Plutarch, Marius 25. Untempered shank: Keppie 1984, 102. Wooden rivet dismissed: Connolly 2001–2, 2. Experiments: Haines 1998, 60.
8. Samnite: Reinach 1907. Spanish: Schulten 1911; cf. Sanz 1997, 325–43. Etruscan: Connolly 1981, 100. Tarquinia: *loc. cit.* Fig. 5. Vulci: Connolly 1997, 44. Two versions: Polyb. VI, 23. See Small 2000, 226–9.
9. Polybios: VI, 23. Cf. Schulten 1914.
10. Castellruf: Álvarez Arza and Cubero Argente 1999. Talamonaccio: Schulten 1914, 489; Luik 2000. Numantia *pila*: Schulten 1914; 1927, 249–51; 1929, 214. Cáceres el Viejo: Ulbert 1985, 105–8. Caminreal: Vicente *et al.* 1997, 181–6. Alesia: Verchère de Reffye 1864, Figs. 5–8, Pl. XXIII; Reddé *et al.* 1995, 148–9. Entremont: Coutagne 1987, Figs. 146, 148. Ephyra: Connolly 1997, Fig. 2, F–J. Renieblas: Schulten 1929, Pl. 25, 4.
11. Talamonaccio: Luik 2000. Castellruf: Álvarez Arza and Cubero Argente 1999. Ephyra: Connolly 1997, Fig. 2, F–J.
12. Renieblas: Schulten 1929, Pl. 25, 8. Valencia: Connolly 1997, Fig. 3, G. Caminreal: Vicente *et al.* 1997, 181–4, Fig. 24–5. Peña Redonda: *ibid.* 1927, Pl. 47, 1. Headless *pila*: Connolly 1997, 44.
13. Renieblas: Schulten 1927, Pl. 25, 1. Castillejo: *ibid.* Pl. 34, 6. Osuna: Sievers 1997, 275, Abb. 2. Caminreal: Vicente *et al.* 1997, 184–6, Fig. 26–7.
14. Verchère de Reffye 1864, Figs. 9–13, Pls. XXII–III. Reddé *et al.* 1995, 148–9.
15. Šmihel: Horvat 1997, 111, Fig. 7. Single-barbed heads: Roth-Rubi *et al.* 2004, 43–4, Taf. 4, F64–5 and Taf. 7, B38.
16. Polyb. VI, 23.
17. Butt: Polyb. VI, 25. Spearhead shape: Bishop 1987, 110–11.
18. 'Siletto' blades: Schulten 1929, Pls. 25, 5; 45, 4.
19. Polyb. VI, 25.
20. *Suda*: 'machaira'. *Gladius Hispaniensis*: Connolly 1991a, 361. Padova: Franzoni 1982; Keppie 1991b.
21. Delos: Siebert 1987, 637, Figs. 17–19.
22. Šmihel: Horvat 1997, 113, Fig. 10. Giubiasco: Connolly 1997, 50, Fig. 8. Vrhnika, Caminreal, and Alesia: Rapin 2001. Jericho: Stiebel 2004, 230.
23. Long sword: Schulten 1929, Pls. 25, 9; 26, 6 (scabbard). Spanish examples: Sandars 1913, 228–31. Spanish *falcata*: *ibid.* 231–65; Quesada Sanz 1992a; 1997, 61–171. Cáceres: Ulbert 1985, Pl. 25, 201. Caminreal: Vicente *et al.* 1997, 193–4, Figs. 32, 34.
24. Veg. I, 12; Webster 1985b, 12, 129. Cf. Polyb. III, 114.
25. Native form: Sandars 1913, 265–8, Figs. 37, 6–10, 39, 40; Schulten 1927, Pl. 53; Filloy Nieva and Gil Zubillaga 1997; Sanz 1997, 273–305. Cáceres: Ulbert 1985, Pl. 25, 195–9. Numantia: Schulten 1927, Pls. 34, 1–3; 47, 7; 1929, Pl. 45, 1. Caminreal: Vicente *et al.* 1997, 194, Figs. 35–6. Coins: Kent 1978, Pl. 27, 98. Padova: Franzoni 1982; Keppie 1991b. Ciruelos: Connolly 1997, Fig. 13, C. Exeter: Scott in Holbrook and Bidwell 1991, 263–5, Fig. 120, 1; cf. Connolly 1997, 56. Taranto: Mackensen 2001.
26. Couissin 1926, 302–3, Fig. 87; Reddé *et al.* 1995, 145, Fig. 34, 2.

27. Perugia: Keppie 1984, 123–5, Fig. 36. Entremont: Coutagne 1987, Fig. 150. Puy d'Issolud: Girault 2002, 33 Figs. 16–23. Single-bladed arrowheads: Sievers 1997, Abb. 1; Brouquier-Reddé 1997, Fig. 6; Girault 2002, 33 Figs. 5–10. Šmihel: Horvat 1997, 111–13, Fig. 8, 1–5.
28. Archery: Coulston 1985, 288. Slinging: Griffiths 1989, 267–9. Artillery: Marsden 1969, 174.
29. Emporion: Schramm 1980, 40–6. Cato's campaigns: Keay 1988, 31. Caminreal: Vicente *et al.* 1997, 169–81, Figs. 3–21. Ephrya: Baatz 1979. Azaila: Vicente *et al.* 1997, 197, n.14. Mahdia: Baatz 1985.
30. Numantia: Schulten 1927, 264–5, Pl. 53. Cáceres: Ulbert 1985, 111–14. Athens: Völling 1997, 97–8.
31. Hand-thrown stones: Baatz 1983b; Griffiths 1992. City walls: Veg. IV, 23.
32. Bolts: Verchère de Reffye 1864, Pl. XXII; Schulten 1927, 251 1929, 214–5; Ulbert 1985, 105. *Pilum catapultarium*: Plautus, *Curculio* 689.
33. Baatz in Schramm 1980, ix–x.
34. *Scutum*: Eichberg 1987. Livy: VIII, 8. Italian origin: Eichberg 1987, 171–5.
35. Kasr al-Harit: Kimmig 1940. Celtic: *ibid.* 109–11. Cf. Connolly 1981, 131. Ahenobarbus: Coarelli 1968. Paullus: Kähler 1965.
36. Polyb. VI, 23. Cf. Celtic binding: Dionysius XIV, 9; Pliny *NH* XVI, 209.
37. Kimmig 1940, 106–9. Renieblas: Bockius 1989, 271 citing Schulten 1929, Pl. 39, 6. Caminreal: Vicente *et al.* 1997, 195–6, Figs. 40–2.
38. Reconstructions: Connolly 1981, 131; Junkelmann 1986, 176 (Augustan version).
39. Polyb. VI, 25. Lacus Curtius relief: Robinson 1975, Pl. 305.
40. Polybios: VI, 23. Earlier examples: Connolly 1981, 101 Figs. 9–14; Burns 2003, 71–2. Camp of Marcellus: Schulten 1927, Pls. 44, 19; 50. Other finds: Schulten 1929, 257–9, Pl. 26, 19; 22.
41. Qualification: Polyb. VI, 23. Origin: Varro, *De Ling. Lat.* V, 116. Celtic examples: *CA* 1988, 115–17; Stead 1989, 3–4; Müller 1986; Rusu 1969, 276–8, Pls. 143–6. Renieblas: Schulten 1929, Pl. 26, 20. Tomb of the Scipios: Liberati 1997, 29. *Thoracomachus*: *De Rebus Bellicis* XV. *Subarmalis*: *HA Severus* 6, 11; Bishop 1995; *pace* Tomlin 1998, 62. *Pteryges*: Robinson 1975, 149. Sacrifice of Iphigenia: pers. obs (MCB).
42. Bishop 1989a, 2. Mail repairs: cf. Rusu 1969, 278.
43. Greek doubling: Connolly 1981, 124–5. Osuna: Robinson 1975, Fig. 175.
44. 'Trasimene': Robinson 1975, 154, Pls. 434–5.
45. Greave presses: Mutz 1987. Polybios: VI, 23. Gladiator's stance: Grant 1967, Pls. 4–7.
46. 'Montefortino': Robinson 1975, 13–25; Paddock 1985; Quesada Sanz 1992b; 1997b. Contexts: Paddock 1985, 143–4.
47. Caminreal: Vicente *et al.* 1997, 196, Fig. 43. Alfaro: Iriarte *et al.*, 1997, 247, Fig. 9. Quintanas de Gormaz: Quesada Sanz 1997b, 159, Fig. 6. Pizzighettone: Junkelmann 2000a, 60.
48. Origins: Connolly 1981, 133. Coolus: Robinson 1975, 26–41. Cruder forms: Paddock 1985, 145.
49. Agen/Port: Robinson 1975, 42–3. Senones: Connolly 1981, 120. Origins: Robinson 1977; Connolly 1989a.
50. Plumes: Polyb. VI, 23. Ahenobarbus: Coarelli 1968. Caesar, *BG* II, 21. *Alaudae*: Bishop 1990a.
51. Boeotian: Connolly 1981, 73 Figs. 5–6. Polyb. VI, 25.
52. Experiments: Garlick 1980, 8.
53. Castillejo: Schulten 1927, Pls. 35, 29; 42, 2–3. Later frogs: Grew and Griffiths 1991, Figs. 15, 163, 165; 16, 166–75.
54. Renieblas: Schulten 1929, Pl. 44. Cáceres: Ulbert 1985, Pl. 10, 65.
55. Padova: Franzoni 1982, Fig. 1; Keppie 1991b.
56. Ahenobarbus: Coarelli 1968. *RE s.v. 'paludamentum'*. Officers: Keppie 1984, Pl. 5a–d. Emperors: Robinson 1975, Pls. 430–2. Centurions: *ibid.* Pls. 442, 465; Horn 1981, 13 Fig.
57. Padova: Franzoni 1982, Fig. 4; Keppie 1991b, 115.
58. Eagle: Pliny *NH* X, 16. Coins: Keppie 1984, Pls. 4 and 12.
59. *Cornu* and *tuba*: Cicero *Sulla* V, 17. *Bucina*: Cicero *Murina* 9, 22; cf. Caesar *Bell. Civ.* II, 35. Early *cornu*: Strong 1980, Fig. 60; Spivey 1997, Fig. 156; Köhne and Ewigleben 2000, Fig. 67; Museo di Villa Giulia, Rome and Muso Archeologico, Firenze, pers. obs. Osuna: Stary 1994, Pl. 114.1.
60. Spurs: Schulten 1927, Pls. 35, 17, 19, 21–4; 36, 19; 1929, Pl. 21, 23; Ulbert 1985, Pl. 10, 51–3; Vicente *et al.* 1997, 196, Fig. 44. Bits: Schulten 1927, Pls. 35, 25; 36, 20–1; Vicente *et al.* 1997, 196, Fig. 45.
61. Pickaxe: Schulten 1927, Pls. 47, 14 and 54, 1. Tethering pegs: Schulten 1927, Pl. 39, 3–5; Ulbert 1985, Pl. 26, 212–24; Polybios: Schulten 1927 citing Frag. 95. Wooden pegs: e.g. Curle 1911, 310.
62. *Stimuli*: Caesar: *BG* VII, 73; Reddé *et al.*, 1995, 152, Fig. 38. *Tribuli*: Brouquier-Reddé 1997, Fig. 2.

5 From Augustus to Hadrian

As Rome consolidated the territorial gains of the Republican period, her army became more sedentary, although not to the exclusion of all strategic movement. When new areas such as Britain came into the Empire, the army was forced to reorganize its dispositions, shuffling both legions and *auxilia* as the need arose. Some areas, like the Voralpenland, were abandoned completely because the advance of the frontier region rendered them militarily irrelevant. All this military activity led to the frequent abandonment of sites when garrisons were changed and, inevitably, the deposition of surplus damaged equipment. The frontiers in Britain were especially active between the invasion of AD 43 and the reign of Marcus Aurelius, with a correspondingly great amount of discarded equipment.¹

Individual soldiers, on the beach at Herculaneum and down a well at Velsen, were unusual finds, but our study of this period is dominated by the Roman army's rubbish. The finest example of this is the *Schutthügel* (rubbish tip) at Vindonissa, additions to which were apparently made each time the garrison legion changed. The archaeological record for this period is also particularly rich in terms of deposition in water, with many fine examples of helmets, swords, and daggers known from rivers. There are also a number of burials with equipment of the early Principate, notably the 'Cananefate' series with horses, mail, boots and other fittings, and the 'Thracian' series with cavalry 'sports' helmets and other equipment. More enigmatic are the deposits of equipment from Kalkriese, identified as spoil from the Varian disaster of AD 9.²

There is a very marked bias towards material from the north-western provinces, with the exception of some finds of cavalry equipment from North Africa, and a growing corpus of published finds from sites in Palestine associated with the two Jewish Revolts. This might be due to the quality of information retrieval (and dissemination) practised by archaeologists in the various regions, but it could equally be due to differential depositional mechanisms in operation, a subject touched upon in Chapters 2 and 9.³

However, the period up to Hadrian is probably best known for its representational evidence, for not only did it produce a magnificent tradition of funerary military depiction (Figs. 4, 150), but also the quality of state propaganda images peaked with Trajan's Column (Plate 5), paralleled by the more provincial, but no less interesting, Adamclisi *tropaeum* sculptures (Fig. 53).

Weapons

Pila (Figs. 36–7)

Some of the best surviving tanged *pila* date from the 1st century AD. Examples found in the Augustan base at Oberaden before the Second World War not only had intact heads, shanks, and collets, but even substantial portions of the wooden shafts sur-

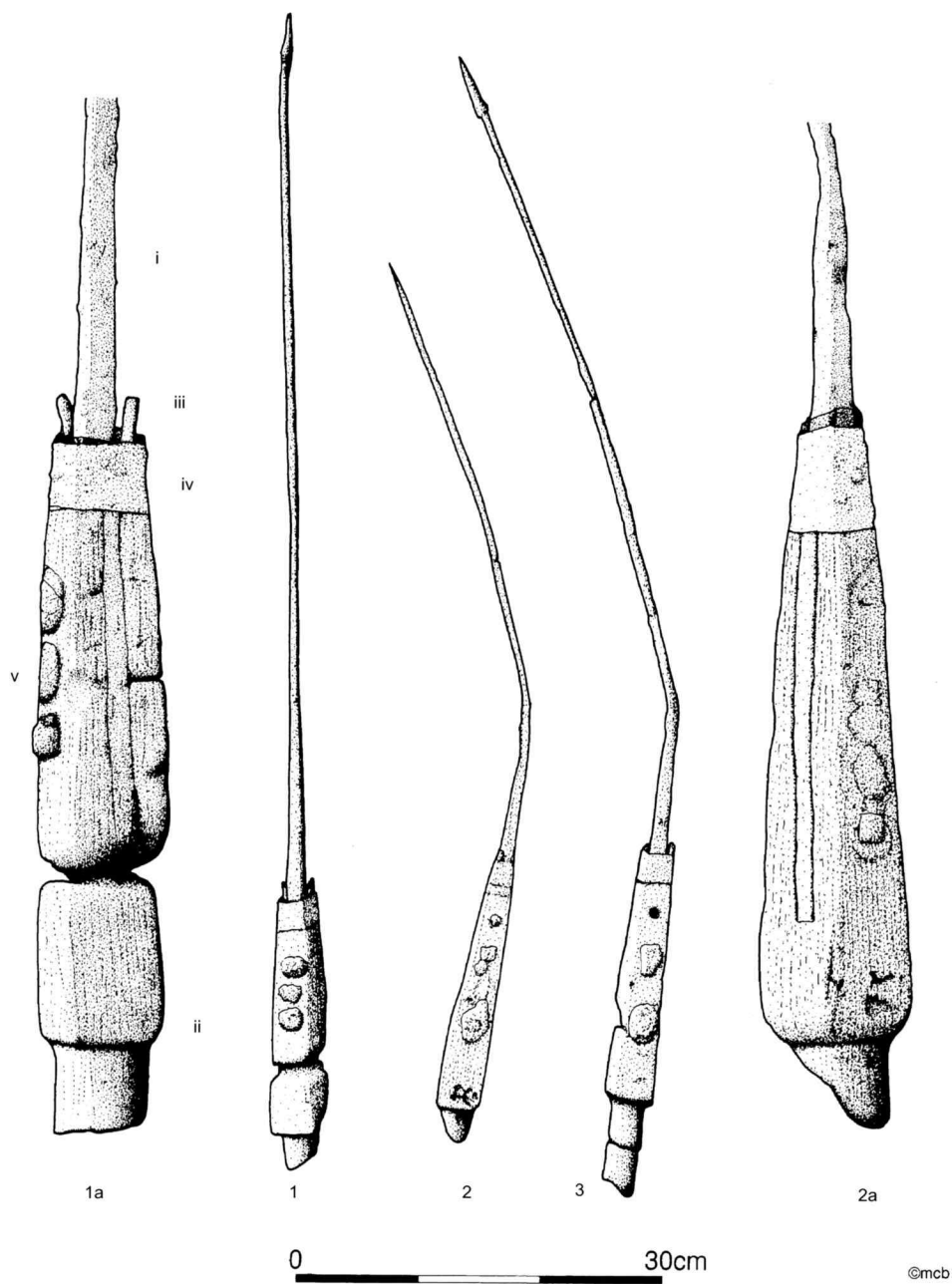


Figure 36: The Oberaden pila with (1a, 2a) details of the junction between the shank (a) and shaft (b), and showing wedges (c), collet (d), and rivets (e).

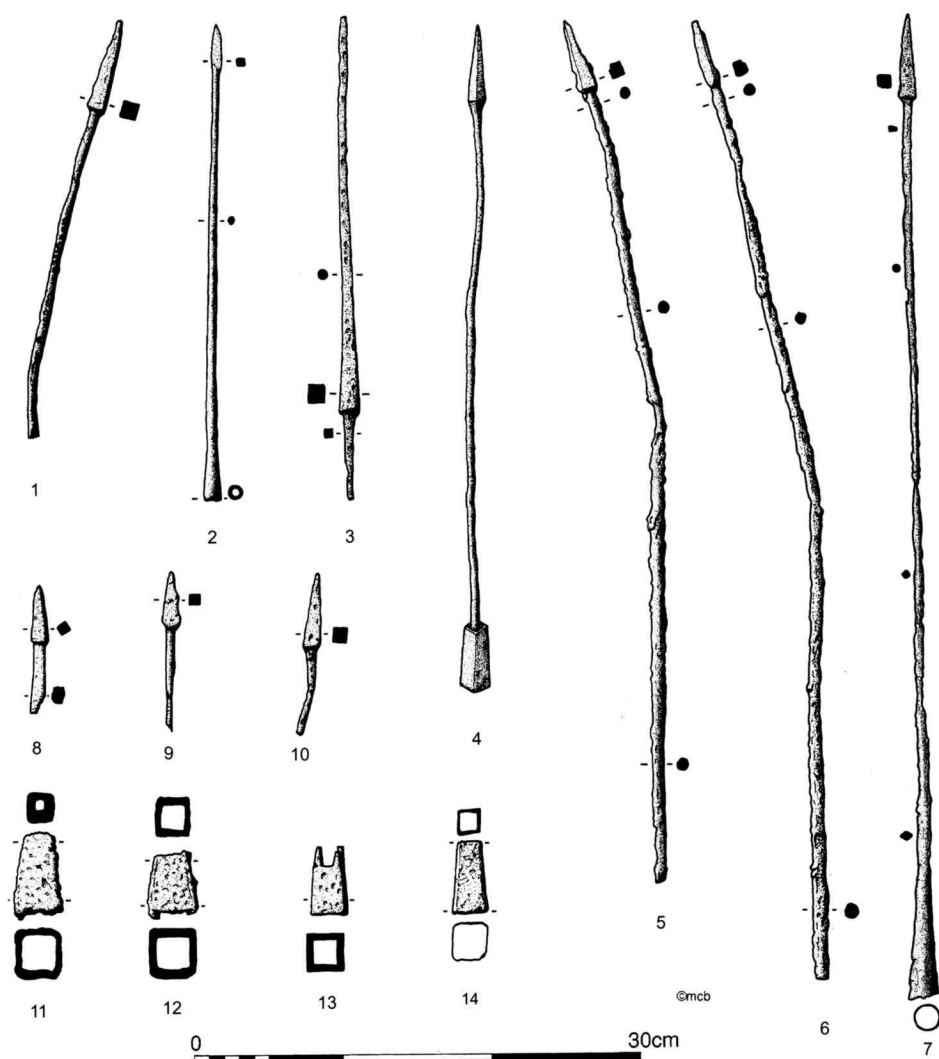


Figure 37: Early Principate pila. 1–9 Heads and shanks (1 Dangstetten; 2 Waddon Hill; 3 Rottweil; 4 Carnuntum; 5–6 Hod Hill; 7 Vindonissa; 8 Longthorpe; 9–10 Oberstimm); 11–14 collets (11–12 Hod Hill; 13 Dangstetten; 14 Rheingönheim).

vived. These showed how the tang was riveted through a pyramidal expansion of the shaft. Many other examples of the shanks have been found, often bent through use. *Pilum* heads are common finds on Roman military sites, although sometimes confused with drill bits and nails. The shafts must have been carved down from the maximum diameter of the pole (the broadest point of the expansion). Examples of early Imperial shanks are known from Augsburg-Oberhausen, Hod Hill, and Dangstetten, whilst collets (which fitted on top of the pyramidal expansion) have been found at the last two

and at Kalkriese. The fact that the *pilum* may normally have had a shoe (or butt) is demonstrated on Cancelleria Relief A (Fig. 2), where one is clearly illustrated. The same relief shows how the handgrip of the *pilum* shaft was bound at the point of balance. Headless (probably damaged) *pila* continue to be re-used and socketed *pila* remained in use in the 1st century AD. Some early Augustan *pila*, from the watchtowers at Filzbach and Schänis, now associated with the Alpine campaign of 15 BC, had single-barbed heads and these may be residual Republican weapons.⁴

Cancelleria Relief A has also led to the notion that a weighted *pilum* was introduced during the latter part of this period, since it depicts a bulbous addition to the weapon, just below the pyramidal expansion and above the handgrip, decorated with an eagle motif. A similar feature is apparent on *pila* on the Adamclisi monument (Fig. 53) and possibly on the tombstone of C. Castricius Victor (Fig. 3b). Such a weight would theoretically give additional penetrative power, whilst limiting the range. Weight was part of the key to the success of the *pilum*: once it had caused the weapon to penetrate a target, it helped to bend the shank so that the weapon was difficult to extract and could not be returned, although it could later be straightened out quite easily in a workshop. Performance of the *pilum* may have been further enhanced by the use of a throwing strap (*amentum*), apparently shown on the tombstone of Flavoleius Cordus (Fig. 150).⁵

Spears (Fig. 38)

The spear is ubiquitous in any period and notoriously difficult to classify. Some factors, such as the length of shaft, are not normally preserved in the archaeological record, so hypotheses tend to be dependent upon analysis of the head form and size, a process that is dubious to say the least. Depictional evidence is also unreliable in this field, both from the point of view of size (the weapon was, generally speaking, scaled to fit within the frame of the work) and shape of the head (usually nondescript). The spear can be categorized as having two extremes of function: first it can be a thrusting weapon, used in hand-to-hand combat; or it can be a missile, thrown at an enemy from a distance. However, there is a third category which covers all those spears that could be used for both purposes (*in extremis*, even the slenderest of javelins might be used as a thrusting spear and the longest of spears as a missile), so we can only hope to divine broad rules about the apparent perceived purpose of a weapon. One useful feature indicating function might be diameter of the shaft, rather than the shape of the head.⁶

The spear consisted of a forged iron head, nearly always socketed at this period, a wooden shaft (usually of ash or hazel, woods with the right qualities of strength and flexibility), and an iron butt. When considering spearheads, the term 'leaf-shaped' is commonly found, but there are obvious problems with this terminology: which leaf shape are we talking about, pinnate or lanceolate? Those detecting the onset of circularity in this search for a descriptive language may well be tempted to give up at this point! A more sensible solution lies in that offered by Barker, and followed by Densem, whereby the ratio between the length of the spear blade and its broadest point is taken as the significant attribute. The distance from the tip of the blade to this broadest point is termed the 'length of entry'. Thus a low-shouldered blade would be one where the broadest part was nearer the socket than the tip, mid-shouldered where it lay

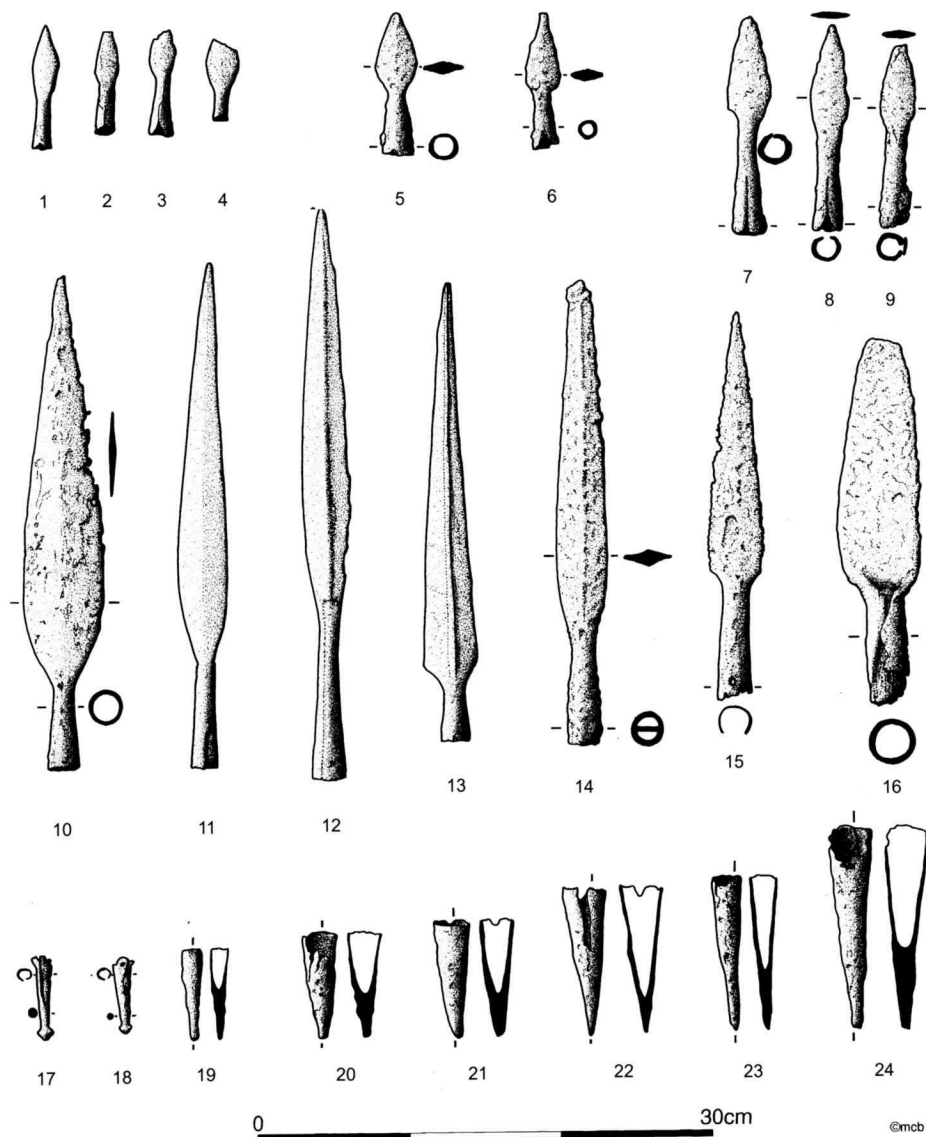


Figure 38: Early Principate spearheads and butts. 1–4, Waddon Hill; 5–6, 14–15 Hod Hill; 7–9 Longthorpe; 10, 17–24 Rheingönheim; 11–12 Newstead; 16 Corbridge.

about half-way along, and so on. In the end, one has to accept that there is no one satisfactory way of categorizing Roman spearheads.⁷

Equally fraught is the question of terminology. The currency of ancient terms like *hasta*, *lancea*, *verutum*, and *spiculum*, let alone the more general *tela* or *missilis*, is virtually impossible to untangle, and Roman writers seem to have used them interchangeably all too often. In fact, it is sometimes tempting to view all of these as synonymous, but

this is perhaps taking too pessimistic a view of the matter. The *lancea*, for example, was a javelin, and in that context we may recall the ill-fated *lancea Lucullanea*. The Elder Pliny wrote a treatise on throwing javelins from horseback and this, together with Lucullus' *lancea*, may have been symptomatic of an aristocratic interest in hunting and mounted combat. The complexity of such terminology is further indicated by a document from Carlisle which records *lanciae pugnatoriae* or 'battle javelins'.⁸

Auxiliary infantry are shown on 1st century tombstones carrying more than one spear (Fig. 150c–d), which suggests that at least one of these was intended for use as a missile. The running auxiliary (if that is indeed what he is) on a Mainz column base (Fig. 5a) is wielding one spear and carrying two more behind his shield. Josephus stated that cavalrymen were equipped with a spear and had several lighter javelins in a quiver. The tombstones of cavalrymen often show their *calones* or servants holding spare missiles, and in at least one case a bundle or quiver is shown. The provision of more than one missile is clearly suggestive of the ability to skirmish, although this need not preclude either auxiliary infantry or cavalry from being used in more direct fighting.⁹

Swords (Figs. 39–41)

Contrary to popular belief, the term '*gladius*' can mean any sword and is certainly not specific to short weapons. The infantry sword underwent an important metamorphosis some time after the middle of the 1st century AD. The familiar long-pointed, taper-bladed weapon of the Republic, the so-called *gladius Hispaniensis* (which survived as the 'Mainz' type), was phased out in favour of a parallel-edged, short pointed replacement (the 'Pompeii' type). These two swords are, it has been suggested, symptomatic of a change in the style of Roman fighting. Examples of the Mainz type sword (so-called because so many examples come from the Rhine at Mainz) and its associated scabbard fittings are found throughout the first half of the century and it was clearly still in use at the time of the invasion of Britain in AD 43. Plotting the distribution of such finds can give us some idea of how long it persisted in use in Britain and there does not appear to be much indication of its continuation into the Flavian period. The blades (excluding tang) vary between 400 mm and 550 mm in length and blade widths taper from something like 54–75 mm to 48–60 mm, with the length of point varying between 96 and 200 mm. The handle assembly consisted of a handguard, an octagonal-sectioned handgrip usually made from a cow longbone, and then a pommel of slightly flattened ovoid appearance. The pommel and handguard were often made of wood, as examples from Vindonissa show, but could also be of bone or ivory. These pieces were held onto the tang by a copper-alloy rivet. The sword from Rheingönheim had a silver plated wooden handle and the rivet originally possessed a 'small ring from a bronze chain', recalling a gladiator relief from Rome where the sword is suspended from the gladiator's wrist by a cord or chain.¹⁰

Scholars differ over the function of the two types of blade. Many of the Mainz type swords had waisted blades and one wonders if they were deliberately made this way (and if so, why?) or whether they had been worn down by repeated sharpening. Vegetius' comment about the Romans scorning anybody who cut, rather than stabbed, with the

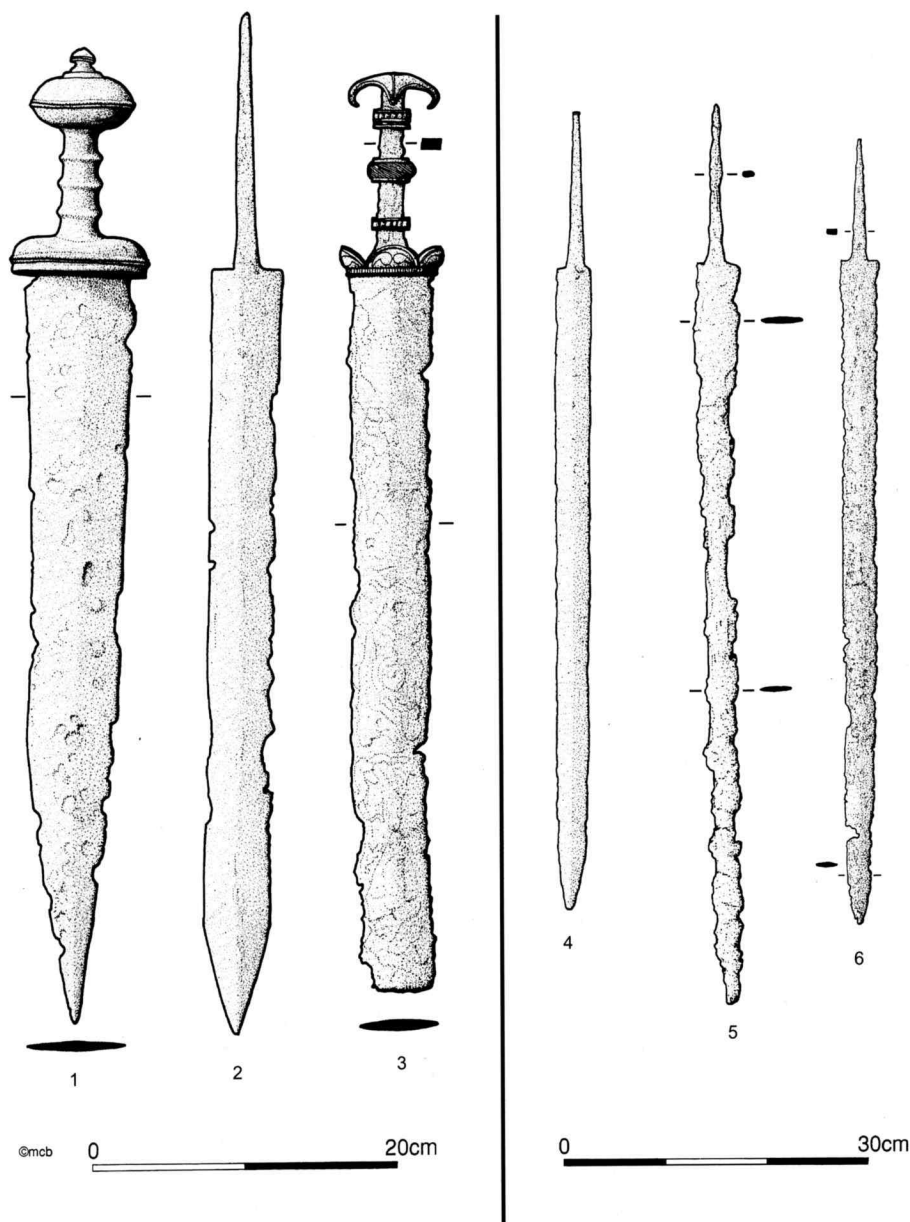


Figure 39: Early Principate swords. 1 Rheingönheim; 2, 4 Newstead; 3 Hod Hill; 5 Camelon; 6 Rottweil.

sword is too vague to be of much use, and Polybios certainly indicates that the *gladius Hispaniensis* could be used for chopping as well as stabbing. So was the change to the Pompeii type made in order to provide a sword equally well adapted to stabbing or chopping?¹¹

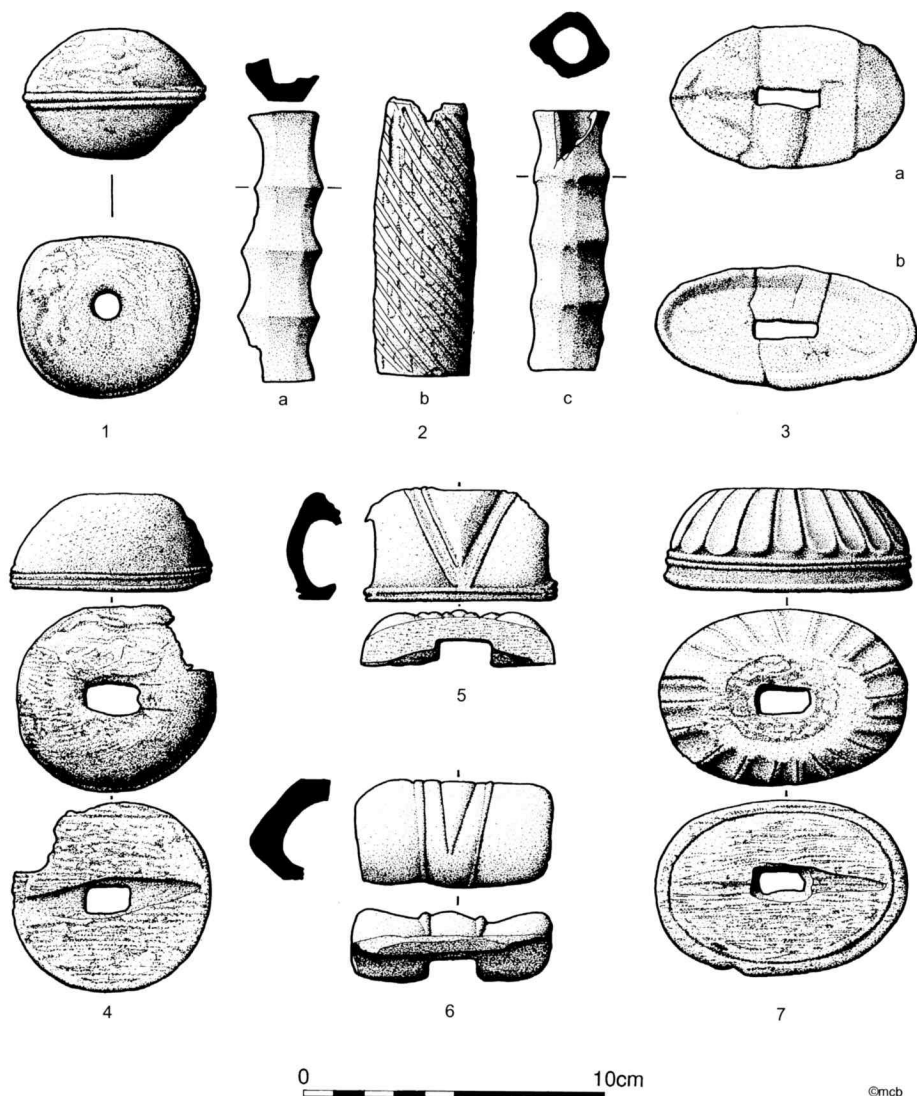


Figure 40: Early Principate swords – handle assemblages. 1 Wooden pommel (Vindonissa); 2a–c bone handgrips (a London; b Dangstetten; c Rheingönheim); 3a–b handguard plates (a Dangstetten; b Baden); 4–7 handguards (4, 7 wood, Vindonissa; 5–6 bone, Rheingönheim).

The parallel-edged Pompeii type (with blade lengths between 420 and 500 mm and widths between 42 and 55 mm) was named after four examples found at Pompeii with the well-known *terminus ante quem* of AD 79 (now supplemented by a fifth sword, carried by the Herculaneum ‘soldier’). Examples of the weapon and its scabbard-fittings give a rather different distribution by comparison with the Mainz-type sword and one piece of scabbard from Verulamium is dated to before the Boudican revolt (AD 60/1), possibly the earliest archaeological manifestation of this weapon. Finds of Pompeii-type

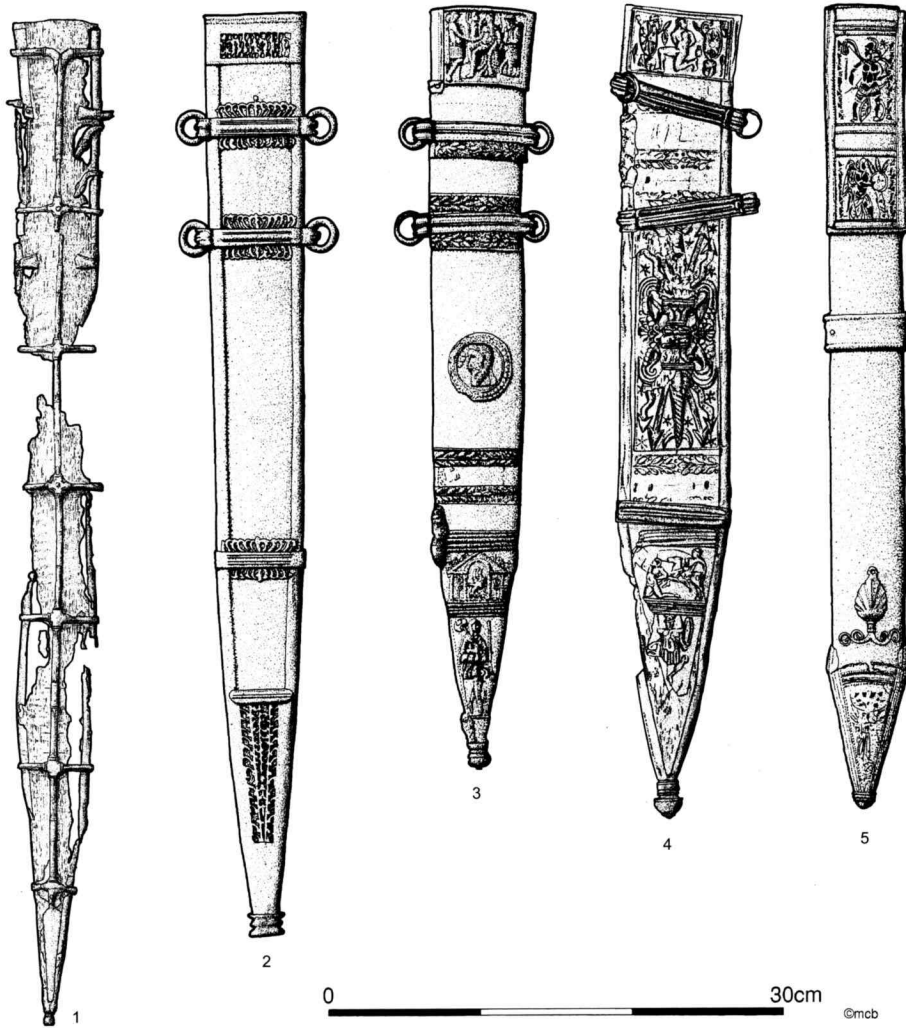


Figure 41: Early Principate swords – sheaths. 1 River Ljubljana; 2 Rhine at Mainz; 3 Mainz ('Sword of Tiberius'); 4 Vindonissa; 5 Rhine at Mainz.

scabbard-fittings from Waddon Hill seem to belong to some time before AD 64, although the earlier terminal date for Hod Hill (which has also produced Pompeii-type fittings) has been questioned. The handle assemblies differ markedly from those of the Mainz-type sword, with the handguard now more pronounced and the pommel resembling a flattened sphere.¹²

There was a variety of types of scabbard for these two swords and these seem to have had a broadly chronological development. The first Mainz-type sheath employed a filigree network retaining U-sectioned binding. A near-complete example from the River Ljubljana can be dated by comparison with more fragmentary pieces from better-dated contexts, such as Magdalensberg, the Comacchio shipwreck, and

Kalkriese (the last also producing an impressive silver example with an embedded *intaglio*). The second form was notable for its use of elaborate openwork fittings at the mouth and chape. Complete examples have come from rivers (the Weser at Bremen and the Rhine at Mainz), but it is the fragments of sheaths which provide the dating evidence. A chape from Dangstetten must have been deposited around 15 BC, but the form seems to have continued until the Claudian period, many pieces of this kind of sheath coming from the Magdalensberg (abandoned *c.* AD 45). The third variant is best represented by the so-called Sword of Tiberius, where openwork decoration has been superseded by embossed motifs, in this case a propaganda scene. Fragments of the suspension bands, decorated with a laurel wreath motif, have come from Colchester and Chichester, indicating the continuation of this type into the 40s. The fourth type is almost totally decorated with embossed plates (again with a propaganda theme), examples coming from the Thames at Fulham, Strasbourg, Wiesbaden, and Valkenburg. A complete example from Vindonissa belongs to a phase that dates between AD 45 and 69.¹³

Apart from the shape and forms of decoration employed, one of the distinctive characteristics of the Mainz-type sheath was the use of guttering, U-shaped copper-alloy (and sometimes iron) binding along the edges to prevent damage from the sword blade during sheathing or unsheathing. All three types appear to have incorporated a wooden lining, to judge from the organic remains sometimes found within them.¹⁴

Pompeii-type sheaths usually lacked guttering, having decorated locket plates and chapes attached to a leather-covered wood body. The locket is usually tinned or silvered and decorated with a combination of punched-out shapes and incised detail, the former presumably designed to contrast the colour of the underlying sheath with the white metal. An ornate palmette was fixed just above the chape, and the bottom of the locket and chape plates were similarly adorned with palmettes at the side. Some examples had studs on the face of the sheath. A Pompeii-type sword and sheath is shown on a relief from Pula.¹⁵

Of course, these were not the only types of sword in use by the Roman army in our period. A longer sword (often called the *spatha*) was used by the cavalry, presumably derived from Celtic weapons. Fewer examples of these swords have survived, although a piece from Rottweil (L. 768mm, W. 33mm) and at least two from Newstead (L. 622 and 635mm, W. 30–35mm each) seem to belong in this class. The longer sword was a prerequisite for a cavalryman to operate against infantry.¹⁶

In Britain, another form of sword that is represented amongst the archaeological finds is the 'native' type. Remains from these weapons have come from such sites as Hod and Waddon Hills, Roeccliffe, Newstead, and Camelon. Whilst much about them reflects the influence of Roman short sword design, they still incorporate features that mark their La Tène ancestry. They certainly seem to show that some troops in Roman service were using their own weapons as late as the Flavian period.¹⁷

Centurions (Fig. 52) and some standard-bearers wore their swords on their left hand side, other troops on their right. The question of sword suspension is vexed, but certainly seems to have started with the sword on one belt and the dagger on another (an arrangement still respected by the Herculaneum 'soldier'). There may have been more than one way in which the sword was attached to the belt, but a sword and

scabbard found at Vindonissa show how a double-looped frog could be used, apparently tied to the belt. The advent of the single belt may have necessitated the adoption of a baldric (no examples of double belts with a baldric are shown on the Rhineland tombstones), but we cannot be certain of whether only two suspension rings, three, or even all four were employed. The baldric did not require a fastener of any kind, since it could simply be slipped over the head and shoulder, but attempts to identify cavalry harness fasteners as baldric fittings persist, despite the obvious differences in decoration between infantry and cavalry equipment.¹⁸

Daggers (Figs. 42–5)

Augustan daggers have been found at Dangstetten, Oberaden, the Titelberg, Kalkriese, and Augsburg-Oberhausen. Whilst some still have the round pommels of Republican daggers, others now have a flat-topped version with rivets, and inlaid decoration occurs for the first time amongst the handles from Oberaden. Flavoleius Cordus has a dagger sheath on his gravestone similar to examples from Titelberg and Exeter, with guttering and cross binding, and similar guttering came from Haltern and this may be a survival of the Republican form of scabbard. By the Tiberio-Claudian period, the dagger had become the complementary sidearm to the sword and is shown on tombstones, often with a scabbard which has three fields of decoration. The blade and tang were forged in one piece and the two halves of the handle riveted in place, sandwiching an organic layer (horn or bone) on either side of the tang. The handle had an inverted T shape, with a swelling half way up its length and another as a pommel at the top.¹⁹

For the purposes of classification, two types of tang and three types of blade have so far been recognised. The first type of tang, with examples from Dangstetten, Oberaden, Hod Hill, and Mainz, is flat and riveted to the blade, characteristically with two rivets through the pommel, one through the central expansion, and two or more through the handguard. With the second type, the rod tang (from Vindonissa, Gelligaer, and Ribtissen), the rivets do not actually pass through the blade or tang; many of these daggers are either found without handles or with replacement wooden ones fitted. The Type A blade (Allériot, Mainz, Hod Hill) is broad with a simple midrib, whilst Type B (Vindonissa, Leeuwen) has deep grooves on either side of the midrib, a pronounced waist, and a long tapering point. Type C dagger blades (Kingsholm, Gelligaer) are much narrower than either of the other two variants, and are also comparatively straight-edged. Type A blades have the flat tang, Type B either type, and Type C the rod tang. As Scott has pointed out, there would seem to be a chronological progression, with Type B being a transitional type, but this is virtually impossible to demonstrate from the limited chronological information associated with these weapons.²⁰

Dagger sheaths were frequently elaborately decorated with metal or enamel inlay and a separate system of classification exists for these, although it should be stressed that this type of sheath was not the only kind in use (see below). There are two basic forms of the inlaid sheath, Types A and B. Type A (Allériot, Hod Hill, Auerberg, Oberammergau) was made of two plates of iron joined at the edges and lined with

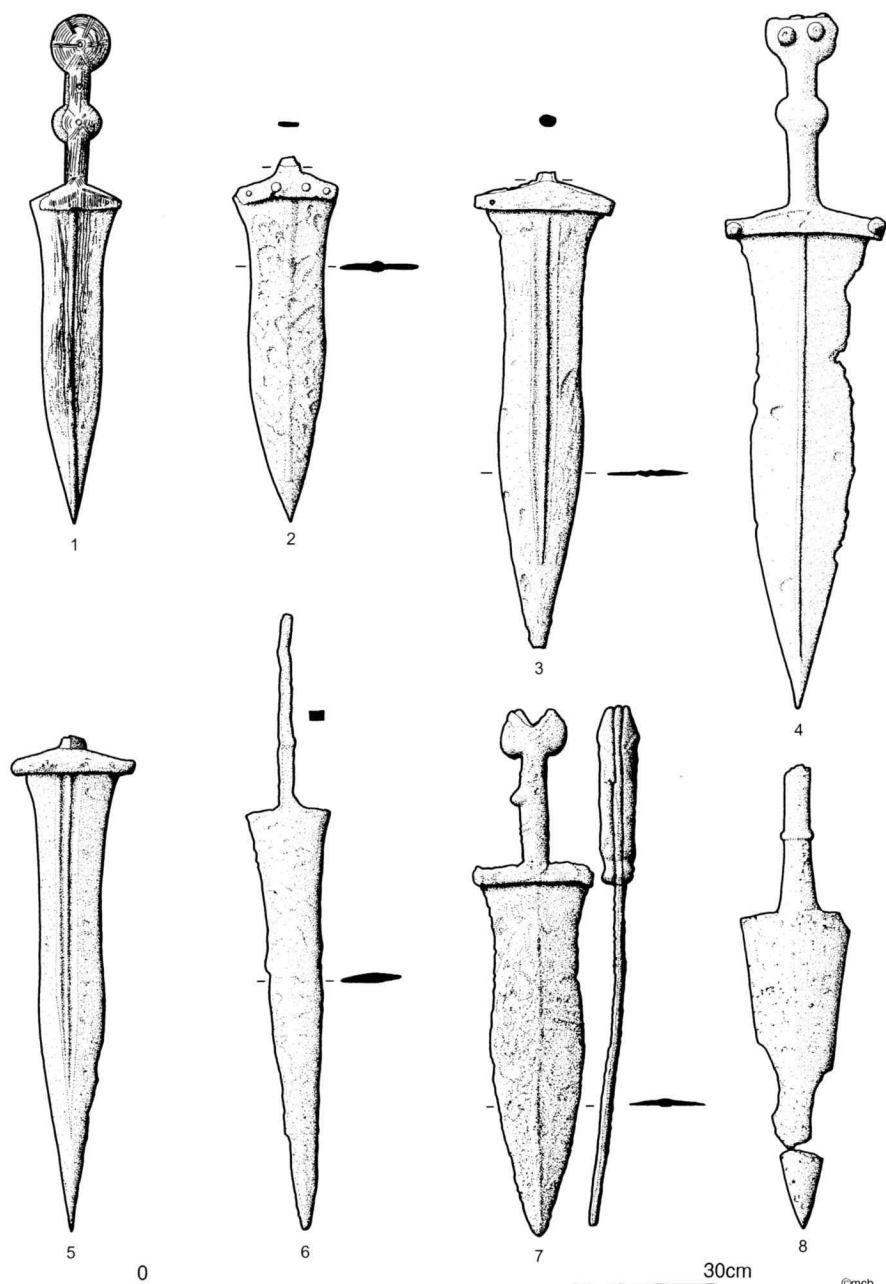


Figure 42: Early Principate daggers. 1 Oberaden; 2 Dangstetten; 3 Rijtissen; 4 Mainz-Weisenau; 5 Mainz; 6 Kingsholm; 7 Buciumi; 8 Mehrum.

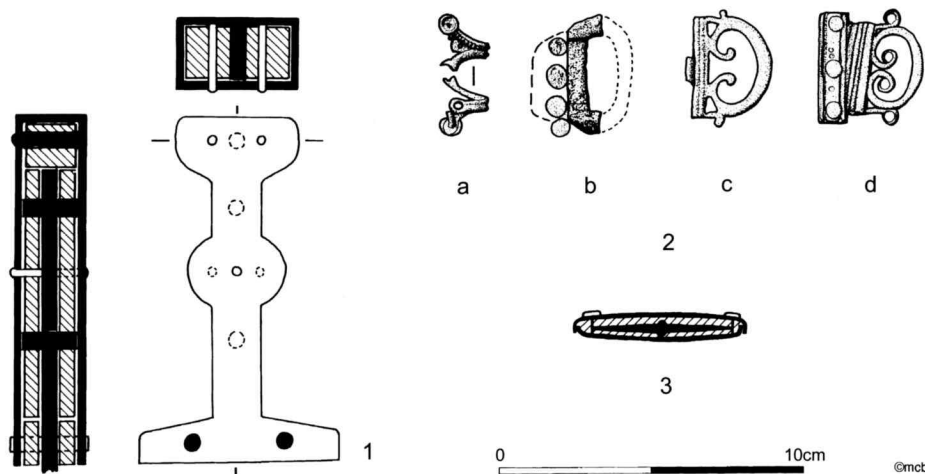


Figure 43: Early Principate daggers. 1 Diagrammatic section of handle; 2a–d suspension loops (a Dangstetten; b Chester; c Kempton; d Velsen); 3 schematic cross-section of blade and sheath (Basel).

wood, the front plate being inlaid with brass, silver, niello, or enamel. The four suspension rings were usually free to move, attached to the sheath by fine copper-alloy loops. Type B sheaths (Vindonissa, Loughor, Ribtissen) were made of organic materials (probably leather and wood) with a near-flat decorated iron plate attached to the front, with two lugs on either side through which the rivets securing the suspension loops passed. These suspension loops were hinged to the sheath and were elaborately formed by bending the metal components. An example from Velsen had iron loops as the upper pair and silver as the lower, all of which were constructed in the same way, although from different metals. Type B sheaths were inlaid with silver and not brass.²¹

The decorative designs employed were, with only a few exceptions, usually placed within four zones and motifs included rosettes, temples, palmettes and various geometric elements.²²

Apart from the inlaid sheaths, there were embossed examples, such as the piece from Leeuwen, and completely undecorated sheaths from Mainz, Basel, Oberaden, Dangstetten, and Carnuntum. The study of daggers and their scabbards is complex, but no aspect of it is particularly helpful in telling us what the weapon was used for. With blade lengths of between 250 and 350 mm, it was clearly a formidable weapon to have as a back-up should the sword be lost or damaged and we need not view it solely as a 'boy-scout' knife used for eating meals or whittling wood. Daggers, like the short sword, were used by both legionary and auxiliary infantry, a fact that is evident from the tombstone evidence. However, they also seem to have been owned by some cavalrymen. A papyrus records that L. Caecilius Secundus, an *eques* of the *ala Paullini*, borrowed money from an auxiliary infantryman, and one of the objects he used as security for the loan was 'a silver dagger sheath with ivory inlay', the document being dated August 25th AD 27.²³

It is commonly supposed that decorated sheaths were personal purchases replacing 'standard issue' items, but the rarity of such plain pieces from the archaeological

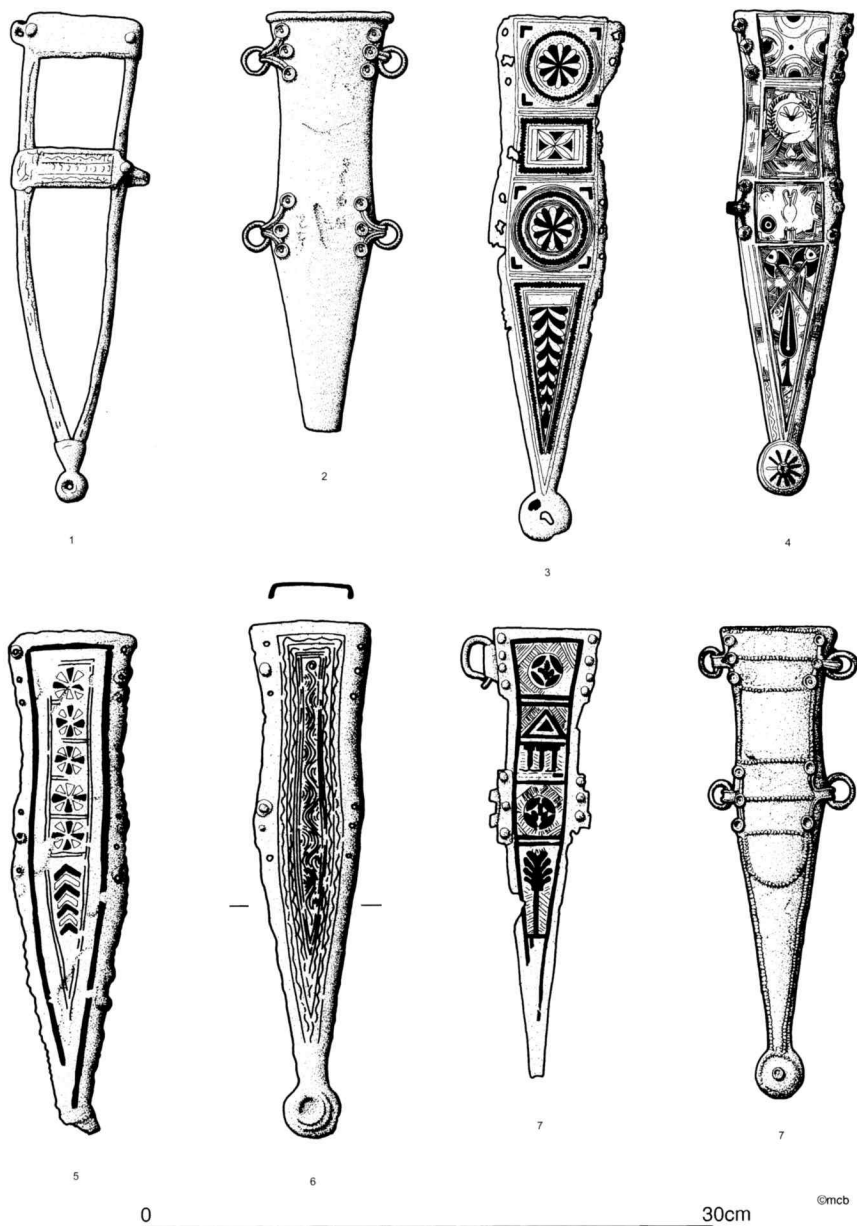


Figure 44: Early Principate daggers – sheaths. 1 Titelberg; 2 Rhine at Mainz; 3 Dunafoldvar; 4 Allériot; 5 Hod Hill; 6 Rijstissen; 7 Vindonissa; 8 Leeuwen.

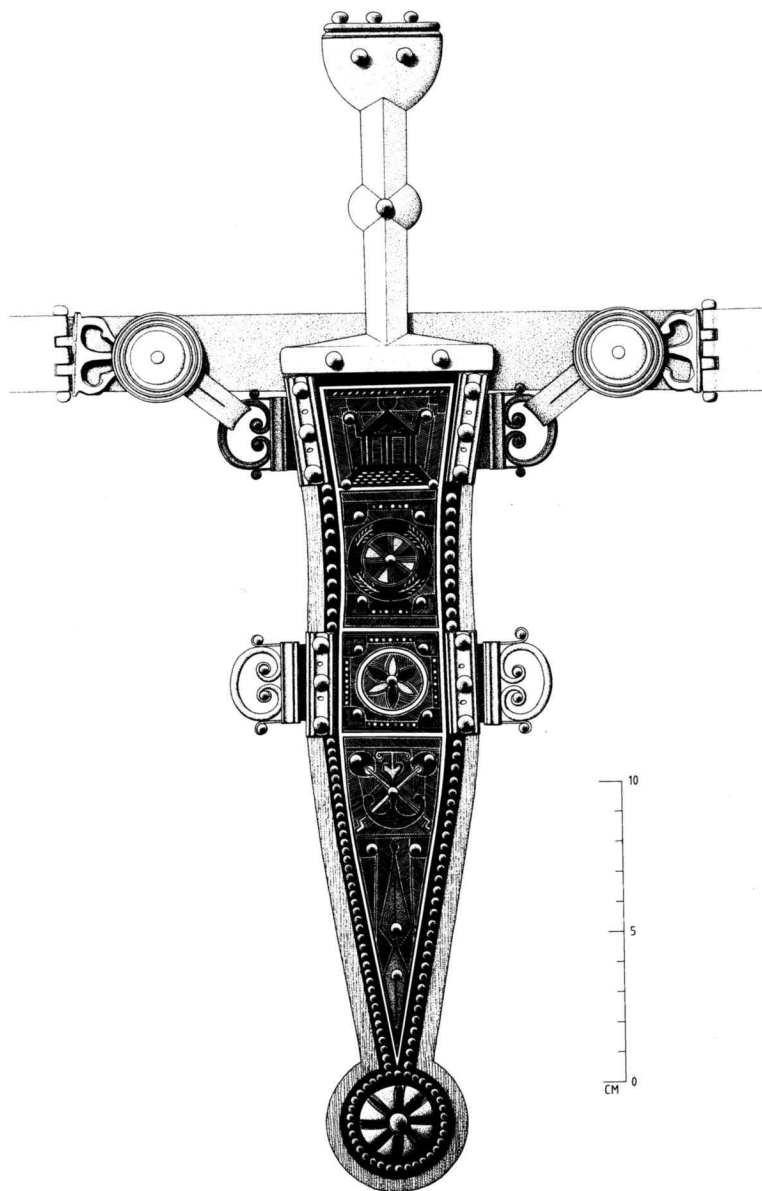


Figure 45: *Reconstruction of the Velsen dagger and belt fittings (by Dr J. Morel).*

record, together with the Roman soldiers' evident taste for decorated equipment, suggest that this view may be groundless. The undecorated sheaths are of Type A and dated ones come from early Principate contexts, so it is feasible, but by no means certain, that most dagger scabbards of the mid 1st century were undecorated.²⁴

A thoroughly heterodox form of dagger was found in the Mehrum burial, and is assumed to have belonged to a Germanic auxiliary in Roman service.²⁵

Contrary to accepted belief, the dagger continued in use into the 2nd century and beyond (Chapter 7), an example coming from Buciumi, and one is shown on the tombstone of Castricius Victor at Aquincum. Decorated sheaths remained in use into the Flavian period, with an example from Corbridge probably dating to after AD 85.²⁶

Bows and Slings (Fig. 46)

Finds of arrowheads, particularly the trilobate tanged variety, illustrate the use of archery by the Romans in this period. Fragmentary bone or antler laths designed to stiffen the ends (ears) of composite bows are known from Oberaden and Dangstetten (Augustan), Velsen (Claudian), Waddon Hill (Neronian), Ribbissen (late Neronian/early Flavian), and Vindolanda (late Flavian). Wooden arrow shafts have been recovered from Vindonissa and painted ones are known from Masada.²⁷

Elliptical pieces of leather found at Melandra Castle and Vindolanda have been identified as sling-pouches. Slingshot are also sometimes found, made of clay or lead. Dramatic evidence from Velsen seems to show soldiers hurriedly using their thumbs to form sand moulds for lead slingshot, in order to fend off an attack. Soldiers were taught both archery and slinging as a matter of course during their training, presumably as a useful skill to keep in reserve, but specialists in these weapons (particularly the bow) seem to have been spread amongst the army when in garrison, rather than kept together in one place.²⁸

Artillery (Figs. 47–8)

The two main types of artillery in use by the Roman army in the 1st century AD were still the stone thrower (*ballista*) and bolt shooter (*catapultula*). Vegetius stated that each legion had ten stone-throwers and 55 bolt-shooters. Some stone throwers could be very large, as is shown by an incident from the civil war of AD 69, reported by Tacitus. The components of torsion artillery are occasionally found on sites of this period, such as a washer from Elginhaugh or the moulds for casting washers from the Auerberg. A shield from the front of the frame of a bolt-shooter, complete with a consular date of AD 45, was found near the site of the battle of Cremona, along with a less-complete second example, and washers probably belonging to both weapons.²⁹

This type is depicted on the side of the Domitianic funerary altar of Vedennius Moderatus in Rome with torsion arms, sinew coils, decorated shield and the same small opening for the missile. Long bolts were shot from these machines, whereas a new form, first seen on Trajan's Column, shot shorter, quarrel-like projectiles. This had a wider, lower frame of iron components, an open front and an arched, horizontal strut (*kamerion*) which assisted aiming, especially at elevation. As seen on the Column, it could be mounted on a two-wheeled cart for battlefield mobility, and became known as the '*carroballista*'. This bolt-shooting artillery continued right through to the Late Roman period, as frame and washer finds demonstrate, shooting the type of wooden bolt found preserved at Dura-Europos (see Chapters 7 and 8), and appearing in Byzantine illustrated treatises as the *cheiroballistra*. A diminutive bolt-shooter frame from Xanten

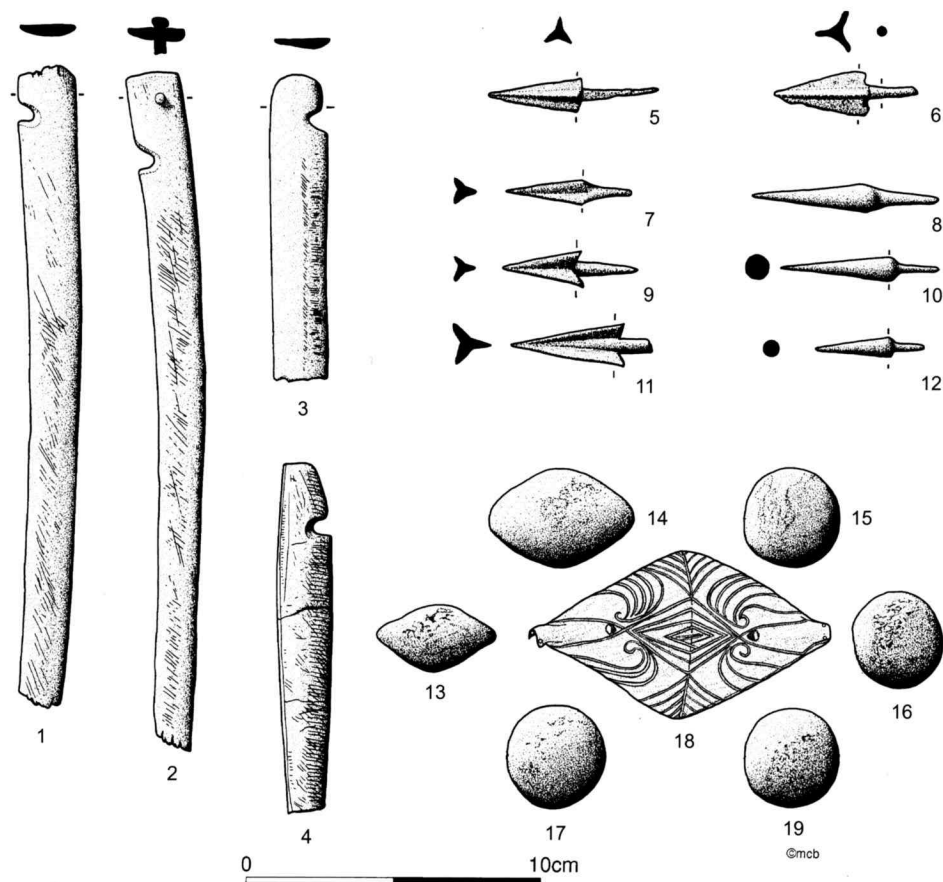


Figure 46: Early Principate archery and slinging equipment. 1–3 Bone (Carnuntum); 4 bone (Waddon Hill); 5 iron (Dangstetten); 6–8 iron (Carnuntum); 9 iron (Hod Hill); 10–12 iron (Carnuntum); 13–17 & 19 clay shot (Pförring); 18 leather sling pouch (Vindolanda).

may represent a hand-held *manuballista*, a form well-attested in the Late Roman period and perhaps more widely used earlier than has hitherto been appreciated.³⁰

We know from Josephus that stone shot were used by Roman artillery in the siege of Jerusalem, and examples of these have been found around the city and at Masada (where they were probably mostly used in an anti-personnel capacity). However, the most common find associated with artillery is the so-called catapult (or *ballista*) bolt-head, also an anti-personnel weapon. These were square-sectioned and socketed, and one found at Dura-Europos, on a wooden shaft with flights, confirms the identification. The most famous 'artillery' projectile head from Britain, found lodged between the vertebrae of a burial at Maiden Castle, not only came from a pre-Roman context, but is of an inappropriate type for Roman catapult projectiles.³¹

By comparison with their Republican predecessors, bolt-heads of the early Principate had much longer heads.

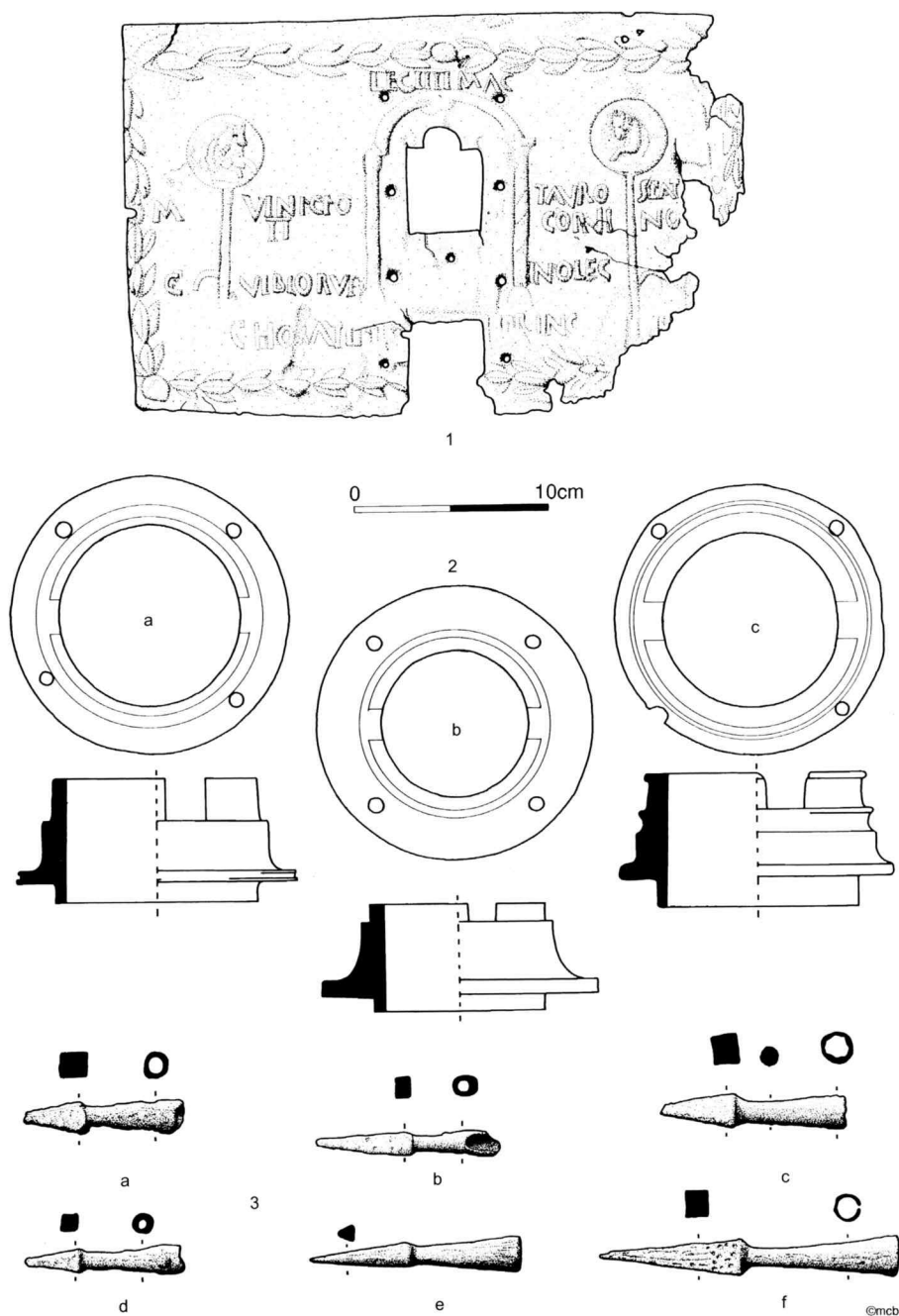


Figure 47: Early Principate artillery. 1 Catapult frame shield (Cremona); 2a–c washers (Cremona); 3a–f catapult bolts (a, d Hod Hill; b Kingsholm; c Corbridge; e Waddon Hill, f Augsburg-Oberhausen).

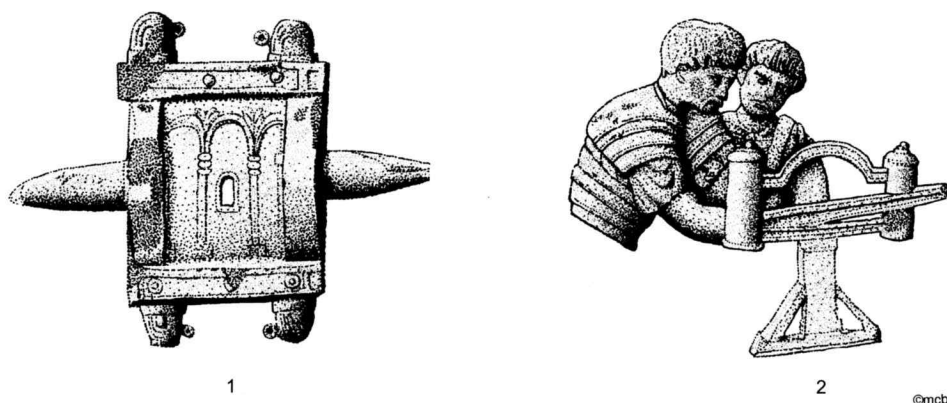


Figure 48: Early Principate reliefs depicting artillery. 1 Monument of Vedennius Moderatus (Rome); 2 Trajan's Column Scene LXVI.

Armour

Shields (Figs. 49–50)

A relief on the mausoleum of Munatius Plancus at Gaeta shows that the curved rectangular shield was already in use by *c.* 10 BC. An *adlocutio* coin of the emperor Gaius shows soldiers of the Praetorian Guard equipped with it (Fig. 9,1), so it was obviously widespread well before the invasion of Britain in AD 43. However, this form, so familiar from Trajan's Column, was by no means the only type of legionary shield. Oval shields are shown on the tombstones of Flavoleius Cordus of *legio XIII Gemina* (Fig. 150a) from Mainz (probably before AD 43) and C. Castricius Victor of *legio II Adiutrix* (Fig. 3b). There are problems in identifying intermediate shapes due to the Romans' difficulty in portraying perspective, but a Praetorian carrying a shield with curved sides and a straight top is depicted on a Trajanic relief from Pozzuoli. The curved rectangular shield seems to have been exclusive to Praetorians and legionaries; no representation accompanied by a diagnostic inscription shows an auxiliary equipped with one.³²

Auxiliaries, both foot and mounted, used flat shields that might be rectangular, oval, or hexagonal. The relief of Annaeus Daverzus from Bingen (Fig. 150d) has a large, flat, rectangular shield sculpted in low relief, as does Licaius at Wiesbaden. Such a flat shield board was found at Doncaster. Oval shields are often associated with auxiliaries (as at Adamclisi, or on the Mainz column base) and leather covers of this shape have been found. The cavalryman Vonatorix from Bonn has a hexagonal shield, as do several other riders.³³

Standard bearers and some other specialists had small round shields that could be tucked under the arm, depicted on Trajan's Column, Cancelleria Relief A, and the Pozzuoli monument, whilst a leather cover for such a shield has been identified at Castleford from a Flavian context.³⁴

No complete examples of 1st century AD shields have survived, although the similarities between the Kasr al-Harit and Dura-Europos curved shields suggest that the curved 'legionary' shield of this period would be made of three layers of plywood, thicker at the centre than at the edges, with a horizontal handgrip. Indeed the Doncaster shield was almost certainly made of plywood. Fragmentary plywood shield boards with painted leather facings have been found at Masada. Size probably varied, but something approximating to the distance from knee to shoulder may have been usual. Shields were edged with U-sectioned brass binding, normally fastened to the wood with brass nails inserted through lobate expansions on either side of the binding. When recovered from Roman military sites, this binding often shows signs of damage, although it is not really possible to tell whether this results from combat or just careless handling. In addition, the rear face was usually strengthened with iron bars, fastened through the shield board with disc-headed iron nails, and such a bar would frequently reinforce the handgrip.³⁵

Bosses for the legionary shield frequently reflected its shape, being rectangular and curved around the central hemispherical boss, although they are comparatively rare as archaeological finds (the two well-known copper-alloy pieces of *legio VIII Augusta* being 2nd-century (Fig. 49) and the three iron examples from the weapons store at Carnuntum of uncertain date). A curved circular boss was found in a grave at Nijmegen, along with a Roman helmet (see below). Circular bosses from flat auxiliary shields are more common, a particularly fine piece with a punched ownership inscription coming from Zwammerdam, closely comparable with the example depicted on a Mainz column base. Bosses could be of iron or copper alloy, the advantage of the latter being that they could be spun.³⁶

The shield was protected when not in use by a leather cover of goatskin with a draw-string around its periphery. These had specially shaped patches that fitted over the boss, and were decorated with appliqué panels containing the legionary name or motif – at Vindonissa the name of the unit in openwork, at the Bonner Berg site a rather crude representation of Minerva, tutelary deity of *legio I Minervia* (whose name is also included in the design). A Flavian-Trajanic shield cover from Roomburg bears an ansate panel with a stitched *cohors XV Vo(luntariorum)* inscription, flanked by a pair of capricorns. This and a second, more fragmentary, cover suggest that rectangular shields were carried by the citizen 'volunteer' regiments in common with legionary troops, although it is of course unclear whether such shields were similarly curved. Caesar implies that it was normal to take the cover off before battle. Although the Masada fragments indicate that the shield board itself was covered with leather glued to it, some bosses at least were clearly designed to be seen.³⁷

Indeed, the study of shield covers has revealed an otherwise unattested type of shield, with curved ends and straight sides. Known from sites like Valkenburg, Caerleon, and Bonner Berg, in the case of the last, the shield was legionary (a fact recorded by the stitching marks on the vanished appliqué panel). Since these covers are not found after the Hadrianic period, but curved legionary shields continue in use, it is not unreasonable to suggest that they came from flat boards, perhaps belonging to legionary light troops.³⁸

Representational evidence suggests that legionary shield blazons comprised a thunderbolt (*fulmen*) and wings, as well as stars and crescents, and these were probably

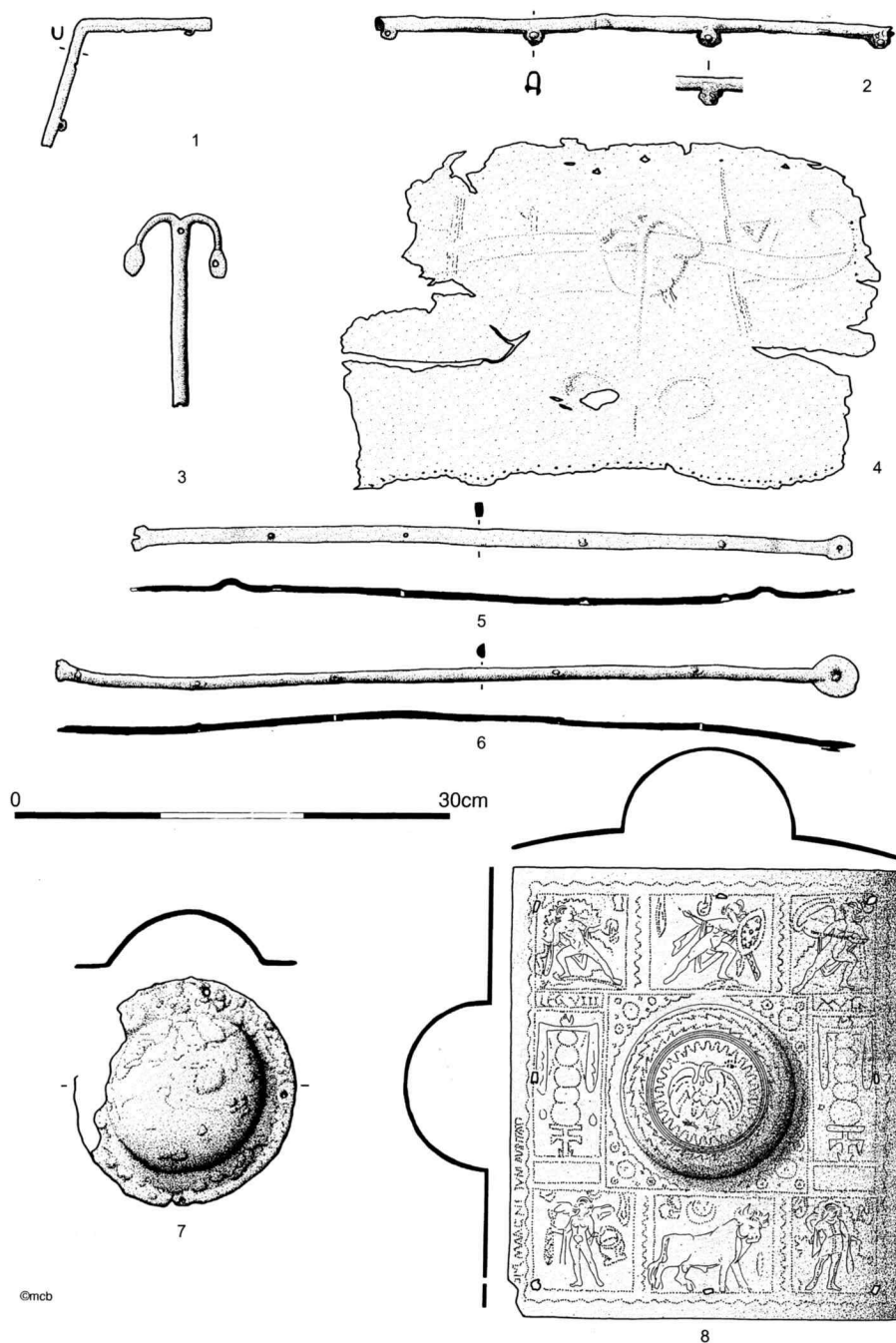


Figure 49: Early Principate shields. 1–2 Binding (1 Aislingen; 2 Spettisbury); 3 reinforcing strip (Newstead); 4 shield cover with impression of reinforcing strip; 5–6 handgrips (Newstead); 7 flat boss (Doncaster); 8 curved boss (Tyne at South Shields).

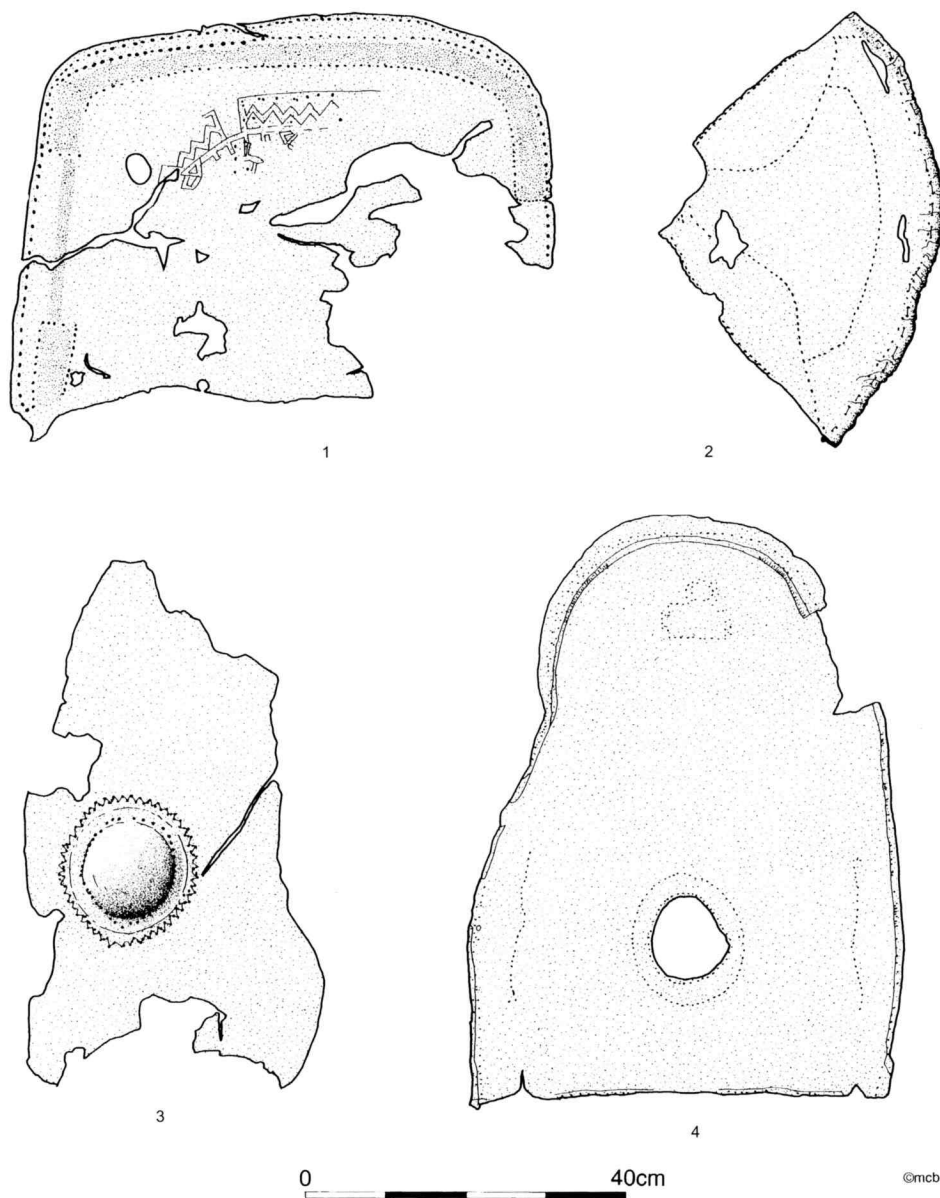


Figure 50: Early Principate shield covers. 1 Rectangular (Vindonissa); 2 circular (Castleford); 3 shield boss (Vindonissa); 4 oval (Valkenburg).

painted on the shield board. Praetorian designs often included a scorpion, but nothing is known about auxiliary blazons. Attempts to identify individual units on Trajan's Column by their supposed badges are misguided.³⁹

Body Armour (Figs. 51–8)

Mail continued in use both with legionaries and auxiliaries during the 1st century AD, a fact that is demonstrated by finds of small clumps of the rings. Robinson showed quite convincingly that what had often been thought to be leather armour on sculpture was in fact supposed to be mail, and the tombstone of C. Valerius Crispus of *legio VIII Augusta* from Wiesbaden (Fig. 3a) shows mail in use by a legionary in the Flavian period, and the Adamclisi metopes confirm its continuation amongst some Trajanic legionaries.⁴⁰

Its use was of course widespread amongst the *auxilia* (arguably more so than scale armour, but this could just be due to a quirk in the representational evidence), and is found worn by both cavalry and infantry. Mail fasteners are known from a number of sites and frequently echo their Iron Age antecedents. These hinged fittings, attached to the centre of the chest, served to fasten the shoulder-doubling. Hip-length mail shirts were now common, those of cavalrymen having a short slit on either side to make it easier to sit on a horse (but this feature is also shown on mail worn by a soldier on a Mainz column base).⁴¹

Scale armour was also used by both legionaries and auxiliary infantry and cavalry. The tombstones of the Sertorii from Verona, one a *centurio* (Fig. 52,3) and the other an *aquilifer* with *legio XI Claudia*, both depict scale, as does the tombstone of a centurion from Carnuntum and, of course, the Adamclisi metopes (Fig. 53). Amongst auxiliaries, the cavalrymen Vonatorix from Bonn, and Longinus Sdapeze of *ala I Thracum* from Colchester (Claudian or earlier) wear scale. Finds of scales in the archaeological record appear to show this type of armour was used much more widely than the tombstones suggest. Scales were frequently tinned, as were alternate ones on a cuirass from Ham Hill (the intervening scales were left their natural brass colour). A hybrid form of body defence, the so-called *lorica plumata*, consisted of mail with very small scales attached to its surface. Presumably very time-consuming to produce, it is not a common find. No examples of the metallic muscled cuirass, presumed to have been used by officers (Fig. 52,1), have survived from this period.⁴²

The form of armour for which the 1st century AD is best-known, however, is that termed '*lorica segmentata*' – a cuirass constructed of strips of iron sheet articulated on leather straps, with copper-alloy fittings. A recent coinage, the Roman name is unknown. Although the Corbridge find that led to our full understanding of this damage-prone type of armour belongs firmly in the 2nd century AD, pieces are found on military sites from the Augustan period onwards and it does not seem to have changed much over a century. Its origins are uncertain, but may lie with gladiatorial equipment, since the articulated armguard or vambrace (*manica*) was certainly in use in this sphere. The earliest finds come from Augustan military sites in the Rhineland and along the Elbe and show that the familiar (and very characteristic) lobate fittings of the Corbridge type were not part of the original design. These Augustan types were still to be found amongst the equipment of the army that invaded Britain.⁴³

The earliest datable lobate fittings come from Chichester (deposited by AD 47?) and Colchester (deposited in AD 49 when *legio XX* moved on?). The fittings are often found on British sites of the 1st century AD and are one of the pivotal points in

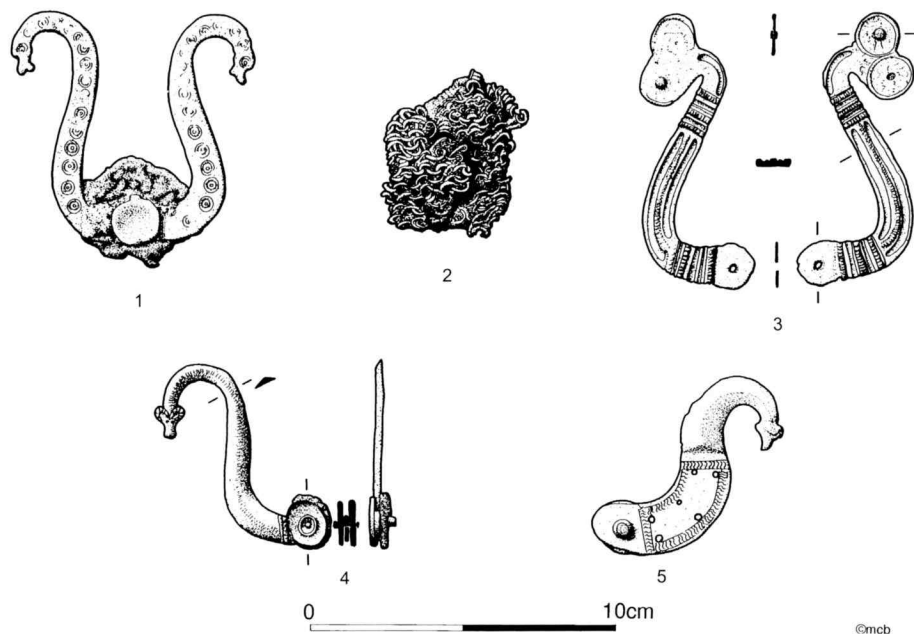


Figure 51: Early Principate armour – mail. 1 Chassenard; 2 Carnuntum; 3 Longthorpe; 4 Dangstetten; 5 Sheepen.

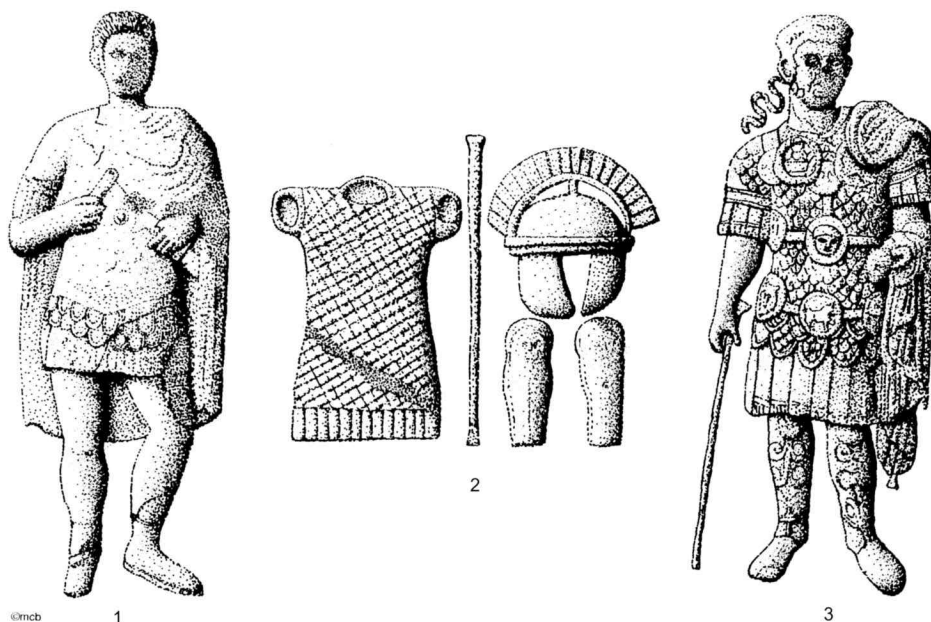


Figure 52: Early Principate tombstones of a prefect and two centurions. 1 T Exomnius Mansuetus (Sitten); 2 T. Calidius Severus (Carnuntum); 3 Q. Sertorius Festus (Verona). (Not to scale).



Figure 53: Adamclisi monument. 1 Marching legionaries; 2 fighting legionary. (Not to scale).

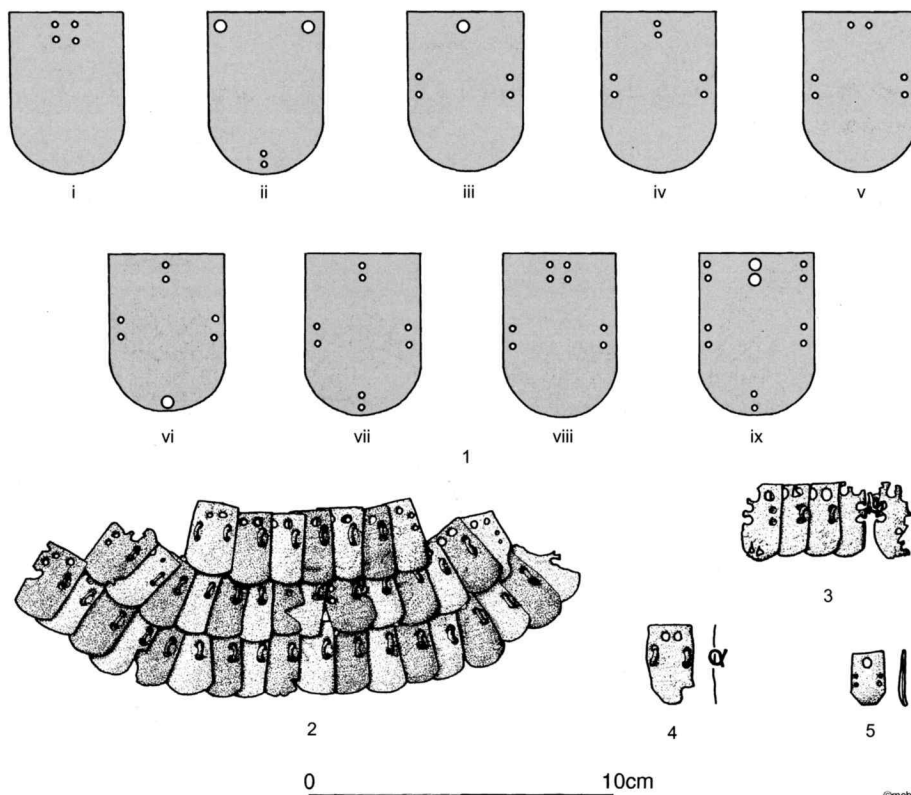


Figure 54: Early Principate armour – scale. 1i–ix von Groller's classification of the Carnuntum scales; 2 Ham Hill; 3 Kempton; 4 Longthorpe; 5 Chichester.

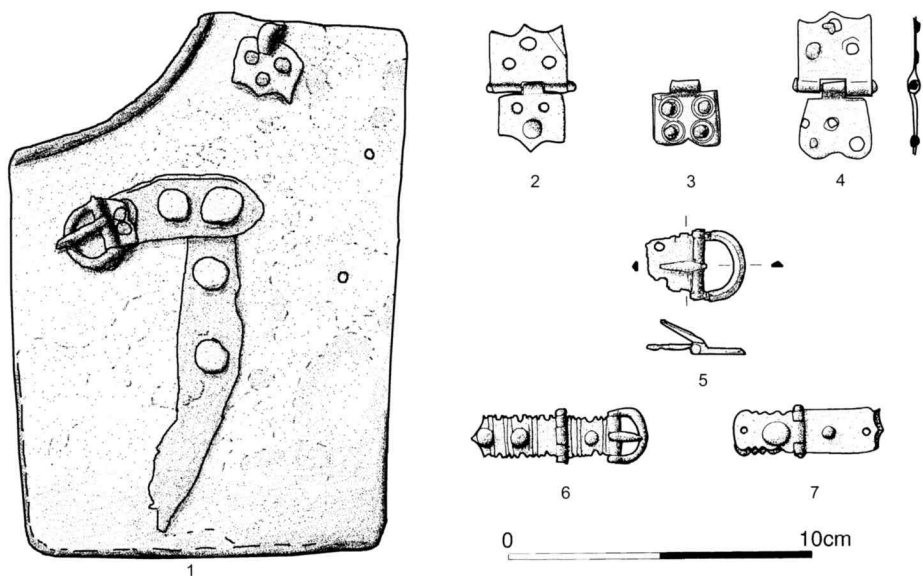


Figure 55: Early Principate armour – Kalkriese type 'lorica segmentata' fittings. 1 Breastplate (Kalkriese); 2–4 sub-lobate hinges (2 & 4 Strasbourg, 3 Chichester); 5 strap-mounted buckle (Kalkriese); 6–7 hinged strap fittings (6 Vindonissa, 7 Hod Hill).

discussions over whether there were distinctions between legionary and auxiliary equipment (see Chapter 10). Usually made of very thin sheet copper alloy, these fittings were commensurately fragile and seem often to have broken. Moreover, the electrolytic reaction between the copper alloy and the iron of the plates would have led to these being the first place that corrosion would start.⁴⁴

The 'lorica segmentata' was especially strong in shoulder-defence, probably for the same reasons that mail shirts had shoulder doubling. Indeed, most of the damage on the Corbridge cuirasses was in the shoulder area. However, it has been pointed out that plate armour has one major advantage over mail, that being the fact that when hit it would absorb the force of a blow (a so-called 'soft' armour), whereas mail, unless extremely well padded, would be driven into the flesh of the wearer. The use of a padded undergarment (*thoracomachus* or *subarmalis*) with 'lorica segmentata' would have further protected the shoulders from bruising, and this would also solve some of the supposed problems with the angle of the breastplates on modern reconstructions. Some writers have suggested that plate armour was easier to manufacture than mail. Whilst the processes involved in making mail would be tedious to the lone craftsman, an increase in manpower would greatly facilitate production.⁴⁵

Limb armour was used by some legionaries in the 1st century AD. A segmental armguard is shown on the tombstone of Sex. Valerius Severus of *legio XXII Primigenia* from Mainz. The Adamclisi reliefs show such armguards being worn by legionaries, leading some scholars to suggest that they were adopted purely to counter the menace of Dacian scythe-weapons (*falces*), but Valerius Severus' tombstone denotes wider use. Substantial portions of at least three ferrous *manicae* have come from what is almost

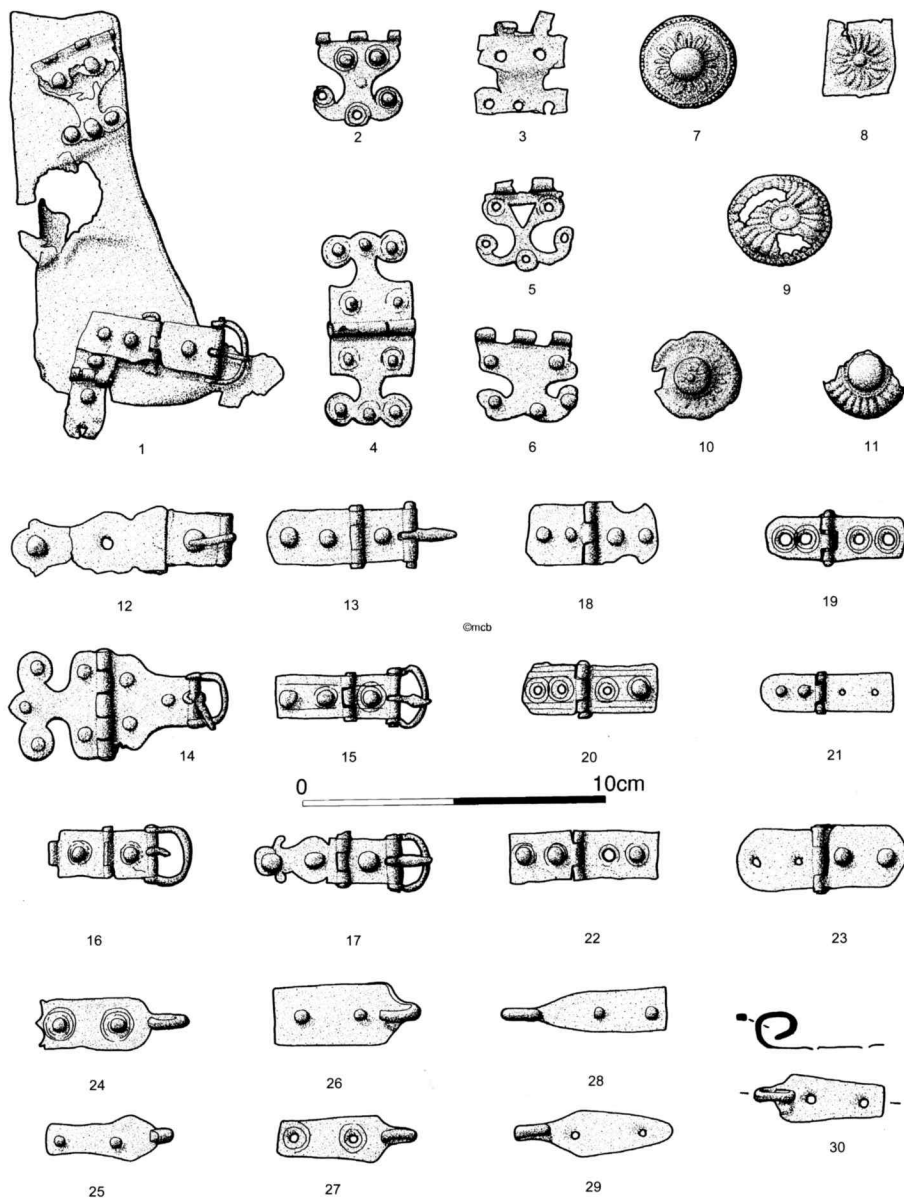


Figure 56: Early Principate armour – Corbridge type 'lorica segmentata' fittings. 1 Breastplate (London); 2–6 lobate hinges (2 Sheepen; 3 Rheingönheim; 4 Chester; 5 Hofheim; 6 Oberstimm); 7–11 decorated washers (7 Silchester; 8 Rheingönheim; 9 Longthorpe; 10 Chichester; 11 Chester); 12–17 hinged buckles (12 Sheepen; 13 Chichester; 14 The Lunt; 15 Rheingönheim; 16 Aislingen; 17 Vindonissa); 18–23 hinged strap fittings (18 Carnuntum; 19–20 Oberstimm; 21 Broxtowe; 22 Rheingönheim; 23 Rißtissen); 24–30 tie loops (24 & 26 Hod Hill; 25 Rißtissen; 27 Rheingönheim; 28 Carnuntum; 29 The Lunt; 30 Corbridge).

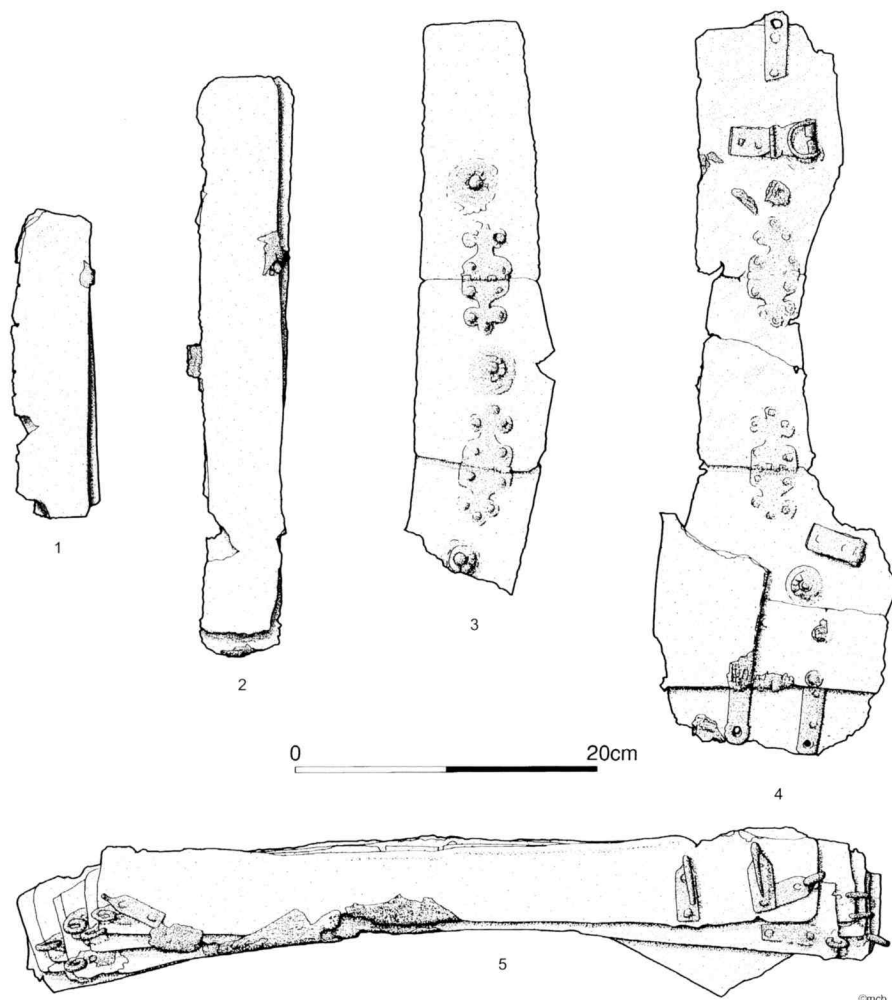


Figure 57: The Corbridge Hoard armour, cuirass 5. 1–2 Lesser shoulder-guards; 3 upper shoulder-guard; 4 collar plates; 5 girth plates.

certainly a Hadrianic context at Carlisle. Likewise, it is often said that greaves, both decorated and undecorated, were the exclusive preserve of centurions and cavalry, but they are also shown being worn by ordinary infantry on the Adamclisi metopes; a sculpture from Alba Iulia may also depict one. The leather lining from a greave was found in the *Schutthügel* at Vindonissa.⁴⁶

Helmets (Figs. 59–61)

Perhaps one of the best attested forms of Roman equipment from this period, the helmet can be seen to have had a number of different traditions which gradually began to blend. However, helmet studies are hindered, rather than furthered, by the various sys-

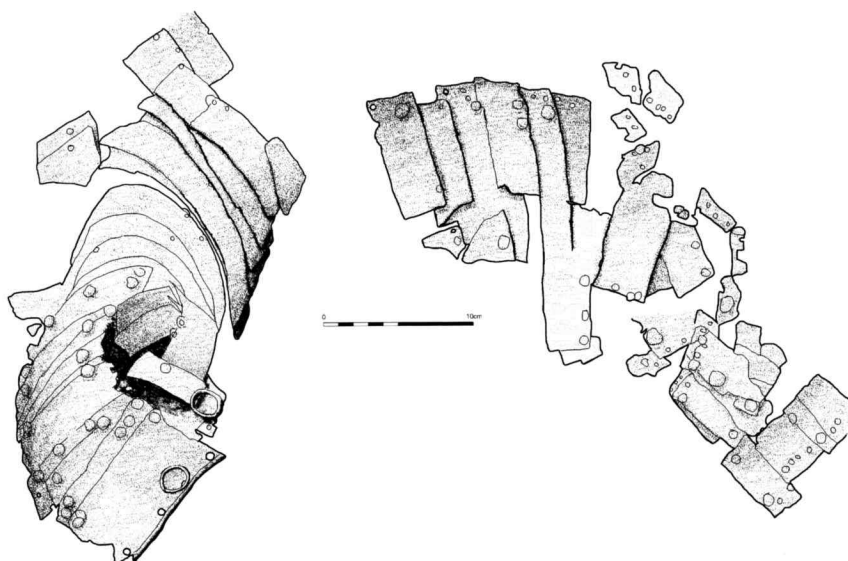


Figure 58: Early Principate armour – armguards from Carlisle.

tems of classification in use: continental scholars preferring a clumsy type-site nomenclature, and the British using Robinson's inflexible scheme (with its implied linearity of development). The essential characteristics of the helmets introduced in the 1st century AD were a bowl and broad, ribbed neck-guard manufactured in one piece, a browguard, and large hinged cheek-pieces. Helmets now also began to feature cut-outs on the side of the bowl for the ears, some even having added ear-protectors. The browguard and ribbing on the neck were probably designed to counter (or at least hinder) slashing blows travelling downwards, whilst the neck-guard quite clearly protected the back of the head and shoulders.⁴⁷

The Coolus and Montefortino types continued from the Republic, whilst the Imperial-Gallic (also known as 'Weisenau') and Imperial-Italic types soon came to the fore, so that a trend towards a deeper neck and broader neck-guard is detectable amongst the better-dated pieces. The earliest piece that is recognisably Roman was found in an Augustan grave at Nijmegen (along with the above-mentioned curved, circular shield boss), but there are a number of similar helmets from undated contexts which appear to belong to the same stage of development. However, examples of the Agen-Port type of helmets, although technically pre-Roman, may well have been used by Celtic auxiliaries in the service of the Romans, and this would provide a likely mechanism for the introduction of this helmet to the regular soldiers of the legions.⁴⁸

The Imperial-Gallic helmet was usually (but not exclusively) manufactured of iron, the bowl having to be beaten out over a former. It was characterized by a pair of stylized eyebrows on the front of the helmet bowl. Trimmed with brass piping and decorated with brass bosses (sometimes enamelled), these are amongst the finest helmets produced by the Romans. Imperial-Italic helmets, on the other hand, lacked the quality of finish displayed by their Imperial-Gallic counterparts, although they had many of the

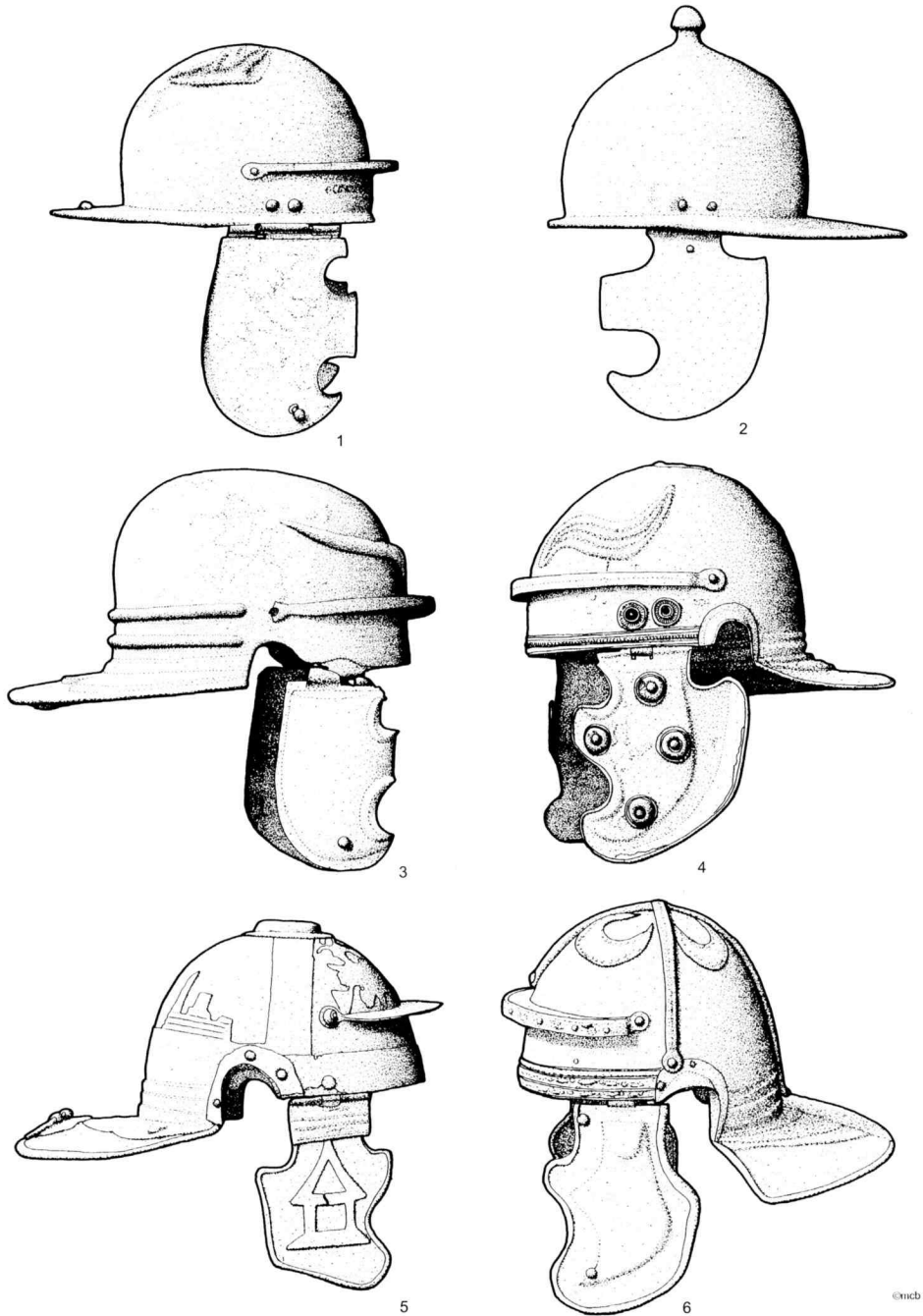


Figure 59: Early Principate helmets. 1 Coolus C (Schaan); 2 Montefortino F (Cremona); 3 Imperial-Gallic A (Nijmegen); 4 Imperial-Gallic D (Mainz); 5 Imperial-Italic D (Mainz); 6 Imperial-Italic G (Hebron). (Not to scale)

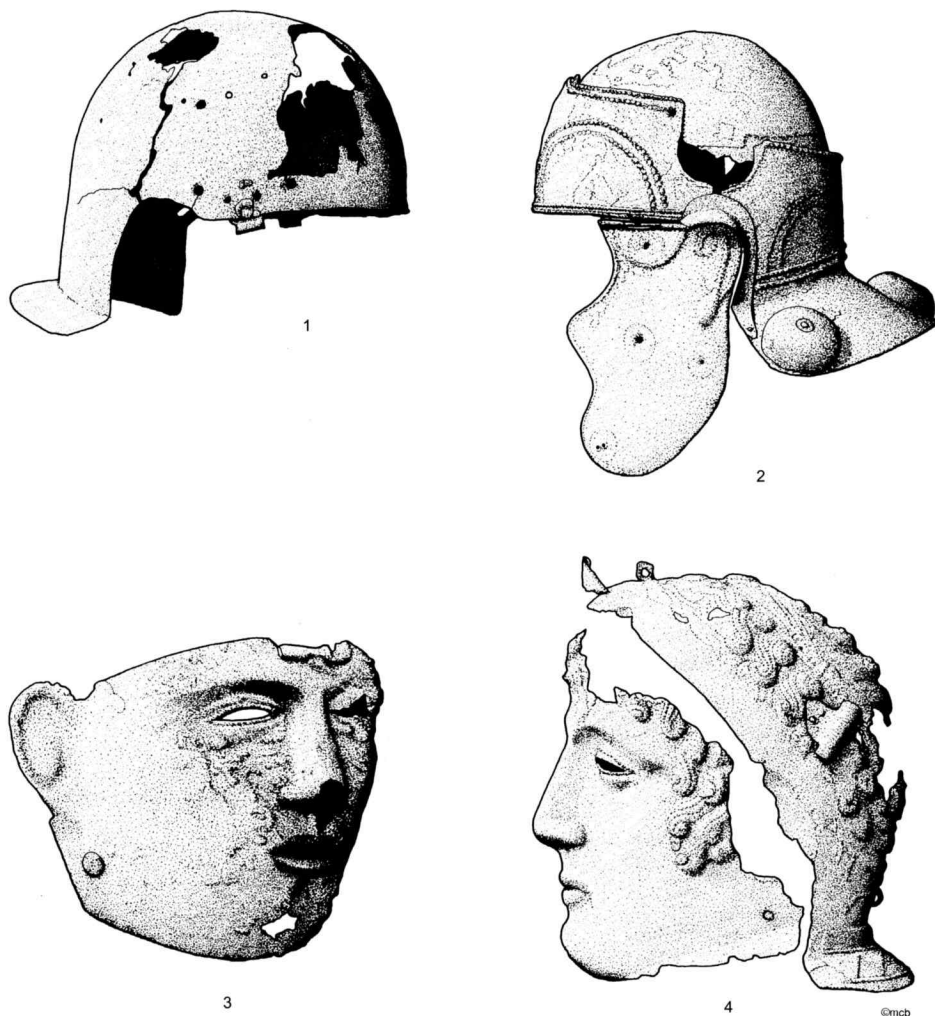


Figure 60: Early Principate battle and 'sports' cavalry helmets. 1, 4 Newstead; 2 Ely; 3 Chassenard. (Not to scale)

same design tendencies. Crests could be fitted to helmets, for which purpose a forked crest-box holder could be slid or twisted into a plate on top of the bowl, and plume-tubes on the side of the bowl could receive decorative plumes. No example of a crest-box has survived from this period, but we know how wide they must have been from the crest-box holders. Nor, curiously enough, have any fittings been identified that might have belonged to the transverse crest worn by centurions. Many helmets, both iron and copper-alloy, were tinned or silvered.⁴⁹

When not in use, helmets might be protected by leather covers and an example enclosed in this way has been found at Vindonissa.⁵⁰

It was also in the 1st century AD that carrying-handles began to appear on helmet neck-guards. This interpretation of isolated handles is sometimes doubted, but those that do belong to helmets are always of the same internal width, just big enough to place the three middle fingers through the loop whilst steadying the neck-guard with the thumb and little finger. Helmets had to be lined and, more often than not, padded so that they fitted comfortably; the remains of lining are sometimes found, as with a helmet from Vindonissa.⁵¹

In truth, the distinction between the two traditions may be more illusory than real and the implication of Robinson's terminology – that they were manufactured in two different areas – may be misleading. Their origins may have been disparate, but the reasons for their evolution were probably the same. It has also been suggested that some helmets, purely because of the poor quality of their manufacture, might have been specifically designed for auxiliaries, but this is difficult to prove without a larger body of data and more specific inscriptions.⁵²

Cavalry helmets enjoyed a quite separate developmental life from their infantry counterparts during the 1st century AD. Tombstones, such as those of T. Flavius Bassus from Köln (Fig. 4a) and C. Romanus Capito from Mainz, both of *ala Noricorum*, show helmets with what appears to be hair depicted on the helmet bowl itself, that of Romanus also showing a decorated cheek-piece. Helmets resembling these are seen on the arch at Orange. A few actual examples are now known, and fragments (especially cheek-pieces) of this type of helmet are fairly common finds. The helmets were made of iron and then covered with a copper-alloy sheathing, embossed to look like hair on the bowl itself. Cheek-pieces completely covered the wearer's ear and were likewise of iron with a thin covering copper-alloy sheet (an example from Kingsholm was actually of copper), usually highly decorated with embossed mythological scenes. Virtually complete examples are known from Koblenz-Bubenheim, Weiler, and Xanten (Pl. 2a), but iron bowls have also been found at Newstead and Northwich.⁵³

A bizarre twist has been added by the discovery of cavalry helmets from Nijmegen and Xanten with organic remains ('hair nets') adhering to the exterior of the bowl. It has been suggested that these 'hairy' helmets, like the embossed metal examples, may hark back to the iconography of Alexander the Great.⁵⁴

During the 1st century AD, the first evidence of what is usually called 'sports' or 'parade' armour is encountered. This is thought to have been used by Roman auxiliary cavalry in the exercise called the *Hippika Gymnasia*. The helmets associated with this activity were made in two parts, a helmet bowl and a face mask, and these were usually hinged together. A well-dated grave find from Chassenard (AD 37–41) included a mail shirt folded up inside such a helmet. This is certainly not the earliest known example: masks from such helmets have been found at Kalkriese and in the legionary base of Haltern, which must date to the years c. 7 BC–AD 9. The Newstead examples presumably belong to the abandonment of the fort in c. AD 105, but a sports helmet with mask came from a particularly exciting 1st century grave at Catalka, along with mail, scale, and lamellar armour, and various other pieces of military equipment indicating a blending of steppe and Roman influences. Burials like those at Catalka and Chassenard may involve native, perhaps especially Thracian, commanders of auxiliary units serving with the Roman army.⁵⁵

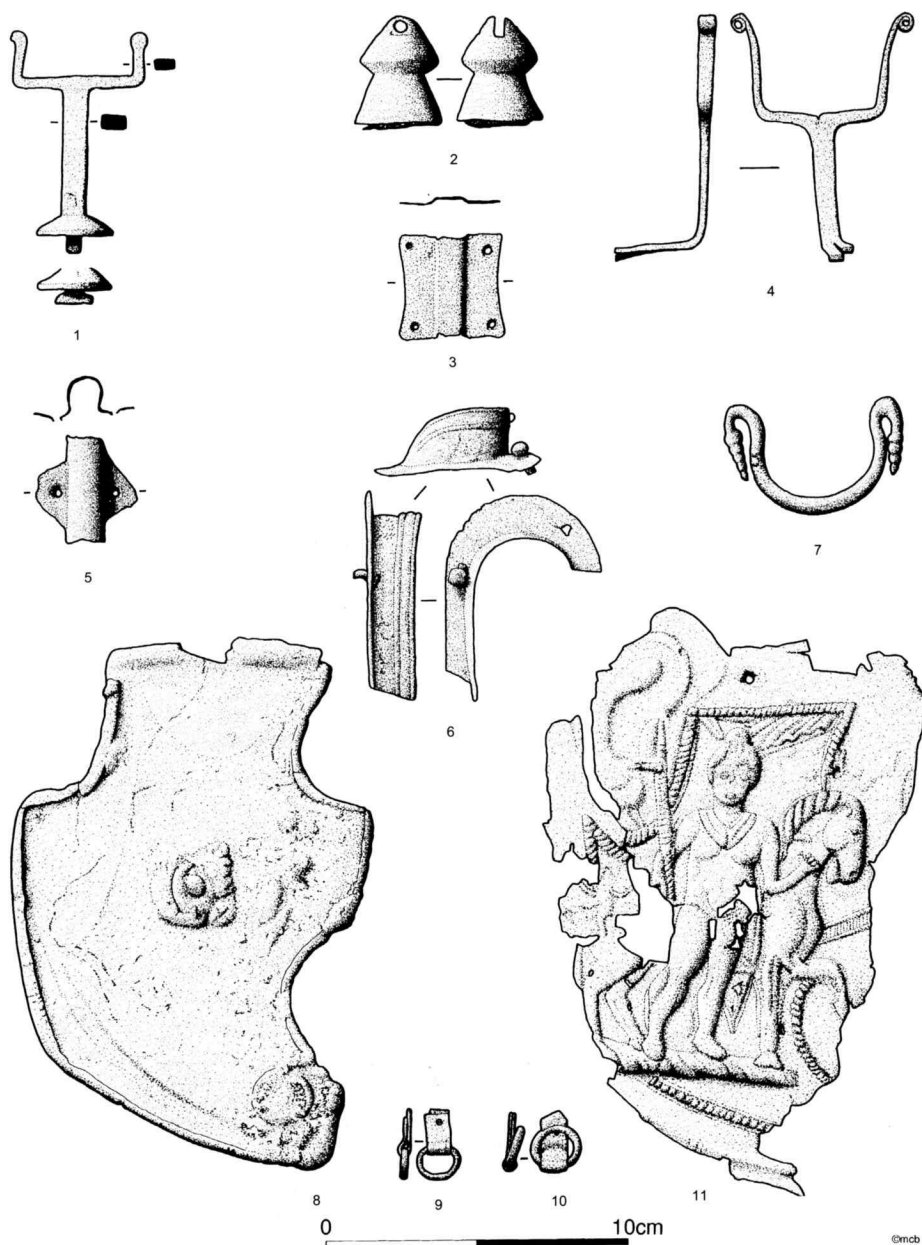


Figure 61: Early Principate helmet fittings. 1 Twist-on crest holder (Aislingen); 2 crest knob (Chichester); 3 slide-on crest holder attachment (Rheingönheim); 4 slide-on crest holder (Rheingönheim); 5 plume tube (Rheingönheim); 6 ear-guard (Rheingönheim); 7 carrying handle (Eich); 8 iron infantry helmet cheekpiece (Chester); 9–10 tie loops (Waddon Hill); 11 copper-alloy helmet cheekpiece (Brough by Newark).

It has been suggested that these 'sports' helmets can be identified on sculpture, but even the best Roman tombstones cannot be relied upon to support this interpretation. Some writers have taken three tombstones from Mainz to indicate that infantry standard bearers could also wear this type of helmet, but the sculptures are all too crudely executed to provide reliable evidence for this.⁵⁶

Other Equipment

Belts (Fig. 62)

Although traditionally known as the *cingulum militare* (or *militiae*), there is good reason to believe that the Roman military waist-belt of the 1st century AD was actually simply called a *balteus*. The term *cingulum* is hardly ever found before the 3rd century AD; Varro stated that *cinctus* was a belt worn by men, *cingillum* that worn by women. Papyri and literary sources suggest that *balteus* is the more correct term, for in a letter of AD 99, Terentianus' sister Apollonous wrote to him in Greek that 'I understood from Thermouthas that you obtained for yourself a pair of belts [using the Greek *baltion*, equivalent to the Latin *balteum*], and I was much gratified.' Another fragmentary letter of the early 2nd century AD, written by Claudius Terentianus to his father Claudius Tiberianus, includes the phrase *balteum militare*. The Tiberianus archive also has a letter from one Tabatheus to Tiberianus which refers to the fact that a relative 'sent your son Isidorus to you so that [he might take to you] your belts (*baltea*).' Pliny the Elder shed more light on this terminological problem when he discussed the soldiers' habit of silvering military equipment, noting that 'their scabbards ring with silver links and their belts (*baltea*) with silver plates'. Tacitus recorded that when Vitellius needed to raise money for his attempted usurpation in AD 69, soldiers handed over their belts (the word '*balter*' is used) in lieu of cash. Isidore of Seville simply stated that 'the *balteus* is the military belt'.⁵⁷

Tombstones show that there was a gradual change during the 1st century AD from two belts (often worn 'cowboy' fashion, that is crossed) to just one (Fig. 150). Originally, each belt served to support one sidearm, but later both dagger and sword were hung on one belt (or the dagger was worn on the belt and the sword on a baldric over the shoulder). It has been suggested that the introduction of the single belt coincided with the appearance of '*lorica segmentata*', since crossed belts were impractical with this type of cuirass. However, single belts are also presented worn with mail shirts, so we must be careful not to over-simplify this matter. The Herculaneum 'soldier' had two belts and the Trajan's Column sculptors confusedly depicted up to four(!) belts with segmental armour. In fact, there was a general change from narrow belt-plates to broader ones and it might be argued that this coincides with the change from two (narrow) to one (broad) belt. Reconstruction work has shown that the belt (or belts) served to relieve the weight of a mail shirt upon the wearer's shoulders.⁵⁸

The elements common to all belts were ordinary belt-plates, plates with a hinged buckle, and plates with dagger or sword frogs (sometimes, but not always, hinged). A set from Velsen contained four plain plates, one buckle plate, and two frog plates

whilst one from Rheingönheim (found together with the sword) had five plain plates and one with a buckle. There is no guarantee of the integrity of the Rheingönheim set, but the Velsen fittings are almost certainly complete and would seem to indicate that some belts did not have plates to the wearer's rear. This is suggested by a relief from Cassacco, but the Herculaneum 'soldier' (who was wearing one belt and had another wrapped around the sword he was carrying) had at least sixteen, and possibly as many as twenty-one plates on his two belts (five were attached to the sword handle and the marks of five more were evident on the sword sheath). Thus it is possible that the Herculaneum belts were completely covered by plates.⁵⁹

In Britain and the Rhineland, the narrow belt-plates were either left plain and then part or wholly tinned or silvered on the front face (as was the case with the belt fittings from the well at Velsen), or quite often decorated with niello inlay. Even when inlaid with niello, the belts usually seem to have been tinned or silvered, providing an attractive contrast between the white metal surface and the black of the niello. The decorative motifs largely consisted of geometrical and vegetal designs, frequently incorporating one or more saltire patterns, reflected on some of the finer tombstone representations of belts. The plates were usually cast and fastened to the leather of the belt itself using four rivets.⁶⁰

Another type of plate was that embossed with designs such as the wolf-and-twins (*lupercal*), a hunt scene, or a bust (often thought to be the emperor Tiberius) with *cornucopiae*. In Britain, these are generally only found in the south and west of England where the *legio II Augusta* was campaigning after the capture of Camulodunum. On the continent, they are mainly found in Upper Germany, Raetia, and Noricum. Both rectangular and circular examples were associated with the sword and scabbard excavated at Vindonissa. Plates from the Magdalensberg (abandoned c. AD 45) confirm the use of this type in the Claudian period, and might further indicate that they are contemporary with the niello-inlaid plates.⁶¹

At the same time, another type of embossed belt-plate was to be found, bearing a simple boss and concentric rings. This pattern, dominating the latter half of the 1st century AD, was accurately depicted on the Cassacco gravestone and first occurs in the Augustan period, as at Haltern. Finds from Tekije are of this kind, as were those worn by the Herculaneum 'soldier'. Both ends of the plate were rolled over to form a tube and a spindle with bulbous terminals passed through it as a sort of 'pseudo-hinge'.⁶²

Buckles were normally hinged to one of the plates, although occasionally they were integral with it. Tombstone evidence shows the buckle both on the wearer's left hand end of the belt and on the right, but with the latter a more common method. Buckles of this period were normally D-shaped and frequently had internal volutes, although one type had a quadrilateral form that can be seen in both earlier and later periods. Buckle tongues were almost exclusively of the 'fleur-de-lys' type, less elaborate examples usually being repairs.⁶³

Dagger frogs were likewise normally hinged to a belt-plate, and would either be made by casting in one piece and then bending up the knob, or the button would be riveted on after the frog had been cast.⁶⁴

A different kind of belt seems to have been worn by at least some cavalymen, such as Bassus and Vonatorix. This 'Celtic belt' was a normal (but apparently unadorned)

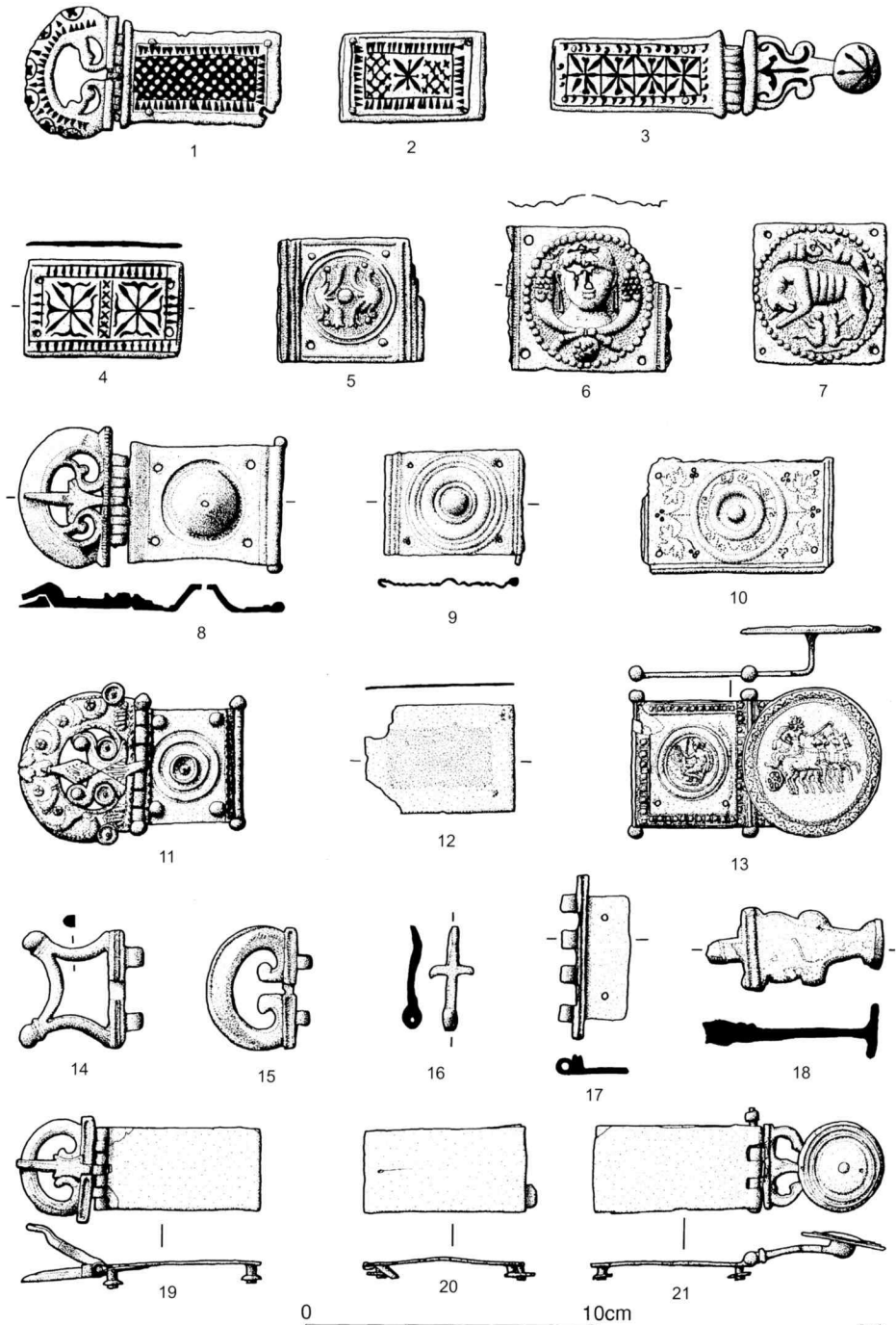


Figure 62: Early Principate belts. 1–3, 5, 15 Hod Hill; 4, 8–9, 18 Rheingönheim; 6 Rißtissen; 7, 14, 17 Oberstimm; 10 Colchester; 11 Tekije; 12 Mehrum; 13 Naples; 16 Verulamium; 19–21 Velsen.

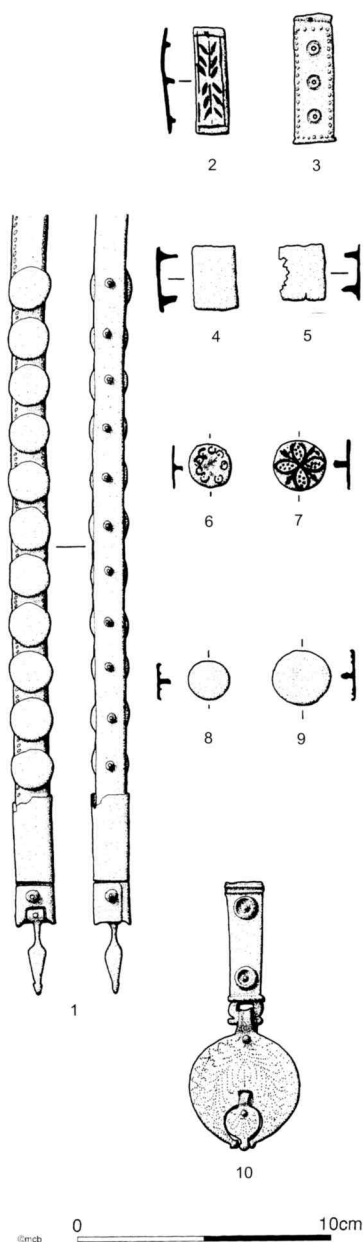


Figure 63: Early Principate aprons. 1 Rhine at Mainz; 2, 4-5, 8-9 Rheingönheim; 3, 10 Tekije; 6 Caerleon; 7 Hofheim.

waist belt with an additional strap which appears to have fastened to the lower suspension rings on the scabbard. It is clearly shown on the statue of the Vachères warrior (Fig. 6).⁶⁵

'Aprons' (Fig. 63)

It is commonly held that the 'apron' (also sometimes erroneously called the 'sporran' – a Gaelic word for purse), as it has become known, originated in the elaboration of belt terminals with studs and pendants, and developed into as many as eight straps with sixteen studs each. This process, it is said, can be seen on the sculptural evidence. The tombstone of the *aquilifer* Cn. Musius from Mainz shows the end of his belt divided into four straps, each with a terminal pendant, three of these hanging freely, the fourth passing through the buckle and thus appearing shorter. Two reliefs from Pula are also pertinent here. One shows a Pompeii-type sword and belt, complete with belt-plates, to which it is evidently attached. At the opposite end to the buckle, the belt is divided into two straps, each of which is studded, with a lunate terminal. The other sculpture shows a dagger attached to a belt (again with belt-plates) which ends in four straps with crude representations of terminals. The arch at Orange represents plated belts with terminals. Finally, the fragmentary tombstone relief from Cassacco shows two crossed belts, the ends of which hang freely as an apron.⁶⁶

Care must be exercised, however, because the bulk of the representational evidence can be dated only very approximately. In fact, it could equally well be argued that different 'apron' traditions developed in different areas, or that a range of forms were in use at the same time.

For the more elaborate 'aprons', our evidence is surprisingly good. Not only did an actual example survive from the Rhine in Germany, but a set of fittings were found with the Herculaneum soldier, closely paralleling some from Tekije and Aznalcázar. These correspond with the 'aprons' shown on 1st century AD infantry tombstones (Figs. 3, 148), but they do not help in interpreting function. It is thought that it offered protection to the area of the lower abdomen and groin, although practical experiments with reconstructions have shown that weighted straps swinging between the legs of running soldiers are more likely to pose an additional, unwanted, hazard in combat. A more attractive theory is that which sees the 'apron' as a mark of status, reinforcing the soldier's ego with its jingling components (stealth wearing an apron would have been virtually impossible, but it is not difficult to imagine the effect of thousands of men marching past!).⁶⁷

Studs are found in vast numbers on most Roman sites and it is usually impossible to tell what they were used for. Plain disc-headed studs abound, many of them tinned or silvered, but the fact that those on the Rhine strap and many in the Tekije hoard were of this form suggests that at least some such studs from military sites must come from aprons. Some disc-headed studs were inlaid with niello, a sure sign that they were in military use. Apron straps were terminated with a hinged pendant, as the material from Tekije, Herculaneum, and the Rhine demonstrates (it is even clear on some tombstones), although pieces of what are quite obviously cavalry equipment are quite commonly misidentified as 'apron terminals'. Examples of lunate terminal pendants can be found both in sculpture and amongst archaeological finds, but the form attached to the Rhine strap, and a more general teardrop type seem to have been equally common.⁶⁸

Tunics and Leggings

The Roman military tunic was very distinctive, for it instantly marked its wearer as a soldier simply by the way it was worn: shorter than the everyday tunics of ordinary citizens. Its lower edge hung just above the knee, but it could also be worn off-the-shoulder, as a number of early 2nd century AD reliefs attest. Unfortunately, these garments are unlikely to survive in a recognisable form in the archaeological record, although some tunics (almost certainly not military and probably not Roman) were found in the Cave of Letters at Nahal Hever.⁶⁹

In form, it may have been a simple 'bag' comprising two rectangles joined, with a central neck opening and holes for the arms. Length could evidently be regulated by gathering the material over the waist belt. The length was clearly important, for one of Augustus' punishments for wayward soldiers recorded in Suetonius was that they should be made to stand outside the headquarters building of a legionary base without a belt, simultaneously depriving them of their two key indicators of status (weapons belt and short tunic).⁷⁰

Early imperial tunics had a very distinctive form (shown to best advantage on the tombstone of Annaius Daverzus) which may mean they were more complex than just a straightforward bag. They also seem to have been worn with a cummerbund (possibly called the *fascia ventralis*) beneath the waist belt(s).⁷¹

One recent attempt at reconstruction has suggested that the later tunic was fairly loose and could be knotted at the shoulder to gather up surplus material (these knots are shown on reliefs such as that in Chatsworth House). There is little modern agreement about the colour of military tunics (or even whether there was one set colour), but it is interesting that a pay record from Masada mentions white tunics.⁷²

Under the early Principate, cavalrymen are depicted on sculpture as wearing leggings that reach to just below the knee. This fashion seems to have caught on and some of the Adamclisi metopes show infantrymen wearing similar garments (Fig. 53). Some cavalrymen, such as Flavius Bassus (Fig. 4a), also wear a long-sleeved tunic with the cuff turned back and with a split in the hem, apparently identical to that of the Vachères warrior (Fig. 6).⁷³

Cloaks and Capes

There were two types of overgarment habitually worn by soldiers under the early Principate and these were the *sagum* and *paenula*. The *sagum* was a draped cloak, fastened at the wearer's right shoulder by a brooch, whilst the *paenula* was a cape which the soldier put on over his head. Tombstones of the 1st century AD show rather more men wearing the *paenula* than the *sagum*, and the former lasted well into the 2nd century AD (Chapter 6).⁷⁴

There seems to be little doubt about the form of the *sagum*. It appears to have been a rectangular piece of material, usually depicted as having one or more fringed edges (Fig. 5d). These might be applied fringes, but it seems more likely that the edge of the material had been deliberately picked out to avoid hemming or unsightly fraying of a cut edge. If specially woven, two of the edges could have been selvedge. The fastening of the *sagum* must have been one of the major uses of brooches in the Roman army.

The *paenula* may have been oval or circular in shape, to judge from the representations (Fig. 150b–c), with a central hole for the head. As worn, it was knee-length, and split up the front, being fastened on the breast with buttons and toggles (but not brooches, apparently), a fact revealed by the detailed sculpture on a funerary *stela* from London. When the sides of the *paenula* were folded over two or three times onto the shoulders, to give easy access to side-arms, the front opening below its fastenings yawned wide, creating the characteristic 'W' profile. This was often exploited by sculptors of both metropolitan monumental and private funerary works, specifically to exhibit the sword, belt and/or apron, and thus to emphasise the wearer's military status.⁷⁵

Centurions such as Caelius, Sertorius (Fig. 52,3), and Favonius Facilis are depicted on tombstones wearing the *paludamentum*, draped over the left shoulder and wrapped around the left arm, more as a symbolic than a practical garment.⁷⁶

Footwear (Fig. 64)

Roman military footwear of this period was very distinctive and is well-known from the literary, representational and archaeological evidence. Usually known as a *caliga*, each boot was made from three main pieces of vegetable-tanned ox or cow leather – the up-

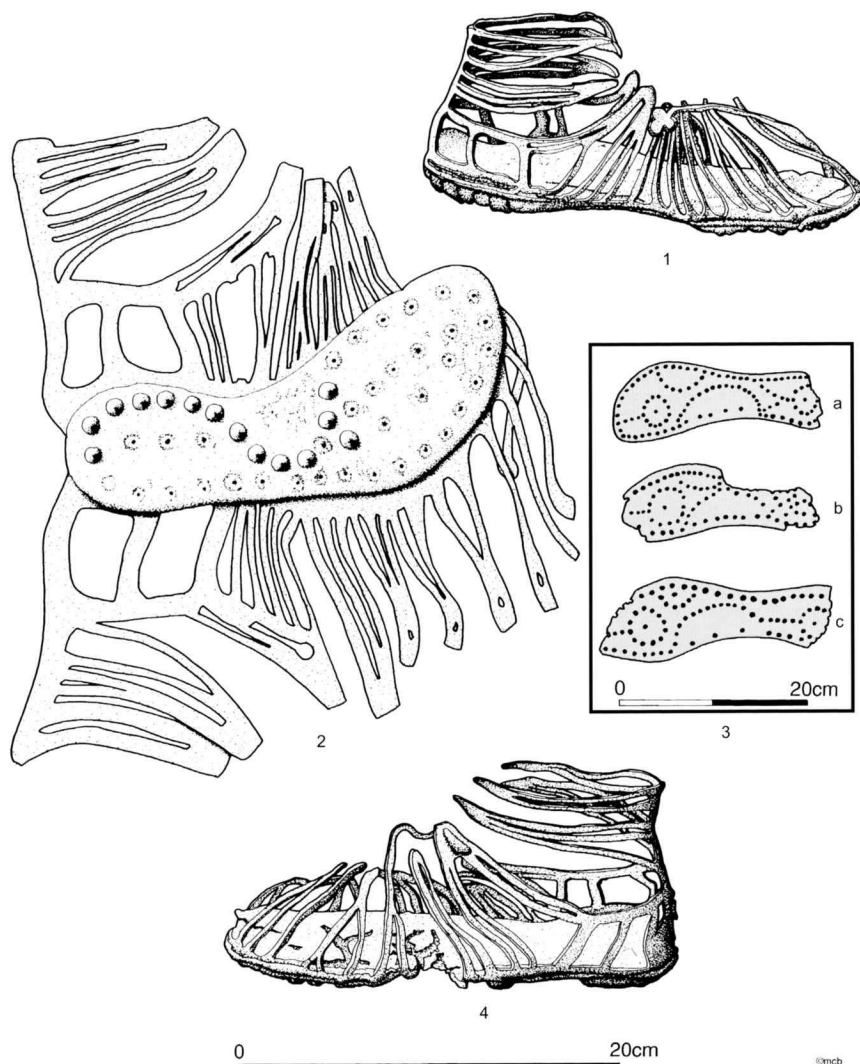


Figure 64: Early Principate footwear. 1 Complete caliga (Mainz); 2 underside of a caliga (Mainz); 3 caliga nailing patterns from a Valkenburg; b Xanten; c Velsen; 4 Complete caliga (Mainz).

per, the sole, and an insole. All three layers were clenched with hobnails, frequently arranged in patterns, at least some of which were designed to facilitate comfortable walking and anticipated 20th-century research into the optimum design of training-shoe soles. The uppers were pierced with openwork designs, so that the boots looked more like the modern idea of a sandal, but it was, as van Driel-Murray has pointed out, an extremely functional piece of footwear. The openwork upper gave good ventilation, the many straps allowed adjustment to fit the peculiarities of an individual's foot, whilst parts of the boot that might rub (toe joints, ankle, big toe nail)

were cut away. *Caligae* found on Roman military sites seldom show signs of repair, usually being thrown away once the nails started to wear through the insole and thus become uncomfortable. Complete boots have been found at Mainz and Valkenburg, but their remains are known from several 1st-century sites where waterlogged conditions have preserved leather.⁷⁷

Caligae were laced up through the end of the openwork straps, and were frequently depicted on 1st-century Rhineland tombstones in paint, only the ridge caused by this lacing being represented in relief (leading many earlier scholars to think the soldiers went barefoot!). Socks were worn (they are mentioned in the writing tablets from Vindolanda) and one open-toed type without a heel is even shown on the Cancelleria relief (Fig. 2).⁷⁸

Hob-nailed boots were not merely worn by Roman soldiers, but they became synonymous with the military. Juvenal commented on the brutal use of boots on civilians and the imprint of studs on a victim's face. Josephus recounted the anecdote of a Roman centurion who was killed by a mob after his hobnails caused him to skid on stone paving and fall over, and it seems that soldiers from the frontiers, visiting Rome and unused to paved streets, were the butt of metropolitan humour. Hob-nailed boots were forbidden to Jews by Jewish law for reasons of identification, because both their tracks and their noise revealed the presence of Roman soldiers.⁷⁹

Standards (Fig. 65)

No legionary eagles of any period survive, but there is a considerable body of representational evidence to show what they looked like. The tombstone of the *aquilifer* Cn. Musius depicts the eagle with its raised wings garlanded, perched on a thunderbolt, on top of an elongated square-sectioned plinth. The standard shaft has a downward-curving hook and is terminated by a conical butt. A similar depiction can be found on the tombstone of L. Sertorius Firmus at Verona. Eagles with raised wings are also shown on the Adamclisi metopes and Trajan's Column.⁸⁰

Centurial standards are also shown on reliefs, including tombstones. These are typically a decorated spear with a crossbar and attached pendant straps, the shaft bearing a mixture of discs and crescents, as in the Republican period, and a conical butt. Inverted hooks and what appear to be tassels are also common features. They frequently bore representations of a raised hand, harking back to the manipular organisation of Republican units, when each *manipulus* had two centurial standards. Praetorian standards, like that shown on the funerary panel of M. Pompeius Asper, might include eagle, *imago*, and scorpion decorations, as well as symbols (such as crowns) depicting unit awards. A *signum* of the *ala Afrorum* is shown on the tombstone of Oclatius.⁸¹

Imagines – busts or portraits of the emperor – were carried by both infantry and cavalry units, examples of the former being shown on the tombstone of Genialis, and the latter on that of Flavinus. Intriguingly, at least one object from Newstead may have belonged to an *imago*. A large embossed copper-alloy disc with a part-circular niche contains what appears to be the head and shoulders of a figure. Lacking any detail (which was presumably provided on an embossed appliqué panel, perhaps of precious metal), the object was 245mm in diameter. A silver *phalera* from Niederbieber, adorned

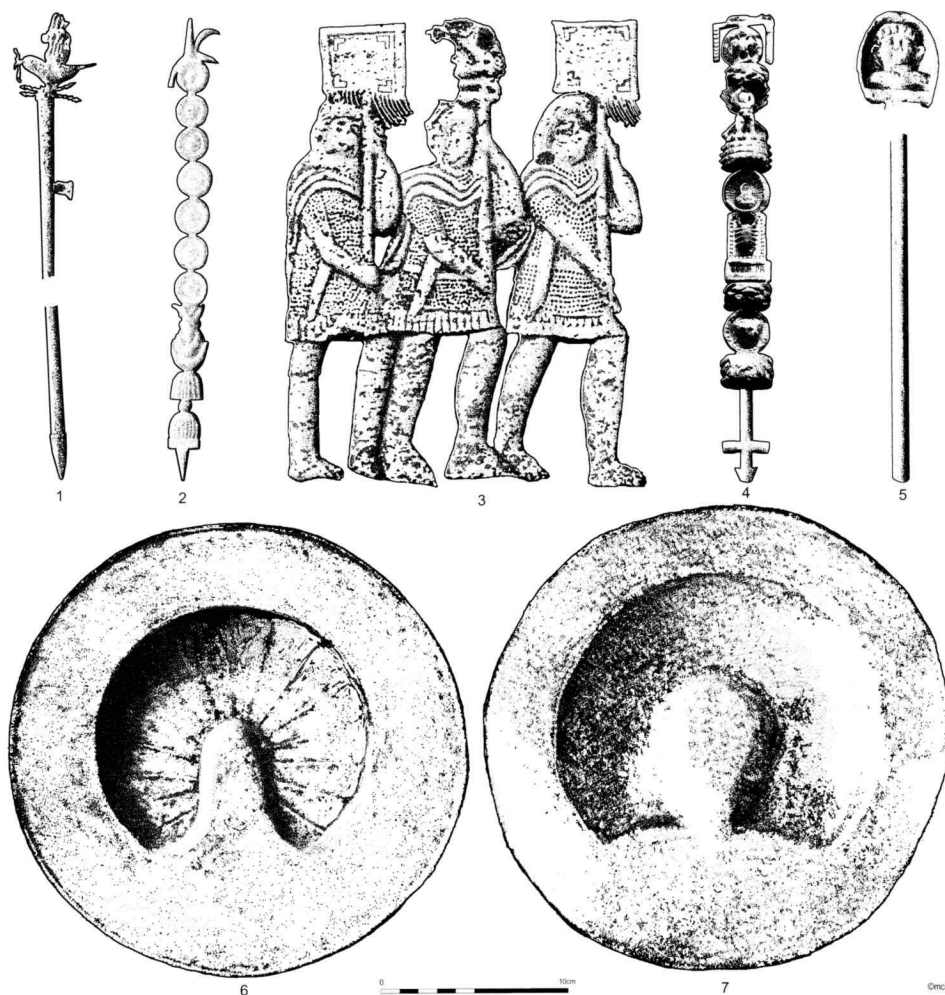


Figure 65: Early Principate standards. 1 legionary eagle (Gn. Musius, Mainz); 2 legionary signum (Q. Luccius Faustus, Mainz); 3 vexillarii (Adamclisi); 4 praetorian signum (M. Pompeius Asper, Tusculum); 5 auxiliary imago (Genialis, Mainz); 6–7 possible imago phalerae (Newstead). 1–5 not to scale.

with the figure of an emperor (possibly Tiberius), has also been suggested as a standard disc.⁸²

Vexilla were square flags suspended from crossbars terminating in pendant straps mounted on a spearshaft. They served as standards for both cavalry units and detachments from other units. They are shown on the Adamclisi metopes and occur frequently on Trajan's Column. A teardrop-shaped pendant bearing the portrait of Nero may be an example of a fitting from a *vexillum*.⁸³

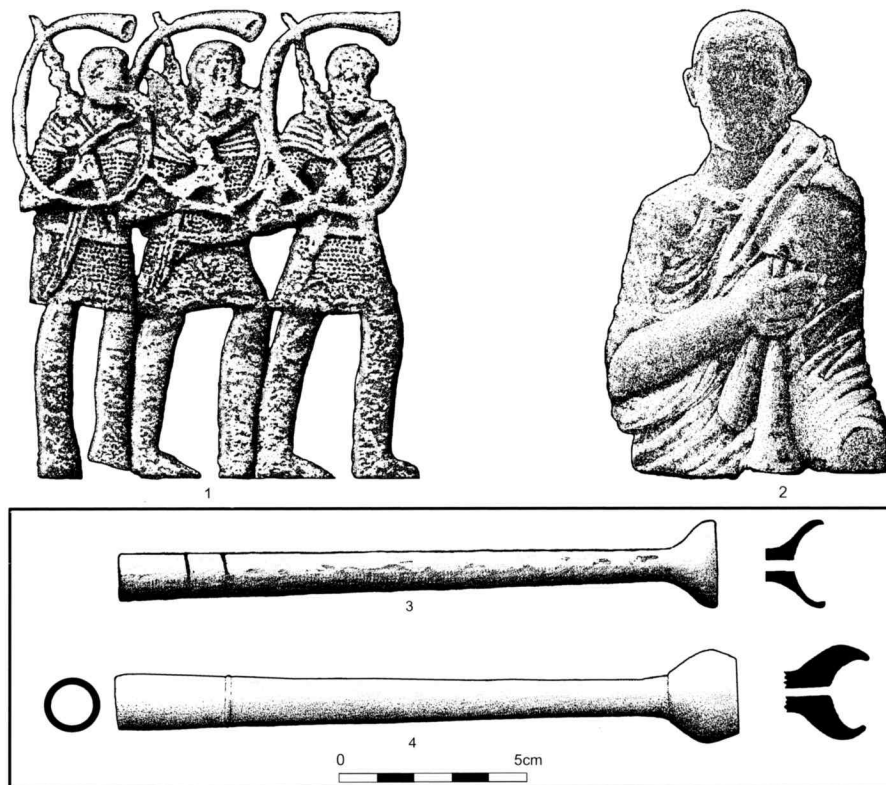


Figure 66: Early Principate musical instruments. 1 Cornicines (Adamclisi); 2 tubicen (Sibbaeus, Mannheim/Mainz); 3-4 mouthpieces (3, Great Chesterford; 4 Vindonissa). 1-2 not to scale.

Standard bearers, with the possible exception of *aquiliferi*, are often (but by no means always) depicted wearing animal skins over their helmets. On Trajan's Column, Praetorians are shown wearing lion skins, legionaries and auxiliary infantry those of bears. Unfortunately, these appear to have left little trace in the archaeological record.⁸⁴

Musical Instruments (Fig. 66)

A range of musical instruments were used by the Roman army, including the *cornu*, the *tuba*, and the *bucina*, according to Vegetius. These seem to have been used in combination with the standards for signalling, more than providing any sort of marching band. Flutes were also used in religious ceremonies (and probably to provide a beat for rowers in the fleet).⁸⁵

As a rule, all that survives in the archaeological record are cast copper-alloy mouthpieces, usually because they were detachable, but Pompeii produced a civilian example of the *cornu* which bears close comparison with military representations of the

instrument on the Adamclisi metopes or Trajan's Column. The *cornu* was curved into a near-circular shape with a central bracing crossbar which was used as a handle. *Cornua* were widely used outside the army, particularly in connection with public events such as funerals and gladiatorial games, hence the examples recovered from Bay of Naples sites. The tombstone of the *tubicen* Sibbaeus at Mannheim depicts his *tuba* and this shows it to have been a long straight instrument, broken into two pieces. The *tuba* of C. Vetienius Urbiquus has a biconical bell (a mute?), decorated with beading around its broadest point. A curved musical instrument is also depicted on the stone of the cavalryman Andes, but as no reference is made to it in the accompanying text and it is not instantly recognisable as any of the above instruments, it has only served to inspire debate amongst scholars. Fragments of a wooden flute have been recovered from Vindonissa. Trajan's Column shows musicians, like standard bearers, wearing animal skins.⁸⁶

Bags

There was a wide range of baggage available to soldiers, much of it only qualifying as military equipment because it was demonstrably found in association with troops. Early imperial tombstones show both legionary and auxiliary infantry wearing small rectangular pouches around their necks. Although a case has been made for these having contained writing tablets, the proportions are not convincing. Moreover, most soldiers who had a need to carry such documents made great show of displaying them on tombstones. Therefore, these objects may have been purses (no other type of purse is depicted on military tombstones).⁸⁷

Tents (Fig. 67)

Tents were constructed of leather panels stitched together so that water would run off. Leather panels from tents were first positively identified by McIntyre and Richmond in 1934. The reconstruction they offered, based on a compromise between misinterpretations of depictions on Trajan's Column and the space allowed for each tent in Pseudo-Hyginus' description of a Roman camp, has had to change as more finds of leatherwork have been made. During the 1960s, Groenman-van Waateringe produced the best reconstruction possible that utilized the newly available evidence from the Netherlands, but it was not until the 1980s that large portions of tent began to be found at Vindolanda, enabling a more accurate understanding of this difficult subject. It is now thought that at least one variety of the Roman tent was much bigger than Richmond and McIntyre had envisaged and may in fact have had a wooden frame inside. Tent pegs were of wood, examples of oak (L. 250–500 mm), triangular in section and pointed at both ends, being recovered from the fort ditches at Newstead.⁸⁸

Obstacles (Fig. 68)

One wooden object, pointed at both ends with a medial 'handgrip', was for a long time interpreted as a palisade stake and, curiously, at the same time named '*pilum muralis*' (although to Roman writers this was clearly a weapon thrown from the ramparts and not a

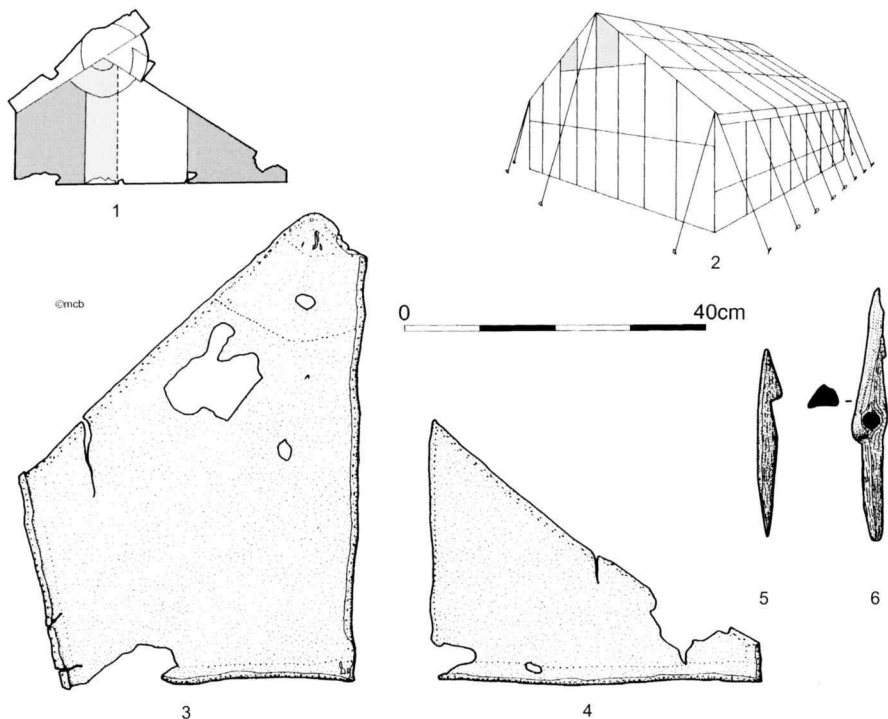


Figure 67: Early Principate tents. 1 Gable assembly (Vindolanda); 2 reconstruction of a contubernium tent; 3-4 gable panels (Vindolanda); 5-6 tent pegs (5 Newstead; 6 Mollins).

rampart stake). The alternative suggestion is that these were components of some sort of portable obstacle, either bound to a common bar as *chevaux de frise* (known to the Romans as *ericus*, a hedgehog), in groups of three or four to make a giant caltrop, or protruding from ramparts above ditches (thorn bushes were used for a similar purpose).⁸⁹

Tools (Fig. 68)

The classic military tool was the pickaxe or *dolabra*, with an axe blade and an opposing tine. Used for breaking up ground when ditch digging, clearing scrub, or sometimes even fighting (as happened in the revolt of Florus and Sacrovir, when legionaries used them to hack at rebellious armoured gladiators). When not in use, the axe blade was fitted with a copper-alloy sheath, probably as much to protect the blade as the careless soldier, and this was occasionally decorated with small pendants.⁹⁰

Military sites naturally produce a wide range of tool-finds that would be equally at home in a civilian context, such as those associated with metalworking, carpentry, and numerous other handicrafts, but military pieces were often marked for unit identification, as was the case with a wooden mallet and a bread stamp, both from Mainz.⁹¹

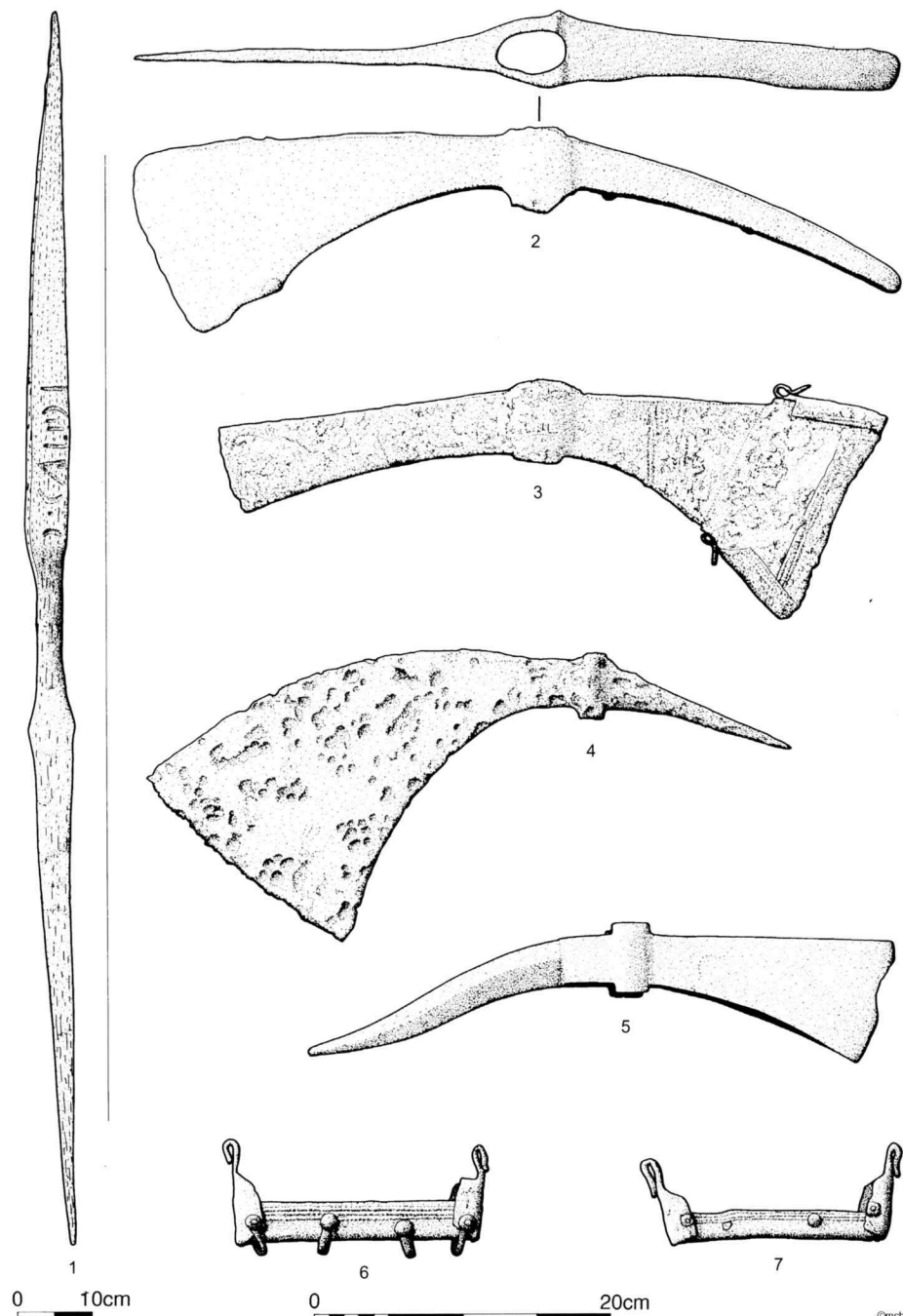


Figure 68: Other equipment of the early Principate. 1 double-ended chevaux-de-frise stake with a centurial inscription (Oberaden); 2–5 pickaxes (2 Brandon Camp; 3 Rhine at Mainz, with (?) leather cover under sheath; 4 Rißtissen; 5 Newstead, with damaged blade); 6–7 pickaxe sheaths (Vindonissa).

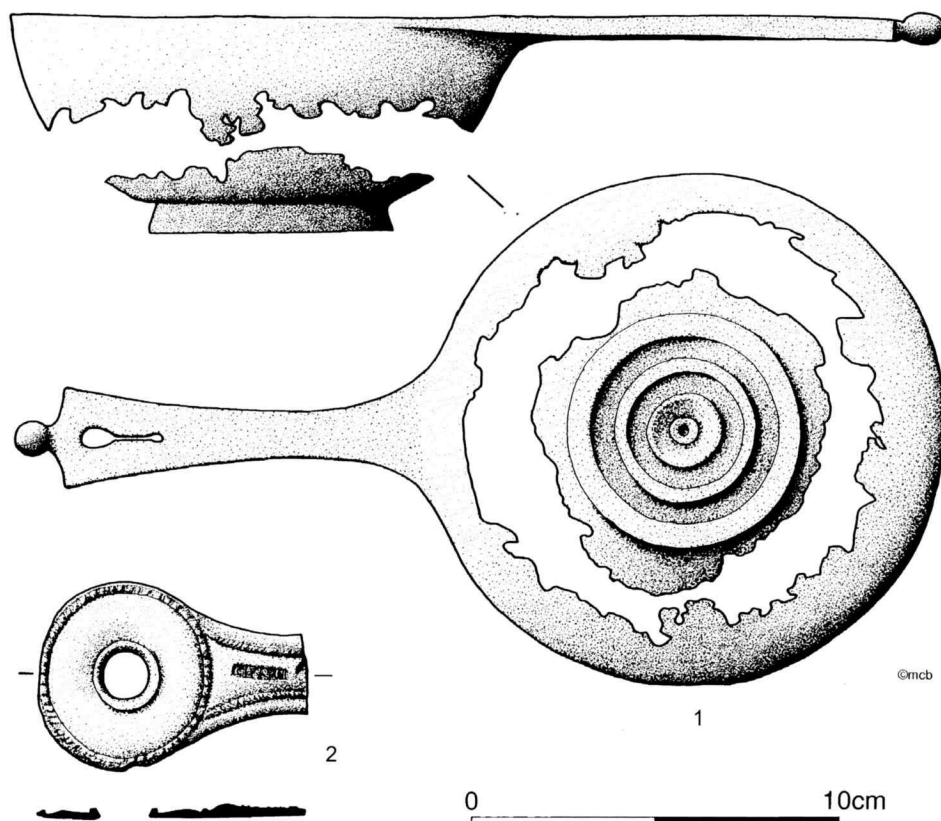


Figure 69: Early Principate metal vessels. 1 Skillet (The Lunt); 2 handle (Chester).

Metal Vessels (Fig. 69)

All soldiers seem to have had access to a wide range of metal vessels, presumably for campaign use when pottery would be too cumbersome and fragile. One familiar piece of military equipment from the 1st century AD is the cooking pan (variously known now as the *patera* or *trulleus*). These came in a range of sizes and had a base with pronounced moulded concentric rings (a feature that aided rapid and even heating of the contents), and were probably the everyday cooking and eating vessel for Roman soldiers of the 1st century. The flat handle, which was cast in one with the rim of the bowl, usually had a hole at the end (convenient for suspending them from a kit pole). In military equipment terms, these objects were unusual not only for being manufactured in Italy, as indicated by the makers' name-stamps, but also for being made from true bronze, not brass (see Chapter 9). One of these pans found at Caerleon not only bore the manufacturer's stamp, but also the countermark of an *ala* to which it presumably belonged. Soldiers also used a range of other copper-alloy cooking vessels and grid-irons.⁹²

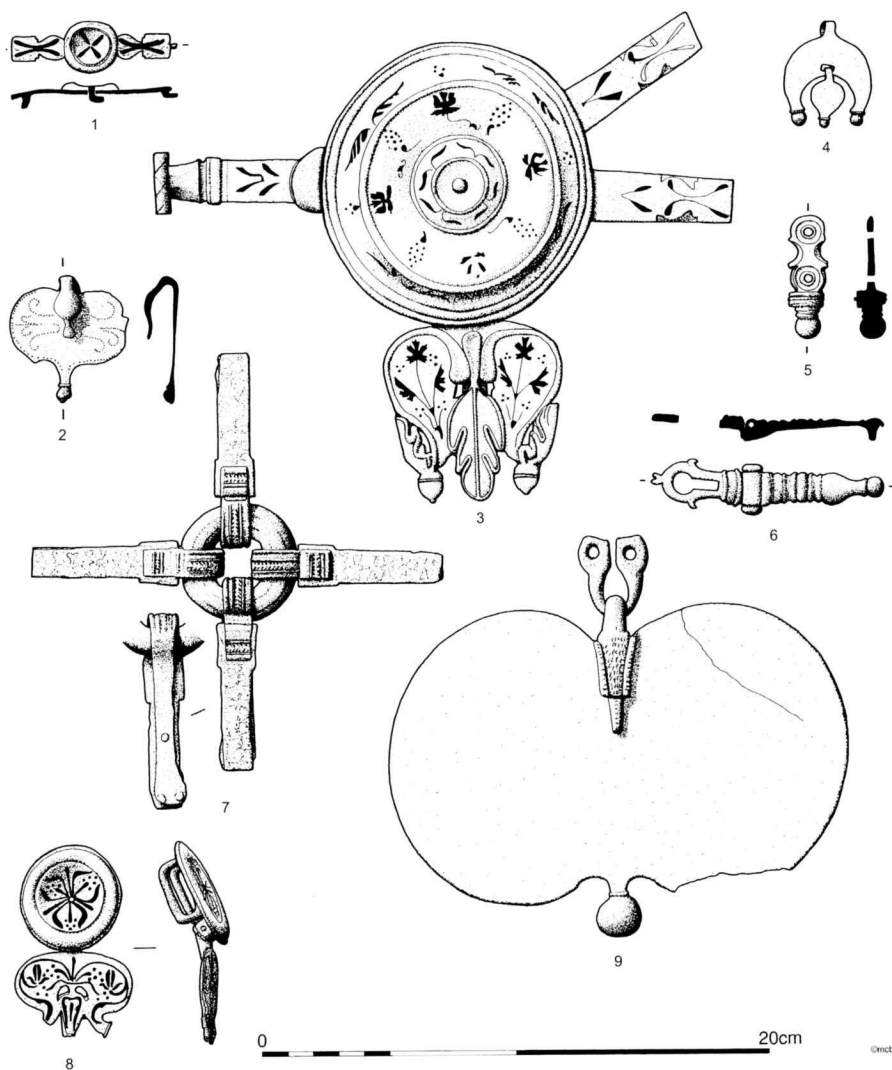


Figure 70: Early Principate equine equipment. 1 Rißtissen; 2 and 7 Rheingönheim; 3 Magdalensberg; 4 Doorwerth; 5 Krefeld; 6 Kempton; 8 Wroxeter; 9 Cirencester.

Funerary reliefs show that the centurion's vine-wood staff (*vitis*) was waist-high, straight, and with a knobbed end. *Optiones*, however, bore a shoulder-high knobbed staff.⁹³

Equine Equipment (Figs. 70–2)

The harness fittings of the auxiliary and legionary cavalry of the early Principate are probably directly descended from Celtic equipment. The main harness consisted of

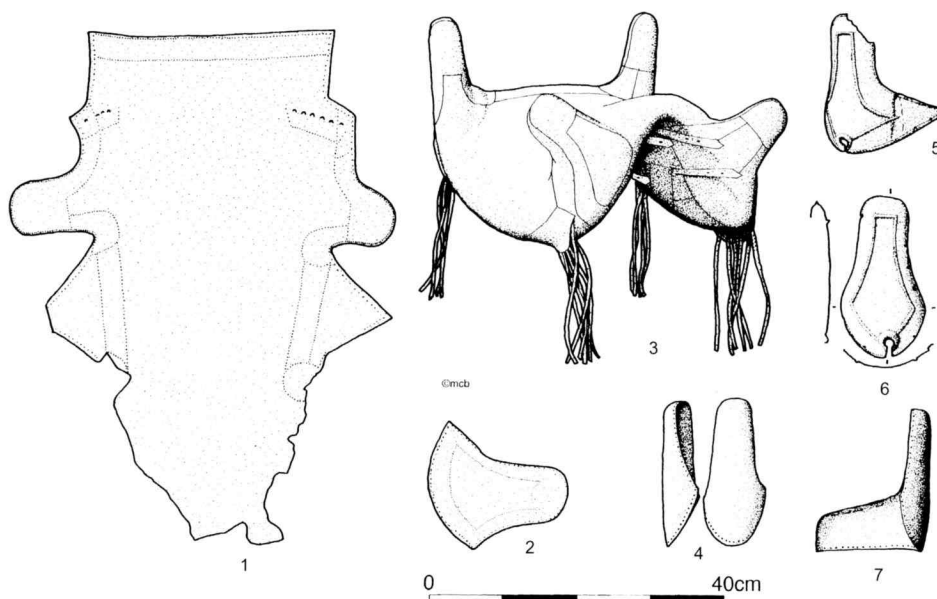


Figure 71: Early Principate saddle fittings. 1 leather saddle cover (Valkenburg); 2, 4-7 saddle horns (2 Valkenburg, 4-5 Mainz-Weisenau, 6-7 Newstead); 3 reconstruction (after Connolly).

five junctions which, along with the girth, served to hold the saddle firmly in place. It combined functional and purely decorative components.⁹⁴

The first type of junction consisted of a cast ring, to which three or four leather straps would be attached by means of free-moving junction loops. Strap-fittings of the pre-Flavian period were frequently decorated with moulded relief which would sometimes incorporate into the design the rivets necessary for attaching the fittings to the leather. The junction loops were boldly adorned with hollow-cast loops, since they were visible with ring junctions. Pendants hung from the harness, characteristically in stylized bird-designs, whilst rectangular openwork saddle plates appear to have been used to decorate the saddle on ceremonial occasions.⁹⁵

However, some time probably during the reign of Claudius, a new type of junction came into favour utilizing concealed loops behind discs (*phalerae*), although some Augustan examples had loops mounted around the periphery of a disc. The fittings were covered with silver foil and inlaid with niello using designs drawn from Bacchic imagery (vine tendrils, leaves, and bunches of grapes, presumably relating to Bacchus' association with horses) and junction loops were now very simple affairs with little or no moulded decoration. Pendants were suspended from the *phalerae* and these employed imagery derived from the oak tree (oak leaves and acorns in low moulded relief), mixed with the Bacchic designs. A similar grammar of ornament was associated with the saddle plates, now being moulded roundels and only limited amounts of openwork on terminal plates. A set of fittings from the Rhine near Xanten includes a *phalera* inscribed (Fig. 18,8) and it has been suggested that this refers to Pliny the Elder, whom we know commanded a cavalry *ala* in Lower Germany during the reign of

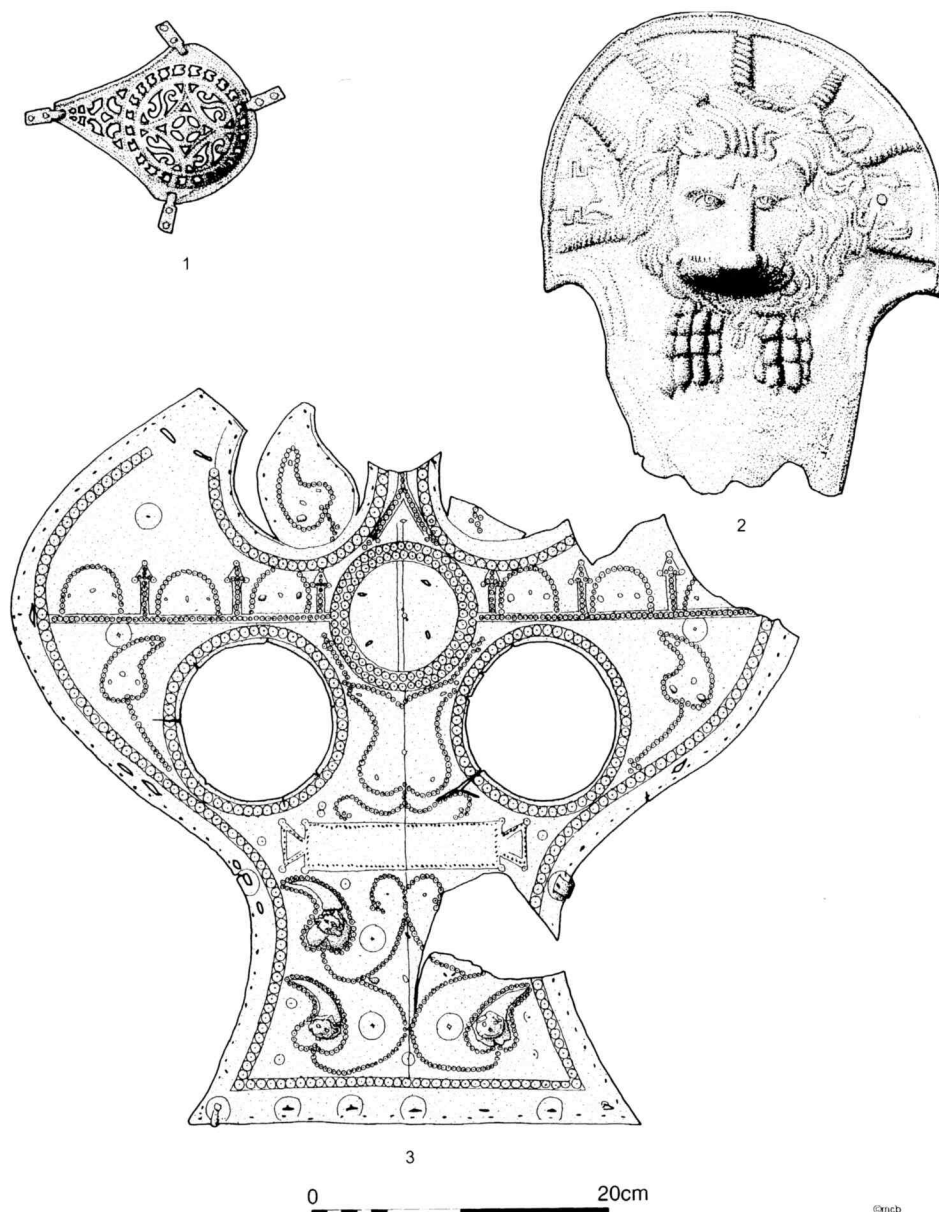


Figure 72: Early Principate horse and 'sports' armour. 1 Copper-alloy eye-guard (Mainz); 2 chamfron (Neuss); 3 leather chamfron with silvered copper-alloy studs (Vindolanda).

Claudius. The Xanten hoard, together with the collection of items from Doorwerth, forms a very important source of information for the study of cavalry harness during this period. In particular, both sets clearly demonstrate the identification of so-called 'baldric fasteners' (see above, p.83) as cavalry harness.⁹⁶

Leather straps from horse harness do not normally survive, except in corrosion products, as they were probably made of oiled, rather than vegetable tanned, leather. Saddle-covers, on the other hand, have survived and a considerable number of goatskin fragments have now been recognised, together with copper-alloy 'stiffeners' for the horns, and these convincingly demonstrate that the saddle incorporated a wooden tree. The most plausible reconstruction of such Romano-Celtic saddles has been made by Connolly which fully accommodates the surviving evidence (shape of the leather, type of stitching, stretch and wear marks), unlike alternative interpretations. The saddle had a wooden tree with four horns, over the whole of which was stretched a leather cover. The shape of the horns is described by the four plates attached to them, and from this it is clear that they passed over the rider's mid-thighs at the front and supported his rump and the base of his back. This made for a comfortable seat and provided convenient points from which to hang items such as a shield, as seen on Trajan's Column and on some gravestones. The horns supported the rider and held his thighs so as to allow him to perform any activities required of ancient cavalry, such as leaning right out sideways to deliver a sword cut or spear thrust, two-handed use of the lance, or shooting a bow in all directions. As modern experimentation has demonstrated, the lack of stirrups before the 6th century did not limit the actions of horsemen using the four-horned saddle.⁹⁷

Tanned leather was also used for chamfrons, serving (together with eye guards) to protect the horse's head during the practice manoeuvres known as the *Hippika Gymnasia*. Cavalry 'sports' armour, of the kind found in the 3rd century, was generally rarer in the 1st century, although a copper-alloy peytral of Claudian date was found at Neuss (a legionary base with a cavalry contingent present); some eyeguard finds could also be strapped onto the head without a chamfron.⁹⁸

Notes

1. Garzetti 1974; Wells 1972; Wells 1984, 133–64; Frere 1987, 48–125.
2. Herculaneum: di Fraia and d'Oriano 1982; Gore 1984; Bisel and Bisel 2002, 468. Velsen: Morel and Bosman 1989. Vindonissa Schutthügel: Hartmann 1986, 92–4. Water: e.g. Bonnamour 1990; Künzl 1999–2000. 'Cananefate': Waasdorp 1999. 'Thracian': e.g. Bujukliev 1986. Varian disaster: Wilhelm 1992; Franzius 1995; von Carnap-Bornheim 1999; Moosbauer 2005.
3. Africa: Mackensen 1991. Palestine: e.g. Holley 1994; Aviam 2002; Syon 2002; Stiebel 2003; 2005.
4. Oberaden: Albrecht 1942, Pls. 48–9. Drill bits: Manning 1985, 160. Shanks: Hübener 1973, Pl. 5, 13–14 (Augsburg-Oberhausen); Manning 1985, Pl. 75, V20–1 (Hod Hill); Fingerlin 1970–71, Fig. 14, 1 and 9 (Dangstetten). Colls: Manning 1985, Pl. 76, V25a–b (Hod Hill); Fingerlin 1970–71, Fig. 14, 2 (Dangstetten); Franzius 1992, Abb. 6, 2–3 (Kalkriese). Headless: Allason-Jones and Bishop 1988, 9, Fig. 9 (Corbridge). Cancellaria: Magi 1945, 26. Socketed *pila*: Webster 1979, Fig. 31, 67 (Waddon Hill). Filzbach and Schänis: Roth-Rubi *et al.* 2004, 43–4, Taf. 4, F64–5 and Taf. 7, B38.
5. Adameli: Florescu 1965, Inv. Nos. 12, 28, 43. Victor: Robinson 1975, Pl. 470; Schober 1923, No. 162; pers. obs. Aquincum Museum. Throwing strap (*amentum*): Caesar, *BG* V, 48; Cordus: Esp. 5835.
6. Scott 1980; Manning 1985, 160–70; Marchant 1990.
7. 'Leaf-shaped': Scott 1980, 333; Marchant 1990, 5. Cf. Barker 1975; Densem 1976.
8. Terminology: Gellius, *Noct. Att.* X, 25. *Lancea Lucullanea*: Suetonius, *Dom.* 10. Elder Pliny: Pliny, *Ep.* III, 5. *Lanciae pugnatoriae*: Tomlin 1998, 55–63.
9. Two spears: Esp. 6207, 6125, *Germ.* 16. Mainz: Esp. 5819. Josephus: *Bell. Iud.* III, 96. *Calones*: Esp. 6435, 6448, 6454, 6463, 6465. Bundles: Esp. 6575.

10. 'Mainz' and 'Pompeii': Ulbert 1969b. Fighting styles: Connolly 1991a, 362. Britain: Manning 1985, Pl. 71, V2; Webster in Down 1981, Fig. 8.28,1; Brailsford 1962, Fig. 1.A8. Handle: Fellmann 1966; Greep 1983, 20, Fig. 3. Rheingönheim: Ulbert 1969a, 44–5. Gladiator: Grant 1967, Pl. 29; pers. obs.
11. Veg. I,12; Polyb. III,114. Change: Connolly 1991a.
12. Pompeii: Ulbert 1969b, 97–9; Maiuri 1947, Fig. 102. Herculaneum: Gore 1984, Fig. 572. Verulamium: Frere 1984, Fig. 11.71–2. Waddon Hill: Webster 1979, Fig. 29.52. Hod Hill dating: Todd 1982, 53–4. Hand-guard: Ulbert 1969b, 97–9.
13. Mainz sheaths: Grohne 1931; Ulbert 1969b, 128 No.13 (Weser); *MZ* 12/13, 1917/18, Fig. 6,1; *AuhV* 4, Pl. 27,1 and 3; *Westdeutscher Zeitschrift* 23, 1904, Pl. 4,1–2 (Rhine). Cf. Klein 2003d. Filigree sheaths: Istenič 2003. River Ljubljana: Istenič 2000. Magdalensberg filigree sheath: Dolenz 1998, 49–53, Pl. 1.M1. Comacchio: Istenič 2003, 272, Fig.6. Kalkriese: Franzius 1999, 578–81, Abb. 11,2a–b; 16,2. Dangstetten chape: Fingerlin 1970–71, Fig. 13,11. Magdalensberg: Deimel 1987, Pls. 69,1 and 3; 71,1. 'Sword of Tiberius': Lippold 1952; Klumbach 1970; Walker 1981. Colchester: Crummy 1983, Fig. 204, No.4658. Chichester: Down 1981, Fig. 8.30,9. Fulham: Ettlinger and Hartmann 1984, 16–18. Strasbourg: Forrer 1927, Pl. LXXV.A. Wiesbaden: Ettlinger and Hartmann 1984, 18–20. Valkenburg: *ibid.*, 14–16. Vindonissa: Deschler-Erb 1998.
14. Iron binding: Connolly pers. comm. Organic remains: Manning 1985, Pl. 71, V2.
15. No guttering: Ulbert 1969b, Pls. 17–19. Guttering: Gore 1984, 572 Fig.; Maiuri 1947, Fig.102. Fittings: Ulbert 1969b, Pls. 17–19. Pula: Ulbert 1969b, Pl. 29.
16. Celtic origins: Manning 1985, 149. Rottweil: Planck 1975, Pl. 79,3 (drawing published at wrong scale). Newstead: Curle 1911, Pl. XXXIV,6–7.
17. 'Native' swords: Brailsford 1962, Fig. 1.A1–4; Pl. IIA; Manning 1985, Pl. 72,V3a (Hod Hill); Webster 1960, Fig. 8.38; 1981, Fig. 30.57 (Waddon Hill); Bishop 1994; 2005, 183, Fig. 27,7 (Roecliffe); Curle 1911, Pl. XXXIV,8 and 10 (Newstead); Scott in Breeze *et al.* 1976, 81–4, Fig. 3,1 (Camelon). La Tène: Manning 1985, 151. Dating: *loc. cit.*
18. Centurions: Robinson 1975, Pls. 442, 465. Herculaneum: P. Connolly pers. comm. Attachment: Nylén 1963, 224–7; Ulbert 1969b, 115–8; Hazell 1982, 73–7; Connolly 1991b. Vindonissa: Deschler-Erb 1998. Fasteners: Bishop 1988, 103.
19. Augustan: Fingerlin 1970–71, Fig. 14,5 (Dangstetten); Albrecht 1942, Pl. 52,1–9 (Oberaden); Metzler and Weiler 1977, Fig. 31,1 (Titelberg); Franzius 1995, 76, Abb. 6,4 (Kalkriese); Hübener 1973, Pl. 8,9, 13, and 21 (Augsburg-Oberhausen). Inlay: Albrecht 1942, Pl. 52,2 and 6. Exeter: Scott in Holbrook and Bidwell 1991, 263–5, Fig. 120,1. Tombstones: e.g. Esp. 6209, 6213, 6125, 6255, 6207. Handle: Manning 1985, 156–7.
20. Tang types: Scott in Manning 1985, 153; cf. *id.* 1985, 162–3. Blade types: Scott in Manning 1985, 153–4; cf. *id.* 1985, 164–5. Chronological progression: Scott in Manning 1985, 155; *id.* 1985, 165.
21. Dagger scabbards: Exner 1940; Webster 1985a; Obmann 2000; Klein 2003b. Type A: Scott in Manning 1985, 154; *id.* 1985, 168–72. Type B: Scott in Manning 1985, 154–5; cf. *id.* 1985, 172–3. Velsen sheath: Morel and Bosman 1989, 177–8.
22. Scott 1985, 168–73.
23. Leeuwen: Braat 1967, 59–60, Pl. V,2. Undecorated: *AuhV* 4, Pl. 11,1; Helmig 1990, Fig. 2; Albrecht 1942, Pl. 52,1; Helmig 1990, Fig. 3b; Scott 1985, 207, No.69. Legionaries with daggers: Esp. 6253, 5835, 5798. Auxiliaries: Esp. 6255, 6125, *Germ.* 16. Secundus: Harrauer and Seider 1977; Gilliam 1981.
24. See Webster 1985b, 128–9 fn.3.
25. Gechter and Kunow 1983, Fig. 16,8.
26. Buciumi: Chirila *et al.* 1982, Pl. LVII. Victor: Schober 1923, No.162. Corbridge: Bishop 1990b, 11.
27. Heads: Davies 1977; Coulston 1985, 264–5. Laths: *ibid.*, 224–34. Shafts: Unz and Deschler-Erb 1997, Taf. 21,388–98 (Vindonissa); Stiebel pers. comm. (Masada).
28. Pouches: Wild 1998; Griffiths and Carrick 1994. Slingshot: Greep 1987; Griffiths 1989; Völling 1990. Velsen: Bosman 1995; Baatz 1990. Specialists: Coulston 1985, 283–5.
29. Veg. II,25; Tac. *Hist.* III,23. Elginhaugh: Miss L. Allason-Jones, pers. comm. Auerberg: Handelsbank 1989, Monatsbild Januar. Cremona: Baatz 1980.
30. Moderatus: *CIL* VI.2725; Amelung 1903, No. 128, Pl. 26; Marsden 1969, 185, Pl. 1; Baatz 1994, 130; Stoll 1998, 207–10. Trajan's Column: Cichorius 1896–1900, Scenes XL, LXVI. *Carroballista*: Veg. 2.25, 3.14, 3.24; Maurikios, *Strategikon* 1.2.B6. *Cheiroballista*: Baatz 1966, 122–8; 1999, 5–10; Marsden 1969, 123, 188–90, Pl. 6–13; 1971, 208–33; Schramm 1980, 59–60, Fig. 25–6, Pl. 6; Chevedden 1995, 135–42, 152; Iriarte 2000. Bolts: Baatz 1999, 10, Fig. 9. Xanten: Schalles 2005.

31. Jerusalem: Schatzman 1990, 483–4; Josephus: *Bell. Iud.* V, 268–74. Dura: James 2004, Cat. No. 810, Fig. 138. Masada: Holley 1994. Maiden Castle: Wheeler 1943, Fig. 93, 13; Sharples 1991, 124–5. *Contra* Campbell 2002, 66.
32. Plancus: Fellmann 1957, 31, 48. Coin: Kent 1978, Pl. 49, 168. Cordus: Esp. 5835. Musius: Esp. 5790. Victor: Schober 1923, No. 162. Perspective difficulties: Coulston 1988b, 5. Pozzuoli: Kähler 1951, Pl. 28; Flower 2001, Fig. 1, 10.
33. Annaeus: Esp. 6125, pers. obs. Licaius: Esp. *Germ.* 16, pers. obs. Doncaster: Buckland 1978. Adamclisi: Florescu 1965, Inv. 14, 32, 34, 36. Trajan's Column: e.g. Scenes I–II, XI, XIV, XVIII. Mainz: Esp. 5819. Cf. Esp. 6207. Oval covers: Groenman-van Waateringe 1967, 67–8, Fig. 17. Vonatorix: Esp. 6292. Other: Hassall in Wachter and McWhirr 1982, 69–71, Fig. 22; Esp. 5852; 6018.
34. Trajan's Column: e.g. Scenes IV–V, XXVI, XLVIII, CVI. Pozzuoli: Kähler 1951, Pl. 29. Castleford: van Driel-Murray 1989b, 18–19.
35. Structure: Kimmig 1940, 106–8 (Kasr al-Harit); Rostovtzeff *et al.* 1936, 456–7 (Dura-Europos). Doncaster: Buckland 1978, 251. Masada: Stiebel pers. comm. Knee to shoulder: e.g. Esp. *Germ.* 11. Binding: *RLÖ* II, Pl. XXIV, 1–4. Bar: Buckland 1978, 249–51; *RLÖ* II, Pl. XXIV, 19–20.
36. *Legio VIII*: Allason-Jones and Milet 1984, 3.724 (Tyne); Simonett 1935; Hartmann 1986, Fig. 99; (Vindonissa). Carnuntum: *RLÖ* II, Pl. XX, 11–13. Nijmegen: Brunsting and Steures 1991, 5–6. Cf. Bonnamour 1990, No. 132, Fig. 98. Zwammerdam: Haalebos and Bogaers 1970. Mainz: Selzer 1988, No. 271. Spinning: Paddock 1985, 146–7.
37. Cover: van Driel-Murray and Gechter 1983, 30. Vindonissa: Gansser-Burckhardt 1942, 94–7. Bonner Berg: van Driel-Murray and Gechter 1983, 35–6. Roomburgh: van Driel-Murray 1999a. Caesar: *BG* II, 21. Glued cover: Gansser-Burckhardt 1942, 74.
38. Valkenburg: Groenman-van Waateringe 1967, 68–70, Fig. 16; Caerleon: van Driel-Murray 1988; Bonner Berg: van Driel-Murray and Gechter 1983, 35.
39. Blazons: Esp. 5790, 5816, 5822; Schober 1923, No. 162. Painted: Veg. II, 18. Scorpion: Kähler 1951, 432, Pl. 28; Robinson 1975, Pl. 238; Maxfield 1981, Pl. 12a. Trajan's Column: Coulston 1989, 33–4.
40. Robinson 1975, 164–9. Crispus: Esp. *Germ.* 11. Adamclisi: Florescu 1965, inv. 18, 21, 22, 31, 35.
41. Fasteners: Robinson 1975, 164; Deschler-Erb *et al.* 1991, 19–20. Antecedents: *CA* 1988, 115 Fig. Slit: Robinson 1975, 164. Mainz: Esp. 5816.
42. Sertorii: Robinson 1975, Pls. 442–3. Carnuntum: *ibid.*, Pl. 445. Adamclisi: Florescu 1965, inv. 17, 33. Vonatorix: Esp. 6292. Longinus: Schleiermacher 1984, No. 76. Ham Hill: Webster 1958, No. 105, Pl. XI, c. *Plumata*: Robinson 1975, 173; Price 1983.
43. Term: Robinson 1975, 174; Harmand 1986, 197; Bishop 2002, 1. Augustan finds: Bishop 1998; 2002, 23–30. Origin: *ibid.*, 18–22.
44. Chichester: e.g. Down 1981, Fig. 8.28, 2. Colchester: e.g. Crummy 1983, Nos. 4182, 4186. Fittings: Thomas 2003. Electrolytic reaction: Rollason 1961, 127–8. Cf. Bishop 2002, 80–1.
45. Corbridge: Allason-Jones and Bishop 1988, 102. 'Soft' armour: Williams 1977, 77. Cf. Bishop 2002, 77. *Thoracomachus*: *De Rebus Bellicis* XV. *Subarmalis*: *HA, Severus* VI, 11; Bishop 1995.
46. Armguards: Simkins 1990. Valerius Severus: *AuhV* 3, Heft 6, Pl. 5, 3; Selzer 1988, No. 59; Coulston 1995; Bishop 2002, 62–7. *Falk*: Richmond 1982, 49. Carlisle: Richardson 2001. Centurions: Robinson 1975, 187. Adamclisi: Florescu 1965, Inv. Nos. 13, 18, 20, 33; Coulston 1995; Bishop 2002, 62–7. Alba Iulia: Gallina 1970, C63; Coulston 1995; Bishop 2002, 62–7. Vindonissa: Gansser-Burckhardt 1948–49, 49, Fig. 17.
47. Classifications: Waurick 1988 (Continental); Robinson 1975, 13–135 (British). Earguards: *ibid.*, 46. Browguard and ribbing: Connolly pers. comm. Cf. Connolly 1991a.
48. Imperial-Gallic and -Italic helmets: Robinson 1975, 45–75. Nijmegen helmet: Brunsting and Steures 1991. Undated examples: Connolly 1989a. Introduction: Connolly pers. comm.
49. Crests and plumes: Robinson 1975, 140–3; Bishop 1990a. Transverse crest: Veg. II, 13; 16.
50. Leather cover: Künzl 1999, 156, Abb. 9; Deschler-Erb *et al.* 2004.
51. Handles: Robinson 1975, 47–51. Lining: *ibid.*, 144. Vindonissa: E. Deschler-Erb, pers. comm.
52. *Auxilia*: Robinson 1975, 83. Cf. Simkins 1988, 144.
53. Bassus: Esp. 6435. Capito: Esp. 5852. Orange: Amy *et al.* 1962, Pls. 16 and 18. Kingsholm: Hurst 1985, 26, Fig. 10. Koblenz-Bubenheim: Klumbach 1974, 45–6, Pl. 32. Weiler: Fairon and Moreau-Maréchal 1983. Xanten: von Detten and Gechter 1988. Newstead: Curle 1911, Pl. XXVI, 1. Northwich: Robinson 1975, 95, Pls. 247–9.

54. Nijmegen: van Enckevoort and Willems 1994. Xanten: Kempkens 1993, 113–20; Schalles and Schreiter 1993, 191–2, Taf. 28. Alexander: Künzl 1997, 77–82.
55. *Hippika Gymnasia*: Garbsch 1978, 35–42. Chassenard: Déchelette 1903. Kalkriese: Franzius 1995, 78, Abb. 3. Haltern: *MAKW* 5, Pl. XXXIX, 2. Catalca: Bujukliev 1986, Pl. 8, 91. Thracian: Waurick 1986.
56. Sports helmets on cavalry tombstones: Robinson 1976, 3. Standard bearers: Junkelmann 1986, 173. Esp. 5792, 5799, 5850. In general see Bartman 2005.
57. *'Cingulum militare/militiae'*: Bishop 1989b, 102–3; Varro: *De ling. Lat.* V, 114. Apollonous: Youtie and Winter 1951, No. 464. Tiberianus: *ibid.*, No. 470, line 6. Tabatheus: *ibid.*, No. 474, lines 8–9. Pliny: *NH* XXXIII, 152. Tacitus: *Hist.* I, 57. Isid. XIX, 33, 2.
58. 'Cowboy' fashion: e.g. Esp. 6125, 6207. Non 'cowboy': Esp. 5495, 6253. Single belt: Esp. 5790. Single belts with mail: Esp. *Germ.* 11. Herculeanum soldier: P. Connolly, pers. comm. Trajan's Column Scene IV. Reconstruction: Garlick 1980.
59. Velsen: Morel and Bosman 1989, 180–1, 184. Rheingönheim: Ulbert 1969a, Pl. 32, 5. Cassacco: Ubl 1989, Fig. 8. Herculeanum: P. Connolly, pers. comm.
60. Velsen: Morel and Bosman 1989, 180.
61. Embossed plates: von Gonzenbach 1966. Connection with *legio II*: Bishop 1987, 123. Upper Germany etc.: Böhme in Schönberger 1978, 218–22; Deschler-Erb *et al.* 1991, 25–6, 142, Fig. 16. Vindonissa: Deschler-Erb 1998. Magdalenberg: Deimel 1987, Pl. 77, 13.
62. Cassacco relief: Ubl 1989, Figs. 6–8. Haltern: *MAKW* 5, Pl. XXXVII, 6; 6, Pl. XVIII, 19. Tekije: Mano-Zisi 1957. Herculeanum: P. Connolly, pers. comm.
63. Hinged buckles: Grew and Griffiths 1991, 49. Buckle on right: Esp. 5790, 6207. Left: Esp. 6255. Both together: Esp. 5495. Quadrilaterals: Ulbert 1985, Pl. 10, 62. Later: Oldenstein 1976, Pl. 76, 1010. Repaired tongues: cf. Glasbergen and Groenman-van Waateringe 1974, Pl. 13, 27; Deschler-Erb *et al.* 1991, Fig. 11.
64. Grew and Griffiths 1991, 50.
65. Bassus: Esp. 6435. Vonatorix: Esp. 6292. Vachères: Esp. 35.
66. Aprons: Bishop 1992. Musius: Esp. 5790. Pula: Ulbert 1969b, Pl. 29; pers. obs. Orange: Amy *et al.* 1962, Pls. 16 and 18. Cassacco: Ubl 1989, Figs. 6–8.
67. Herculeanum: P. Connolly, pers. comm. Tekije: Mano-Zisi 1957, Pl. 15. Aznalcázar: Aurrecoechea Fernández 1998, 37–40, Figs. 1–2.
68. Tekije: Mano-Zisi 1957, Pl. 15, 25. Niello: Webster 1958, Fig. 6, 151. Mis-identification: Webster 1958, 73, Fig. 3, 26. Lunate: e.g. Bishop 1983b, Fig. 1. Teardrop: e.g. Deschler-Erb *et al.* 1991, Fig. 43, 57.
69. Tunics: Sumner 2002, 3–12. Nahal Hever: Yadin 1963, 204–19. Cf. Fuentes 1987, 43–5.
70. Suetonius, *Augustus* 24. Length: Fuentes 1987, 48.
71. Annaeus Dacier: Esp. 6125. *Fascia ventralis*: Ubl 1989; Sumner 2002, 38–9.
72. Reconstruction: Fuentes 1987, 48–9. Colour: *ibid.*, 60–3; Sumner 2002, 17–36. Masada: Cotton and Geiger 1989, 35–56.
73. Leggings: Wild 1968, 226; Sumner 2002, 37–8. On tombstones: e.g. Esp. 6435 (Flavius Bassus); 5852 (Romanus); pers. obs. Adamclisi: Florescu 1965, Inv. Nos. 40, 38. Long-sleeved: Esp. 35, 5522, 6014, 6435, pers. obs. Avignon Museum; Hassall in Wachter and McWhirr 1982, 71, Pl. 23.
74. *Sagum*: Shaw 1982, 45–6; Wilson 1938, 104–9; Sumner 2002, 14–15. *Paenula*: Kolb 1973; Wilson 1938, 87–92; Sumner 2002, 12–14. Tombstone *paenula*: e.g. Esp. 6207 (Firmus); *Germ.* 16 (Licaius). With *sagum*: Esp. 6125, 5835.
75. Shape: Junkelmann 1986, 157. London: Bishop 1983b.
76. *Paludamentum*: Wilson 1938, 100–4; Sumner 2002, 15. Caelius: Esp. 6581. Sertorius: Robinson 1975, Pl. 442. Facilis: *ibid.*, Pl. 465.
77. Van Driel-Murray 1986a; 1986b; 1999b; Goldman 1994, 122–3. Discarded: *ibid.*, 24. Mainz: *AuhV* 4, Pl. 37; Göpprich 1986, 16–25, Fig. 35–6. Valkenburg: Groenman-van Waateringe 1967, 129–37.
78. Lacing ridge: pers. obs. Socks: Youtie and Winter 1951, No. 468, line 25; Goldman 1994, 125–6. Vindolanda: Bowman and Thomas 1983, No. 38, line 2. Cancellaria: Magi 1945, Figs. 23–5.
79. Juvenal: *Satires* 3.248, 16.25. Josephus: *Bell. Jud.* 6.85. Paved streets: Tacitus, *Hist.* 2.88. Jewish law: Roussin 1994, 188. Cf. Stiebel 2003, 223, n. 108.
80. Musius: Esp. 5790. Firmus: Esp. 6207. Adamclisi: Florescu 1965, metopes XII–XIII, XXVI, XLI. Trajan's Column: Scene IV, XLVIII, LI, LXIII, CIV, CVI.
81. Centurial standards: Esp. 5792, 5799, 6255; *RIB* 673. Two standards: Polybios VI, 24. Asper: Maxfield 1981, 219, Pl. 12a. Oclatius: Esp. 6575.

82. Genialis: Esp. 5850; Flavinus: *RIB* 1172. Newstead: Curle 1911, 178, Pl. XXXIII. Niederbieber: Horn 1982.
83. Adamclisi: Florescu 1965, metopes XXVI, XLI. Trajan's Column: Scenes IV, VII, XL, LI, LIV, LXXIX, LXXXIX, CII, CV, CVI. Nero fitting: Bishop forthcoming.
84. Lion skins: Scene V. Bears: Scenes IV, V, XXII, XXIV, XXVI, XXVII, XL, XLII, XLVIII, LI, LIII, LIV, LXI, LXIII, LXXV, XCVIII, CII, CIV, CVI, CVII, CXXIII, CXXXVII.
85. Vegetius II,22. Flutes: Trajan's Column Scene CIII.
86. Pompeii: Ward-Perkins and Claridge 1976, No.303; La Regina 2001, Cat. no. 63–4. Adamclisi: Florescu 1965, metopes XI, XLII. Trajan's Column: Scenes V, XL, LXI, CVI, CVII. Events: Esp. 16, 1107, 3465; Levi 1931, Pl. LXXXIX; García y Bellido 1949, No. 361; Junkelmann 2000, Fig. 50, 82, 142, 164, 211–12, 234; *CIL* VI.40334. Sibbaeus: Esp. 5801. Urbiquus: Esp. 6446. Andes: Esp. 5854. Vindonissa: Unz and Deschler-Erb 1997, Taf.76,2346. Animal skins: Scenes V, XL, LXI, CVI, CVII.
87. Legionary: Esp. 5495, 5835. Auxiliary: Esp. 6125, 6136. Writing tablets: Baatz 1983a.
88. McIntyre and Richmond 1934; Groenman-van Waateringe 1967, 79–105; van Driel-Murray 1990; 1991; Coulston 2001a. Pseudo-Hyginus: Gilliver 1993b. Pegs: Curle 1911, 310, Pl. LXXXIII,6, 13.
89. '*Pila muralis*': Beesser 1979; Bennett 1982. Caltrop: Gilliver 1993a.
90. Revolt of Florus and Sacrovir: Tacitus, *Ann.* III,43. Sheaths: *AuhV* 5, Pl. 10,166–72.
91. Marked tools: Klumbach 1961, Fig. 1.
92. *Patera*: Bennett and Young 1980. *Trulleus*: Boon 1984. Doorwerth: Holwerda 1931, Afb. 12. Manufacture: Bennett and Young 1981, 38. Caerleon: Boon 1984; *RIB* 2415.39. Vessels: Curle 1911, Pl. LIII.
93. Centurions: Schober 1923, Nos.54, 130; Franzoni 1987, No.30; *RIB* 200. *Optiones*: *RIB* 492.
94. Celtic origins: Bishop 1988, 112–13. Function and decoration: *ibid.*, 116.
95. Ring: *ibid.*, 94. Pendants: *ibid.*, 96–8. Saddle plates: *ibid.* 110, 131–3, Fig. 38.
96. *Phaleræ*: *ibid.*, 94–5. Augustan: Albrecht 1942, Pl. 47,5–6. Bacchus: Hutchinson 1986, 137–9, 142–3. Xanten: Jenkins 1985. Saddle plates: Bishop 1988, *loc. cit.* Pliny: *Ep.* III,5,4. Doorwerth: Holwerda 1931; Brouwer 1982. Cf. Staffilani 1996.
97. Straps: Jenkins 1985, 148, Pl. X,B. Saddle leather: van Driel-Murray 1989b, 293–312, Figs. 8–15. Reconstruction: Connolly 1987; Connolly and van Driel-Murray 1991. Alternatives: Junkelmann 1989, 30–2, Figs. 24–6. Trajan's Column: Scenes VII, XLII, XLIX, LXXXIX, CIV. Gravestones: Esp. 6454, 6463, 6465, 6603. Experiments: Hyland 1990a; b; 1991; 1992; 1993; Junkelmann 1991; 1992; 1996.
98. Chamfrons: Curle 1911, Pl. XXI; 1913, Fig. 11 (Newstead); van Driel-Murray 1989b, 283–92, Figs. 2–6 (Vindolanda); Winterbottom 1989, 330–4, Figs. 5–6 (Carlisle). Neuss: Garbsch 1978, S1, Pl. 44. Eyeguards: Garbsch 1978, S3, Pl. 45,5–6; (Mainz); cf. *ibid.*, S11, Pl. 47,1 (Pompeii).

6 The Antonine Revolution

Whereas the 1st century AD gives the impression of gradual evolution in equipment design, the period from the death of Hadrian to the accession of Severus seems to present a rapid revolution. This may be a result of the sparse evidence, and some changes in sword fittings, for example, may be traced over an extended period. It might, therefore, be a mistake to ascribe change to a specific series of events, such as the Marcomannic Wars. Nevertheless, there was such real and rapid development in design, and especially decoration, as to warrant the term 'revolution'.¹

The funerary reliefs of this period declined both quantitatively and qualitatively, whilst propaganda sculpture became increasingly derivative and detached from reality. Nevertheless, the Antonine era, usually thought of as a peaceful time, was not completely devoid of military activity.

The archaeological evidence, although not matching the volume of 1st-century material, has some reasonably well dated contexts. In the 140s, the frontier in Britain advanced to the Antonine Wall line, involving the re-occupation of old sites and the establishment of new ones, mostly abandoned again by the 180s. Even after the frontier reverted to Hadrian's Wall, the majority of its turrets remained out of use or were finally demolished. These movements formed narrowly defined occupations and created datable abandonment deposits. Thus, pits at Newstead were filled with abandoned Antonine material, quite distinct from equipment found in the Flavian pit series.²

Elsewhere, there was an advance to an outer line between Rhine and Danube, ending the occupation of forts on the previous frontier. Under Marcus Aurelius, Roman military activity during the Marcomannic Wars went beyond the Danube with the establishment of a series of bases, such as those at Mušov, Iža, and Orgovány. These were short-lived and their abandonment involved Antonine equipment deposition.³

Whilst other advances were made, notably in Syria in the 160s, which brought Dura-Europos under Roman control, material did not enter the archaeological record here in the quantities seen in earlier or later periods.⁴

Based on the evidence of the general style of the iconography on the helmets found within it, a Thracian-style burial at Nawa in Syria seems to date to the 2nd century. One of the most significant deposits of military equipment ever found, the '*Waffenmagazin*' at Carnuntum, may in fact belong to this period, reflecting the Antonine revolution in the variety of material found in one building. A significant find of armour from Carlisle also belongs to the middle of this century and, viewed in the context of the comparable damaged material in the near-contemporary Corbridge Hoard, may be a tangible indication of unrest in northern Britain at this time.⁵



©aga

Figure 73: Croy Hill relief (drawn by A. Gibson-Ankers)

Weapons

Pila (Figs. 73–4)

The continued use of the *pilum* into the 2nd century is confirmed by the presence of examples at Newstead, but also by some rather unusual heads from the Antonine Wall fort at Bar Hill. *Pila* are depicted on a small relief from the nearby fort of Croy Hill which shows three soldiers usually identified as legionaries. The Newstead heads are up to 70 mm long, quite large by comparison with earlier forms of the weapon; their dating is not certain, as they do not come from pits, but from the vicinity of the Antonine barracks. The Bar Hill heads (22 out of 26 coming from the well in the headquarters building) are short and stocky (between 50 and 58 mm in length) and doubt has been cast upon their identification as *pilum* heads, even though they share many characteristics of examples elsewhere: square-sectioned pyramidal heads (some with bent tips), and square sectioned shanks, also showing bending.⁶

A single *pilum* was found in the *Waffenmagazin* at Carnuntum, and this had an 86mm-long head on a 560 mm shank, with its collet surviving. Another piece from Eining, where there was a Marcomannic-period vexillation fortress, was 775 mm long.⁷

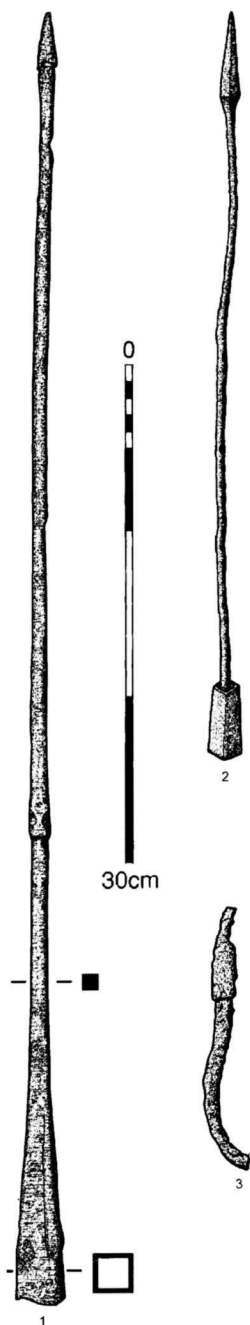


Figure 74: Antonine pila. 1 Eining. 2 Carnuntum. 3 Bar Hill.

Spears and Lances (Fig. 75–6)

The equipment in the Nawa burial included a spearhead 110 mm long. Other heads that can be dated to the Antonine period include pieces from Newstead and Strageath, with both mid- and low-shouldered heads. Sites associated with the Marcomannic Wars have been more productive and a range of types can be recognised amongst the finds from Iza.⁸

From the reign of Trajan onwards there is firm evidence that some auxiliary cavalry were armed with a lance (*contus*). Gravestones from Tipasa in Algeria show members of *ala I Ulpia contariorum* and *ala I Cannanefatium* wielding lances with both hands. These *alae* were usually stationed in Pannonia, but they both took part in Pius' Mauretanian War in the mid-2nd century. Despite the lack of a '*contariorum*' title, the fact that *ala Cannanefatium* were lance-armed is confirmed by a lancer on a stone from Bratislava-Rusovce. Arrian mentioned Roman lancers in the eastern theatre during Hadrian's reign, and soldiers of the *ala I Ulpia contariorum* carry lances on 3rd-century gravestones from Apamea.⁹

The two-handed use of lances on the Antonine grave-stones accords with the fighting styles of Sarmatian and Mesopotamian cavalry as seen in 1st-century and later artworks. Roman writers associated the *contus* with Sarmatians in particular, and it is likely that Danubian contacts were responsible for 2nd-century Roman adoption of the lance. Double-handed lances could not be used with shields.¹⁰

Swords (Figs. 77–9)

Short swords continue to be depicted in Roman art. The Nawa burial contained two swords, 510 mm and 710 mm in length. Two *spathae* (L. 870 mm and 915 mm), found with a pair of skeletons at Canterbury (Fig. 14), are datable to the later 2nd century by an accompanying button-and-loop fastener and scabbard-fittings (see below). Their blades had parallel sides and triangular points, the shorter had longitudinal channels, whilst the longer one had a core which may be described as 'proto pattern-welded'. The shorter weapon had a poplar or willow grip and a maple-wood guard, whilst the other perhaps had an entirely maple grip-assembly.¹¹

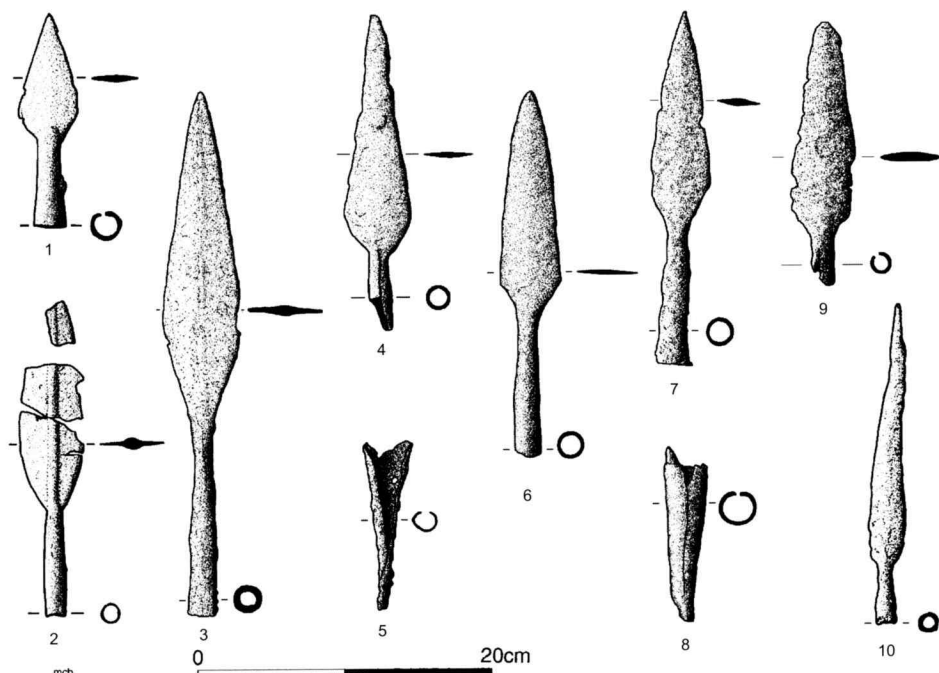


Figure 75: Antonine spears. 1 Strageath; 2 Hadrian's Wall, Turret 10A; 3 & 5–8 Iŕa; 4 & 9 Inveresk; 10 Strageath.

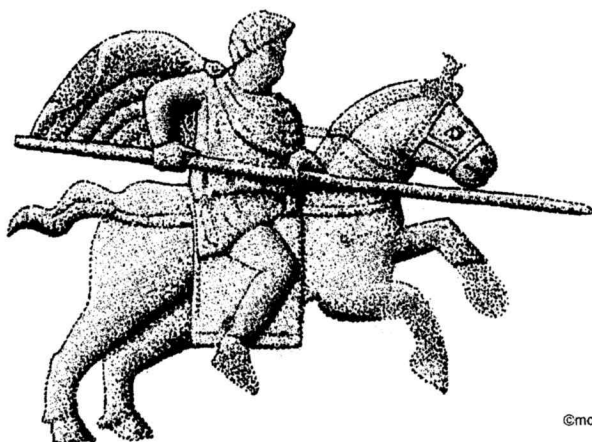


Figure 76: Antonine tombstone of the lancer Ulpius Tertius (Tipasa). (Not to scale)

A new form of short sword introduced during the 2nd century, and found on fort-sites, had a tapering blade (L. 480 mm) and a grip-assembly made up of iron tang, guard and ring-pommel. The latter is the most characteristic feature, was usually riveted to the tang, and was occasionally elaborately decorated with inlay. Five principal types of this weapon have been discerned from the finds, whilst a 2nd(?) -century

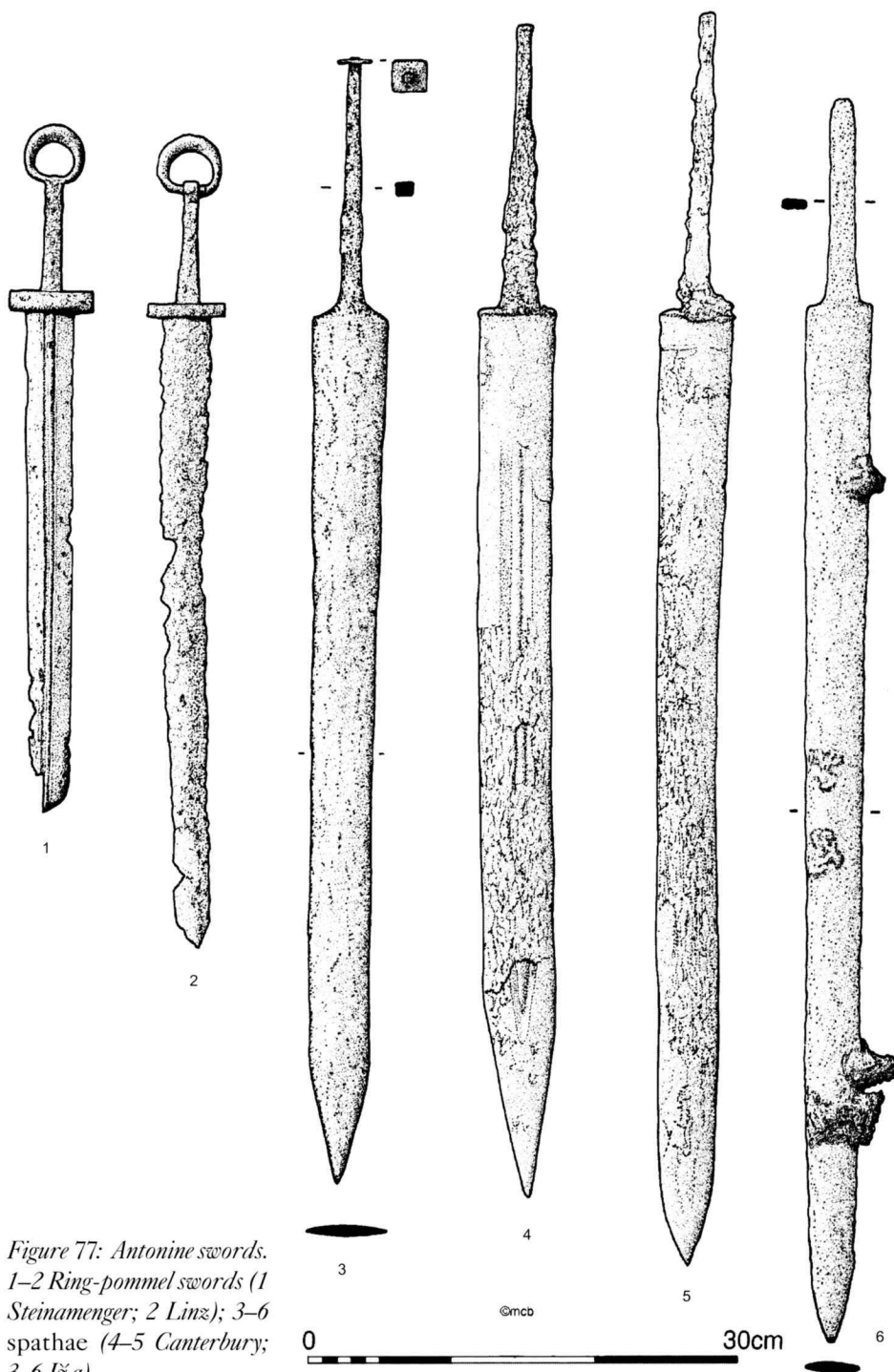


Figure 77: Antonine swords.
 1–2 Ring-pommel swords (1 Steinamenger; 2 Linz); 3–6
 spathae (4–5 Canterbury;
 3, 6 Iž a).

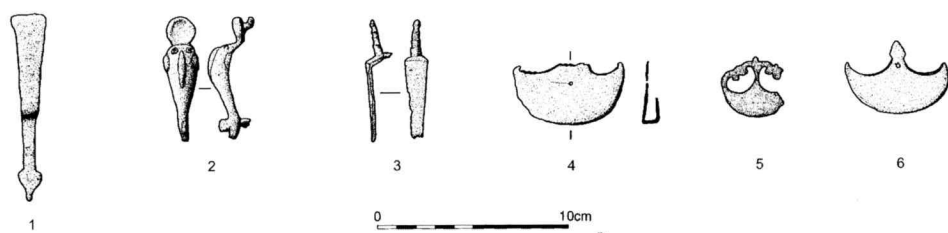


Figure 78: Antonine sword scabbard fittings. 1–3 scabbard slides (1 Hadrian's Wall; 2 Strageath; 3 Newstead); 4–6 chapes (4 Strageath; 5 Newstead; 6 Hadrian's Wall)

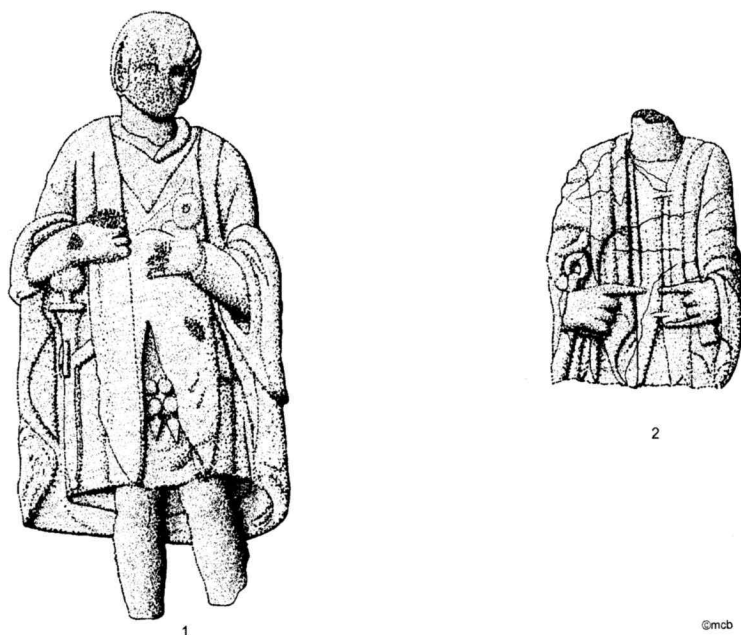


Figure 79: Tombstones from Aquincum. 1 Unknown, with scabbard-slide; 2 unknown, with ring-pommel sword. (Not to scale).

gravestone from Aquincum depicts such a sword worn by a *paenula*-clad soldier on his right side. Belt-appliqués and strap-ends were sometimes fashioned in the shape of miniature ring-pommel swords.¹²

The earliest representations of such weapons are not in fact Roman, but are on 1st century AD Crimean gravestones. Many ring-pommel swords come from Sarmatian graves, or from burials in Free Germany, and trans-Danubian contacts may again explain the Roman adoption of a new equipment type.¹³

Scabbard-fittings were also undergoing change during the period (Fig. 78). New copper-alloy heart-shaped or peltiform chapes appear in the artefactual record: peltate examples accompanied the Canterbury swords. The Marcus Column depicts these and semi-circular chapes in use alongside the older triangular guttering chapes.¹⁴

The new method of fastening the scabbard and baldric together involved the belt passing through a vertical runner or slide which was mounted on the scabbard facing away from the wearer. Another soldier in a *paenula* on a 2nd(?) century Aquincum gravestone is shown with a short-sword on his right, attached by a slide to a narrow baldric. A copper-alloy slide from the Bonner Berg may be Hadrianic, and examples come from Antonine contexts along Hadrian's Wall.¹⁵

Slides may have originated as early as the 7th to 6th century BC in the Volga-Ural steppe region, and they were used north of the Black Sea by the 2nd to 1st centuries. In the Roman sphere they first appear on barbarian scabbards on Trajan's Column, then on the Aquincum *stela*. A Chinese slide was found in a 1st century AD 'Thracian' burial at Čatalka. Slides also supplanted four-ring suspension in Palmyrene use, but the earliest sculptural representations belong to the last decade of the 2nd century AD. It is thus difficult to avoid the conclusion that slide-suspension came into Roman use through contact with steppe peoples in the Danubian zone.¹⁶

Daggers (Fig. 80)

A T-shaped dagger handle with crescentic pommel from Bar Hill is particularly interesting because, in terms of its size (L. 130mm), it more closely resembles 3rd-century daggers than those of earlier periods. A complete dagger of this type has been found in the Antonine fort at Inveresk, whilst a blade and part of a scabbard come from Tuchyňa, north of the Danube, probably deriving from the Marcomannic Wars. It is quite clear that the dagger continued in use during the 2nd century and that the weapons of this period provide a link between the 1st and 3rd centuries. It is far from clear, however, which types of troops were equipped with these daggers.¹⁷

Archery Equipment and Slings (Fig. 81)

Five fragmentary antler ear laths from composite bows (see Chapter 7) were found at Bar Hill on the Antonine Wall. Two of these had a rivet passed through above the nock, a feature paralleled by a Roman lath from Carnuntum and by Avar ear laths. The longest lath (L. 270 mm) had a solid end and was not one of a pair, thus the rivet played no constructional role. Perhaps these rivets were used to hang up the bow when it was not in use. More ear laths, together with fragments of grip laths, have come from Iža. A workshop producing composite bows has been excavated at the fort of Micia in Roman Dacia. Finished and unfinished laths and antler wasters in a store context date up to c. AD 170. Some 35 ear laths and two grip laths were found, all made from antler except for one bone grip lath, plus two bone arrow nocks. The latter would have been used to prevent reed shaftments splitting, just as elsewhere in Roman Levantine practice wooden foreshafts were used to take the arrow head.¹⁸

Trilobate, tanged arrowheads also come from Iža and are paralleled by examples from Bar Hill, Burnswark and other Antonine sites in Scotland. Less common are five Bar Hill incendiary heads (L. 52–60 mm.), and a further undated example from Wroxeter (L. 76 mm). On each, a short point is attached to a tang by three curving bars which would have enclosed inflammable material. A similarly undated piece from Ptuj has four bars and a

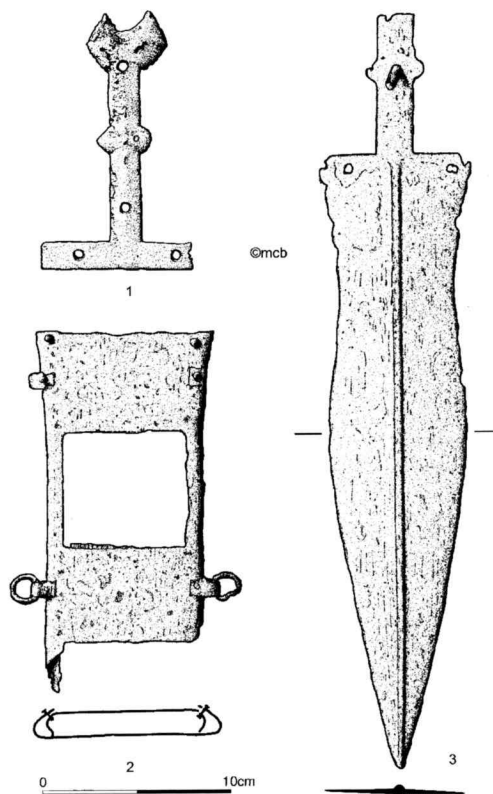


Figure 80: Antonine daggers. 1 Handle from Bar Hill; 2 scabbard and 3 blade from Tuchyňa.

nailed socket. It is long for an arrow-head (120 mm), but the socket is too narrow for attachment to a catapult bolt or even to a light javelin shaft. All these incendiary heads compare well with fire-arrows (*malleoli*) discussed by Ammianus and Vegetius.¹⁹

Lead sling-bullets seem to have gone out of general use during the 2nd century in much of the Empire. However, elliptical and acorn-shaped *glandes* were expended in Antonine exercises at Burnswark and are found on other contemporary Scottish sites. Elliptical bullets in an Italian collection bear *L(egio) II ITAL(ica)* inscriptions which would date them to the reign of Marcus, if not referring to a Republican Italic legion. Hoards of clay shot have also been found in 2nd-century contexts.²⁰

Artillery (Fig. 82)

Bolt heads come from Strageath and there was an impressive collection of stone balls excavated at Burnswark, thought to have been used in practice siege works during this period. Remains of a field-frame at Lyon represent the new metal-framed artillery pieces, discussed by Heron and illustrated on Trajan's Column. These may have entered the archaeological record after the nearby battle of AD 197, so could well be of Antonine manufacture.²¹

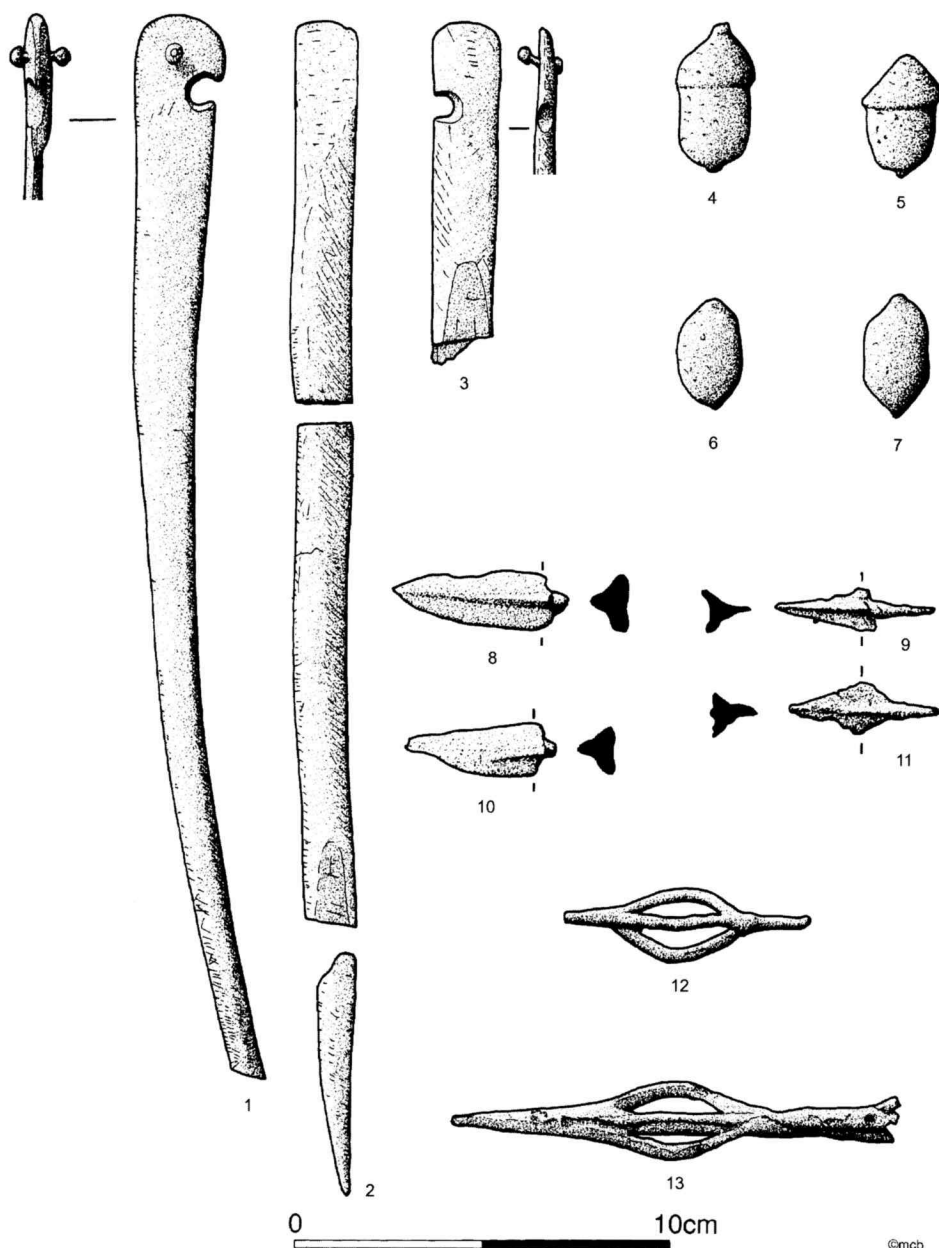


Figure 81: Antonine archery and slinging equipment. 1-3 Antler ear laths (Bar Hill); 4-7 lead slingshot (Burnswark); 8-11 iron arrowheads (8-9 Burnswark; 10-11 Bar Hill); 12-13 incendiary arrowheads (12 Bar Hill, 13 Ptuj).

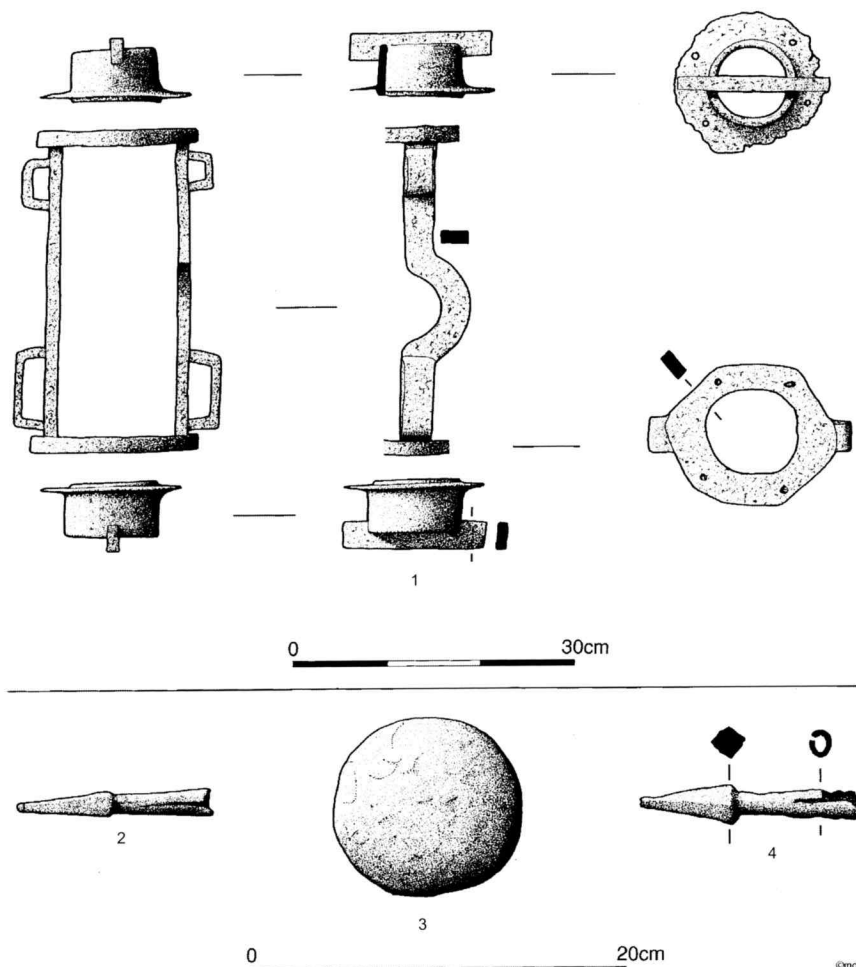


Figure 82: Antonine artillery fittings. 1 Iron field frame and washers (Lyon); 2 iron catapult bolt (Newstead); 3 stone ballista ball (Burnswark); 4 iron catapult bolt (Strageath).

Armour

Shields (Fig. 83)

No examples of Antonine shield boards survive but the curved rectangular body shield continued in use, and it is seen on the Croy Hill sculpture (Fig. 73) and on figures of Roman soldiers depicted in relief on one of the helmets found in the Nawa burial. There are even some curved rectangular iron shield bosses from Iža and the *Waffenmagazin* at Carnuntum, that from the former site being edged in copper alloy. The Carnuntum examples preserved fragments of leather adhering to their outer surfaces, suggesting that complete shields in their covers were stored there. Likewise, copper-alloy shield binding from the site still contained fragments of wooden shield board. Both an iron shield

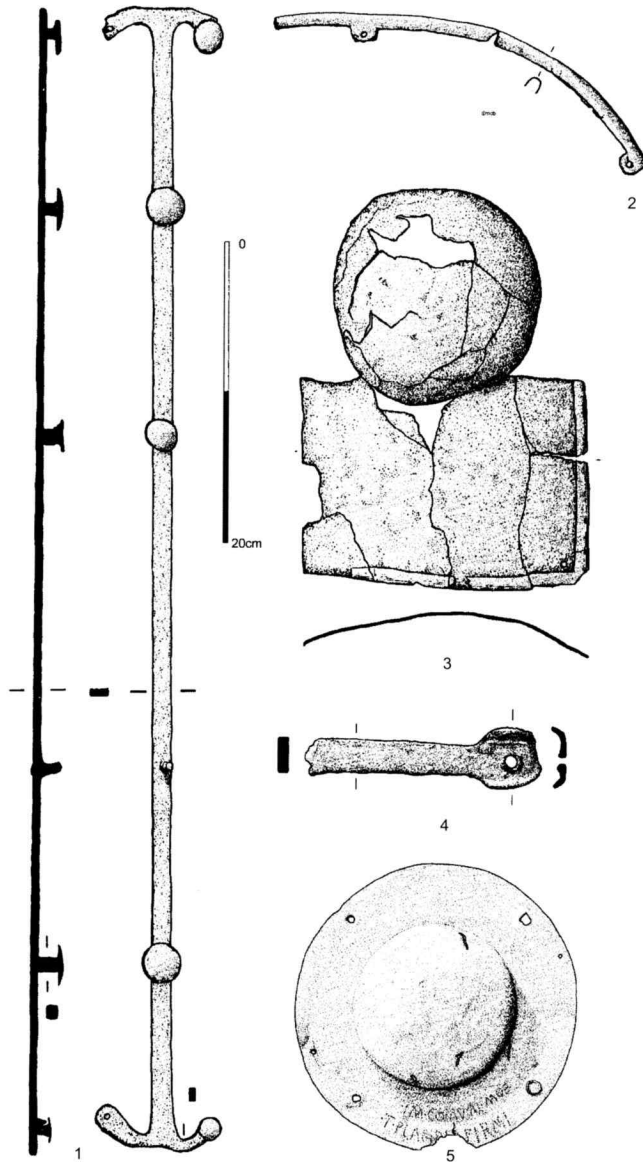


Figure 83: Antonine shield fittings. 1 shield strengthening bar (Iža); 2 shield binding (Iža); 3 curved rectangular iron shield boss (Iža); 4 shield handgrip (Inveresk); 5 Copper-alloy boss from Butzbach, belonging to Firmus in the turma of Placidus in the ala Moesica (the inscription also mentions the emperor Commodus – IM. CO. AV).

stiffening strip and curved binding from Iža may have come from auxiliary shields, whilst parts of a shield handgrip has been found at Inveresk. A circular, hemispherical copper-alloy shield boss from Butzbach bore an inscription mentioning the unit (*ala Moesica*) and soldier to which it belonged, as well as the emperor Commodus. Thus,

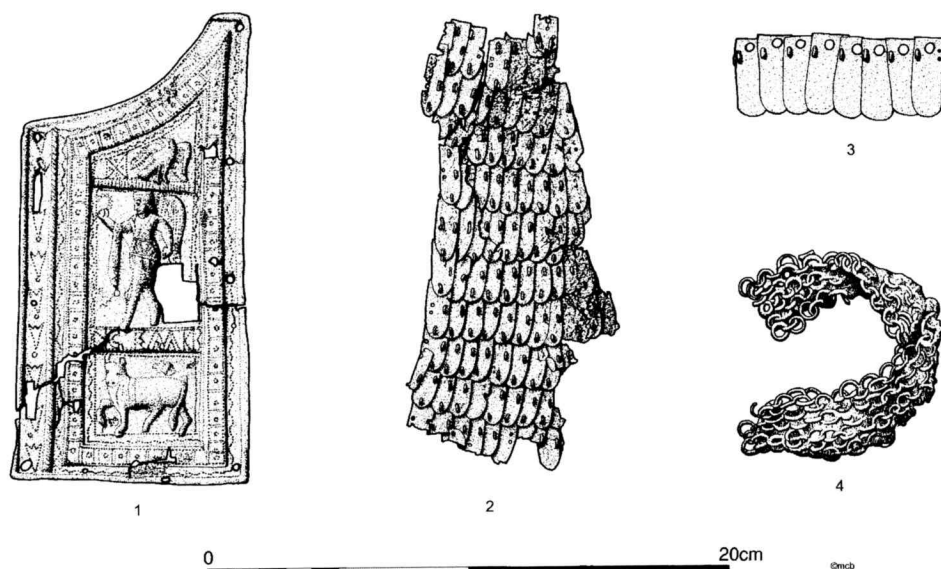


Figure 84: Antonine body armour – mail and scale. 1 Mail or scale breastplate closure (Orgovány); 2 semi-rigid scale (Mušov); 3 scales (Newstead); 4 mail (Iža).

finds from Antonine contexts suggest that shields continued to be edge-bound with copper-alloy guttering.²²

Body Armour (Fig. 84–6)

Whilst there appears to have been little development in body armour between the Flavian and Hadrianic periods, new types of defence were certainly appearing in Antonine use.

Although little can be done by way of improvement to mail itself, ergonomic enhancements were possible in the form of the cuirass. Mail fasteners are absent from Antonine sites, having been comparatively common in pre-Antonine deposits. The reason for this seems to have been that a new system of closure was introduced.²³

Pairs of fairly small, decorated breastplates from 2nd and 3rd century contexts have usually been interpreted as belonging to 'parade' or cavalry sports armour, despite the fact that they are not found amongst the better-known hoards of such equipment. Even when they have been discovered with legionary inscriptions on them (LEG X and LEG XIII), resort has been made to the detachments of 120 legionary cavalry in order to explain away these pieces. Such arguments tend to over-emphasize the artistic, and underplay the defensive, qualities of these pieces of armour. The discovery of examples at Mušov and Orgovány belies such explanations and points the way to re-interpretation of these pieces as fully functional mail and scale cuirass closures of a more sophisticated type than the Celtic-derived pivoting mail hook.²⁴

A new form of semi-rigid scale, typified by pieces found at Corbridge and Mušov, was introduced early on in this period, with ferrous examples amongst the spectacular

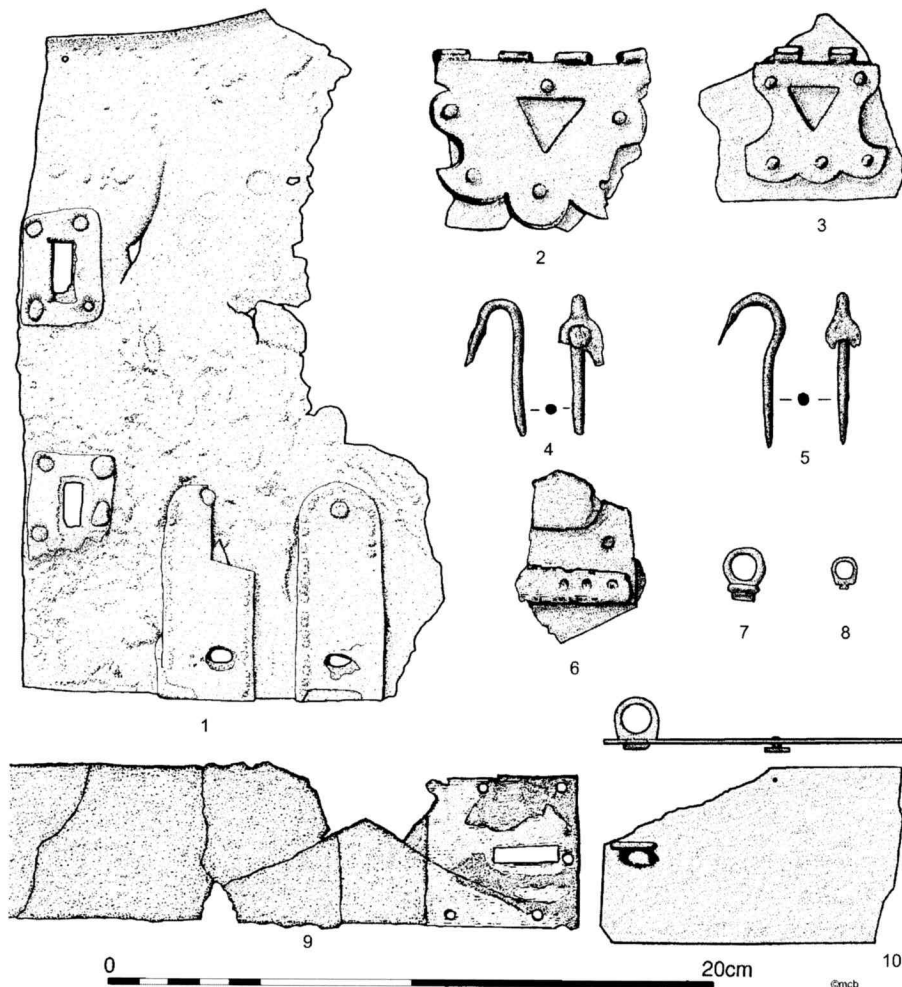


Figure 85: Antonine body armour – Newstead type 'lorica segmentata'. 1 backplate (Newstead); 2–3 lobate hinges (Carnuntum); 4–5 vertical fasteners (Iž a); 6 girth hoop with binding (Iž a); 7–8 copper-alloy tie-rings (7 Newstead; 8 Iž a); 9–10 girth hoops with fastenings (9 Iž a; 10 Carnuntum).

deposit of armour from the vicinity of the *principia* at Carlisle. The new defences were constructed from scales wired to each of their four neighbours, above and below as well as to either side. Earlier scale armour was usually only wired horizontally and then attached to a flexible backing. Examples of scales wired on four sides were found in the *Waffenmagazin* at Carnuntum. The new scales tended to be not only very small, but also long and slender and needed to be carefully shaped around the neck. Cuirasses constructed from such scales have limited flexibility and little movement would be possible in the vertical plane for the wearer.²⁵

'Lorica segmentata' also underwent changes in the Antonine period, as important finds from Stillfried, the well in the headquarters building at Newstead, and Carlisle

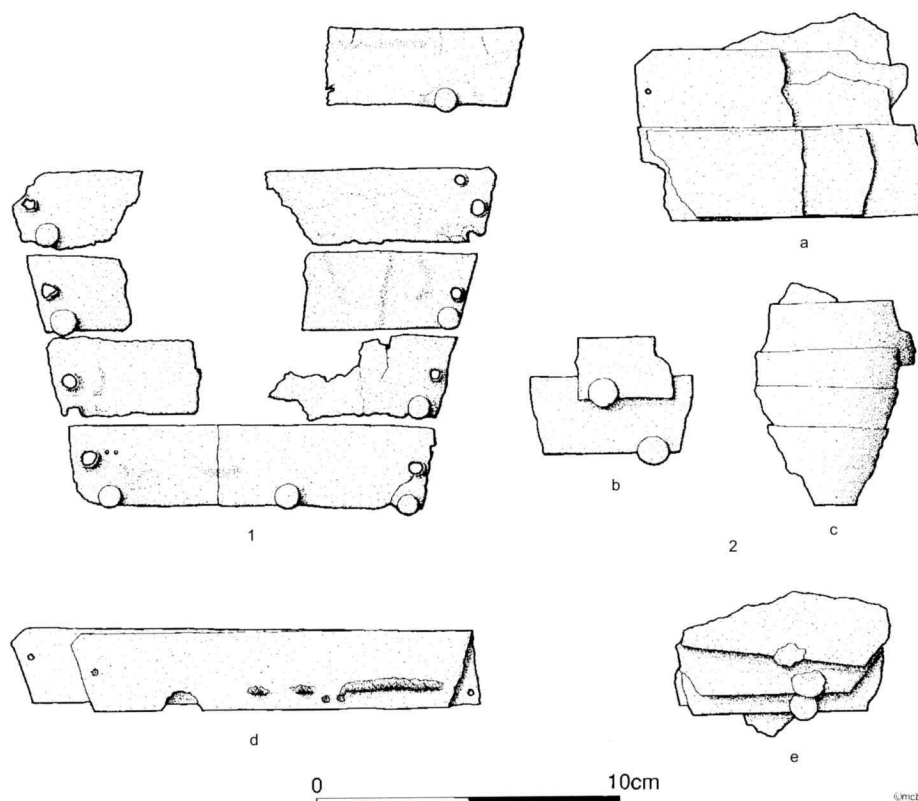


Figure 86: Antonine armour – armguards. 1 Newstead; 2a–e Carnuntum.

demonstrate. Antonine modifications were once thought to be merely simplifications of the earlier versions of the cuirass, with many of the extraneous fittings (such as the semi-functional hinges on the collar and shoulder plates) done away with and a modified fastening mechanism employed. However, the shoulder plates were not riveted together, as Robinson believed, but instead larger lobate hinges than before were employed. The system of attaching the upper portion to the girth hoops was certainly similar to that employed on the Corbridge type B cuirasses, although the vertical fasteners protruded from the inside of the upper girth hoop plate. Nevertheless, breastplates were now enlarged and joined together in a similar way to the new mail and scale closures, whilst the old tie hooks on the girth plates were replaced with simple loops which passed through slots with large rectangular copper-alloy surrounds in the neighbouring, overlapping, plate. Fragmentary ferrous segmental armguards were found in the *Waffenmagazin* at Carnuntum and both iron and copper-alloy examples at Newstead (although wrongly identified as thigh defences by Robinson).²⁶

Helmets (Figs.87)

Similarly poorly represented in the archaeological record, the main contenders for consideration as Antonine infantry helmets lack a soundly dated archaeological context, so it is conceivable that they do not even belong to this period.

One helmet, from Theilenhofen, shows so many affinities with the equipment of the earlier Principate (and hardly any with 3rd-century helmets) that it is at least reasonable to consider it in this context. The appearance of bowl cross-pieces at the beginning of the 2nd century provides a rough *terminus post quem*, as does the likely foundation date of the earliest fort at Theilenhofen (c. AD 100), and its association with the cavalry helmet (discussed below) may hint at continued use. Whilst fitting into the Imperial-Italic tradition of helmet manufacture, the helmet has a comparatively shallow neck-guard.²⁷

A copper-alloy helmet from Niedermörmter, on the other hand, was extremely deep in the region of the neck, as well as ornately decorated. It still retained many of the characteristics of helmets of the earlier Principate – large earguards, ribbing on the neck, thick brow guard – but its cross pieces had now become largely decorative. It also carried an inscription which showed that it belonged to L. Sollonius Super of *legio XXX Ulpia Victrix*. A second, almost identical, ferrous helmet (archaeologically unprovenanced, but reputedly from the Balkans) is additionally decorated with small appliqué mouse motifs to the rear of the helmet bowl and has an openwork browguard.²⁸

Fragments of helmets from Newstead show the use of fully developed crosspieces, similar to those found on 3rd-century helmets.²⁹

The Nawa burial contained two helmets, one (Helmet A) conforming to the usual 'sports' type, but the other (Helmet B), hardly any less decoratively embossed, was presumably for battle use. Helmet B had decorated cheek-pieces of cavalry type (covering the ear), rather than a face mask, and relief decoration of battle and sacrifice scenes. Both helmets were very similar in shape. The main functional difference was that A had a central hinge on the forehead for the mask, whilst B had hinges on either side for its cheek-pieces. Helmet A had a hinged mask depicting a bearded, mustachioed man and relief decoration on the bowl showed a cuirassed emperor surrounded by eagles and a figure of Victoria. Another mask was excavated in an Antonine pit at Echzell; it depicts a frowning youth and has many stylistic affinities with masks from the later Straubing hoard (see Chapter 7). Another piece found at Theilenhofen bore splendid embossed eagle decoration and inscriptions showing that it belonged to an *eques* of *cohors I Bracaraugustanorum* (Plate 2b). A cheekpiece from a cavalry helmet comes from Iža, north of the Danube.³⁰

Another form of helmet is so far only represented by finds from the Danubian region. It consists of a one-piece conical copper-alloy bowl without a neck-guard. Holes around the sides and back of the rim served to attach a protective textile, leather and/or mail curtain. An example from Karaagach had cheek-pieces and overall embossed figural decoration in the Roman 'sports equipment' style. Another from Dakovo in Bosnia is plain except for classical figures of Jupiter, Mars and Victoria on a strip across the front. There is little direct dating evidence for any of these helmets. One from Bumbești in Romania

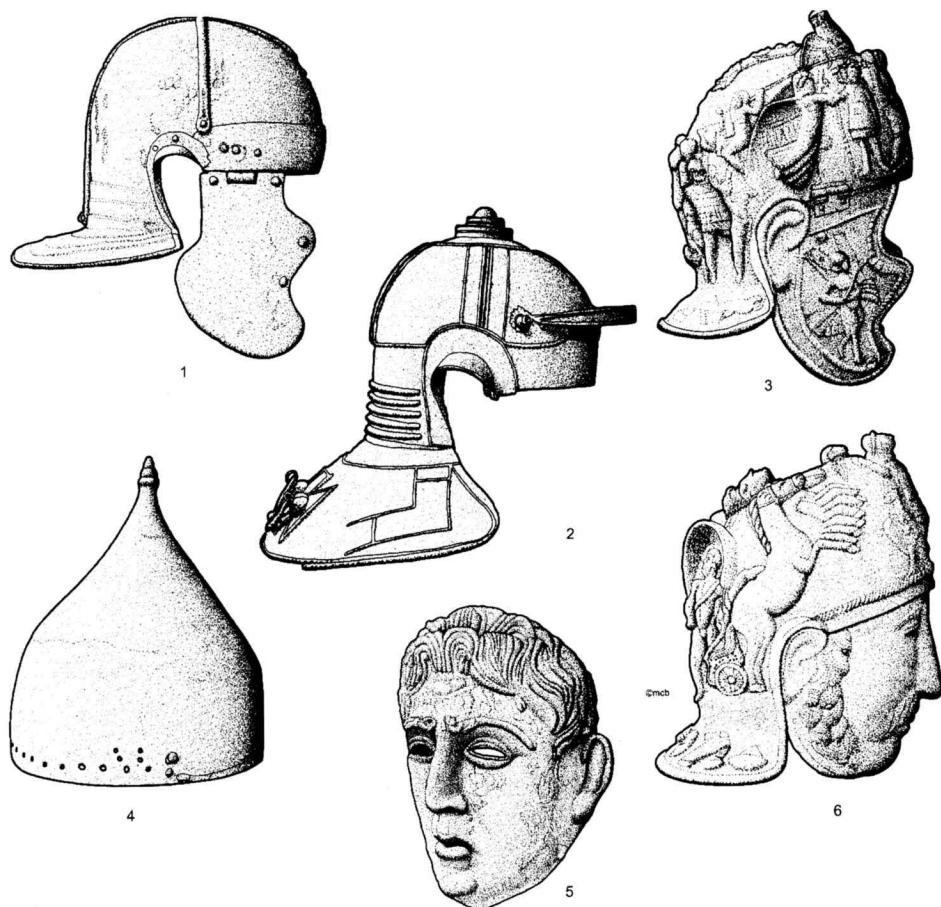


Figure 87: Antonine helmets. 1 Imperial-Italic infantry helmet (Theilenhofen); 2 Imperial-Italic infantry helmet (Niedermörmter); 3 cavalry battle helmet (Nawa); 4 conical infantry helmet (near Intercisa); 5 'sports' cavalry helmet mask (Echzell); 6 'sports' cavalry helmet (Nawa). (Not to scale).

would not have pre-dated the Trajanic conquest of Dacia, and the decoration mentioned above suggests manufacture in the 2nd to 3rd centuries AD.³¹

Conical helmets from Bumbești and Intercisa have been linked by commentators with oriental archer units at these forts, and the Intercisa piece bears two *T(urma)* inscriptions which suggest cavalry use. The conical bowl has been seen as an eastern helmet type translated into Roman form by one-piece manufacture and decorative style, partly because 'oriental' archers on Trajan's Column seem to wear them.³²

Unfortunately, the Column archers are represented using a pastiche of captured Danubian barbarian equipment. Roman helmets from the East found so far all follow more conventional 'Imperial' or 'sports' designs, and none bridge the gap between conical 2nd-century BC types and the 2nd-century AD Danubian helmets in question. Parthian helmets had multi-part bowls and were not truly conical in shape. On the other hand, conical segmental helmets ('*Spangenhelme*') were used by the Sarmatians

(see Chapter 8), and these may have been the primary influence behind the Roman bowls. Another, related possibility is that conical helmets also belonged to a Thracian tradition, linked with trans-Danubian developments.³³

Other Equipment

Personal Equipment (Fig. 88)

Belt fittings of this period have completely changed from their predecessors, most of them now incorporating openwork designs, many of which show traces of Celtic decorative influence. Although comparatively few in number, these fittings are nevertheless recognisable as the prototypes for those excavated in abundance from the 3rd century. Examples come from Strageath, Newstead, and the turrets on Hadrian's Wall. More or less elaborate enamel and millefiori inlaid plates begin to be found (an example of the latter was discovered at Newstead) and the general impression from the limited artefactual evidence is that much of the material familiar from the abandonment of 3rd-century sites was first introduced in the Antonine period. Narrow, hinged teardrop strap-terminals come from Hadrian's Wall turrets, and an Antonine panel reused on the Arch of Constantine shows an ivy leaf strap-end.³⁴

An iron flask from Newstead may have been a military water bottle, but it is not clear how common such vessels were.

Apuleius recorded a *miles* (centurion?) belabouring a civilian with his *vitis*, then reversing it to hit him again with the knobbed end (*nodulus*).³⁵

Footwear and Clothing

Archaeological evidence, notably that from the Bonner Berg deposit, suggests that the classic Roman military boot, the *caliga*, had gone out of use in the first quarter of the 2nd century AD. The hobnails of boots retaining their original pattern have been found at Strageath and Iza. This is also the period in which the *paenula* is last found (being depicted on the Croy Hill relief); the *sagum* was the dominant type of military cloak thereafter. The Croy sculpture (Fig. 73) suggests that the short-sleeved tunic may also still have been in use, and neither this nor the Nawa helmet show infantryman wearing leggings.³⁶

Standards and musical instruments (Fig. 89)

The Hutcheson Hill distance slab from the Antonine Wall depicts a legionary eagle. As in earlier periods, it is shown with raised wings, perched on a small plinth atop its otherwise unadorned shaft. *Vexilla* of the Antonine period belonging to *legio II Augusta* are depicted on the Bridgeness slab and on a frieze from Corbridge. The Bridgeness relief also shows an *auletes* playing the *aulus* (a twin piped reed instrument) during a *suovetaurilia* – not in itself a military use of the instrument, but clearly demonstrating

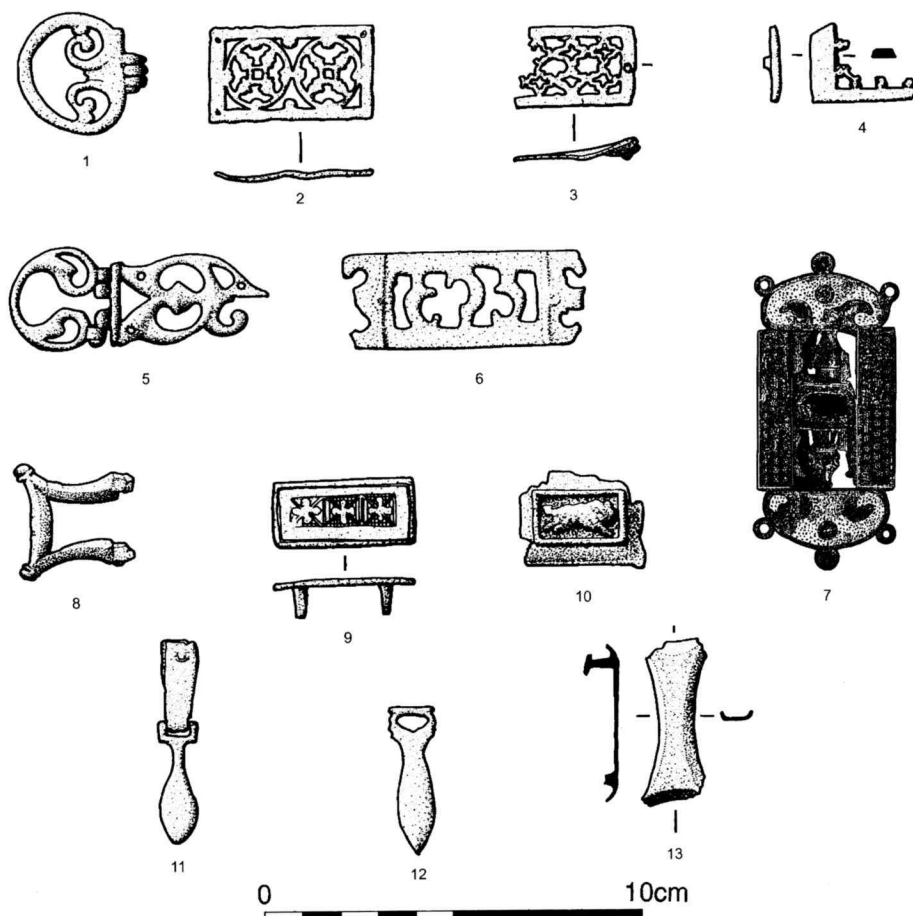


Figure 88: Antonine personal fittings. 1–13 Belt or strap fittings (1–2, 4, 6, 12 Hadrian's Wall; 3, 9–10, 13 Strageath; 5, 7–8, 11 Newstead).

its use by the army in a religious context. A possible portion of a *cornu* was found at Strageath.³⁷

Equine Equipment (Fig. 90)

The Antonine period saw developments in riding harness junctions. Whereas before the junction loop or *phalera* with concealed loops had been favoured, now the *phalera* with loops around its periphery re-appeared (previously used in the Augustan period). The example from Newstead still retained some of its junction loops, which were of a similar type to those used earlier, only they were now somewhat larger. The harness items from the Nawa burial – and it would appear to have included all the requisite items such as *phalerae* and pendants – would not have looked out of place in the 1st cen-

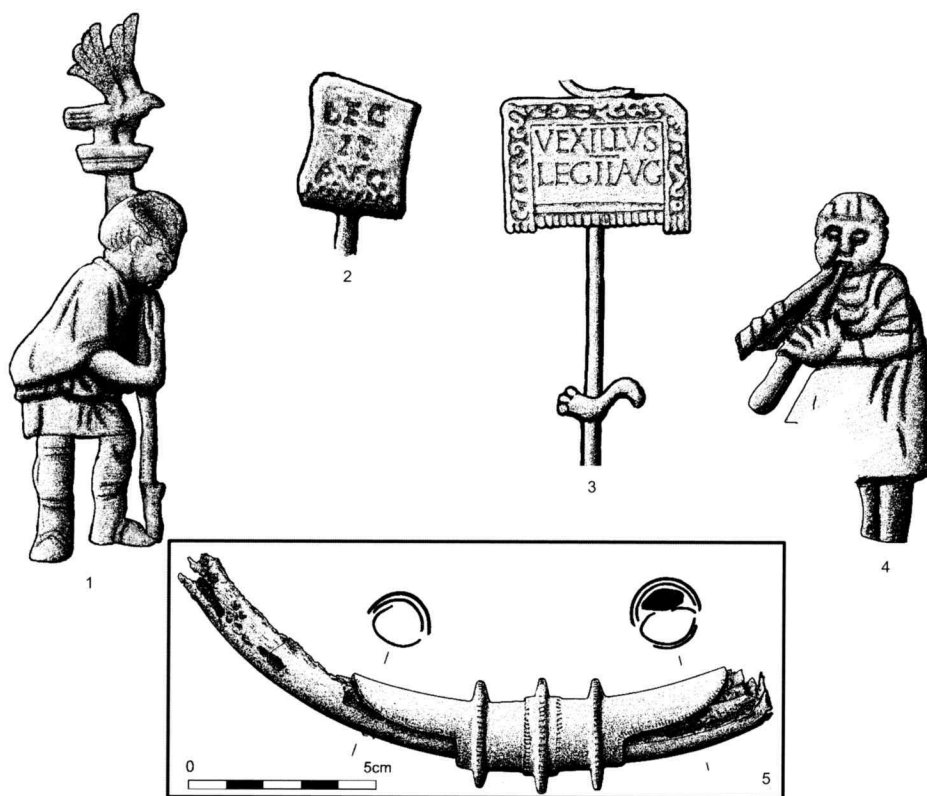


Figure 89: Antonine standards and musical instruments. 1 Eagle on the Hutcheson Hill distance slab; 2-3 vexilla on reliefs (2 Corbridge; 3 Bridgeness); 4 aulus (Bridgeness); 5 Possible cornu fragment (Strageath). 1-4 Not to scale.

ture AD, so it is possible that these may have possessed some antique or personal value. There was also a tripartite bronze chamfron with integral eyeguards.³⁸

Fronto noted slovenly troops at Antioch padding their cavalry saddles, forcing Verus to slit open the horns and remove the stuffing.³⁹

Notes

1. Marcommanic Wars: Zwickler 1941, 14-238; Böhme 1975; Birley 1987, 249-55; Friesinger *et al.* 1994.
2. Antonine Wall: Hanson and Maxwell 1983, 137-51. Hadrian's Wall: Breeze and Dobson 1987, 112-48; Allason-Jones 1988. Newstead: Curle 1911, 113.
3. Rhine-Danube advance: Schönberger 1985, 394-9. Trans-Danube: *CIL* III, 13439; Böhme 1975, 210-11; Kolnik 1986; Pitts 1987; Tejral 1990; 1994; 1995-96.
4. Syria: Isaac 1990, 51-2.
5. Nawa: Abdul-Hak 1954-55. Carnuntum *Waffenmagazin*: *RLÖ* II.

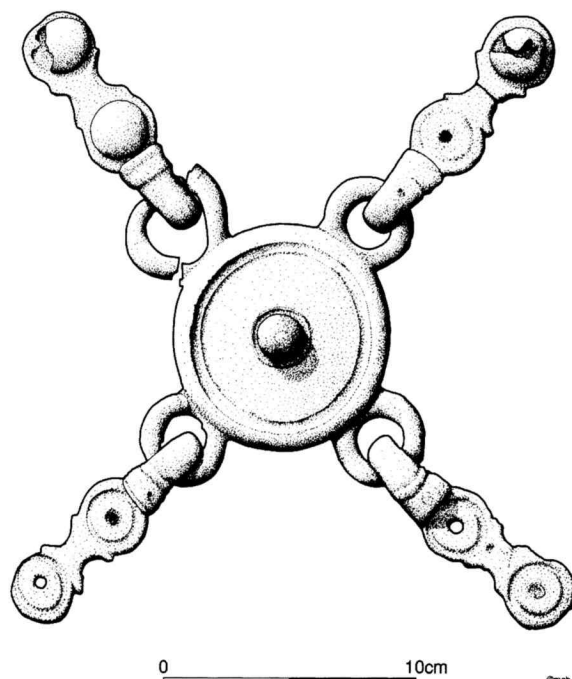


Figure 90: Antonine equine equipment. Junction phalera with junction loops (Newstead).

6. Croy Hill: Coulston 1988b. Newstead: Curle 1911, Pl. XXXVIII,9; 11. Bar Hill: Robertson *et al.* 1975, Fig. 33.18.
7. Carnuntum: *RLÖ* II, Taf. XXIII,1. Eining: Fischer and Spindler 1984, 72 and Abb. 42.
8. Nawa: Abdul-Hak 1954–55, 187. Newstead: Curle 1911, 188. Strageath: Frere and Wilkes 1989, Figs. 69,2–6, 8; 70,9–10, 12. Iža: Rajtár 1994, Abb. 3–4.
9. Tipasa: Schleiermacher 1984, Nos.65, 67. Bratislava: Speidel 1987, Fig.4. Arrian *Ek.*21, 31. Syria: Balty 1987, Fig. 9; 1988, Pl. XV.3; Balty and van Rengen 1993, 48, 50.
10. *RE* s.v. 'contus'; Coulston 1986, 63–6; 2003a, 422, 430; Negin 1998; Nicolle 1980. Cf. Tac., *Ann.* I.79.
11. Nawa: Abdul-Hak, 1954–55, 187. Canterbury: Bennett *et al.* 1982, 185–90, Fig. 99. Cf. Wild 1970.
12. Finds: e.g. Hundt 1955, Fig. 5.1–4; Kellner 1966, Figs. 1.2, 2.4; National Museum, Damascus, two examples (Hauran: inv.1889, 2169); Biborski 1994b. Five types: *ibid.* Aquincum: Ferri 1933, Fig. 286. Models: Raddatz 1953, Fig. 1; Hundt 1955, Fig. 1.
13. Kieseritzky and Watzinger 1909, Nos.599–600, 619, 627. Sarmatian: Ginters 1928, 56–9, 81; Sulimirski 1970, Figs. 42, 45, 49, 67, Pl. 47; Khazanov 1971, Pls. I–VII; Simonenko 2002, 219–25, Figs. 14–19. Graves etc.: Hundt 1955, Figs. 5.5–7, 6; 1960; Raddatz 1960, Figs. 1, 3, 5–6; Jørgensen *et al.* 2003, 228–9, 323.
14. Chapes: Curle 1911, Pl. XXXV,13, 16–18; Bennett *et al.* 1982, Fig. 99; Allason-Jones 1988, No.35a,3; Tejral 1990, Fig. 1. Marcus Column: Waurick 1989, 46–51, Figs. 3–4, 11–14.
15. Hofmann 1905, No.63. Bonner Berg: van Driel-Murray and Gechter 1983, Pl. 16,25. Wall: Allason-Jones 1988, No.50b.3.
16. Origins: Ginters 1928: 66–75, 79; Trousdale 1975, 110–9. Trajan's Column: Cichorius 1896–1900, Pl. II–III, Scene C. Catalka: Bujukliev 1986, No.100; Werner 1994. Cf. Khazanov 1971, Pls. XIV–V. Palmyrene sculpture: Tanabe 1986; Colledge 1976, Pl. 44 (Bet-Phasi'el, AD 191).
17. Bar Hill: Robertson *et al.* 1975, Fig. 32.15. Inveresk: A. Leslie, pers. comm. Tuchyňa: Krekovič 1994, 220, Fig. 7,13–14.
18. Bar Hill: Coulston 1985, 224–5. Carnuntum: *RLÖ* II, Pl. XXIV.25; Coulston 1985, 232. Avar: *ibid.*, 244–5. Iža: Rajtár 1994, Abb. 5,1–8. Micia: Petculescu 2002. Foreshafts: Coulston 1985, 267–8.

19. I a: Rajtár 1994, Abb. 4,1–16. Bar Hill: Robertson *et al.* 1975, Fig. 32,13. Burnswark: Jobey 1977–78, 89–90. Cf. Allason-Jones 1988, 202; Tejral 1990, Fig. 1. Incendiary: Coulston 1985, 266; Ptuj Museum pers. obs. *Amm.* XXIII,4,14–5. Veg. IV,18.
20. Cerchiaz 1982–83; Greep 1987, 191, 197–200, 9–10; Griffiths 1989, 271–3; Frere and Wilkes 1989, 177–8; Volling 1990, 48–58.
21. Strageath: Frere and Wilkes 1989, Fig. 71, 23–4. Burnswark: Jobey 1977–78, 90–1, Fig. 13. Lyon: Baatz and Feugère 1981. Cf. Iriarte 2003.
22. Croy Hill: Coulston 1988b, 6–9. Nawa: Abdul-Hak 1954–55, Pl. VII. Iža fittings: Rajtár 1994, Abb. 6,3, 7–8. Inveresk: Bishop 2004, Fig. 93,59. Carnuntum: *RLÖ* II Tafn. XX,11–13, XXIV,1–3. Butzbach: Simon and Baatz 1968. Binding: Tejral 1994, Fig. 11; Bishop 2004, Fig. 90,24.
23. New closures: Garbsch 1978, 7–8, 33–4.
24. Inscriptions: *ibid.*, Pls. 34–5; Pitts 1987, 26; Borhy 1990.
25. Corbridge: Forster and Knowles 1911, Fig. 41. Mušov: Tejral 1990, Fig. 1. Carlisle: McCarthy *et al.* 2001; Richardson 2001. Carnuntum: *RLÖ* II, Pl. XVI,6.
26. Stillfried: Eibner 2000. Newstead: Curle 1911, 156–8, Fig. 11, Pl. XXII; Robinson 1975, 180–1; Poulter 1988; Bishop 2002, 46–61. Carlisle: Caruana 1993; Bishop 2002, 46–7, Fig. 6,5. Corbridge: Robinson 1975, 177–80; Bishop 2002, 31–45. Fastening: Bishop 2002, 56–9. Armguards from Carnuntum: *RLÖ* II, 115–16, Pl. XX6–10. Newstead: Curle 1911, Pl. XXIII; Robinson 1975, 185–6; Bishop 1999b, 31–3, Fig. 7.
27. Date: Schönberger 1985, 472, D106. Helmet: Klumbach and Wamser 1976–77, Fig. 7.
28. Klumbach 1974, 37–40, Pl. 27; Robinson 1975, 73–4, Pls. 179–86. Balkans: Junkelmann 2000a, 143–53.
29. Curle 1911, Pl. XXXV,8.
30. Helmet A: Abdul-Hak 1954–55, Pls. II–IV; Robinson 1975, Pls. 345–8. Helmet B: Abdul-Hak 1954–55, Pls. V–VIII; Robinson 1975, Pls. 397–8. Echzell: Klumbach and Baatz 1970. Theilenhofen: Klumbach and Wamser 1976–77, Fig. 8; Garbsch 1978, No.F1. Inscription: *ibid.*, 56. Iža: Rajtár 1994, 84, Abb. 6,1.
31. Karaagach: Velkov 1928–29, Pl. III–V; Venedikov 1976, No.420. Dakovo: Popovic *et al.* 1969, No.206; Robinson 1975, Pl. 237. Bumbești: Petculescu and Gheorghe 1979.
32. Intercisa: Szabó 1986; Hainzmann and Visy 1991, No.160. Trajan's Column: Scenes LXVI, LXX, CVIII, CXV.
33. Parthian: James 1986, 117–20.
34. Strageath: Frere and Wilkes 1989, Fig. 73,48. Newstead: Curle 1911, Pl. LXXXIX,25. Hadrian's Wall: Allason-Jones 1988, Figs. 4,50b.2, 6,52a.9 (terminals). Arch: Koepfel 1986, No.31.
35. Flask: Close-Brooks 1977–78. Staff: Apul. IX,39–40.
36. Bonner Berg: van Driel-Murray and Gechter 1983, 17–18. Strageath: Frere and Wilkes 1989, No.220. I a: Rajtár 1994, Abb. 8,16–17. Croy Hill: Coulston 1988b, 1.
37. Hutcheson Hill: Keppie 1979, 16, No.11. Bridgeness: *RIB* 2139; Breeze 1989. Corbridge: *RIB* 1154. *Aulus*: Neuman 1995. Strageath: Frere and Wilkes 1989, Fig. 75.
38. Newstead: Curle 1911, Pl. LXXIV,6. Nawa *phaleræ*: Abdul-Hak 1954–55, 187–8, Pl. XI. Chamfron: *ibid.*, 186, Pl. X,1.
39. Fronton *Ad Verum Imp.* II,1,19.

7 The Army in Crisis

From the death of Commodus to the accession of Diocletian the internal stability of the Empire was disrupted by usurpation and civil war. New confederations of German tribes pressed against the northern frontiers, and in the East the Arsacid Parthians were replaced by the more effective Sassanid Persian dynasty. The Danubian region (Illyricum) provided not only the best soldiers but also many of the 3rd-century emperors who steered the Empire to recovery. With trans-Danubian borrowings, military equipment development in this area was dynamic and influential. Recruitment of *Illyriciani* to Praetorian and legionary units in Italy (from the reign of Severus), and geographically-wide deployment of Illyrian units, brought new equipment forms to other army groups. The renaissance of figural gravestones originated, and spread from, the Danube provinces, especially to Rome.¹

In the Severan period Roman military control was extended further into northern Britain, Numidia and Mesopotamia, providing a *terminus post quem* for equipment from new sites; conversely, some areas were given up in the 3rd century. Forts on the outer Agri Decumates line and beyond Mainz were abandoned in c.259–60, and those in Dacia c.271, giving sites a *terminus ante quem*. As usual, orderly Roman withdrawal was accompanied by the deposit of unwanted equipment.²

Artefactual comparisons may be made with finds from areas with less strategically dated contexts. Excavations at Corbridge produced a group from a small 3rd-century *fabrica* on Site XL. These finds are directly comparable with equipment left in the north-west rampart-back building at Caerleon when the legionary fortress there was abandoned in the later 3rd century.³

The largest single group of military equipment from the Roman Empire was found during Franco-American excavations at Dura-Europos in Syria (1922–37). Dura was a Hellenistic colonial foundation and ‘caravan city’ taken from the Parthians in AD 164. It was held by a number of legionary *vexillationes*, plus *cohors XX Palmyrenorum* and other units, but identities of the latest Roman units are not known with certainty. The city fell to the Sassanid Persians c.254–7 after a siege, and was subsequently abandoned. Much of the military equipment was preserved by arid contexts in collapsed towers and siege-mines and dates to the latest period of occupation (Fig. 91).⁴

Graves and ritual water deposits in northern Europe, especially at Thorsbjerg, Vimose and Simris, often contain Roman armour and weapons preserved in wet conditions. Alongside Roman items are German artefacts and equipment derived from Roman models. The Roman pieces presumably entered Free Germany as *spolia*, diplomatic gifts, service payments and trade-goods, and moved around through inter-German trade, diplomacy and warfare. It is suggested that some large water (now bog) assemblages were created by long-term small-scale offering punctuated by major depositional events involving war-booty.⁵

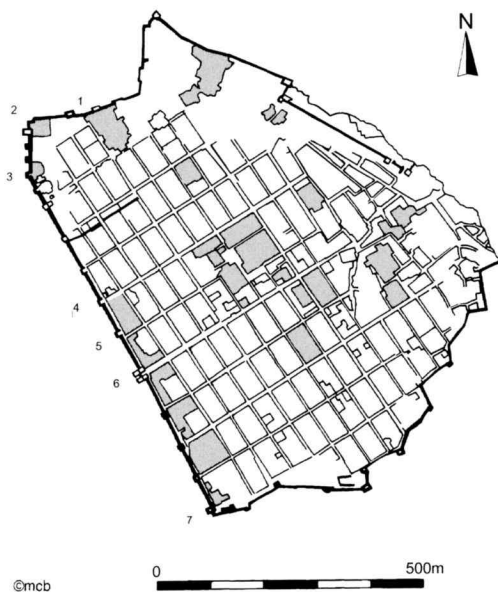


Figure 91: Plan of Dura-Europos. 1 Tower of the Archers; 2 Temple of the Palmyrene Gods; 3 Tower 24; 4 Tower 19 and siege-mine; 5 Synagogue; 6 Palmyrene Gate; 7 assault ramp and mined Tower 14.

Weapons

Pila (Fig. 92)

Pila are represented on a number of 3rd-century Praetorian gravestones from Rome. Examples now in Naples and Fiesole museum collections show a large, bulbous weight between shaft and shank, analogous with weights on Cancellaria Relief A. The *stela* of M. Aurelius Lucianus (Museo Capitolino) and one in the Castel S. Angelo have a second, smaller weight above the first. A binding usually runs up the full length of these *pilum* shafts, and the weapon on the funerary altar of L. Septimius Valerinus (Museo delle Terme) also has a pointed butt.⁶

Gravestones in the provinces generally do not depict *pila*, but there are exceptions. The *stela* of a *b(ene)f(iciarius) tr(ibuni) leg(ionis)* from Apamea shows a *pilum* with butt, two or three weights, shank, triangular head and what appear to be ribbons attached to the lower weight. The gravestone of Aurelius Iustinus, *miles* of *legio II Italica*, from Celje shows a *pilum* with two weights.⁷

At least 55 *pilum* heads and shanks were found in the Caerleon rampart-back building. They are closely paralleled in proportions and dimensions by heads from Corbridge, and are longer and slimmer than examples from earlier periods. Other heads from Richborough and from German sites may also date to the 3rd century.

Pila therefore continued in use during the 3rd century, but they probably ceased to be the priority shafted weapon for legionaries that they were in earlier periods. Nevertheless, the pictorial and artefactual evidence continues to associate the *pilum* with Praetorian and legionary troops.

Spears (Figs. 93–4)

Gravestones and provincial sarcophagi sometimes show a standing soldier holding one or two spears. The majority have narrow-shouldered, leaf-shaped heads, but exceptionally a single spear with a broad-shouldered, triangular head is depicted. Most of these representations involve legionaries, with a few Danubian auxiliaries (see Fig. 111).⁹

There are numerous artefactual parallels from British, German and Danubian sites for such gravestone spearheads. These, together with butts, did not differ greatly from those used in earlier periods. Heads from Caerleon, for example, fall into two main types: narrow-shouldered, widest about half-way along the blade; and broad-shouldered, widest near the socket. Perhaps the narrow type was designed primarily for throwing and deep penetration, whilst the broader form was for thrusting, with ease of withdrawal a priority. A third common form continuing from the 2nd century had a proportionally long and slim solid head with a triangular or square cross-section.¹⁰

Third-century spear-shafts from Danish bogs were sometimes decoratively carved below the socket. Roman shafts may have been similarly embellished, or at least painted.¹¹

Provision of a pair of shafted weapons on *stelae* suggests that one or both were chiefly missiles. Three figural gravestones of *legio II Parthica* soldiers from Apamea, including that of Aurelius Mucianus who is designated '*quandam discenti(s)*

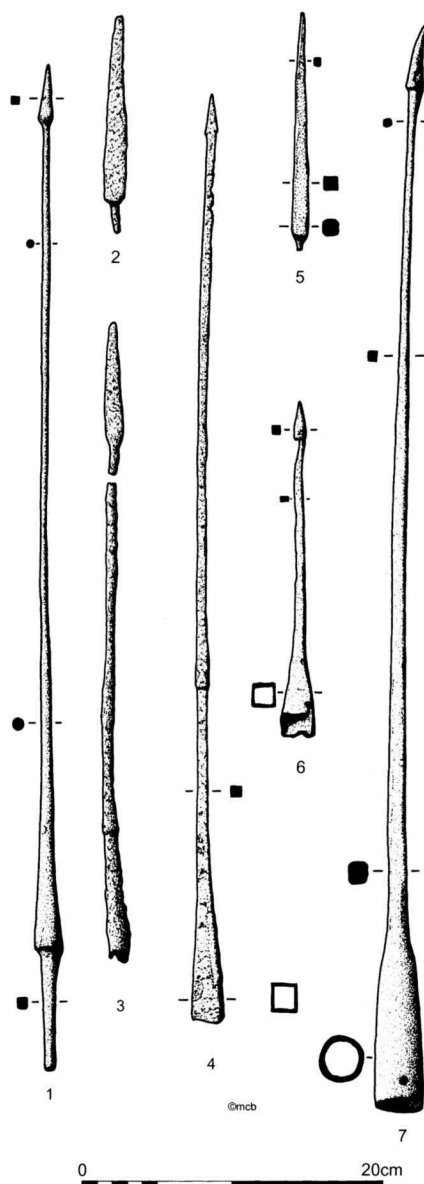


Figure 92: Third-century pila. 1, 6–7 Saalburg; 2–3 Caerleon; 4 Eining; 5 Corbridge.

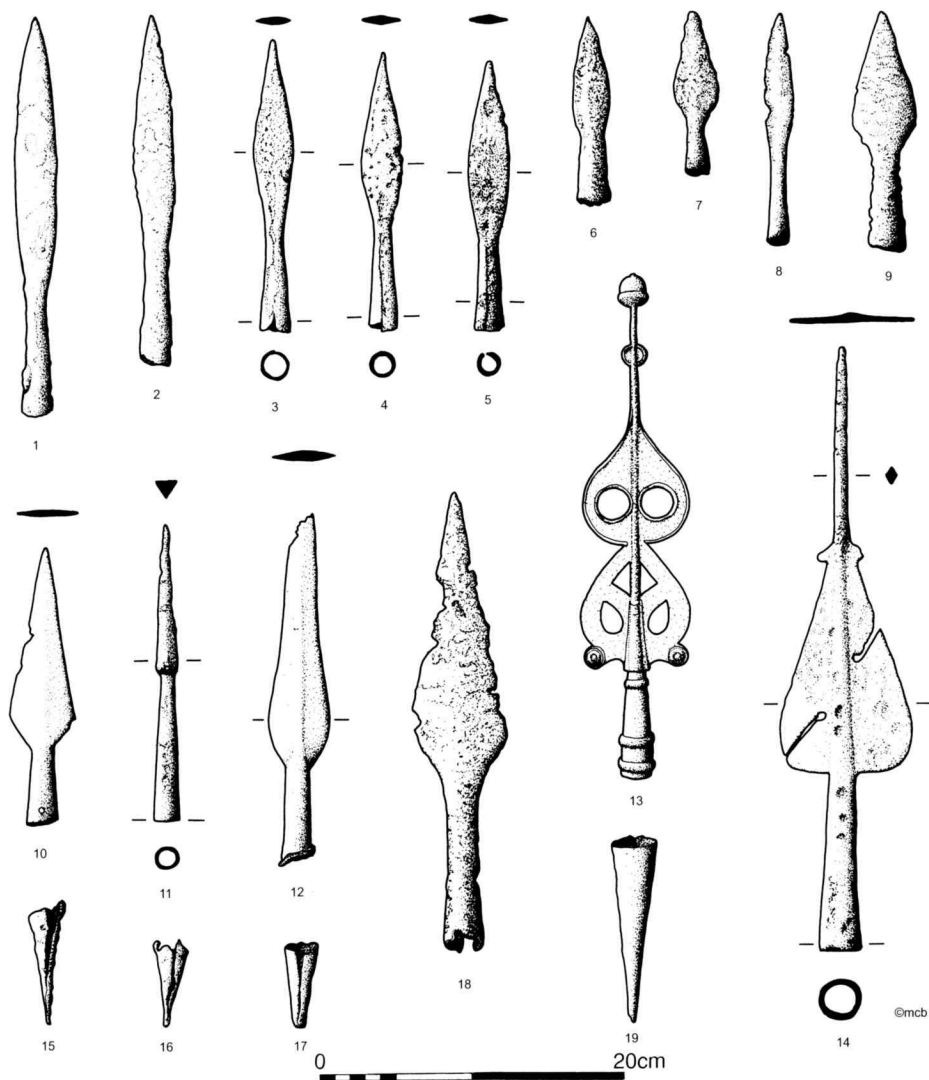


Figure 93: Third-century spearheads and butts. 1, 15–16 Buch; 2, 9 Caerleon; 3–5, 11, 14 Künzing; 6–8, 18 Saalburg; 10, 12, 17, 19 Osterburcken; 13 Wiesbaden.

lanchiari(um)’, depict the deceased holding a bunch of up to five shafted weapons with narrow-bladed heads. They are shorter than the spears on other contemporary Apamea stela¹².

A distinctive class of iron spearhead had a low, broad-shouldered blade exhibiting such features as copper-alloy inlays, silvering, circular or slot perforations, and attached rings. These are generally identifiable with heads carved on monuments erected by and for *beneficarii*, *frumentarii* and *speculatores*. One head with attached copper-alloy rings accompanied a collection of *beneficarius* altars at Osterburcken.



Figure 94: Third-century tombstones. 1–2 unknown (Rome); 3 Aurelius Mucianus (Apamea); 4 Aurelius Lucianus (Rome). (Not to scale).

Soldiers presumably carried spears ('*Benefiziarierlanze*') as rank insignia whilst engaged in special administrative, supply and policing duties. The spearhead shape was also applied to baldric fastening plates, decorative belt appliques and strap

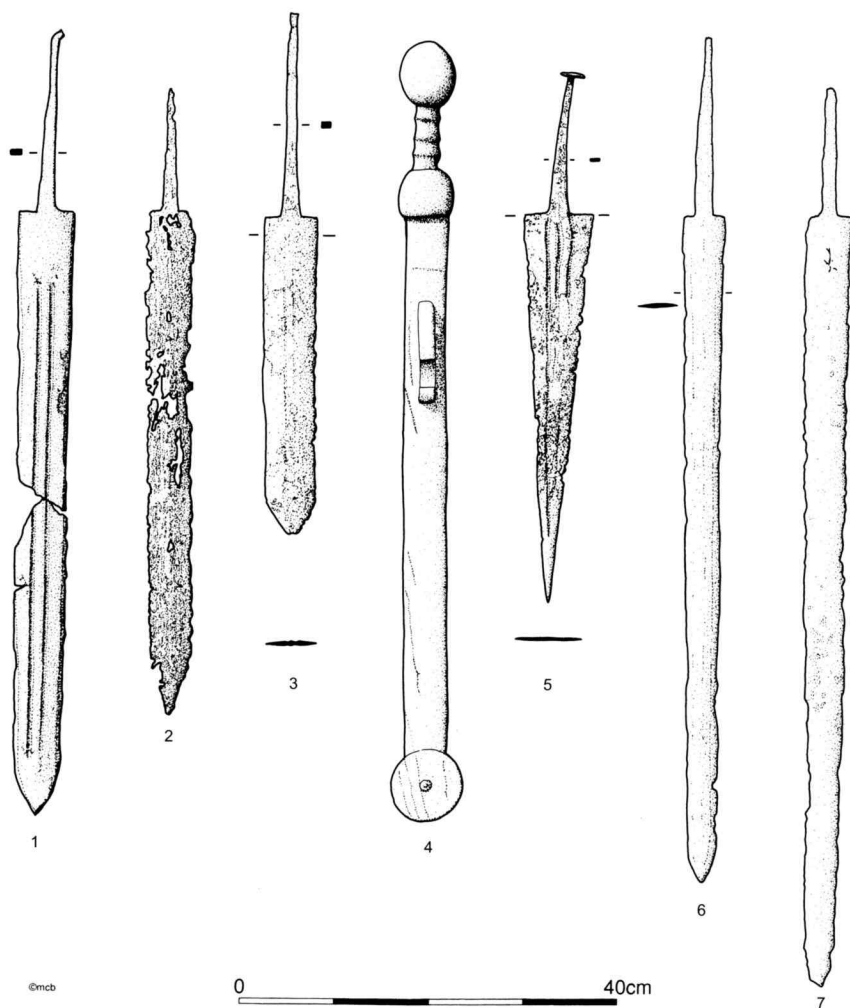


Figure 95: Third-century swords. 1, 6 Augst; 2 Lauriacum; 3, 5 Künzing; 4 Khisfine; 7 Straubing.

terminals. Many of the heads have been published as fittings from *signa* or *vexilla*, but they are far too numerous for this to be a general identification.¹³

Swords and baldrics (Figs. 13, 95–102)

The representational sources indicate that Roman swords underwent three major changes in the later 2nd and 3rd centuries. First, the shorter 'Pompeii' type sword disappeared, to be replaced by *spathae* for all types of troops. Second, the sword was now always carried suspended from a broad baldric on the soldier's left side, rather than on his right as before. Third, ring-suspension was entirely replaced by the scabbard-slide. Swords are seldom found with their furniture intact on Roman sites, but Free German burials and water deposits both involved all the fittings entering the archaeological re-

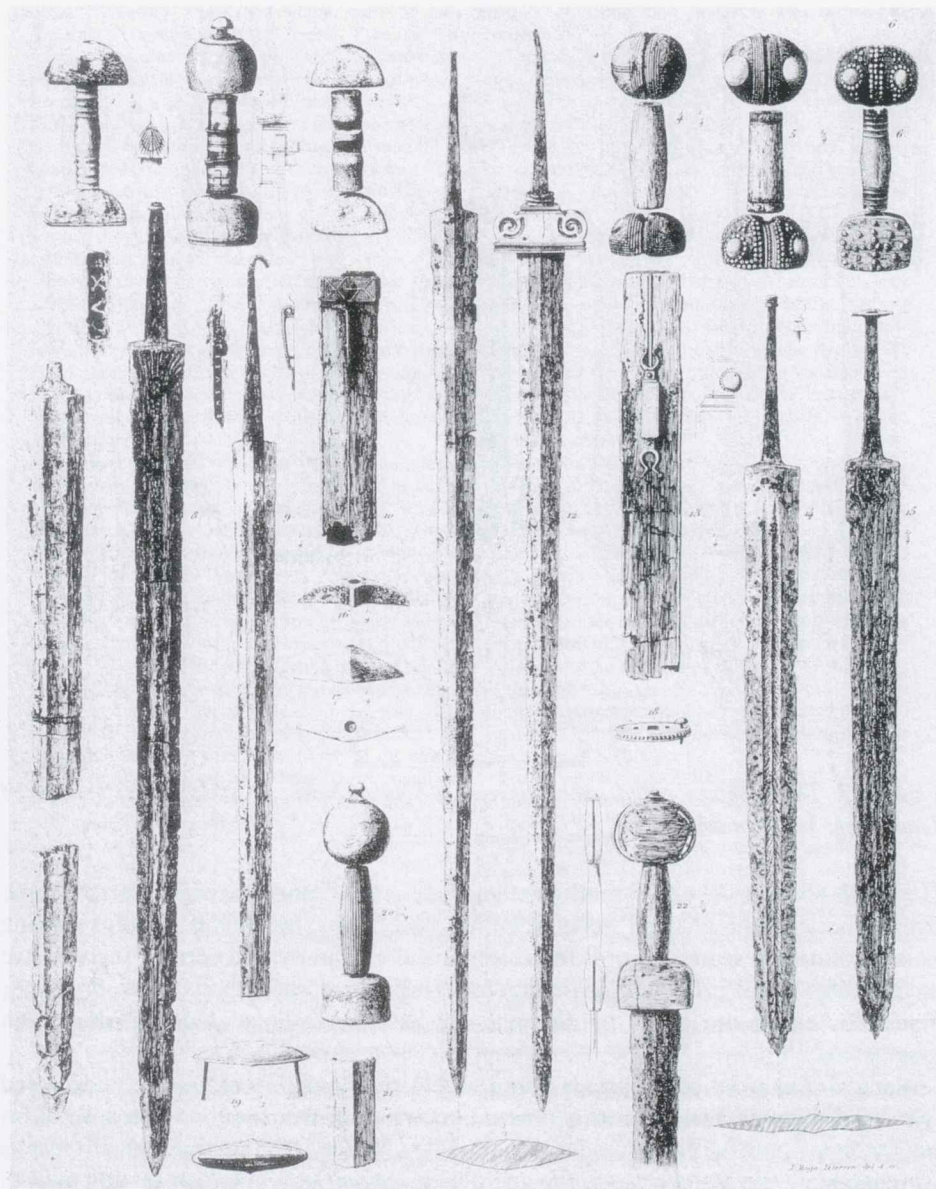


Figure 96: Swords from Vimose (from Engelhardt 1869).

cord together. Few swords were deposited in Roman graves but burials at Lyon and Khisfine are important exceptions.

Tanged swords were classified by Ulbert into two categories, based on blade proportions. Firstly, the long, narrow 'Straubing/Nydam' type had a blade length to breadth ratio of 15–17:1 (L. c.650–800 mm, W. 44 mm max.) and, generally, a slightly tapering blade. Secondly, the shorter, wider 'Lauriacum/Hromowka' form had an 8–12:1 ratio



Figure 97: Third-century inlaid sword figures. 1 South Shields; 2 Stabu; 3 Hromowka; 4 Lauriacum; 5 Podlódow.

(L. c. 557–655 mm, W. 62–75 mm), parallel edges and a triangular point. There is some overlap between groups and some individual exceptions, but this is a useful starting point for future research. Swords from sites abandoned in the 3rd century include five or six *spathae* found at Dura (plus fittings for at least 25 more weapons). Swords of considerable length are worn by Romans on Sassanid reliefs, and are shown on gravestones.¹⁴

Some 3rd-century sword blades found within the Roman frontiers were decorated with inlaid figures, but more examples are known from Free Germany because of funerary deposition. Military standard, eagle, Mars, Victory, Minerva and wreath motifs were inlaid on the blade close to the guard in *orichalcum* and other contrasting metals. Figures are always head downwards towards the sword-point and to be displayed the sword would have had to be held point upwards or laid on a flat surface. Many 3rd-century swords on both sides of the frontiers have channels down their blades and are pattern-welded in contrast with earlier Roman techniques (see below, Chapter 9).¹⁵

Plain, ribbed and fluted grips and elliptical pommels of bone have been found at German frontier forts. Guards were semi-oval or rectangular, and made of bone, iron or copper alloy. Complete wooden grip-assemblages of similar form have been recovered from Danish bog contexts and, in addition, eagle-headed pommels are shown on

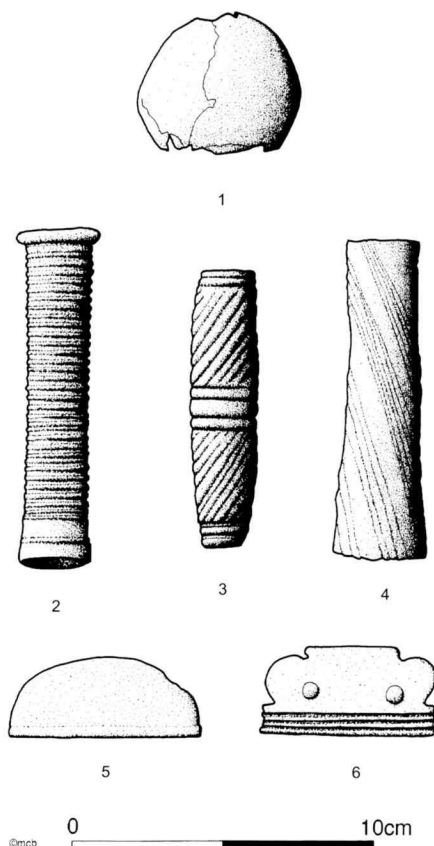


Figure 98: Third-century sword-grip assemblages. 1 Pommel (Zugmantel); 2–4 handgrips (2 Cannstatt; 3 Buch; 4 Zugmantel); 5–6 handguards (5 Butzbach; 6 Niederbieber).

gravestones and sarcophagi. Most beaks pointed along the grip, whereas those on swords carried by Roman emperors on Sassanid reliefs are perpendicular.¹⁶

The emphasis on long swords above does not preclude the continued use of shorter weapons, but there was a break in the 'Pompeii *gladius*' tradition. The ironwork hoard from Künzing includes fourteen short swords of different proportions (L. 231–389 mm). Several have parallel edges and the total length of 530 mm of one included 210 mm of tang. A triangular blade (L. 400 mm; W. 56 mm) tapered down its entire length to a point. These blades were pattern-welded and thus technologically not part of the '*gladius*' tradition. It is likely that some at least are broken *spathae* which have been given new points. However, Vegetius does mention the 4th-century use of '*semispathae*', and swords from Augst, Wehringen and Köngen parallel the Künzing finds. Ring-pommel swords continued in use, and examples from Eining and Künzing may date to the 3rd century.¹⁷

Scabbards surviving in Scandinavian contexts were made from thin wooden laths with an overall leather covering for binding and weather-proofing. One sword found at

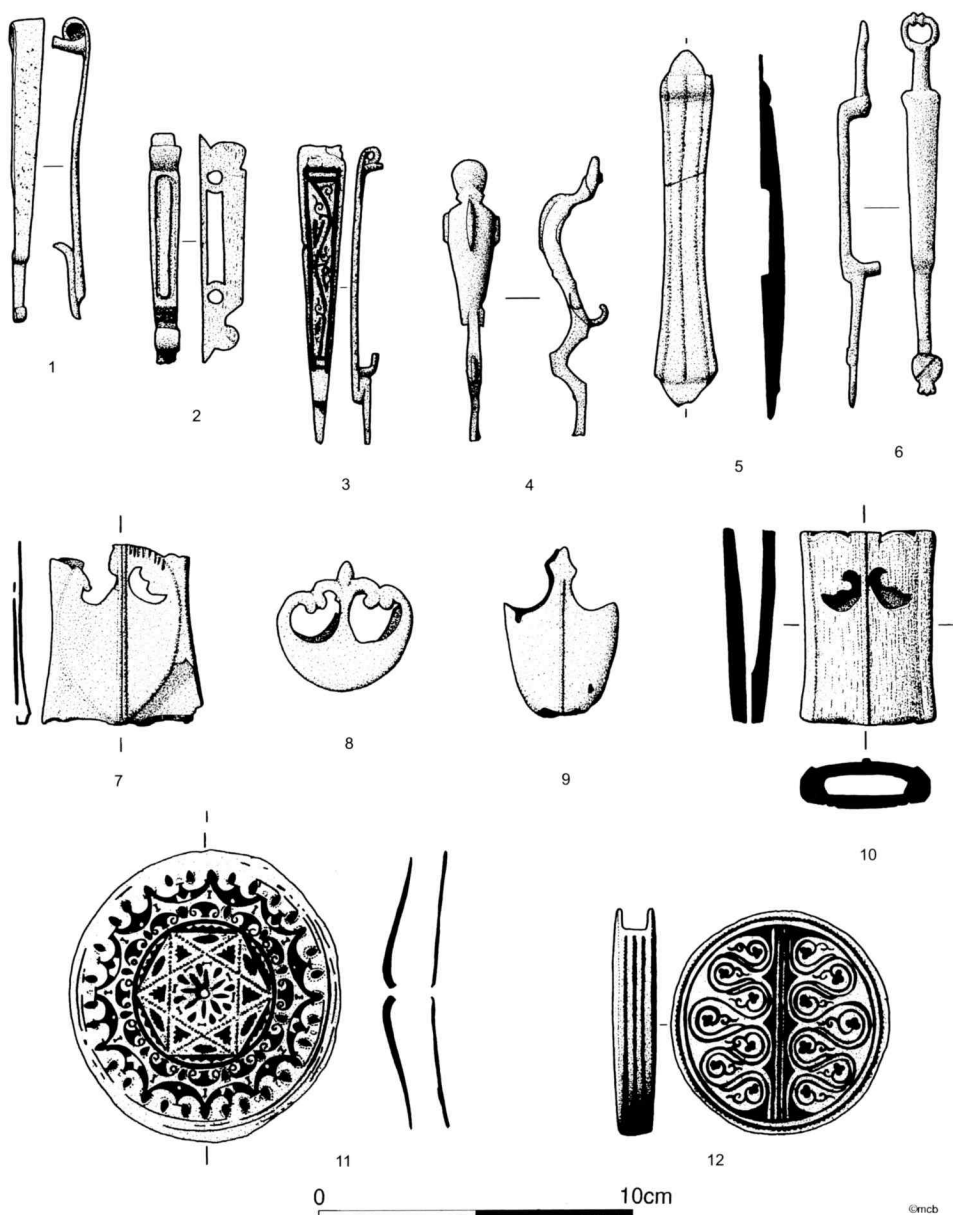


Figure 99: Third-century scabbard-fittings. 1–6 scabbard slides (1 iron, Stockstadt; 2 ivory, South Shields; 3 iron, Zugmantel; 4 copper alloy, South Shields; 5 bone, Niederbieber; 6 copper alloy, Corbridge); 7–12 chapes (7 copper alloy, Corbridge; 8–9 copper alloy, Caerleon; 10 bone, Colchester; 11 silver, Kaiseraugst; 12 iron, Niederbieber).

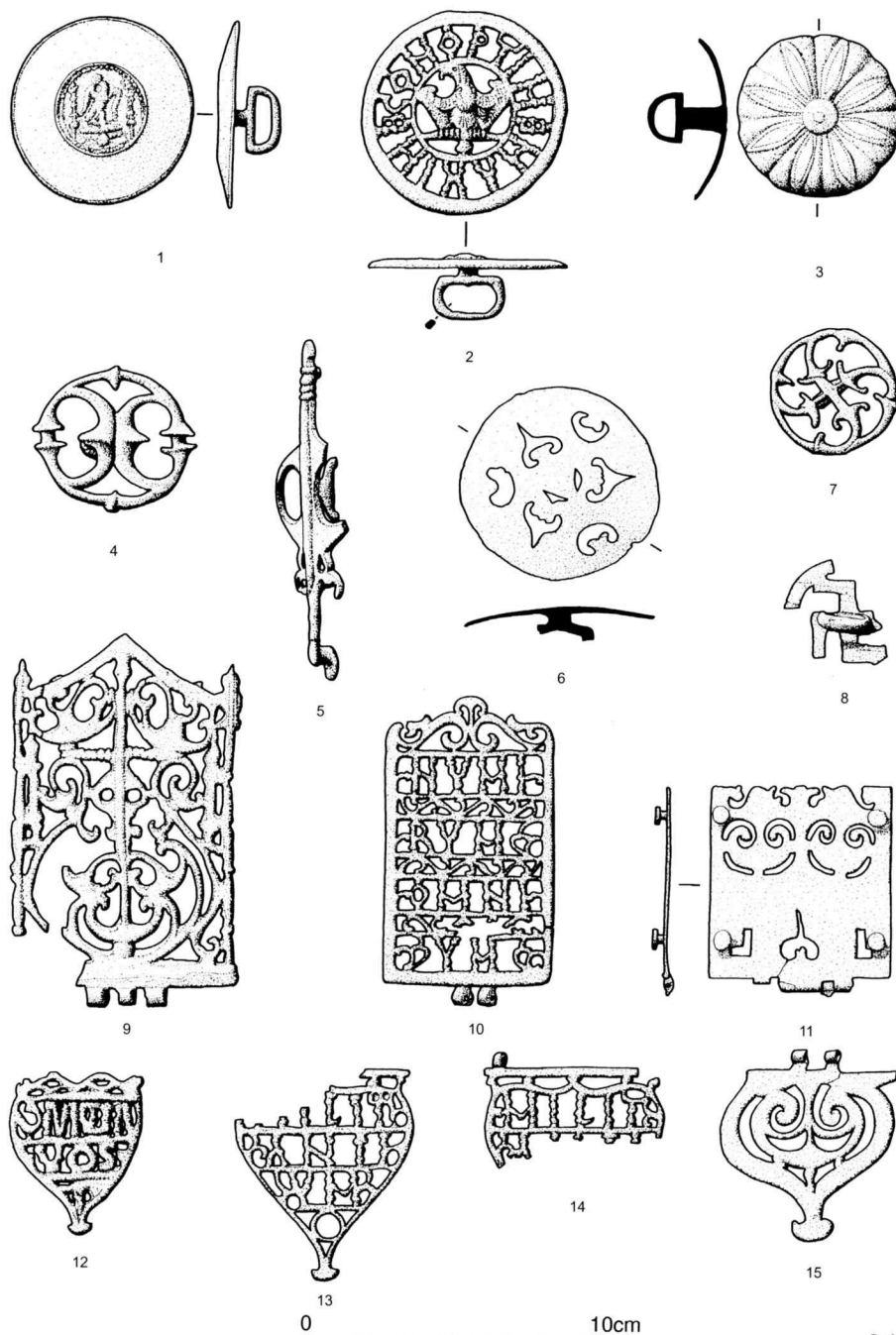


Figure 100: Third-century baldric fittings. 1–8 phalerae (1 Vimose; 2 Carlisle; 3 Saalburg; 4, 7 Banasa; 5 Buch; 6 Zugmantel; 8 Dura-Europos); 9–11 hinged terminal plates (9 Silchester; 10 Zugmantel; 11 Scole); 12–15 terminal pendants (12 Corbridge; 13–15 Zugmantel).

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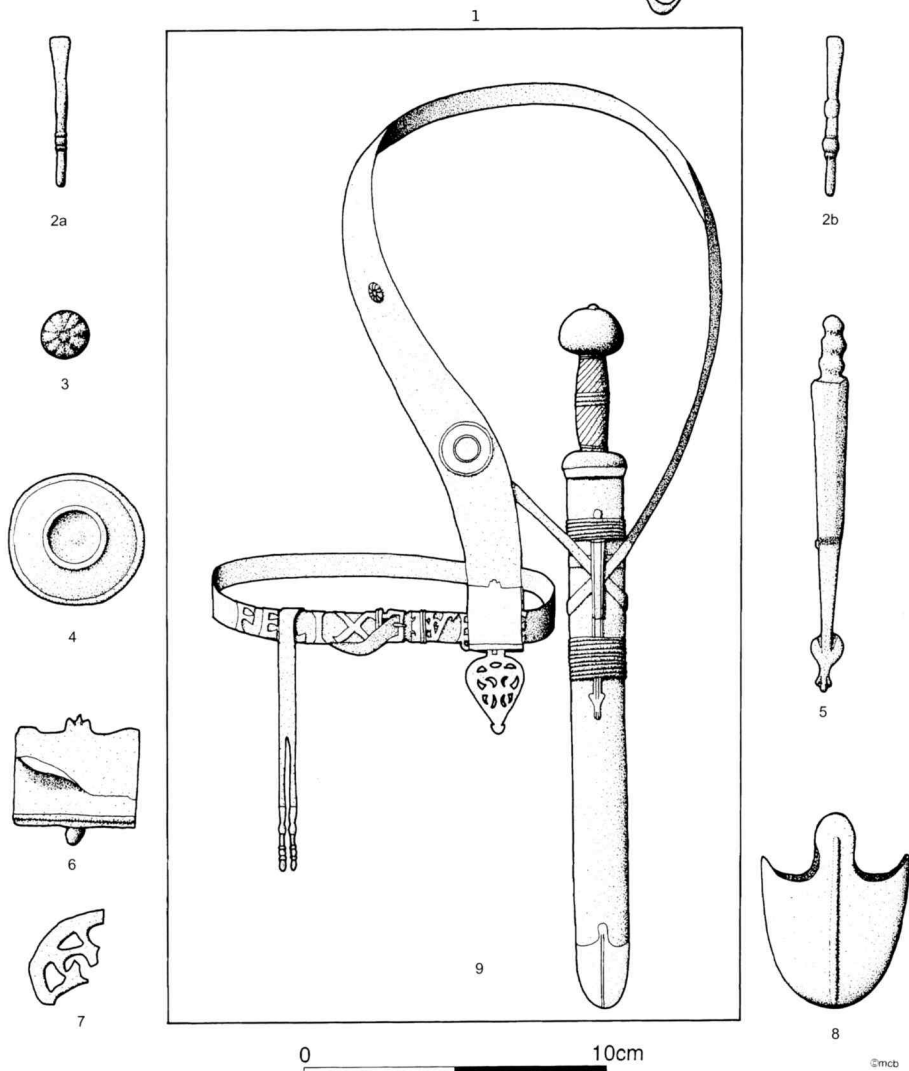


Figure 101: The Lyon burial. 1 Belt-plates; 2a and b strap terminals; 3 decorative rosette; 4 baldric phalera; 5 scabbard slide; 6 baldric terminal plate; 7 baldric pendant; 8 scabbard chape; 9 reconstruction of the belt, baldric and scabbard.

Dura had a scabbard made of two thin sheets of wood, perhaps bound with textile. Its chape and slide (lost) may also have been made of wood, and the guard, grip and pommel of the sword itself were certainly wooden.¹⁸

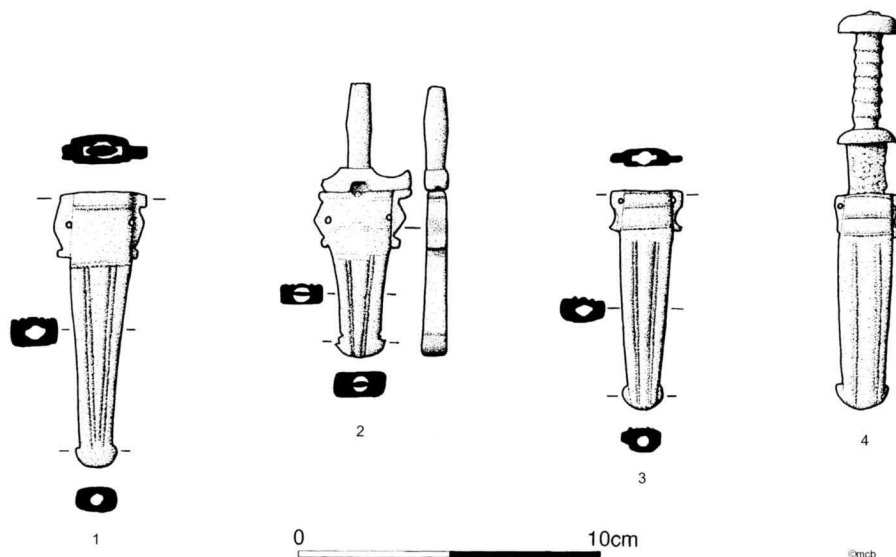


Figure 102: *Sword models. 1, 3 Trier; 2 Milau; 4 Saint-Marcel.*

Peltate and heart-shaped copper-alloy scabbard chapes continued in use alongside new forms. These included two-piece bone or copper-alloy 'box' chapes, which were flat-ended, trapezoidal in profile, and often decorated with paired crescentic or peltate perforations. They have a Europe-wide distribution. Most attractive are circular or disc chapes, made of ivory, bone, iron or copper alloy; these could be plain, engraved, or, in the case of iron examples, inlaid with contrasting coloured metal or niello. The finest are from German forts. They are virtually absent from Britain, but, at the other extreme, there are copper-alloy, iron and bone examples from Dura and the Syrian Hauran.¹⁹

The circular chape is the most common form represented on gravestones (it also appears on model swords), but peltiform chapes are also shown. Roman scabbards on Sassanid reliefs have circular chapes, and a white (bone?) disc-chape appears on a long brown scabbard on a 3rd-century mosaic at Palmyra.²⁰

Scabbard-slides occur in considerable numbers and in a variety of forms on 3rd-century British, Rhenish and Danubian sites, and in Dacia and Syria. Some iron examples were decorated with niello inlay. Copper-alloy pieces generally have some cast ribbing and bevelling, and many had foliate, ring, pelta, crescent or heart-shaped terminals. The most elaborate were cast in the shape of a dolphin. Bone slides were either flat and waisted, or had an upstanding lobate profile which is reproduced on bone model scabbards.²¹

The Khisfine sword has all the elements of blade and scabbard surviving together on one weapon. Grip-assembly, disc-chape, slide and scabbard body were all made of ivory. The chape was plain, but decorated with a central gold rivet on the same side as the slide. The rivet was presumably intended to be displayed, further demonstrating that slides faced away from the scabbard's wearer, just as they are depicted on gravestones.²²

Stelae show the sword always on the wearer's left, attached by a slide to a broad baldric. The latter has a circular *phalera* mounted towards its lower end and an ivy-leaf terminal. When the loose belt-end hangs down or crosses the scabbard, the *phalera* is positioned over the slide. The relationship between scabbard and baldric is clearly shown on Sassanid reliefs where swords are angled because the Roman wearers are kneeling.²³

Two broad leather baldrics were found at Vimose. The less damaged one was c.80 mm wide and at least 1.185 m long. The complete end was cut off straight, whilst the other tapered over 250 mm to 12 mm wide. The eye on the back of a plain, convex copper-alloy *phalera* (W. 70 mm) pierced the baldric at a point 286 mm from the broad end. The wider (86mm) second baldric was incomplete at 1.005 m. Its surviving copper-alloy *phalera* had the 20mm wide belt-end tied through its eye. Two more baldrics occurred amongst the Thorsbjerg material (L. 1.055 m, W. 91 mm; L. 710 mm, W. 70 mm), each bearing two *phalerae*. The longer one was virtually complete and had crescentic cuttings at its wide end delineating a heart-shaped terminal. A baldric with *phalera* in Simris Grave 54 was worn over the buried warrior's right shoulder with his sword on his left side.²⁴

Phalerae from German forts were totally plain or had decorative concentric circles, radiating relief petals or geometric perforations similar to box-chapes. The characteristic rear attachment-eye identifies other, more elaborate *phalera* forms, such as the fine series of openwork *phalerae* from Dura-Europos and some North African sites which displayed swastika or Celtic designs, or had radiating spokes, peltae or hearts.²⁵

The most elaborate openwork *phalera* type had a central eagle clutching thunder-bolts, surrounded by an annular inscription which reads OPTIME MAXIME CON(*serva*). Remarkably similar complete or fragmentary examples come from German frontier forts, Strasbourg, Lauriacum, and forts and towns in Britain. A particularly fine silver *phalera* was a chance find at Carlisle, whilst Thamusida has produced a copper-alloy North African example, and another was found at Illerup Ådel outside the empire. Alternative figural designs to the central eagle are known, such as wolf-and-twins (*lupercal*) or a standing Hercules. The eagle with its allusion to Jupiter was a popular motif commonly applied to body armour, helmets, greaves, shields, chamfrons, medallions and sword-pommels.²⁶

Ivy-leaf baldric terminals depicted on gravestones reflect the heart-shaped copper-alloy openwork plates which occur in the artefactual record. Examples from Zugmantel and Aldborough bore inscriptions and were hinged along the top. Rectangular openwork plates in the same inscribed style, also from Zugmantel, have a corresponding hinged edge. Heart-shaped pendants and rectangular plates were thus joined together and attached to the broad end of the baldric. They formed a set with an eagle *phalera*, the whole inscription soliciting Jupiter's protection over the unit of the wearer: OPTIME MAXIME CON(*serva*) (*phalera*)/NUMERUM OMNIUM (rectangular plate)/MILITANTIUM (pendant). A terminal from Corbridge had the different motto: OMNIA VOS ('you all'). Geometric openwork and plain plates also occur without inscriptions. The Vimose baldrics do not seem to have had metal terminals, but their ends were decorated with dolphin and foliate designs.²⁷



Plate 1: Oberammergau dagger and sheath



a



b

*Plate 2: Roman helmets.
a. Xanten;
b. unprovenanced;
c. Theilenhofen; d. Buch;
e. Berkasovo*



c



d



e

Plate 3: a) Copper-alloy medallion depicting vexillations from the British legions.



b) Silver baldric phalera (unprovenanced).

Plate 4: a) Curved rectangular shield,
Tower 19, Dura-Europos



a



b



c

Flat oval shield, reconstruction paintings of the b) decorated front and c) rear



a



b



c

Plate 5: Legionaries recreated a) in watercolour (courtesy Andrei Negin), b) digitally (courtesy Jim Bowers) and c) in the flesh

Plate 6: a) Notitia Dignitatum shield blazons;
 b) painting of a biblical Pharaonic warrior in the
 guise of a 4th century AD Roman soldier, Via
 Latina Catacomb, Rome; c) painting of a 4th
 century AD soldier, Via Maria Catacomb,
 Syracuse.



a



b



c



a



b

Plate 7: a) Baldric phalerae from Vimose; b) Shield boss bearing an inscription to a member of the equites singulares and scenes from the Dacian Wars.



a

b



c

Plate 8 Brooches in the form of a) a sword scabbard and b) a helmet with crest. c) Trajan's Column.



Figure 103: Roman emperors on Sassanid reliefs. 1 Naqsh-e-Rustam; 2–3 Bishapur II. (Not to scale).

The tapering end of the Danish baldrics was clearly tied to the eye behind the *phalera*, but there is less certainty about the method by which the baldric was attached to the scabbard. Oldenstein suggested that rather than the strap merely passing through the slot opening of the slide, it was wrapped twice around the scabbard body starting and finishing from behind. This would have the advantage of distributing the weight of the scabbard without it being carried by the slide alone (which might detach or break). Alternatively, wrapping the strap around the scabbard, starting and finishing at the front with a short piece left over, would best achieve the effect seen on gravestones of *phalera* overlying scabbard-slide. With the *phalera* to one side, the strap would visually appear to pass straight through the slide alone, again as it does on many representations.²⁸

The Lyon burial, mentioned above (p.33), included coins which provide a *terminus post quem* of AD 194, and the dead soldier may have participated in the battle of Lugdunum (Lyon, AD 197). The grave goods included all the fittings for a sword, scabbard, baldric and waist-belt. The *spatha*, missing only the tip of its blade (L. 680 mm, W. 56mm; 12:1), had a plain, rectangular copper-alloy guard. A heart-shaped chape and a palmette-decorated slide, both of copper alloy, were all that remained of the scabbard. Presumably the sword-grip, pommel and scabbard body were wooden, the last covered with leather. The baldric had a copper-alloy *phalera* with simple concentric circle decoration, and a plain rectangular plate hinged to a perforated terminal.²⁹

Daggers (Fig. 104)

The continued use of military daggers in the 3rd century is spectacularly demonstrated by the inclusion of no less than 51 blades and 29 sheaths in the Künzing iron hoard. The larger daggers had 280 mm long blades and were *c.* 400 mm long overall. Most had a pronounced waist and two longitudinal channels defining a rib, although some had parallel sides. A small proportion of the group had pattern-welded blades. Some had entirely organic grip-assemblages, whilst others had inverted 'T'-shaped grip-plates with crescentic pommels.³⁰

The iron sheaths had a mouth, medial plate and chape on the outer face only, connected by edge-guttering. Many had two pairs of rings attached by rivets to the mouth and medial plates, a conservative feature, retained long after ring-suspension had been discontinued for swords. Other 3rd-century daggers from British, Rhenish and Danubian sites are often longer and proportionally wider in comparison with blades of earlier periods. For example, one from Copthall Court, London, has an 80 mm-wide and 300 mm-long waisted blade. The east is represented by finds from Zeugma and Dura. A funerary monument from Augsburg has a possible 3rd-century dagger representation. Herodian stated that when Severus cashiered the Praetorians, he deprived them of decorated daggers in addition to their belts.³¹

Archery equipment and slings (Figs. 105–6)

The representational sources (particularly Levantine mosaics and Palmyrene sculpture) show weapons of 'composite' construction. They had a recurving profile with a set-back handle and angled ends (ears), features which could not be imitated by a bow made of wood alone. The uses of bone and antler laths found on Roman military sites are explained by the attachment of identical items to the grips and ears of bows in steppe nomad graves. Ear laths could be straight or curving, and notably long for upper limbs (Stockstadt *c.* 350 mm; Carnuntum 345 mm; London 325 mm), or short for lower (Belmesa 155 mm; Mainz 140 mm; Heddernheim 112 mm). Grip-laths were waisted and are very much rarer finds, and examples from Intercisa, Micia and Tibiscum may be recognised by analogy with grip-laths in Hunnic and Avar graves.³²

An outstanding collection of Roman laths was found in the Caerleon rampart-back building and included 37 fragmentary rounded or flat-ended ear-laths with nocks. The only unbroken lath is 300 mm long, but another in two pieces is the longest recorded Roman example (370 mm). Six complete and two fragmentary grip-laths (L. 124–65 mm, W. 12–18 mm) were also present. Unfinished or failed fragments indicate manufacture in progress, the laths probably never having been attached to bows.³³

Roman bows were thus of composite construction, with a set-back handle, angled ears and asymmetrical limbs. Each ear had a pair of laths, and some bows had one grip-lath on the handle. The variety of lath shapes and lengths suggests a range of bow designs in contemporaneous use.

Hunting cross-bows with composite staves are depicted on two 3rd-century(?) Gallo-Roman reliefs. Accompanying quivers are long and presumably carried arrows, not the short quarrels used in the Middle Ages.³⁴

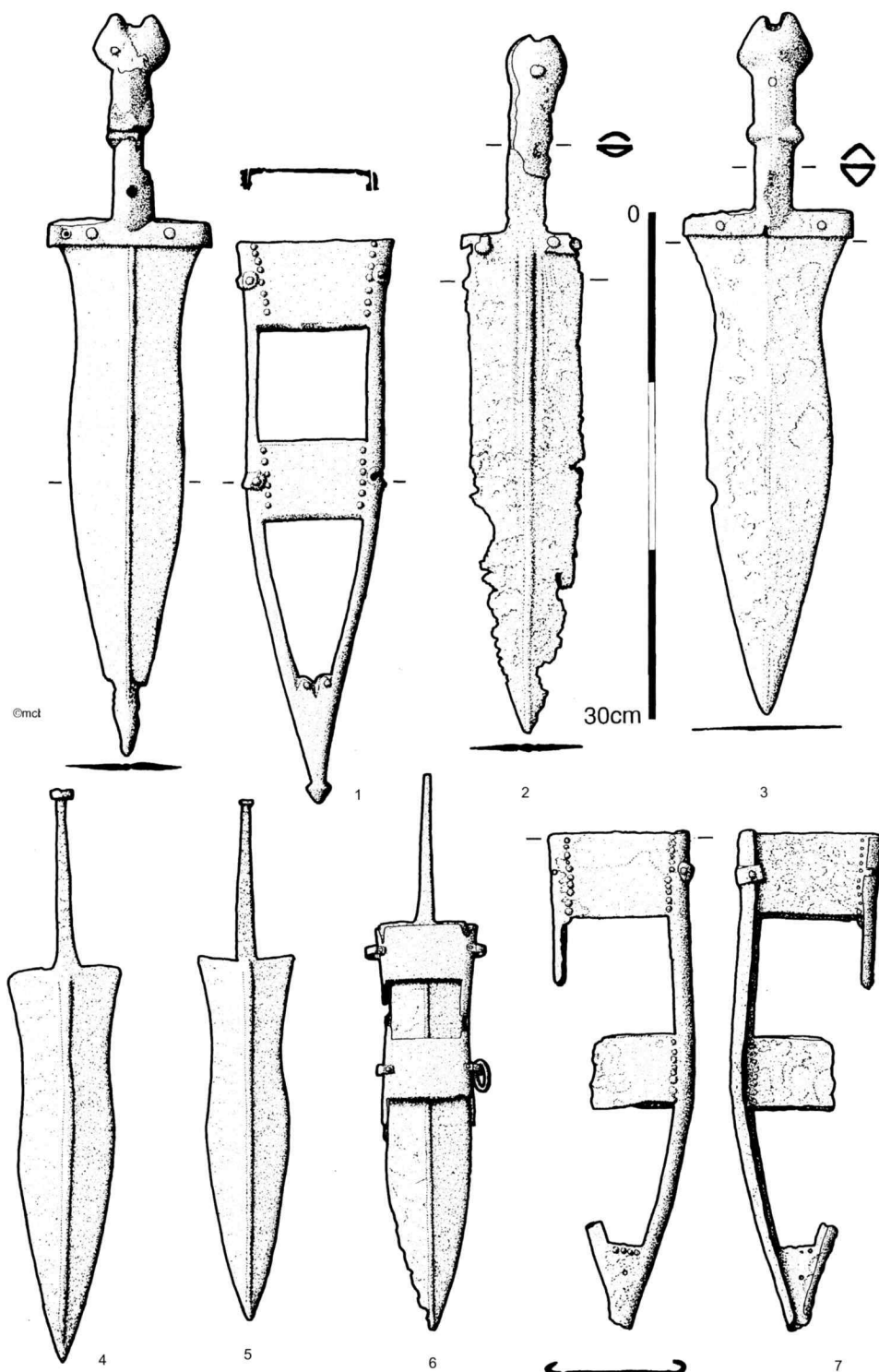


Figure 104: Third-century daggers. 1 London; 2-3, 7 Künzing; 4-5 Eining; 6 Speyer.

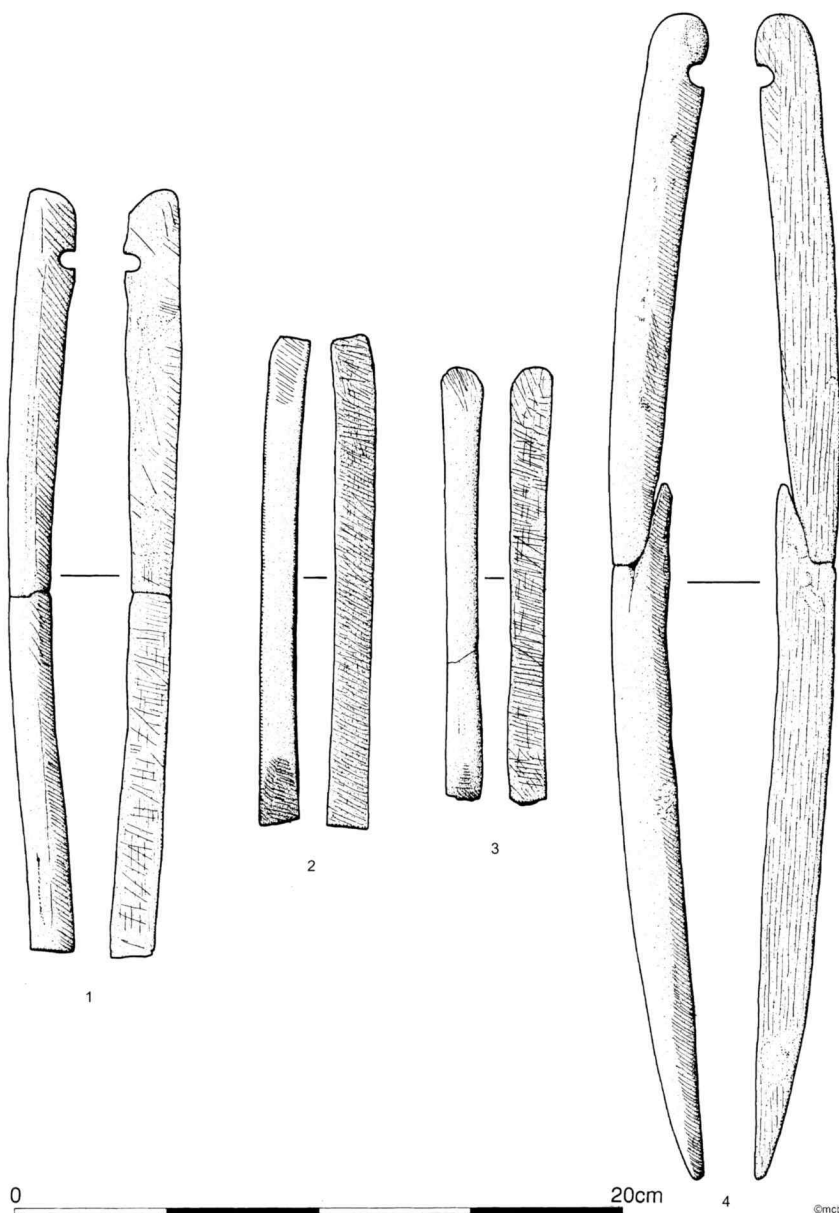


Figure 105: Third-century archery equipment from Caerleon. 1, 4 ear-laths; 2–3 grip-laths.

Arrowheads are common finds on military sites. The tanged, trilobate type continued through the 3rd century, and a new related type, also triple- or quadruple-vaned, but with a long socket, was found at Caerleon and Corbridge. Tanged or socketed bodkin heads with triangular or square sections appear frequently in Germany, and triangular or 'leaf'-bladed flat heads with tangs or sockets, an easier form to manufacture, occur across the Empire.³⁵

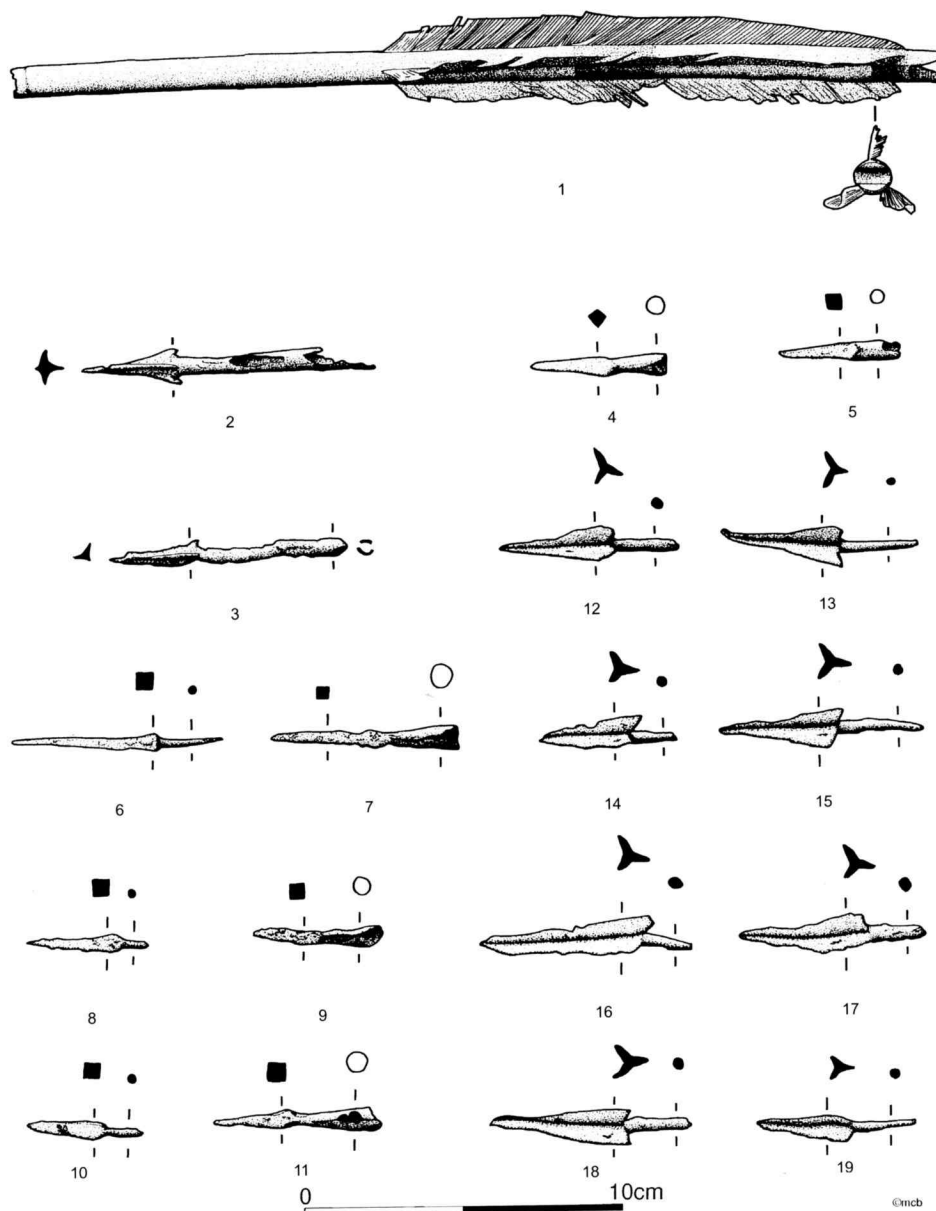


Figure 106: Third-century arrows. 1 Stela with fletchings (Dura-Europos); 2–3 socketed vaned arrowheads (Corbridge); 4–11 bodkin-headed arrowheads (Saalburg); 12–19 trilobate tanged arrowheads (Saalburg).

Arrow shafts (stela) and fletchings rarely survive, although sometimes sockets retain a little wood. Posterior sections of reed or cane arrows from Dura-Europos had fletchings glued onto a roughened surface to give a good purchase. Painted markings

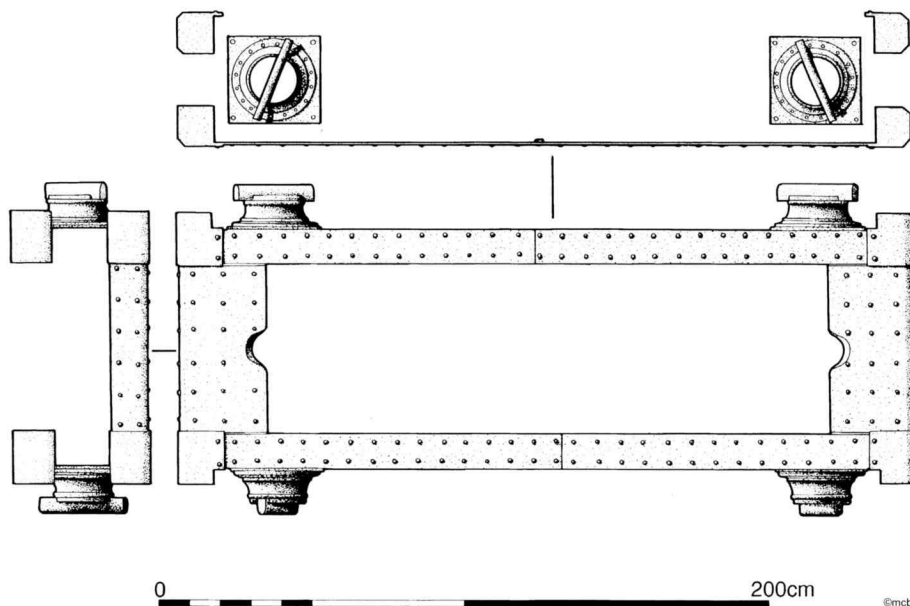


Figure 107: Third-century artillery fittings from a ballista frame (Hatra).

served to identify ownership and/or matching sets. Tamarisk wood piles (170 mm long) were tanged into the reed stele and tapered to take a socketed head. The latter was glued on, not pinned. These piles reduced the risk of stele splitting on impact.³⁶

All the reliable Roman, Parthian and Sassanid representational sources show the 'Mediterranean' release by which the archer used his fingers to draw back the string. Bracers protecting the wrist from the bow-string are shown on Trajan's Column. However, the arrangement of fletchings on the Dura stele suggests that the 'Mongolian' release, using the thumb, was employed during the mid-3rd century by at least some archers on the eastern Roman frontier.³⁷

Bow-cases and quivers were necessary for protecting the vulnerable constituents of bows and arrows from damp. Roman foot-archers would have carried a cylindrical quiver on their back, as seen on gravestones. Nothing is known about their bow-cases. Horse-archers shared in the prevailing quiver and bow-case fashions of neighbouring peoples which are represented on 1st-century Crimean *stelae*, in Palmyrene sculpture and on Sassanid rock reliefs.³⁸

Spherical stone sling-missiles from Buciumi, 30–50 mm in diameter, may date to the 3rd century.³⁹

Artillery (Figs. 107–8)

Metal fittings from the frame of a stone-throwing, twin-armed torsion *ballista* were found at Hatra. The weapon had fallen out of a tower near the north gate, presumably during the Sassanid capture and depopulation of the city in *c.* AD 240/1. It consisted of copper-alloy corner fittings, torsion washers and counter-plates, and nailed sheeting to cover the

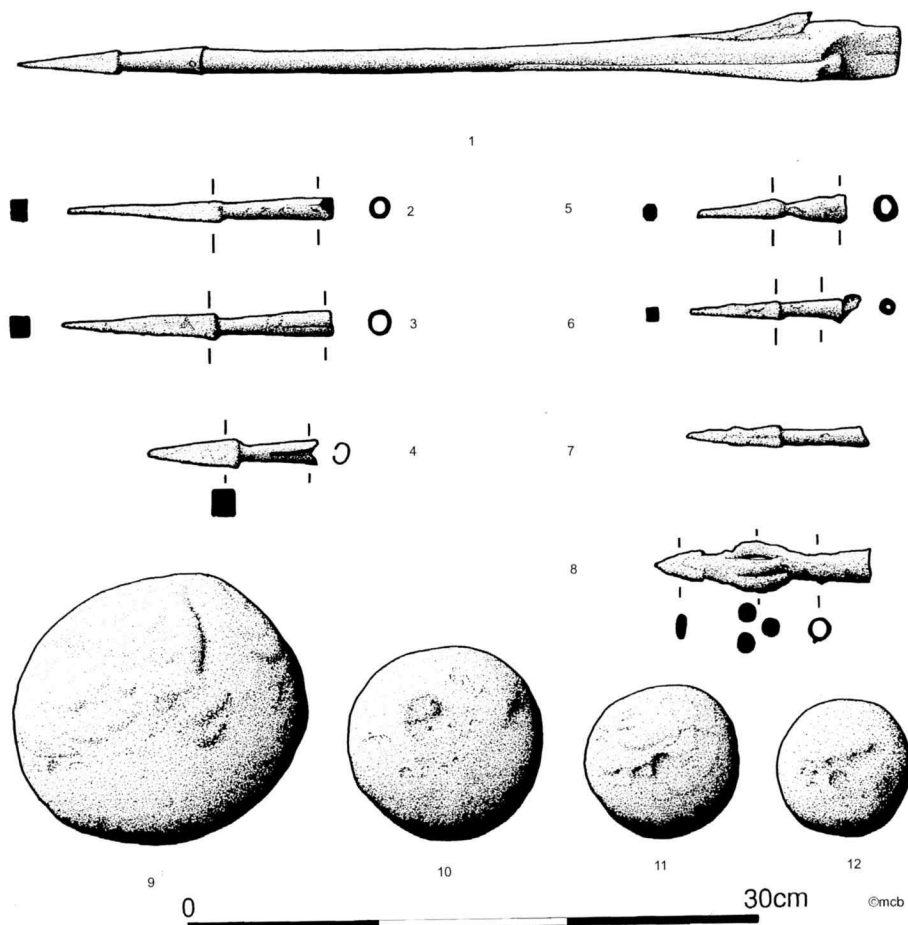


Figure 108: Third-century artillery missiles. 1 Bolt-head with attached shaft (Dura-Europos); 2-7 bolt-heads (2-3, 5-6 Künzing; 4 Vindolanda; 7 Caerleon); 8 incendiary bolt-head (Dura); 9-12 stone shot (Dura).

front. The frame was 0.84 m high and 2.4m wide, and similarities with the technical treatises led Baatz to conclude that the *ballista* was probably of Roman manufacture, and was of medium calibre designed to shoot stones of *c.* 10 Roman pounds (3.27 kg).⁴⁰

Stones either for use by hand or by artillery in a variety of calibres are represented by finds from Dura and Buciumi.⁴¹

Third-century pyramidal iron *ballista* bolt-heads occur widely across the Empire from Britain, Germany and Dacia to Syria. Numerous socketed examples from Dura-Europos are accompanied by a unique iron incendiary bolt-head (L. 113 mm). It had a flat, twin-edged blade connected to a socket by three curving bars in the artillery equivalent of incendiary arrow-heads (see above).⁴²

Some 37 wooden bolt bodies, 340-75 mm long, were also found at Dura. The majority were made of ash (with some birch and pine), tapered towards the head, and had a

vertical tail for projection by the *ballista* sling. Two or three triangular flights of maple wood, 50 mm long, were fixed in slots or mortice joints at or near the tail.⁴³

A 3rd-century gravestone from Apamea uses the term '*scorpio*' of an artilleryman in *legio II Parthica*. Use of artillery by 3rd-century auxiliaries has been postulated on the basis of two inscriptions from High Rochester which mention *ballistaria*, but the catapults could have been operated by legionary personnel. Rounded stones found at the fort are too heavy (c. 50kg) in this context to be artillery missiles.⁴⁴

Armour

Body armour (Figs. 109–11)

There is plentiful artefactual evidence for 3rd-century metallic body armour. Site abandonment sometimes entailed the deposition of partial or whole *loricae*, as perhaps at Grosskrotzenburg (copper-alloy mail), Künzing (iron mail) and Straubing (copper-alloy scale). A section of scale with its surviving textile backing was found in a pit at the Carpow legionary base, probably deposited during Severan demolition. Copper-alloy scales (L. 15 mm, W. 13 mm) were attached to each other in strips with wire, then sewn to a linen backing with linen cords. Third-century Caerleon equipment included a mail shirt, whilst at Buch pieces of iron mail were found in the fort, and a *lorica hamata* accompanied a helmet in Well 9. At South Shields a complete mail shirt was lost when a barrack block burnt down in the late 3rd or early 4th century. Iron mail with decorative copper-alloy rings occurred amongst Roman equipment at Vimose, including a complete knee- and elbow-length *lorica hamata*.⁴⁵

Scattered finds of scales and mail rings were made throughout the excavations at Dura-Europos. Some articulated pieces of scale armour had preserved textile backing, and at least one complete mail shirt had been abandoned in a domestic building. The 16–18 Roman soldiers entombed by the collapse of the mine at Tower 19 fought in mail armour, one mail shirt at least exhibiting a three-quarter-length sleeve. The men were probably members of an infantry unit.⁴⁶

Third-century embossed copper-alloy armour plates come from Manching, Künzing and Pfünz, and a rolled-up *lorica hamata* from Bertoldsheim also has a chest-piece attached. Like some Dura, Danish and other armours, this mail is decorated with copper-alloy rings. The chest-pieces differ in decorative detail from 2nd-century examples. As Petculescu demonstrated, the plates were used in the field, not specifically for 'parade', by both infantry and cavalry. Significantly, the hoards of cavalry sports equipment from Eining and Straubing do not include *lorica* chest-pieces. Broader decorated plates were located at the back of the neck opening.⁴⁷

There is little reliable 3rd-century representational evidence for armour, because infantry and cavalry *stelae* generally show the deceased unarmoured. One exception is the gravestone of Severius Acceptus (*legio VIII Augusta*), from Istanbul, which shows a cuirass with *pteryges* and an unusual body of vertical strips. Another is a sculpture without inscription from Brigetio which shows a legionary(?) wearing a long *lorica*. Around his neck and over the armour he wears a collar which may represent a metallic gorget.⁴⁸

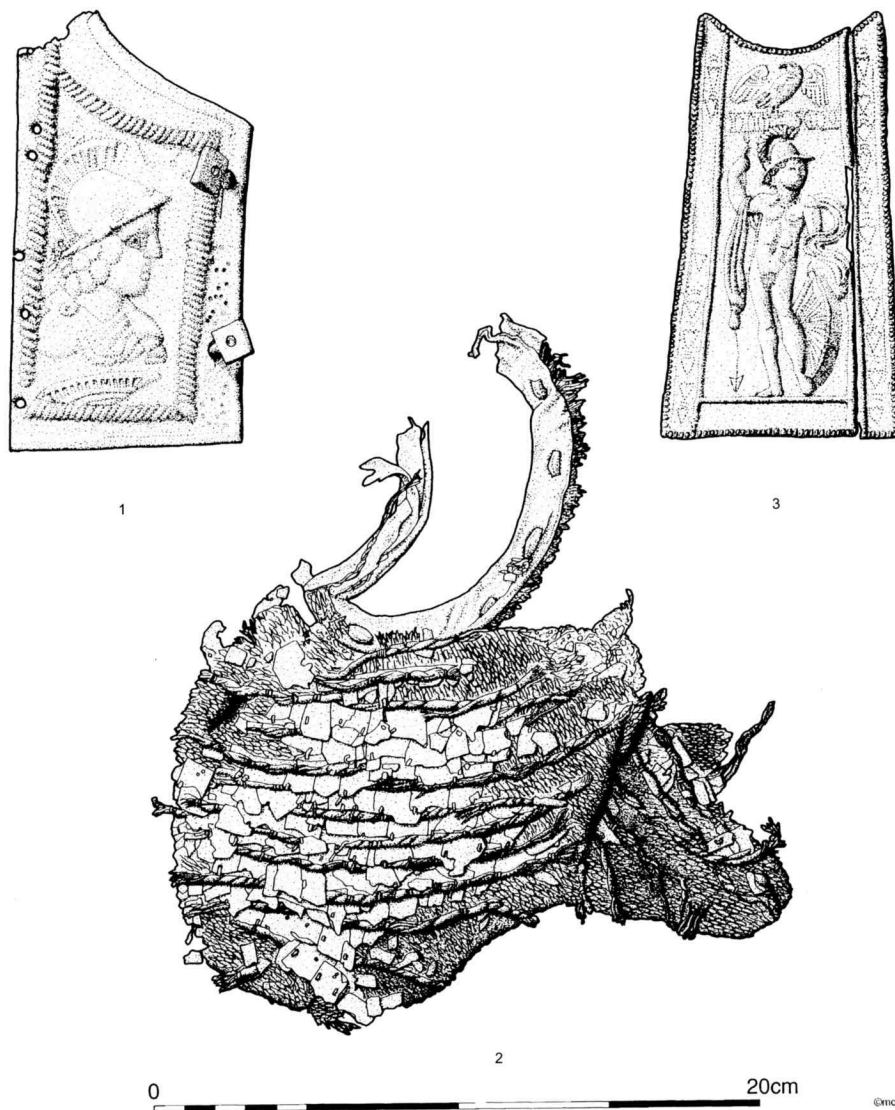


Figure 109: Third-century armour. 1 breastplate (Manching); 2 scales with textile backing and leather binding (Carpow); 3 ?backplate (Bertoldsheim).

The Dura Synagogue frescoes pay close attention to contemporary dress and include some realistic details of Roman equipment. Ranks of soldiers in the 'Exodus' panel marching below Roman *vexilla* wear knee-length *loricae*, although the convention used makes it unclear whether mail or scale was intended. Armoured warriors in the 'Battle of Ebenezer' panel wear knee-length metallic cuirasses with wrist-length sleeves.⁴⁹

Until recently it was thought that the '*lorica segmentata*' did not survive the early 3rd century, because the latest representations are on monuments of Septimius Severus.

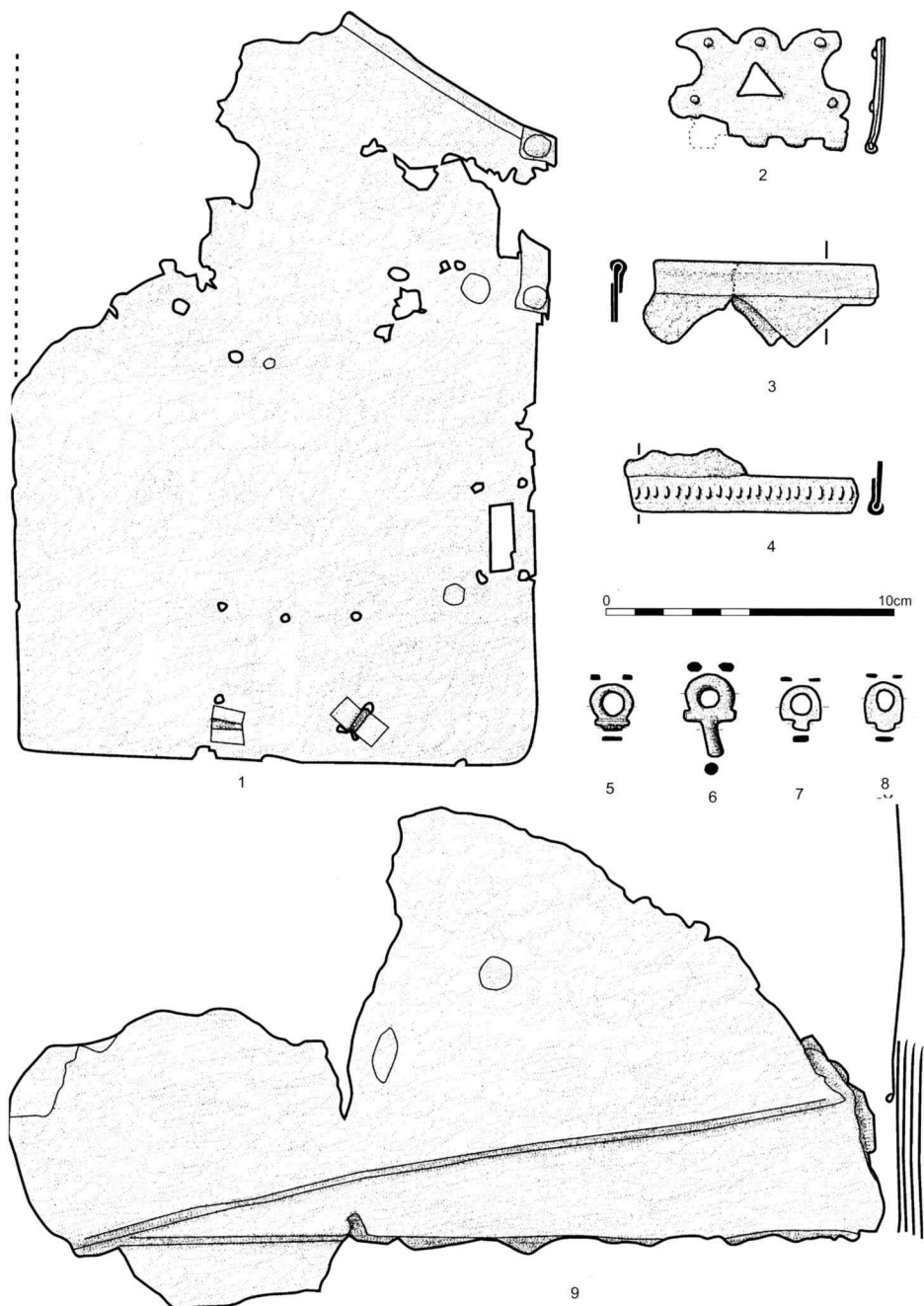


Figure 110: Third-century armour – Newstead type 'lorica segmentata'. 1 Backplate (Eining); 2 lobate hinge (León); 3–4 girth hoop fragments with copper-alloy binding (León); 5–8 tie loops (Caerleon); 9 girth hoops (Zugmantel).

However, armour of the Newstead design has been recovered at Eining from a temple constructed in *c.* AD 226/229 and abandoned *c.* 260. Pieces from Carlisle and León may also belong to the 3rd century, as do some at least of the '*lorica segmentata*' finds from German sites, notably Zugmantel.⁵⁰

Dura graffiti depict segmental defences which are closely paralleled by Hellenistic period armour from Ai Khanoun. Additional limb defence is represented by the continued 3rd-century use of both plain and embossed greaves. A fragmentary copper-alloy greave and a linen greave-lining were found at Dura. Two thigh-guards were also found in Tower 19, one had fourteen rows of downward-overlapping leather scales with red leather lacing (L. 770 mm, upper W. 600 mm, lower W. 270 mm); the other had twelve rows (L. 610 mm, upper W. 480 mm, lower W. 210 mm). In addition, possible thigh-guards of iron and copper-alloy scale were found, and one piece of iron segmental limb-armour. All of these armour forms were used by cavalry, but infantry may have continued to wear arm and shin defences.⁵¹

The Arch of Septimius Severus at Lepcis Magna depicts the usual range of infantry body armours seen in metropolitan sculpture (muscle plate, segmental, scale and mail) with the additional detail of a legionary soldier on the 'siege' panel who wears a '*lorica segmentata*' and *manica* on his sword arm. It is tempting to see the latter as an empirically observed detail, but the possibility should not be discounted that the strips represented on the arm result from a sculptor's exuberant enthusiasm for the banded patterning characteristic of late renditions of segmental cuirasses.⁵²

Helmets (Figs. 113–14)

Helmets appear on a small proportion of gravestones. The armoured legionary(?) from Brigetio (see above) wears a helmet with wide cheek-pieces, a pointed, angled peak and a low, flaring neckguard. A legionary(?) *imaginifer* from Enns is shown holding a helmet on his arm which appears to have a large cheek-piece. On a *stela* from Carnuntum a man holds a better preserved helmet with an upstanding crest and a triangular brow-plate or peak, and a relief from Vienna shows a man being handed a helmet which has an angled peak. On his Brigetio tombstone, M. Aurelius Avitianus of *legio I Adiutrix* has a helmet with a pointed, angled peak resting by one foot; between the cheek-pieces and over the nose the bowl-rim is pointed. Aurelius Surus, a *bucinator* of the same legion, also appears on his gravestone from Istanbul with a helmet by his foot. The bowl comes down low to the neck-guard, the peak projects upwards at an angle, and the large cheek-pieces leave only a small 'T'-shaped face-opening. Iulius Aufidius of *legio XVI Flavia Firma* has a helmet perched over his shield on a *stela* from Veria. The bowl comes down low at the back, with a wide-flaring neckguard, and a wide cheek-piece covers the ear. Reinforcing strips on the crown are joined by a vertical knob.⁵³

Soldiers in the Dura Synagogue 'Exodus' panel wear crestless helmets, some with ribs and apex knobs. A decorated *phalera* from France (Pl. 3a) which belonged to an Aurelius Cervianus shows soldiers wearing helmets with angled peaks. A sculpted cavalry *vexillarius* from Chesters wears a crested helmet with a pointed bowl-rim above the wearer's nose.⁵⁴

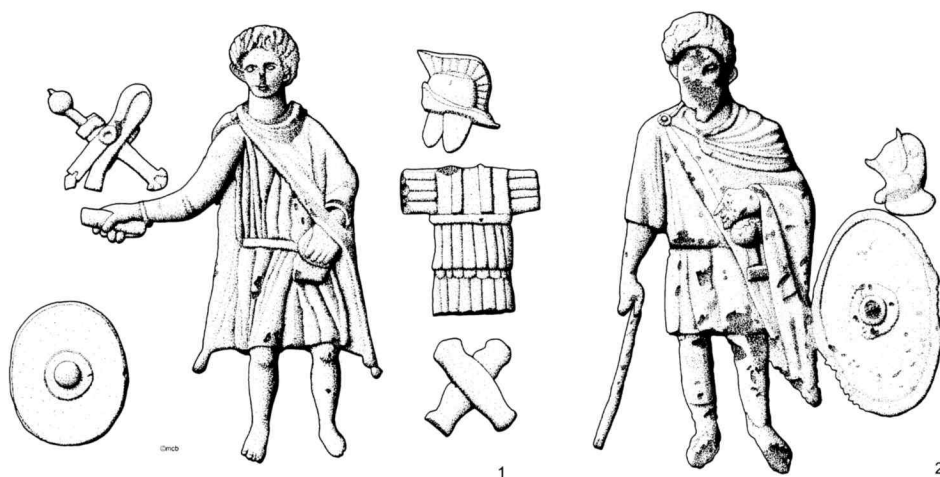
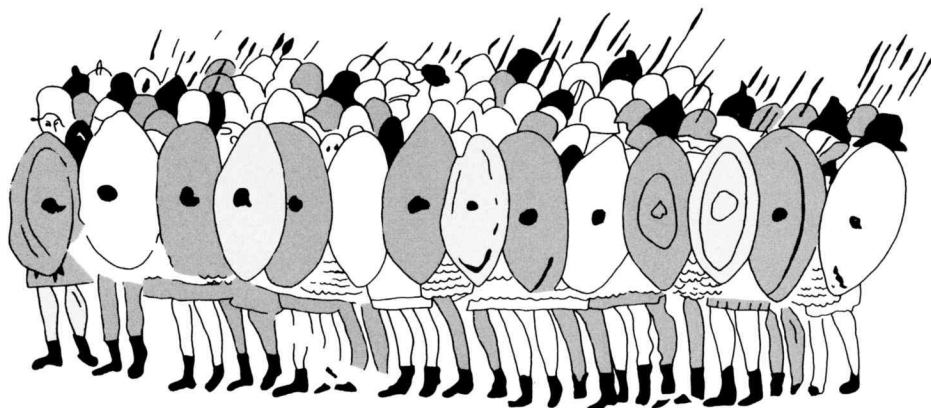


Figure 111: Third-century tombstones. 1 *Severus Acceptus*, legio VIII Augusta (Istanbul); 2 *Iulius Aufidius*, legio XVI Claudia (Veria). (Not to scale).

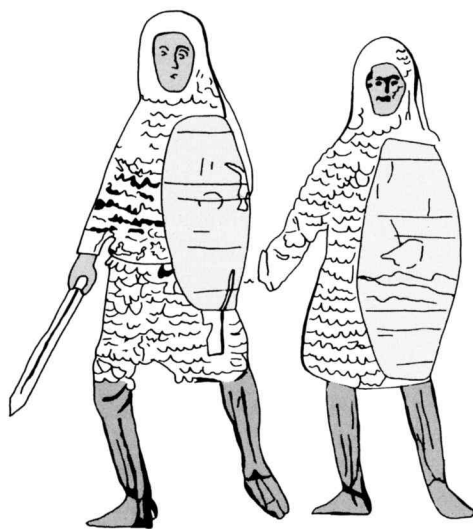
Helmet finds securely datable to the 3rd century do not continue the evolution of 1st- to 2nd-century 'Imperial' infantry forms and there is a typological gap in the artefactual record. Other iron and copper-alloy helmets assignable to the 3rd century have been attributed to cavalry use. However, these correspond closely with the representational evidence reviewed above. The bowl generally extended down to the base of the neck, and had a low, angled neckguard, a horizontal or upwardly-angled pointed peak, and crossed reinforcing bars. Examples from Niederbieber and Nijmegen also had a pointed bowl-rim over the nose, as shown on the *Brigetio* and *Chesters* sculptures.⁵⁵

An *orichalcum* helmet found in Well 9 at Buch (Pl. 2d) belonged to a related form. The bowl extended down to the base of the neck and has embossed cross-ribs. The unfinished neck-guard was restrained. The peak was missing, but rivet-holes show it was intended to angle slightly upwards. The wide, incomplete cheek-pieces covered the ears and overlapped at the chin leaving a small, 'T'-shaped face-opening. The overall appearance was similar to the helmet on the *stela* of *Aurelius Surus*. Finds from this and other Buch wells suggest a site abandonment date of *c.* AD 259–60 and the unfinished helmet was presumably deposited at this time. The Buch fort is thought to have held an infantry unit.⁵⁶

Buch-type cheek-pieces have been found at Regensburg, Eining-Unterfeld, in the Caerleon rampart-back building (see Fig. 113,3) and at Dura, all sites associated with legionary troops. Indeed, a bowl fragment and reinforcements from Dura conform to the type. The men in the Tower 19 mine wore mail armour and carried shields, but were helmetless, probably because the 'Buch' type did not allow a wearer to crouch forward with his head bent back. Adoption of similar helmet forms for both infantry and cavalry use would account for, and fill, the apparent typological gap in 3rd-century infantry helmet types. It also denotes adoption of a more upright fighting stance from



1



2

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Figure 112: Dura synagogue soldier paintings. 1 *Exodus* fresco; 2 *Battle of Ebenezer* fresco.

that assumed by soldiers wearing Republican and 1st- to 2nd-century infantry helmets, perhaps in connection with the use of longer infantry swords.⁵⁷

A conical, wool and felt cap with side flaps found at Dura has been identified credibly as an 'arming-cap' worn under a helmet with cheek-pieces. It would have given the helmet a comfortable seating and served to absorb blows and sweat.⁵⁸

It is likely that some supposed 'sports' cavalry helmets used with cheek-pieces rather than full face-masks were actually designed for service in battle. Petculescu suggested that this was the case for the 'pseudo-Attic' copper-alloy helmet form, of which likely 3rd-century examples come from Guisborough, Châlon and Lunca Mureşului.

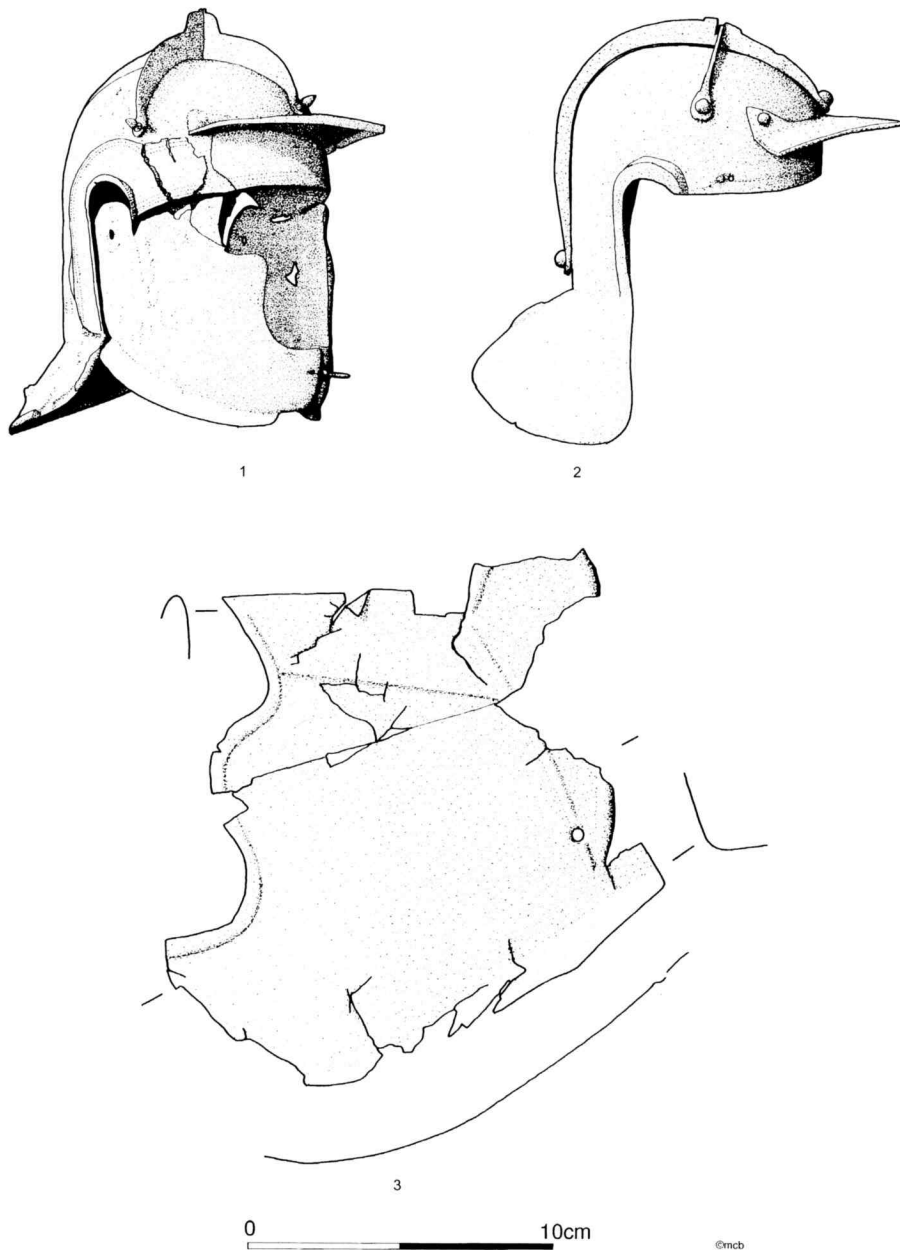


Figure 113: Third-century infantry(?) helmets. 1 Friedberg; 2 Kalkar-Hönnepel (not to scale); 3 cheekpiece (Caerleon).

These exhibited a narrow neck-guard and a vertical brow-plate. Although highly decorated, principally with snakes, they had a greater bowl thickness than mask-helmets.⁵⁹

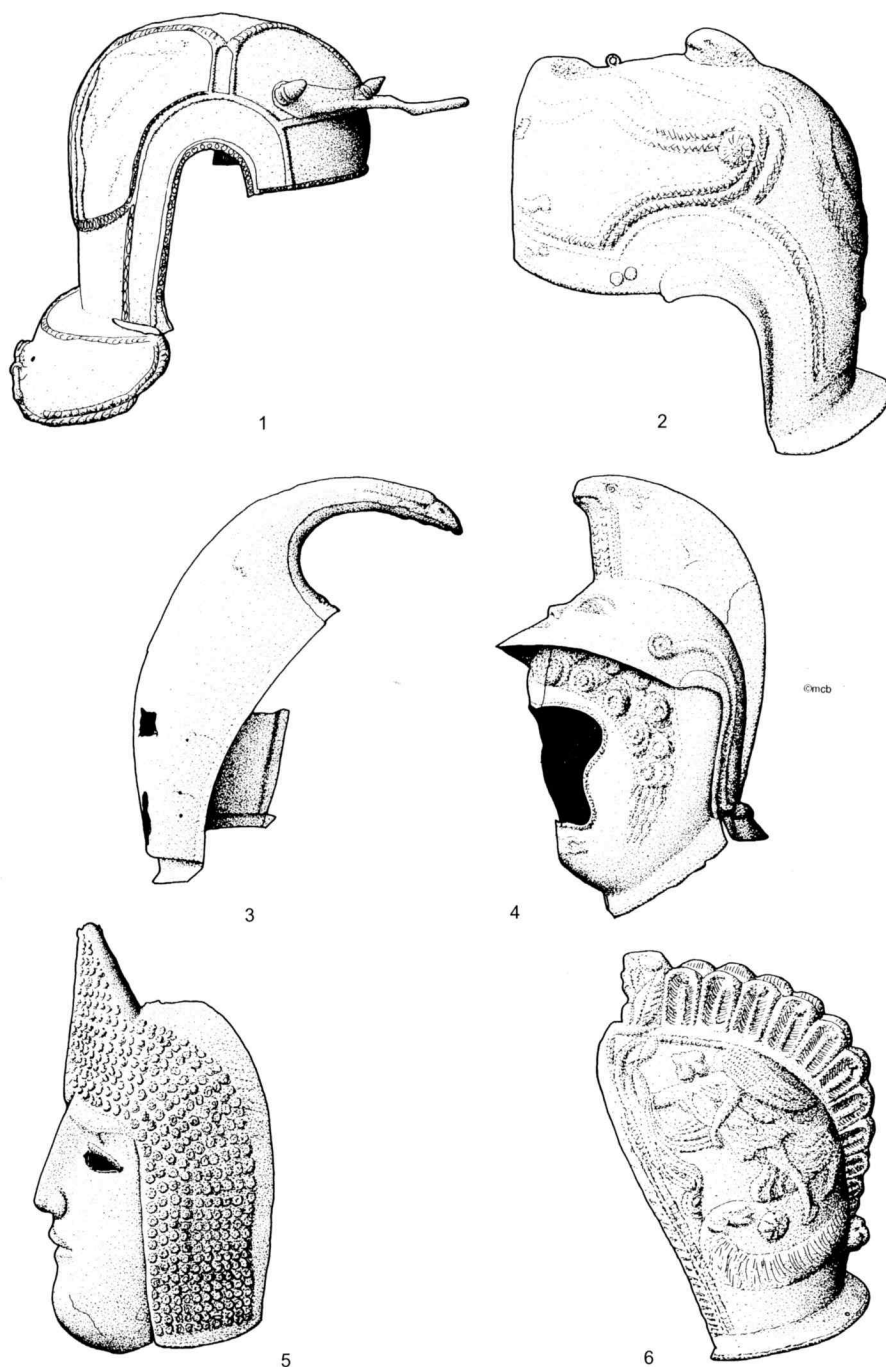


Figure 114: Third-century cavalry(?) helmets. 1 Bodengraven; 2 Châlon; 3 Vechten; 4 Heddernheim; 5 Straubing; 6 Eining. (Not to scale.)



Figure 115: *Vatican manuscript illustration showing soldiers wearing coifs.*

Another copper-alloy helmet type has a bowl which curved over the ears and extended forward as a pointed horizontal peak, adorned by an upward-looking human face. An upstanding crest terminates in an eagle's head. Decorative snakes were present, but eagle imagery predominated. A complete example from Hedderenheim had a one-piece face-protection covering chin, cheeks, brow, ears and part of the neck, leaving only a 'T'-shaped opening. Other one-piece protectors have been found in the north-western provinces, and both these and human face peak-decoration are reproduced on a sculpture of Mars from Intercisa. An *orichalcum* helmet from Worthing combined a pseudo-Attic bowl-form with an eagle crest. It had a one-piece face-protection, rather than a pair of cheek-pieces, but the one found with it did not belong with the bowl. Eagle-crested helmets are shown on stelae and sarcophagi in Rome.⁶⁰

Mask-helmets were undoubtedly used in 3rd-century cavalry sports displays. A bowl from Eining covered only the back, top and sides of the head. The front would have been protected by a full mask with an upstanding 'peak' of hair, of the type found at Straubing, Eining and Grafenhausen. A helmet from Vechten which has lost its mask had the apex of its bowl extended forward into a graceful eagle's neck with a small head. An unfinished mask, also from Vechten, had an upstanding-hair peak shape, but was completely plain, and had a 'T'-shaped opening rather than a closed face.⁶¹

The 'Battle of Ebenezer' Dura Synagogue fresco shows soldiers wearing mail or scale coifs, not helmets, and parallels are provided by illuminations in the 4th-century *Vergilius Vaticanus* manuscript. These would have been a defence against arrows, similar to the Mesopotamian-Iranian use of helmet aventails.⁶²

Shields (Figs. 116–17 and Pl. 4)

Circular shield-bosses continued in use through the 3rd century, and there are copper-alloy and iron finds from British, Rhenish and Danubian sites. A copper-alloy boss from Thorsbjerg had a Roman owner's name inscribed on its flange. A number of such bosses from sites in Britain, Germany and Hungary have been erroneously interpreted as 'parade' items because of their figural and geometric decoration. In some cases, for example Mainz 'B', this was stylistically close to Dura shield ornament (see below) and may indicate a 3rd-century date.⁶³

No less than 21 bosses, six reinforcing bars and 24 fragmentary or complete shield-boards were found at Dura. Most of the bosses and bars apparently came from the siege-mine by Tower 19, whilst the better-preserved shield-boards were found inside Tower 19, in 'The Tower of the Archers', or buried beneath material dumped against the back of the west wall. Most bosses were domed with flat, round flanges (Dia. 185–220 mm). Some had eight-pointed flanges which have few European parallels.⁶⁴

Many of the best preserved boards were oval and shallowly dished (L. 1.07–1.18m, W. 0.92–0.97 m). Each shield had between twelve and fifteen poplar wood planks, 8–12 mm thick, glued together edge-to-edge. Two holes, one semicircular, the other trapezoidal, were cut in the centre for thumb and fingers. Holes of exactly the same shapes and function are seen on shields from Thorsbjerg. None of the well-preserved oval boards were found with an *umbo* or a grip-bar in place, or even with rivet-holes from a fitted boss. However, the *Iliad* shield (see below) had two rivets for a bar to run horizontally behind the strut. Additional rivets were located to the left of the boss (as seen face-on), and near the upper right rim, ideally placed to serve as attachments for a carrying strap. Holes along the rim were for sewing on a rawhide edging with twine. None of the Dura boards had metallic edge-guttering like shields of earlier periods, nor does it occur in 3rd-century Roman contexts elsewhere. Modern experiments suggest that shrunken rawhide not only imparts solidity to the shield structure, but also efficiently resists blows to the rim.⁶⁵

One shield from Dura was unpainted, whilst several of the boards in the mine and elsewhere were painted pink. Other shields were extremely richly adorned. One figured a full-length Palmyrene-style warrior god on a grey-green field. Two had red fields with concentric wreath and wave-crest motifs around the boss. On the field proper, one displayed figural scenes from the *Iliad*, whilst the other exhibited an *Amazonomachia* (Pl. 4b). The back of the Amazon shield was painted blue with rosettes and radiating lines of white-bordered red hearts (Pl. 4c). Remains of a 3rd century Scandinavian shield found at Simris similarly indicated different sides painted blue and red, so different 'inner' and 'outer' schemes may not have been unusual. The construction of these boards is identical to shields used in combat found down the mine, and elaborate painting cannot be equated simply with 'parade' use.⁶⁶

Dished and bossed oval shields are carried by soldiers on gravestones and on the 'Exodus' Dura Synagogue fresco, although the 'Battle of Ebenezer' coif-wearers have hexagonal boards (see Fig. 115). Very small shields depicted on 3rd-century figural gravestones may be attributed to sculptural convention.⁶⁷

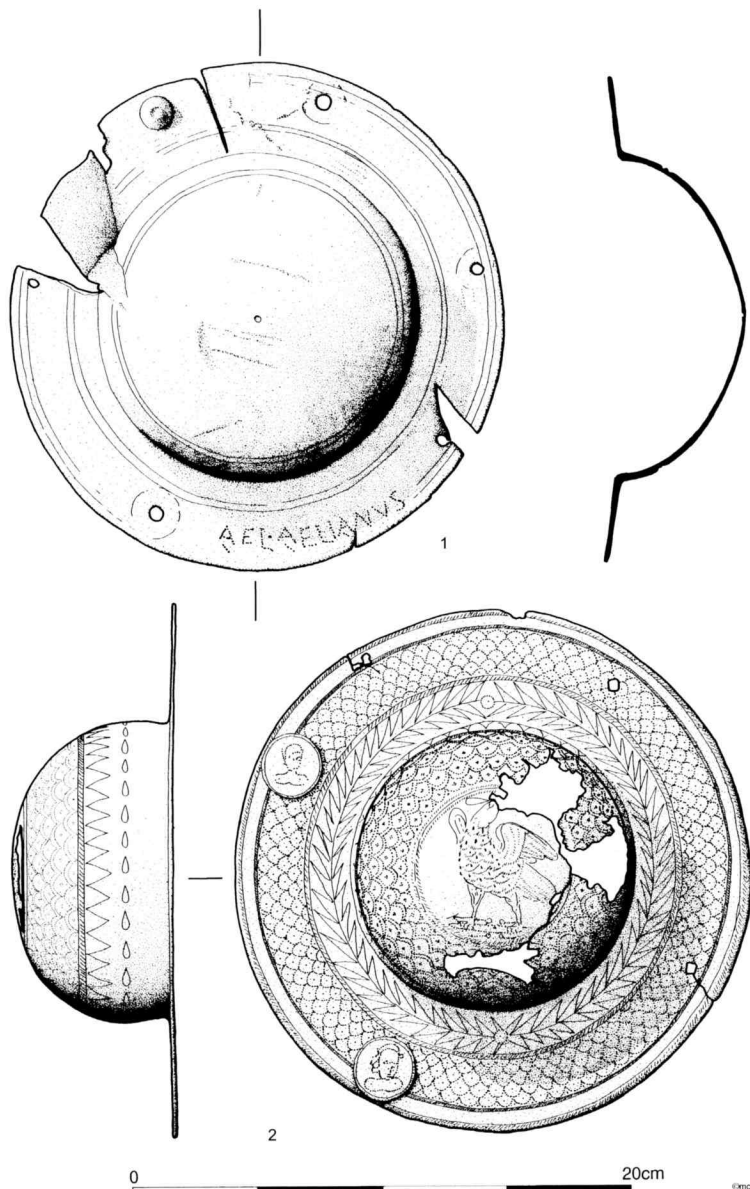


Figure 116: Third-century shield bosses. 1 Thorsbjerg; 2 Mainz.

Only two *stelae* depict 3rd-century rectangular shields. However, artefacts from Dura substantiate the continued use of curved, rectangular boards in the mid-3rd century. Parts of at least three curved rectangular shield-boards were recovered, and one fragmentary boss with a curving rectangular flange. A well-preserved shield from Tower 19 was 1.02 m long and 0.83 m wide (0.66 m along the cord). Its construction was completely different from the oval boards, strips of plane wood, 30–80mm wide,

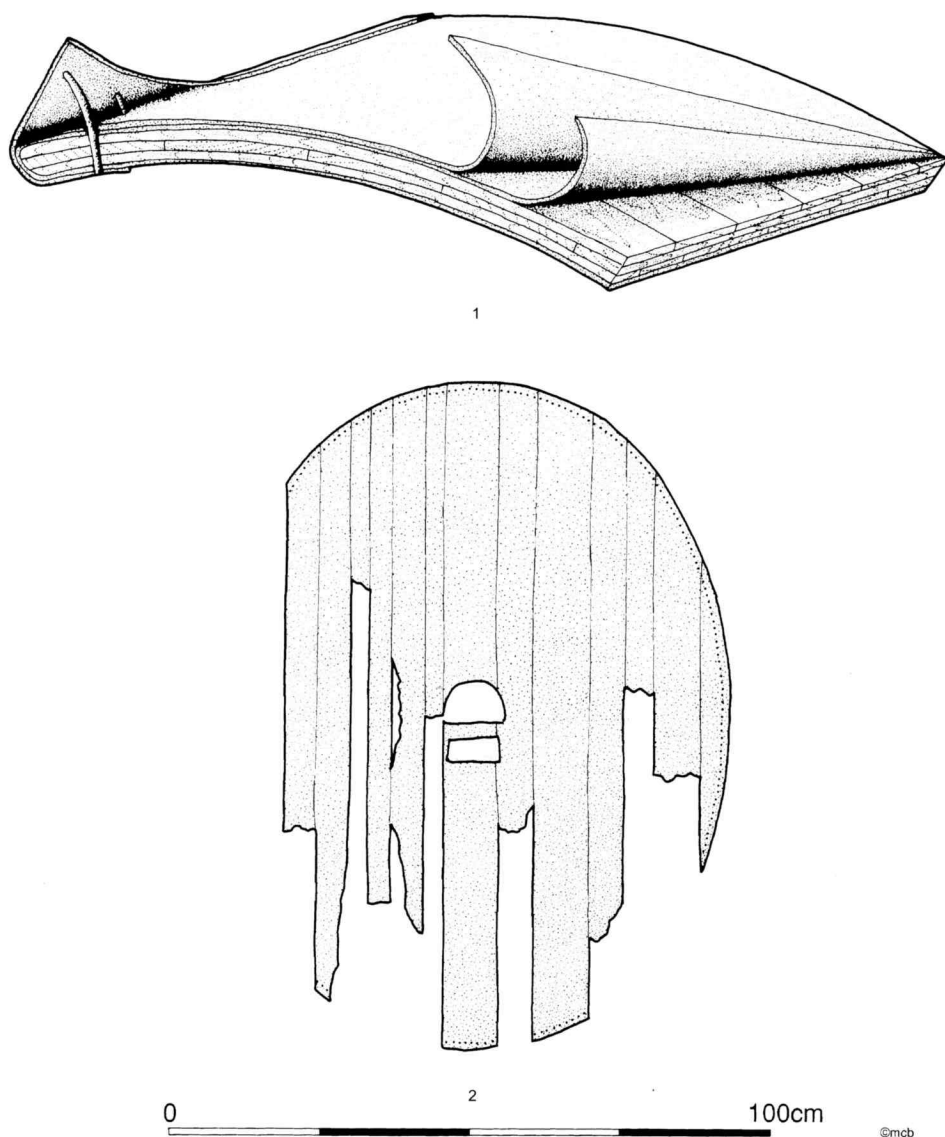


Figure 117: Third-century Dura-Europos shield construction. 1 Curved rectangular (not to scale); 2 domed, oval plank.

15–20 mm thick, being glued together and laid in three superimposed layers. The overall thickness was 50mm. As with the Kasr al-Harit shield, the outer and inner layers ran transversely across the board whilst the middle strips were longitudinal. In the centre was a 120 mm diameter circular opening. The back had a framework of pegged and glued transverse and longitudinal wooden strips (W. 20 mm). One strip crossed the central aperture and was strengthened to form the horizontal hand-grip.⁶⁸

Both sides of the shield were covered with thin leather, which was painted. The rim had a 35–50 mm-wide leather binding stitched over it and four rawhide corner-pieces. No boss was found with the shield, but there were four rivet holes for attaching a rectangular flange. Concentric rectangles with wave-crests, guilloche, and laurel motifs were painted on the red field surrounding the boss-flange. In the upper field, there was an eagle flanked by two Victories, whilst a lion and two sun-bursts (or stars) were below the boss (Pl. 4a).

This was neither an outdated relic nor a 'parade' shield, as has been suggested. The lion was probably a badge belonging to one of the legionary detachments at Dura. The eagle was a common motif on 3rd-century equipment and the stars appear on 1st- to 2nd-century legionary shield blazons (see Chapter 5). Only the warrior god on the oval shields may be a unit emblem. Nothing more is known about painted 3rd-century shield-designs.

The small round 1st- to 2nd-century shields carried especially by standard-bearers and musicians continued in 3rd-century use. One is shown on the Aquincum gravestone of Aurelius Bitho, *cornicen of legio II Adiutrix*.⁶⁹

Other Equipment

Belts (Figs. 118–19)

Third-century gravestone representations of infantry and cavalry most commonly show a broad waist-belt fastened by a ring-buckle. Detailed works show the tapering belt-ends passed through the ring from behind, then back along the front, and held in place by a stud on each side. Often the end on the wearer's right is long and narrow, hanging down in a crescentic loop, and then tucked back up behind the broad belt. This narrow strip appears again at the right hip and hangs down by the right thigh. Alternatively, the narrow strip passes along the front of the belt to the hip. The strip-end has one or two teardrop terminals. Both ring-buckle and crescent loop are worn by Roman emperors on Sassanid reliefs (see Fig. 103), and by officers in the Dura Tribune Terentius fresco. The earliest securely dated ring-buckle representation may be on an altar from Eining, dated by consular year to AD 211.⁷⁰

No actual waist-belts survive, but the buckles have been found in a variety of forms on military sites and in graves. These were plain iron or copper-alloy rings, with or without a tongue, or decorated copper-alloy rings with an extension to enclose one of the belt-studs. Fungiform studs for leather fastenings are common finds. Many narrow, hinged strap-terminals occurred in heart, pear, phallus, ring, triangle, ring-pommel sword and *beneficiarius* spearhead forms. Belt-fittings in the Lyon burial were accompanied by a pair of bulbous strap-ends.⁷¹

Plain rectangular buckles appear on several gravestones, reflecting finds with a rectangular openwork frame enclosing a double-pelta or curvilinear Celtic design. The ends of the belt could be slipped through the frame, and these buckles are associated with fungiform studs in graves excavated at Regensburg. Buckles with peltiform loops, sometimes attached to a rectangular openwork plate, occur widely along the northern

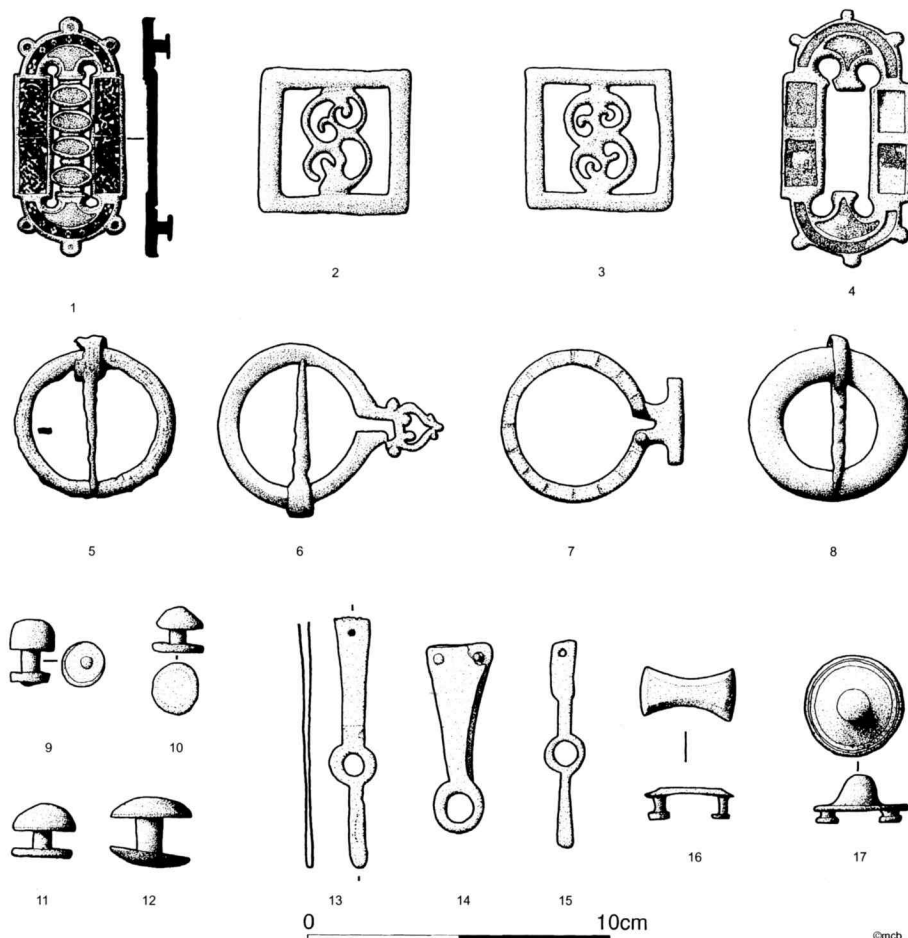


Figure 118: Third-century belt-fittings. 1, 4 Millefiori and enamel inlaid plates (1 Carnuntum; 4 Dura-Europos); 2–3 rectangular buckles (2 Pfünz; 3 Banasa); 5–8 ring-buckles (5 Straubing; 6 Saalburg; 7 Carnuntum; 8 Niederbieber); 9–12 fungiform studs (9 Holzhausen; 10 Porolissum; 11–12 Volubilis); 13–15 strap terminals (13 Porolissum; 14 Saalburg; 15 Pfünz); 16–17 belt mounts (Volubilis).

frontiers, and at Thamusia and Dura. Emperors and soldiers on some Bishapur reliefs may wear belts with similar buckles.⁷²

A small rectangular buckle and a counter-plate on the Lyon belt were cast with the letters 'X' and 'VT' respectively (see Fig. 101). Separate appliqué spelt the motto FELIX VTERE ('Use with good luck'). This is the best-dated and most complete example of the narrow belt-type bearing this motif (W. c. 25–35 mm). The letters served to stiffen the belt and prevent it curling over with wear. They had limited regional use: letters are chiefly found on sites along the Middle and Lower Danube and in Dacia. Outlying examples at Lyon and Dura may be explained by the presence of Danubian

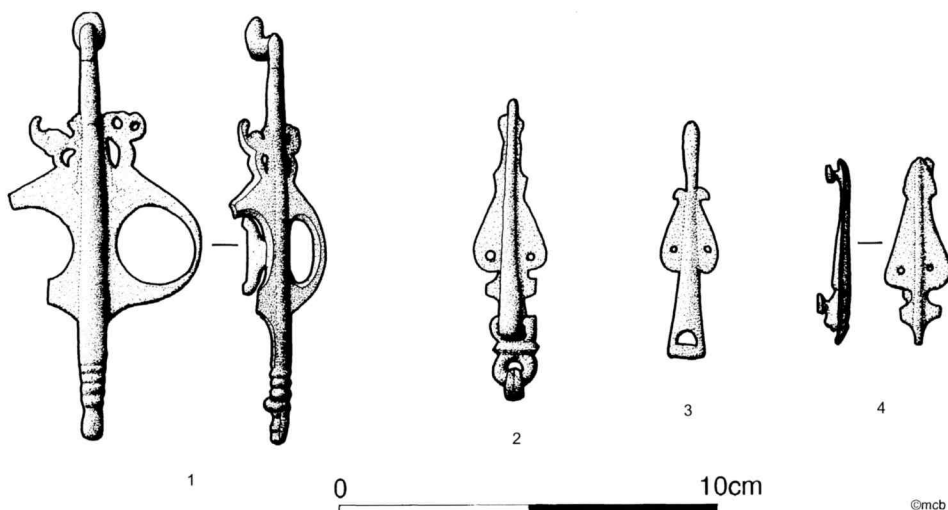


Figure 119: Third-century beneficiarius spear fittings. 1 Baldric fastener (Buch); 2 mount with pendant (Zugmantel); 3 mount with loop (Heddernheim); 4 mount (South Shields).

troops. Some gravestones show variously-shaped stiffening-plates on both waist-belts and baldrics in addition to *phalerae*, terminals and buckles. These plates correspond with purely decorative copper-alloy appliquéés from military sites.⁷³

Enamelled rectangular openwork plates with peltiform ends occur across the Empire from Britain, along the Rhine and Danube, to Syria (Dura). Four plates from South Shields (L. 83 mm, W. 36 mm) were chained together on a broad leather belt with their long axes aligned vertically.⁷⁴

Clothing and Footwear (Fig. 120)

Soldiers on gravestones are shown wearing a wrist- and knee-length tunic. Legs are bare or covered by tight trousers. A *sagum* is worn fastened at the right shoulder, falling open to reveal the right side of the body, hanging down the back of the wearer to behind the knees or even calves. Hems are often fringed or have corner tassels.⁷⁵

The Dura Tribune Terentius fresco and the Dar al-Madinah mummy portrait both depict white tunics with purple bands on the hem and cuffs, worn with chocolate or reddish-brown coloured cloaks, and dark grey or brown trousers. The cloaks of two officers are white. Textiles at Dura were predominantly woollen, and tunics were woven in one piece, with a neck-slit and chest and cuff bands. True purple was a less common dye than cheaper, madder-based substitutes.⁷⁶

Brooches fastening cloaks are usually represented as circular with decorative insets and, sometimes, attached pendants. Comparison may be made with copper-alloy disc-brooch finds.⁷⁷

Both pointed and flat-ended boots are depicted on sculptures. Some open-topped shoes have a strap across the front of the ankle, notably on a statue from Alba Iulia.⁷⁸

Tools and Implements (Fig. 121)

The Künzing iron hoard included some 39 pickaxes with a sharp blade and an opposing pointed or chisel-bladed tine. There were also a number of flat-bladed digging tools, and numerous axe-heads and bill-hooks. Iron spikes in the hoard could be for tethering animals. Third-century hammer and pickaxe heads were found at Caerleon.⁷⁹

Seventeen caltrops (*tribuli*) occurred in the same building. These consisted of four iron spikes all joined at the base so that, however the object lay, three formed a tripod and a fourth always pointed upwards. Perhaps originally a Hellenistic development, they continued in Byzantine use through the Middle Ages. In the 3rd century Macrinus' troops used them on the battlefield, and they could be laid as a nasty surprise in long grass or concealed in fords. More commonly, they would have been put down around fortifications, in the same manner as *stimuli*; presumably a supply was kept available in Roman military installations.⁸⁰

Staffs carried by 3rd-century centurions are sometimes represented as longer than previously, and they often exhibit broad fungiform heads. Even taller staffs with knobbed ends were still carried by *optiones*, but now also by *tesserarii* and *bucinatores*, some displaying marked off sections down the shaft. Such staffs may have been used horizontally in the manner of serjeants' spontoons to straighten files of soldiers, or, like modern Indian police staffs, to press them forward.⁸¹

A flask similar to the Antonine(?) example from Newstead was found in a 3rd-century context at Buch.⁸²

Standards and musical instruments (Fig. 122–3)

Legionary *aquilae* appear on a number of 3rd-century gravestones and sarcophagi, notably on the *stela* of T. Flavius Surillio from Istanbul depicting the eagle of *legio II Adiutrix* with outstretched wings standing on a pedestal. A similar bird appears on a sarcophagus from Badaörs held by an *aquilifer*, although the sculpture is more crudely executed and the size of the eagle and pedestal is exaggerated. The funerary altar of Felsonius Verus (AD 242–4) from Apamea shows an eagle with folded wings peering out through the cross-bars of a frame or cage. This unparalleled feature may have been intended to emphasise the mobility of the *legio II Parthica*. Stationed at the fortress at Albano near Rome, it was used as a loyal formation accompanying emperors campaigning in the east. Legionary centurial *signa* also appear in funerary representations in the old forms, topped by hand or spearhead, bearing small *vexilla* and *phalerae*. It is unclear whether sculptors extended such items down the whole of the standard shaft in order to display them clearly (as may be seen on 1st-century gravestones from Mainz), or whether this represents the accumulation of imperial honours over time, much like the battle-honour labels sewn to regimental flags from the 17th to the 21st centuries. Such standards also include rectangular plates bearing a cohort number and part of one of these, embossed in silver and reading COH V[, was found at Niederbieber. It retained a rivet for attaching a pendant strap.⁸³

The fringed textile flag from a *vexillum* of unknown date has been recovered from Egypt. It is a rectangle of linen, 0.47 m high, 0.50 m wide, painted with the figure of a winged

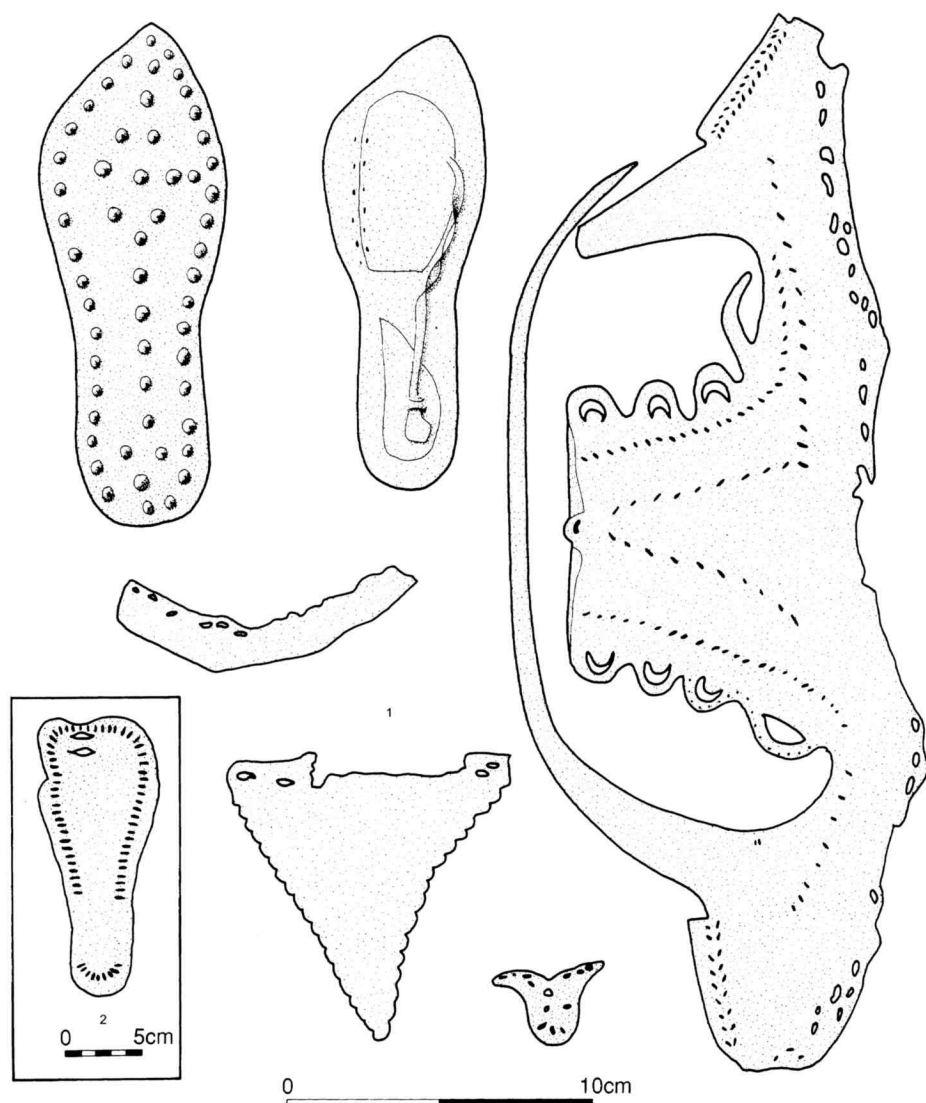


Figure 120: Third-century footwear. 1 Eyelet boot (Zwammerdam); 2 sole of sandal (Zugmantel).

Victory standing on a globe. It is discussed here because the most detailed representation of a *vexillum* appears in the 3rd-century frescoes of the Temple of the Palmyrene Gods at Dura. A rectangular, fringed flag hangs from a cross-bar, the shaft topped by a wreath or *phalera*. The officers of *cohors XX Palmyrenorum* line up before the Palmyrene Triad of gods and the female personifications of Palmyra and Dura. This suggests that at this period the *vexillum* was used amongst other things as the senior standard of a whole auxiliary regiment. It of course continued to be used by legionary detachments (*vexillationes*, serving *sub vexillo*), and occasionally appears on cavalry gravestones.⁸⁴

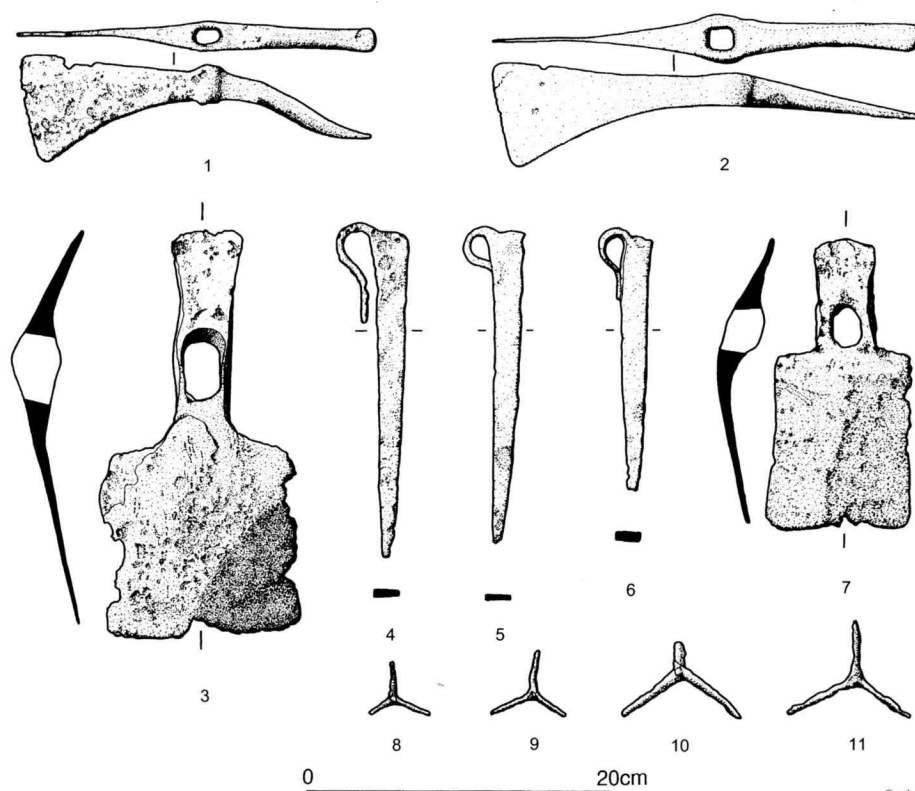


Figure 121: Other equipment of the 3rd century from Künzing (1–7) and Corbridge (8–11). 1–2 Pickaxes; 3, 7 entrenching tools; 4–6 tethering pegs; 8–11 caltrops.

A bull *imago* atop a shaft with a carrying-handle is depicted on a gravestone from Carrawburgh, but there is no accompanying inscription. Perhaps the animal represented the regimental standard of *cohors I Batavorum*, the contemporary fort garrison. There is little information about the use of totemic animals and other symbols as unit emblems amongst auxiliary units, although a cockerel was perhaps the punning standard of *cohors V Gallorum*, appearing as it does on its lead seals. Animal standards were also a feature of Celtic and Germanic military practice which may have continued through into the Roman *auxilia*. There is some evidence that zodiac signs for the birth-date of a unit, or for the emperor who raised it, may have been employed, aping legionary practice. However, the Carrawburgh gravestone may simply represent a bull *imago* of *legio VI Victrix*, comparable with the ram standard seen on Trajan's Column (see chapter 5).⁸⁵

The head of a standard type not hitherto discussed was found in the fort at Niederbieber, dating early in the second half of the 3rd-century. This was the snake (*draco*) standard which consisted of a stylised copper-alloy snake-head with scales, up-standing crest and an open mouth with multiple sharp teeth. The head was mounted on a staff and a tubular 'sock' of light textile was attached to form a tail directly behind.

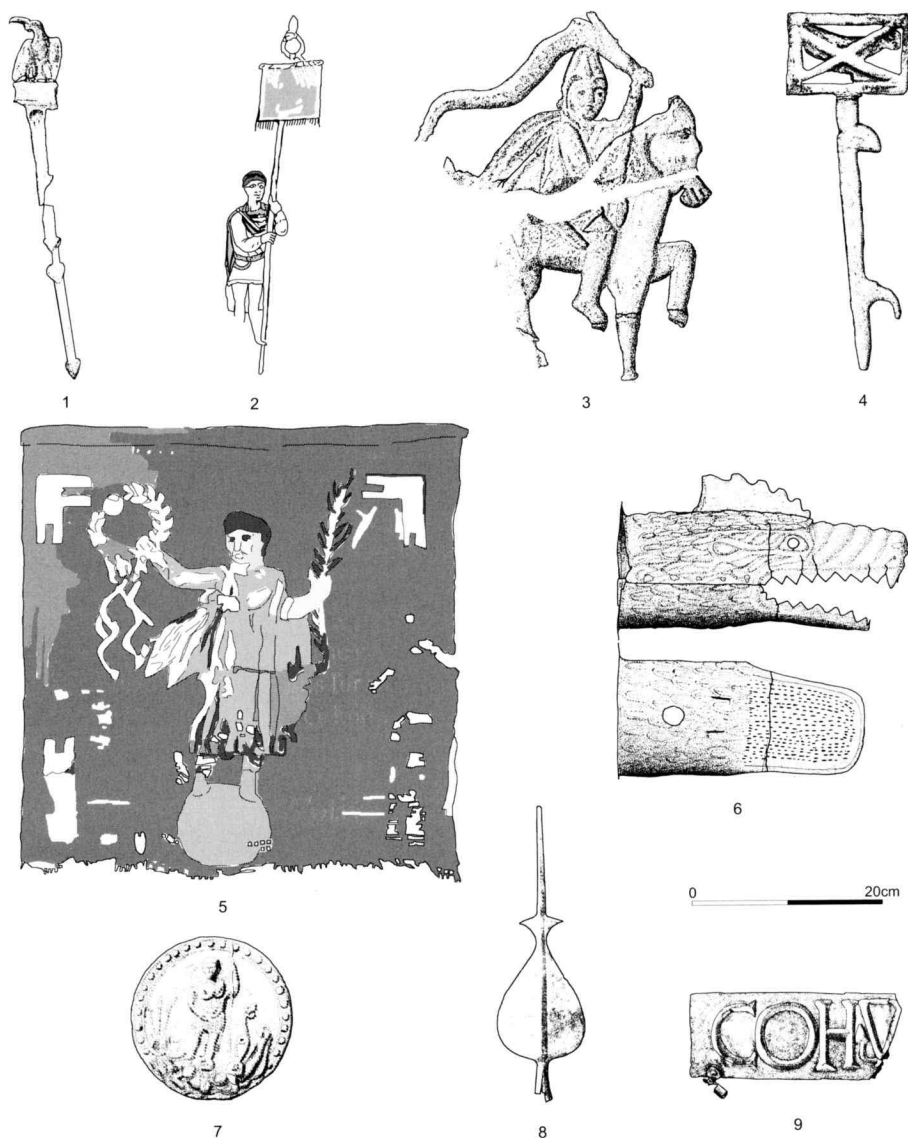


Figure 122: Third-century standards. 1 Eagle (Istanbul); 2 vexillarius from the Tribune Terentius fresco (Dura); 3 draconarius (Chester); 4 eagle in a 'cage' (Apamea); 5 vexillum (Egypt); 6 copper-alloy draco head (Niederbieber); 7 silver signum phalera (Niederbieber); silver standard(?) head (Caerleon); 9 silver signum cohort nameplate (Niederbieber). 1-4 not to scale.

Dracones were most likely first brought to Roman attention by Sarmatian contacts during the Civil War, or through Domitian's Danubian wars. The type is first seen with a wolf's head and a beribboned tail on a Domitianic(?) trophy frieze, and carried by Dacians on Trajan's Column. Others are featured amid the *spolia* on the Column

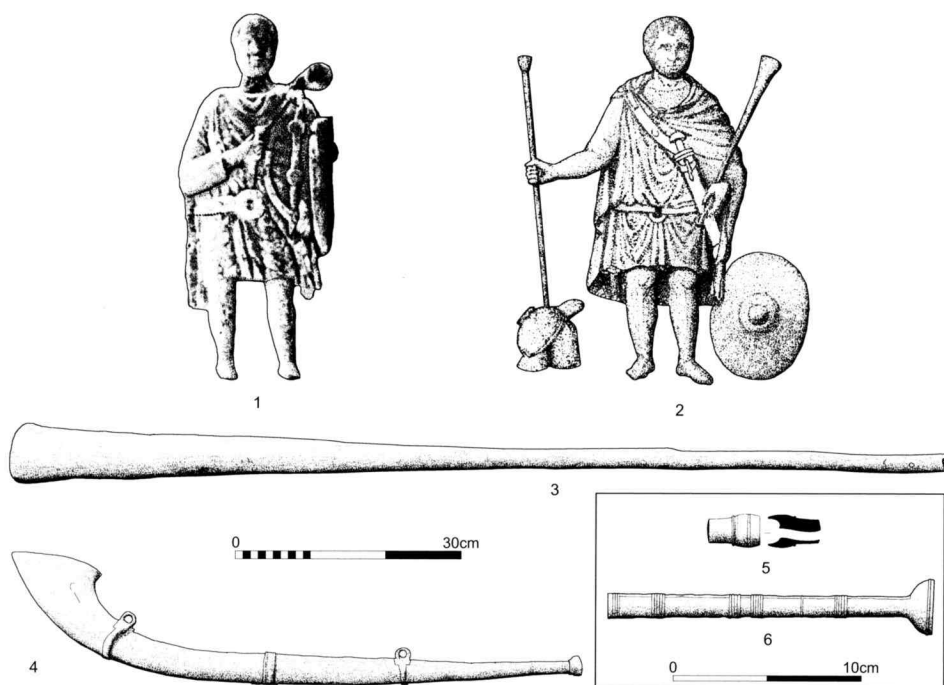


Fig. 123: Third-century musical instruments. 1 Cornicen (Aquincum); 2 bucinator (Istanbul); 3 tuba (Aquincum); 4 lituus (Saalburg); 5-6 mouthpieces (Straubing - 5 bone; 6 copper alloy). 1-2 not to scale.

pedestal. It was a steppe nomad standard form which continued in use in Asia into the Mediaeval period, one which was particularly effective carried on a galloping horse with the tail streaming behind. Roman cavalry had already adopted the *draco*, changing the head and body imagery to that of a snake, by the time of Hadrian, according to Arrian. Fine *dracones* appear on the Antonine Portonaccio sarcophagus and the 3rd-century Ludovisi Sarcophagus. Indeed snake imagery, with its links to the Danubian Rider-God cult, was common in the decoration of 2nd- and 3rd-century cavalry equipment. The Niederbieber head and the Egyptian *vexillum* are the only two surviving items which undoubtedly come from military standards. Many which have been claimed as standard fittings, such as the Vindolanda horse statuette and numerous *beneficiarius* spearheads, had more plausible functions. The paucity of definite artefacts is perfectly understandable, given the spiritual, ritual and honorific value of standards to their military formations.⁸⁶

As for musical instruments, the gravestone of the legionary Aurelius Bitho from Aquincum represents a *cornicen* with the same form of *cornu* as that seen on Trajan's Column, and similarly carrying a small round shield. The rider *stela* of Aurelius Disas from Apamea both depicts the cavalryman of *ala I Flavia Britannica* at full gallop playing a curved horn and supplies the rank of '*cornicen*' in its inscription. Aurelius Surus of *legio*

I Adiutrix from Istanbul shows a *bucinator* holding his long, straight, bell-ended horn, whilst the *tubicen* Aurelius Salvisnus of *legio XI Claudia* holds a *tuba* on his gravestone from Chersonesus. The instrument has a conical bore for its whole length and corresponds with artefactual finds. A 3rd-century *lituus* at the Saalburg has a broad body and a wide, turned-up, ovoid mouth. It had attachments for a carry-strap and this may be a cavalry instrument. No animal skins are shown in the 3rd-century iconography of standard bearers, except for on the Carrawburgh gravestone.⁸⁷

Equine equipment (Figs. 124–6)

Our knowledge of Roman riding harness in this period is highly dependent on the archaeological evidence because the representational material is not nearly as detailed as before. However, this is partially compensated for by a number of horse burials in central Europe which included items of harness apparently *in situ*. Normal site finds are quite prolific, their distribution ranging from Dura to the German and Raetian frontiers, and from Britain to Mauretania.⁸⁸

By the early 3rd century, *phalerae* had changed again and seem to have completely discarded the use of junction loops, direct attachment to the disc being preferred. The system had the advantage of possessing fewer fragile components than before. Harness ornament came in a variety of forms, such as studs of a range of types, strap terminals, pendant streamers and elaborate bridle cheek-pieces. The dominant decorative motifs were now a mixture of Classical (waves, swastika) and Celtic (trumpet, lotus blossom) elements.⁸⁹

The horned saddle was still in use, as it is visible on one of the Bishapur reliefs, along with breast and haunch straps and ivy-leaf pendants. Actual examples of contemporary harness have been recovered from a tumulus at Celles-les-Waremme.⁹⁰

Horse-armour had two distinct functions: face-protection during sports displays, and protection for head, neck and body in battle. Hinged 3rd-century triple chamfron-plates from Straubing and Gherla covered the front and sides of the horse's head, and were decorated with Mars, Minerva, Dioscuri, Victory, snake and eagle motifs. Smaller guards covering the eyes alone occurred at Straubing and Künzing, and were little different from 2nd-century examples.⁹¹

Three scale armour trappers were found in Tower 19 at Dura-Europos. One with copper-alloy scales was in fragments, but the other two were exceptionally well preserved. Housing I also had copper-alloy scales (L. 35 mm, W. 25 mm) attached to each other in rows by copper-alloy wire. The 31 rows per side were stitched with linen to a textile backing in two rectangular panels, 140 mm apart. When worn by a horse, the trapper hung down over the sides, and measured 1.22m along the spine and 1.69m across. An oval opening, 0.37m along the spine and 0.68 m across, accommodated the saddle. This opening, the spine and the lower edges of the trapper were covered with strips of red leather. A triangular section of scale protected the base of the tail. Two thongs at the rear of the saddle-opening may have looped over the saddle-horns or around the haunch straps to increase the stability of the trapper. Leather thongs near the front edge of the housing were presumably tied to the back of a separate scale frontlet.⁹²

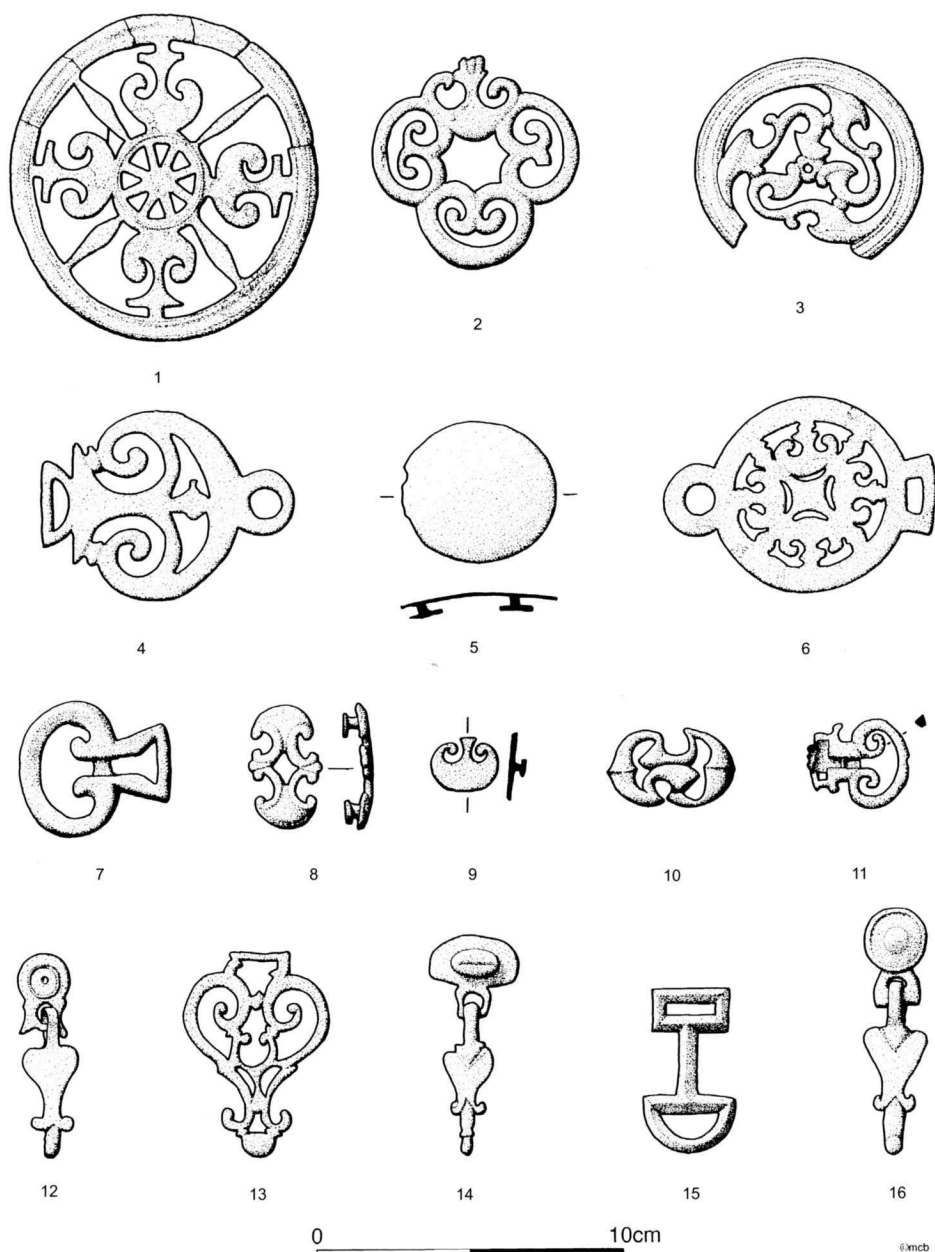


Figure 124: Third-century equine equipment. 1 Phalera (Banasa); 2 mount (Volubilis); 3 phalera (Zugmantel); 4 bit cheekpiece (Thamusida); 5 mount (Niederbieber); 6 bit cheekpiece (Dura-Europos); 7 buckle (Dura); 8–10 mounts (8 Cirencester; 9–10 Saalburg); 11 buckle (Corbridge); 12–16 pendants (12 Dura; 13, 15–16 Zugmantel; 14 Saalburg).

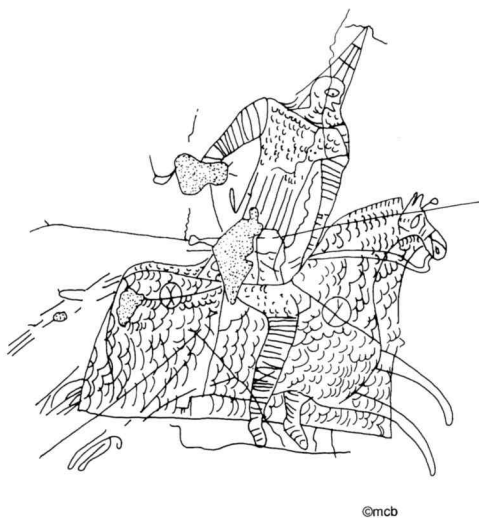


Figure 125: Graffito of cataphract from Dura-Europos.

Housing II was proportionally longer (L. 1.48 m, W. 1.10 m), with curving extensions at the front which meet across the horse's chest, and a saddle-opening perpendicular to the spine. The iron scales (L. 60 mm, W. 45 mm) were attached to the fabric backing with leather laces in 19 rows per side.

The Dura trappers compare with armour described by such writers as Xenophon, Arrian and Heliodorus. One Dura graffito shows the full provision of a trapper (*parapleuridion*), separate overlapping pieces for neck and chest (*prosteridia*), and a chamfron for the head (*prometopidion*). A second sketch pictures a frontlet hanging down lower than the trapper. Full Sarmatian and Parthian scale horse-armours are shown on a Crimean gravestone and a relief at Tang-i-Sarvak respectively.⁹³

These horse-armours were primarily a defence against arrows and, for a trained animal, heat-exhaustion would have been a more debilitating problem than the burden of weight. Standard equipment for wealthy cavalry in Partho-Sassanid armies, its use was emulated by Roman troops from at least the early 2nd century AD. In the 3rd century, heavily-armoured cavalry (*catafractarii*) were taken into Italy by Maximinus Thrax, and were prominent in Palmyrene armies.⁹⁴

Notes

1. *CAH* XII, ii, v–vi, ix; Jones 1964, 14–36; Birley 1969; Smith 1972; Brauer 1975; Fitz 1982; Potter 2004.
2. Advances: Birley 1988, 129–35, 147–8, 152–3, 173–86; Daniels 1987, 250–5; Isaac 1990, 30. Decumates: Schonberger 1985, 422–4, 478–88; Oldenstein 1976, 59–67; Okamura 1990; Nuber 1993; Kuhnén 1997; Fischer 1999; Wamser 2000, 75–9. Mainz: Schonberger 1985, 461–6. Danube: *ibid.*, 417–8, 421–4, 488–90; Fischer 1990, 29–32. Dacia: *CAH* XII, 150–3; Jones 1964, 35; Mocsy 1974, 209–11; Gazdac 2002.
3. Corbridge: Richmond and Birley 1940, 105–7, 112–4, Pl. XI. Caerleon: Nash-Williams 1931, 122–33; 1932, 66–99, Figs. 16–43; Boon 1972, 54, Fig. 30.
4. Dura: Hopkins 1979; James 2004. Units: Welles *et al.* 1959, 24–7; James 2004, 16–20, 24–5; 2005. Fall date: James 1985; 2004, 11, 22–5.

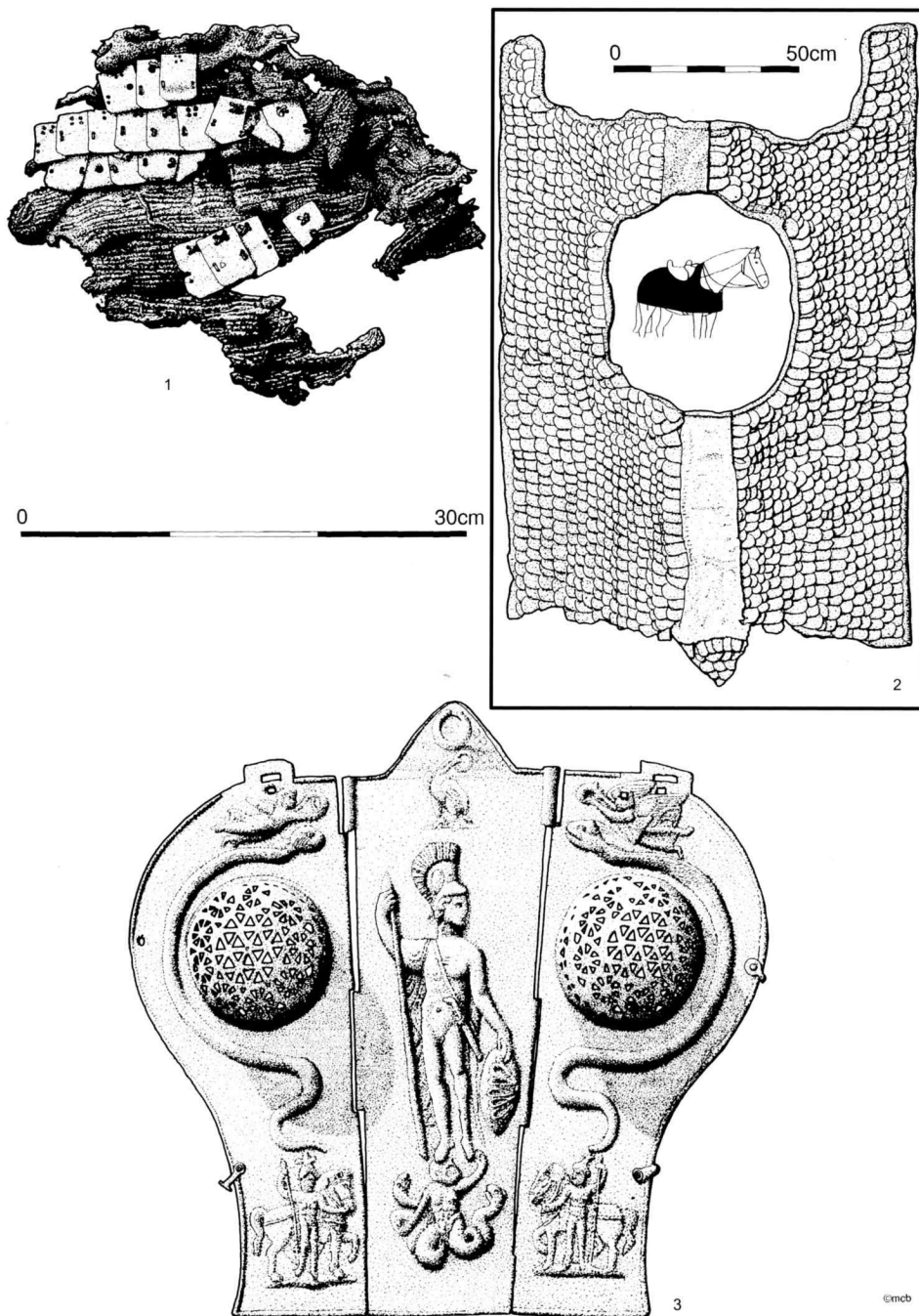


Figure 126: Third-century horse armour. 1 Fragment of housing III (Dura-Europos); 2 housing II (Dura); 3 chamfron (Straubing).

5. Ilkjaer and Lønstrup 1982; Kunow 1986; Hines 1989; Jørgensen *et al.* 2003.
6. Naples: von Bienkowski 1919, Fig. 117. Fiesole: Speidel 1990. Lucianus: Stuart Jones 1912, Pl. 82; Oldenstein 1976, Fig. 13,2. S. Angelo: Rocchetti 1967–68, Fig. 1. Valerinus: de Lachenal *et al.* 1984, V,20.
7. Apamea: Balty 1987, Fig. 6; 1988, Pl. XIV.1. Celje: Schober 1923, No. 199. Cf. *ibid.*, Nos. 341, 351.
8. Caerleon: Nash-Williams 1932, Figs. 20–1, 24; Boon 1972, Fig. 30,9–10. Corbridge: Richmond and Birley 1940, Pl. XI. Richborough: Bushe-Fox 1949, Pl. LVIII.281–82. German: Oldenstein 1982, IV.B.2.
9. Single leaf: Bernand 1966, Pl. 15; Balty 1988, Pl. XIII,2–3; Balty and Rengen 1993, 31; Pfuhl and Möbius 1977, No. 311; Speidel 1976, Fig. 4; Barkóczy 1944, Pl. L,3. Two leaf: *ibid.*, Pl. VII,3; Barkóczy *et al.* 1954, Pl. LI,1; Breccia 1914, Fig. 41. Triangular: Pfuhl and Möbius 1977, No. 314; Speidel 1976, Fig. 3.
10. Heads and butts: Scott 1980, 335–9; Richmond and Birley 1940, Pl. XI; Oldenstein 1982, IV.B.1, 3; Keim and Klumbach 1951, Pl. 43,46–8; Herrmann 1969, Fig. 4,1–9; Planck 1983, 85–7, Figs. 50–1, 97; Gudea 1989, Pls. CXXIII–VIII. Caerleon: Nash-Williams 1932, Figs. 17–18. Triangular section: Scott 1980, 337, Fig. 24,9–11; Walke 1965, Pl. 108,14–16; Herrmann 1969, Fig. 4,11–13; Gudea 1989, Pl. CXXIX,16–9.
11. Engelhardt 1865, Pl. II–III; Jørgensen *et al.* 2003, 77, 278, 283, 288. Cf. James 2004, Cat. No. 646.
12. Balty 1987, Fig. 5; 1988, Pl. XIV.2; Balty and Rengen 1993, 24–6; Speidel 1992, 15–19.
13. Heads: Ritterling 1919; Alföldi 1959b, Figs. 1–48; Herrmann 1969, Fig. 4,10; Waurick 1971; Boon 1972, Fig. 38; Oldenstein 1982, IV.B.4; Klein 1999, Fig. 1, 3–10. Sculpture: Ritterling 1919; Alföldi 1959b, Pl. 9,2. Osterburken: Schallmayer 1984, Fig. 165; 1986, Fig. 8; Clément-Nelis 2000, 285–8, 538, 551–2. Duties: Schallmayer 1991; Mirkovic 1991; Clément-Nelis 2000, 211–68; Stoll 1997. Baldric plates: Engelhardt 1869, Pl. 11,3; Oldenstein 1976, No. 385.
14. Ulbert 1974, 199–211; Oldenstein 1982, IV.B.7; Biborski *et al.* 1985; Martin-Kilcher 1985, 182–3. Dura: Rostovtzeff *et al.* 1936, 82–3, 195–97, Pl. XXVI.1; James 2004, Cat. No. 512–21. Sassanid: Herrmann 1980, Pls. 4, 41–7; 1983, Pls. 5, 10; Herrmann and Mackenzie 1989, Pls. 1–2.
15. Rosenquist 1967–68; Weise Rygge 1967–68; Dabrowski and Kolendo 1972; Ulbert 1974, 200–4; Allason-Jones and Milet 1984, 296–8; Martin-Kilcher 1985, Figs. 25–6; Ilkjaer 1989, Fig. 6; Biborski 1994a; Horbacz and Oledzki 1998; Jørgensen *et al.* 2003, 322.
16. Grip-assemblages: Oldenstein 1976, Nos. 11–22, 32–4; Engelhardt 1863, Pl. 9; 1869, Pl. 6. Eagle: Barnett 1983; von Bienkowski 1919, Figs. 117, 119; Rocchetti 1967–68, Figs. 1–2, 5–7; Barkóczy *et al.* 1954, No. 220; Koch and Sichtermann 1982, Pl. 82–3. Sassanid: Herrmann 1983, Fig. 1, Pls. 5, 5a, 13.
17. Künzing: Schönberger and Herrmann 1967–68, 57–61, Fig. 20; Herrmann 1969, 133, Fig. 2. Veg. II,15. Augst: Martin-Kilcher 1985, Fig. 22,1. Wehringen: Kellner 1966, Fig. 4,1. Köngen: Luik 2005. Cf. Bonnamour 1990, No. 113. Eining: Fischer and Spindler 1984, Fig. 39; Kellner 1966, Fig. 1,2. Künzing: *ibid.*, Fig. 2,4.
18. Scandinavia: Engelhardt 1863, Pl. 10; 1869, Pl. 6, 10; Jørgensen *et al.* 2003, 187, 230, 266, 273, 275, 281, 310, 419. Dura: James 2004, Cat. No. 513, Fig. 85–6.
19. Pelta and heart: Cumont 1926, Pl. XCVII,4; Nash-Williams 1932, Figs. 34,40–1, 36,15–22; Rostovtzeff 1934, Pl. XXIII; Oldenstein 1976, Nos.102–31, 178–84; Gudea 1989, Pl. CLXXX,13–14, 16; Ezennat 1989, Fig. 217,51; Jørgensen *et al.* 2003, 231, 422; James 2004, Cat. No. 553–64, 576–81. Box: Nash-Williams 1932, Fig. 43,1–6; Oldenstein 1976, Nos. 133–35, 148–77; Greep 1983, Fig. 1; Allason-Jones and Milet 1984, Nos. 2,75–81; Gudea 1989, Pl. CLXXX,12; James 2004, Cat. No. 582. Disc: Engelhardt 1865, Pl. IX,44–7; Hundt 1953; Sternquist 1955, Pls. XI, XVIII, XXII, XL–I; Kellner 1966, Fig. 3; Dabrowski and Kolendo 1972, Figs. 4, 16; Oldenstein 1976, Nos. 138–47; Martin-Kilcher 1985. Dura: Rostovtzeff *et al.* 1936, Pl. XXVI,2; James 2004, Cat. No. 566–75. Hauran: National Museum, Damascus Inv.6127.
20. Models: Raddatz 1953; Hundt 1955. Pelta: Pfuhl and Möbius 1977, Nos. 305, 309, 313; Coulston and Phillips 1988, No. 195. Sassanid: Herrmann 1980, Pls. 41–5; Herrmann and Mackenzie 1989, Pl. 2. Mosaic: Colledge 1976, Pl. 140; Palmyra Museum, pers. obs.
21. Trousdale 1975, 220–9, 105–8; Nash-Williams 1932, Fig. 36,2–11; Chapman 1976; Greep 1983, Fig. 1; Dixon 1990; Oldenstein 1976, No. 35–100; Hundt 1959–60; 1960; *RLÖ* XI, Fig. 31,4; XIII, Fig. 92; Barkóczy *et al.* 1954, Pl. XX,3; Petculescu 1983; Cumont 1926, Pl. XCVI,2; Engelhardt 1863, Pl. 10,38; 1869, Pls. 6,10, 7–9; Raddatz 1987, Pl. 9; James 2004, Cat. No. 533–52. Models: Beal and Feugère 1987.
22. Trousdale 1975, 236, Pls. 18–19; Goggräfe and Chehadé 1999, 74–7, Fig. 2–5.

23. Phaleræ and terminals: Amelung 1903, No. 137a; Schober 1923, Nos. 154, 158; Barkóczi *et al.* 1954, No. 220; Rocchetti 1967–68, Figs. 1–2, 5–6; Condurachi and Daicoviciu 1971, Fig. 117; Pfuhl and Möbius 1977, Nos. 305, 315–16; Polenz 1986, Fig. 28. Angled: Herrmann 1983, Pls. 5, 13; Herrmann and Mackenzie 1989, Pl. 2.
24. Vimose: Engelhardt 1869, 19, Pl. 11; Sternquist 1954, Fig. 4.1, 3; Jørgensen *et al.* 2003, 230. Thorsbjerg: Engelhardt 1863, 44, Pl. 11.48; Raddatz 1987, Nos. 165, 167, Figs. 12, 14–5. Simris: Sternquist 1955, 116–17, Pls. VIII, XXI.11–12.
25. German finds: Oldenstein 1976, Nos. 1105–25, Pls. 84–6. Dura: Frisch and Toll 1949, Pls. I; II, 9, 12; VII, 1938; James 2004, Cat. No. 17–28. North Africa: Boube-Piccot 1980, Nos. 199–201, 386, 478–9, 562.
26. Allason-Jones 1986; Oldenstein 1976, Nos. 1092–6, Pl. 83; *RLÖ* XIII, Fig. 102.2; Petculescu 1991 a, 394–5; Callu *et al.* 1965, Pl. CXXXIII. Illerup: Jørgensen *et al.* 2003, 44. *Lupercal*: Southern and Dixon 1996, Fig. 33.
27. Zugmantel: Oldenstein 1976, Nos. 1097, 1100–1. Aldborough: Bishop 1991, Fig. 5.2.A2. Whole inscription: Oldenstein 1976, 223–6; Allason-Jones 1986, 69; Petculescu 1991a, 394. Corbridge: Forster and Knowles 1911, Fig. 9a. Plain terminals: Bishop 1991, Figs. 5.1, 5.3; Oldenstein 1976, Nos. 217–20, 428–30, 1062–79; *RLÖ* IX, Fig. 18.8–9; XI, Fig. 20.4; Rostovtzeff *et al.* 1944, Pl. XXIV.1. Vimose: Engelhardt 1869, Pl. 11; Sternquist 1954, Fig. 4.
28. Oldenstein 1976, 228–30, Figs. 11–12. Representations: Franzoni 1987, No. 19; Pfuhl and Möbius 1977, No. 308; Speidel 1976, Fig. 3; Herrmann 1980, Fig. 1, Pl. 7; 1983, Pl. 13.
29. Wuilleumier 1950, Fig. 1; Ulbert 1974, 211–15, Fig. 4; Oldenstein 1976, 88–9.
30. Schönberger and Herrmann 1967–68, 57, 60–1, Figs. 18, 21–3; Herrmann 1969, 133, Fig. 3. Cf. Ubl 1994, 140–4.
31. Copthall Court: Merrifield 1965, Pl. 99. Rhineland: Oldenstein 1982, IV.B.7d; Jacobi 1897, Fig. 77.5; *Auhl* I.V, Pls. 5, 21. Danube: Keim and Klumbach 1951, Pl. 43.44. Cf. Walke 1965, Pl. 106.6; Planck 1983, 87; Fischer and Spindler 1984, Fig. 39; Fischer 1990, Pl. 54.27; Polenz 1986, Pl. 2. Zeugma: Kennedy and Bishop 1998, 135–7, Fig. 5.9. Dura: James 2004, Cat. No. 3232. Augsburg: Ferri 1933, Fig. 3; Wagner 1973, No. 29. Severus: Herodian 11.13.10. Cf. Ubl 1994; Reuter 1999.
32. Representations: Coulston 1985, 234–S. Funerary bows: *ibid.*, 239–4; Werner 1956, Pls. 25, 36–7. Ear-laths: Coulston 1985, 224–34. Intercisa: Intercisa Museum pers. obs. Micia: Petculescu 1991b, 10; 2002, Fig. 3.36–7. Tibiscum: Bona *et al.* 1983, Pl. XI.1; Petculescu 2002, Fig. 5.58. Parallels: Coulston 1985, 243–4.
33. Nash-Williams, 1932, Fig. 42; Coulston 1985, 227–9.
34. Esp. 1679, 1683; Coulston 1985, 260.
35. Davies 1977; Erdmann 1976; 1982; Coulston 1985, 264–70; Zanier 1988.
36. Rostovtzeff *et al.* 1936, 453, Pl. XXIV.1; James 1987, 78, Figs. 3–4; 2004, Cat. No. 720–41. Cf. Coulston 1985, 267–8.
37. Coulston 1985, 275–8; Cichorius 1896–1900, Scene LXX; James 1987; 2004, 198, Cat. No. 652.
38. Coulston 1985, 270–5.
39. Chirila *et al.* 1972, Pls. LXIV–V.
40. Baatz 1978, 2–9, Figs. 2–7.
41. Dura: Baur and Rostovtzeff 1931, 14–5, 55; Baur *et al.* 1933, 10–11; Rostovtzeff 1934, 101; Rostovtzeff *et al.* 1936, 28; James 2004, Cat. No. 214, Cat. No. 843–51. Buciumi: Chirila *et al.* 1972, Pl. LXIII.
42. Heads: Nash-Williams 1932, Fig. 19; Herrmann 1969, Fig. 4.15–16; Gudea 1989, Pl. CXXIX.1–14. Dura: Baur and Rostovtzeff 1931, 72–3, Pl. IX; Baur *et al.* 1932, 79; Rostovtzeff *et al.* 1936, 455, Pl. XXIV; James 1983; 2004, Cat. No. 742–803. Fire-bolt: James 1983; 2004, Cat. No. 804. Cf. Brok 1978.
43. Cumont 1926, 260–1, Pl. XCVII, 1–2; Baur and Rostovtzeff 1931, 72–3, Pl. IX; Baur *et al.* 1933, 10; Rostovtzeff *et al.* 1936, 455–6, Pl. XXIV; James 1983; 2004, Cat. No. 805–42.
44. Veg II.25. Apamea: Balty 1987, 221; Balty and van Rengen 1993, 36–7. High Rochester: Baatz 1966, 199–200; Marsden 1969, 191; Campbell 1986, 121–2.
45. Grosskrotzenburg: Klee 1989, Fig. 106. Künzing: Schönberger and Herrmann 1967–68, Fig. 25. Straubing: Walke 1965, Pl. 103.1. Carpow: Wild 1981; Coulston 1999. Caerleon: Nash-Williams 1932, Fig. 16. Buch: Planck 1983, Fig. 26. South Shields: Croom 1997, Fig. 1–2; Hodgson 2005, 210–11. Vimose: Engelhardt 1869, 12, Pl. 4; Waurick 1982, 112–13, Fig. 4; Jørgensen *et al.* 2003, 58, 407.

46. Baur and Rostovtzeff 1931, 73; Baur *et al.* 1932, 78–80; Baur *et al.* 1933, 11; James 2004, 110–11, Cat. No. 380–440. Mine: Rostovtzeff *et al.* 1936, 194–7, Figs. 17–18; Hopkins 1979, 187; James 2004, 37, Fig. 14–5; 2005, 201–2.
47. Plates: Garbsch 1978, Pls. 8, 36,4 and 6. Bertoldsheim: Garbsch 1984, Figs. 1–3. Copper-alloy rings: James 2004, Cat. No. 398–411; Nash-Williams 1932, Fig. 41.4; *ORL* B71a, Pl. IV.41; Alfs 1941, 78. Petculescu 1974–75, 85–7; 1980, 391; 1990, 849. Back plates: Künzl 2001; 2004.
48. Istanbul: Pfuhl and Möbius 1977, No. 305. Brigetio: Barkóczi 1944, Pl. L.3. Cf. Ubl 1969, No. 37.
49. Exodus: Kraeling 1956, Pls. LII–III. Ebenezer: *ibid.*, Pls. LI V–V.
50. Monuments: Brilliant 1967, Pls. 45a, 46a–b, 65; Andreae 1977, Pl. 557. Eining: Fischer and Spindler 1984, 58–62; Bishop 2002, 46, Fig. 6.4. Carlisle: Caruana 1993; Bishop 2002, 46–7, Fig. 6.5. León: Aurecochea Fernandez 2001–2. German finds: Oldenstein 1982, IV.6a; Bishop 2002, 47, Fig. 6.3.
51. Graffiti: Baur *et al.* 1933, Pl. XXII.2; Rostovtzeff *et al.* 1936, Fig. 8; James 2004, Fig. 17C, 23. Ai Khanoum: Bernard 1980, 452–7, Fig. 11. Greaves: Schönberger and Herrmann 1967–68, Fig. 25 (plain); Garbsch 1978, Pl. 3 (embossed). Dura greave and liner: James 2004, Cat. No. 447–8. Thigh/limb armour: Rostovtzeff *et al.* 1936, 450–2, Pl. XXIII; James 2004, Cat. No. 441–6.
52. Middle register, leftmost figure, pers. obs. (Bandinelli *et al.* 1966, Fig. 32; Brilliant, 1967, Fig. 98).
53. Enns: Eckhardt, 1976, No. 86. Carnuntum: Kruger 1970, No. 320. Vienna: Naumann 1967, No. 27. Brigetio: Barkóczi 1944, No. 20. Istanbul: Pfuhl and Möbius 1977, No. 308. Veria: Cormack 1941, Fig. 3 and pers. obs. Veria Museum.
54. Coulston and Phillips 1988, No. 400.
55. Pointed rims: Klumbach 1974, Nos. 29, 35, 37; Robinson, 1975, Pls. 256–57, 260–1, 273–4, 277–82.
56. Planck 1983, 142–4, 185–87.
57. Regensburg: Garbsch 1978, 76; Dietz *et al.* 1979, Fig. 30. Eining-Untersfeld: Fischer 1985. Caerleon: Nash-Williams 1932, Fig. 36.1; Boon 1972, Fig. 30.5. Dura: James 2004, Cat. No. 372–6. Mine: Coulston 2001b, 38. Stance: Connolly 1991a; Coulston forthcoming c.
58. James 2004, 101, Cat. No. 378, Fig. 51.
59. Robinson 1975, Pls. 391–96; Garbsch 1978, Pl. 31; Petculescu 1990, 846–48.
60. Eagle-helmets: Robinson 1975, Pls. 376–83; Garbsch 1978, Pls. 28–9. Cf. protectors: Robinson 1975, Pl. 387–90; Garbsch 1978, Pl. 30.2–4. Intercisa: Barkóczi *et al.* 1954, No. 170. Worthing: Robinson 1975, Pl. 384–6; Garbsch 1978, Pl. 30.1. Theilenhofen: *ibid.*, Pl. 10. Rome: Schafer 1979, Figs. 5–8; Andreae 1977, Pls. 587–88, 590–91; Koch and Sichtermann 1982, Pls. 78, 82, 84.
61. Masks: Keim and Klumbach 1951, Pls. 6–7, 10–11; Robinson 1975, Pls. 364–6; Garbsch 1978, Pls. 1.1, 2.3–4, 25.1–2. Vechten: Kalee 1989, Nos. 8–9, Figs. 14–5.
62. *Cod. Vat. Lat.* 3225; *Vergiliana* 1945, Picture 49 (cf. 44, 48).
63. Bosses: Oldenstein 1982, 111.B. SA; Walke 1965, Pl. 106.1–2; Planck 1983, Fig. 98; Fischer 1990, Pls. 53.B22, 54.25. Cf. Engelhardt 1869, Pl. 5.10; Raddatz 1987, Nos. 249–97. Thorsbjerg: *ibid.*, No. 268. Decorated bosses: Klumbach 1966; Thomas 1971, 31–44.
64. Cumont 1926, 261–3; Baur and Rostovtzeff 1931, 11, 72; Rostovtzeff *et al.* 1936, 195, 204–5, Fig. 18; Rostovtzeff *et al.* 1939, 326–69; Hopkins 1979, 186–7, Fig.; James 2004, 159–70, Cat. No. 589–615. Pointed flanges: Rostovtzeff *et al.* 1936, Fig. 18; James 2004, Cat. No. 603–5. Cf. *ORL* B8, Pl. XI.27 (Zugmantel).
65. Rostovtzeff *et al.* 1939, 327–31; James 2004, 160–3. Thorsbjerg: Raddatz 1987, Figs. 21–2, Pls. 84–5. Experiments: Jørgensen *et al.* 2003, 322.
66. Baur and Rostovtzeff 1931, 72; Rostovtzeff *et al.* 1936, 197; Rostovtzeff *et al.* 1939, 327–8, 331–69, Pls. XLJ–II, XLIV–VI; James 2004, 163–6, Cat. No. 616–19. Back design: Rostovtzeff *et al.* 1939, 326; James 2004, Cat. No. 617, Fig. 98, Pl. 8. Simris: Sternquist 1955, 118–19.
67. *Stelae*: e.g. Ferri 1933, Fig. 274; Pfuhl and Möbius 1977, Nos. 305, 311, 314–5.
68. *Stelae*: Smith 1904, No. 2271; Coulston and Phillips 1988, No. 193. Boards: Cumont 1926, 262–3; Rostovtzeff *et al.* 1936, 456–66, Pls. XXV–XXVA; Connolly 1981, 231; James 2004, Cat. No. 629–32. Boss: James 2004, Cat. number 609.
69. Schober 1923, No. 158.
70. Studs: Alicu *et al.* 1979, Fig. 265; Franzoni 1987, No. 19, Pl. V.4. Crescent loop: Stuart-Jones 1912, Pl. 82; Barkóczi *et al.* 1954, Pl. LXXI.4; Rocchetti 1967–68, Fig. 2; Pfuhl and Möbius 1977, No. 309; Koch and Sichtermann 1982, Pl. 84. Along front: Schober 1923, Fig. 97; Kuszinsky 1934, Figs. 30, 53; Barkóczi 1944, Pl. X.2. Terminals: Esp. 5507; Schober 1923, Fig. 77; Barkóczi *et al.* 1954, Pl. XXI.4; Rocchetti 1967–68, Figs. 4–5; Wagner 1973, Nos. 31, 350; Pfuhl and Möbius 1977, Nos. 315–16; Balty 1987, Fig. 4.

- Sassanid reliefs: Herrmann 1983, Pls. 10–13; Herrmann and Mackenzie 1989, Pls. 2–3, 6. Terentius: Cumont 1926, Pl. L; James 2004, Pl. 1–2. Eining: Wagner 1973, No. 477. See Ubl 2002.
71. Plain: Oldenstein 1976, Nos. 1048–52; von Schnurbein 1977, 88, Pl. 16; Cumont 1926, Pl. XCVII,6; James 2004, Cat. No. 38–47. Adjustable: Oldenstein 1976, Nos. 1058–60, Fig. 8; Barkóczy *et al.* 1954, Pls. XXII,6–7, XXV, 1, 3; Alföldi *et al.* 1957, Fig. 99; Radman-Livija 2004, Nos. 291–8. Studs: Oldenstein 1976, No. 473–903; von Schnurbein 1977, Pls. 6, 13, 50, etc.; James 2004, Cat. No. 239–89. Terminals: Nash-Williams 1932, Fig. 34,6–7; Oldenstein 1976, Nos. 290–348; Raddatz 1953; Hundt 1955, 51–3, Fig. 1; von Schnurbein 1977, 92–4, Pls. 29, 45, 82, etc.; Gudea 1989, Pls. CCXII–IV; Radman-Livija 2004, Nos. 315–43. James 2004, Cat. No. 133–88. Lyon: Willeumier 1950, Fig. 1.
 72. Gravestones: Schober 1923, No. 154; Polenz 1986, Fig. 28; Hofmann 1905, Fig. 58. Artefacts: Barkóczy *et al.* 1954, Pl. 22,13–15; Oldenstein 1976, 222–23, Nos. 1083–86, Fig. 9; von Schnurbein 1977, 87–8, Fig. 13, Pls. 56, 82, etc.; Fischer 1988, Fig. 9; 1990, Pl. 92,B1–2, etc.; Boube-Piccot 1980, No. 388; Oldenstein 1976, Nos. 971–85, 997–1025; Gudea 1989, Pls. CCXXII–III; Boube-Piccot 1980, Nos. 408–11, 537–47; Frisch and Toll 1949, Pl. IV,40; James 2004, Cat. No. 52, 72–3. Bishapur: Herrmann 1980, Pl. 47a; 1983, Pl. 5, 10–13.
 73. Frisch and Toll 1949, Pl. VI,82; James 2004, Cat. No. 78; Willeumier 1950, Fig. 1; Bullinger 1972; Ulbert 1974, 213–14, Fig. 4,2, 5; Petculescu 1991, 392–94, Fig. 74,1. Gravestones: Schober 1923, Fig. 75; Ferri 1933, Fig. 291; Rocchetti 1967–68, Figs. 2, 5–6; Oldenstein 1976, Figs. 13,2, 14,1. Appliqué types: *ibid.*, Nos. 268–72, 509–27, 539–57, 622–49, 686–712, 715–46, 785–96; James 2004, Cat. No. 300–24.
 74. Allason-Jones and Miket 1984, 94–6; Oldenstein 1976, Nos. 809–12; Fischer 1990, Pl. 66,D2; Gudea 1989, Pl. CCXXIII,10; Frisch and Toll 1949, Pl. IX,31; James 2004, Cat. No. 90.
 75. E.g. Rocchetti 1967–68, Figs. 1–2, 4–5; Pfuhl and Möbius 1977, Nos. 305, 307, 316.
 76. Cumont 1926, Pl. L; James 2004, Pl. 1–2; *Luxor* 1981, Fig. 154; Pfister and Bellinger 1945, 1–9, 14–5.
 77. E.g. Allason-Jones and Miket 1984, 3.142–51; Böhme 1972, Pls. 25–8; Gudea 1989, Pl. CXCv; Frisch and Toll 1949, Pl. XVII,168; Gerharz 1987, 87–90, Nos. 165–7; James 2004, 59.
 78. Sculpture: Hofmann 1905, No. 65; Wagner 1973, Nos. 29, 31, 350; Condurachi and Daicoviciu 1971, Fig. 117; *Luxor* 1981, No. 296, Fig. 156. Cf. Busch 1965; James 2004, 55–7.
 79. Künzing: Herrmann 1969, 5–7. Caerleon: Nash-Williams 1932, Fig. 25.
 80. Caerleon: Nash-Williams 1932, Fig. 22. Macrinus: Herodian IV,15,2–3. Uses: *OED*, s.v. ‘caltrop’.
 81. Centurions: Franzoni 1987, No. 19,59; Pfuhl and Möbius 1977, Nos. 302–3. Tall staffs: *ibid.* No. 308; Bernand 1966, Pl. 13(?); Speidel 1976, Fig. 2; Pfuhl and Möbius 1977, No. 308; Franzoni 1987, No. 15; Balty and van Rengen 1993, 38, 44–5.
 82. Planck 1983, Fig. 117.
 83. Istanbul: Speidel 1976, Fig. 1; Pfuhl and Möbius 1977, No. 307. Badaörs: Maróti 2003, No. 54. Apamea: Balty and van Rengen 1993, 42–3; Stoll 2001b. Albano: Coulston 2000, 99. *Signa*: Hoffmann 1905, Fig. 9–10; Kuzsintzy 1934, Fig. 142; Barkóczy *et al.* 1954, Pl. XXXVII,3; Polenz 1986, Fig. 28; RIU 529; Riad *et al.* n.d., Fig. 15. Mainz: Esp. 5792, 5799. Plate: *ORL* 1a, 23.
 84. *Vexillum*: Rostovtzeff 1942. Dura: Cumont 1926, Pl. XLIX–L; James 2004, Pl. 1–2. *Vexillationes* in general: Saxer 1967. Gravestones: Hofmann 1905, Fig. 27–8; Schober 1923, Fig. 54; Bernand 1966, Fig. 14; Speidel 1990, Fig. 2; Schleiermacher 1984, No. 107.
 85. Carrawburgh: Coulston and Phillips 1988, No. 193. Cockerel: *RIB* I, 2411.100. Cf. Tufi 1983, No. 106. Animal standards: Tacitus, *Germ.* 7; *Hist.* 4.21; Esp. 260; Amy *et al.* 1962, Pl. 44. Emblems: Stoll 2001c, 504–71.
 86. Niederbieber: Garbsch 1978, T, Pl. 43.3; Coulston 1991, Fig. 12. Contacts: *ibid.*, 105–10; 2003c. Frieze: Crous 1933, 77; Polito 1998, 204–5, Fig. 146. Trajan’s Column: Cichorius 1896–1900, Pl. II–III; Scenes XXIV, XXV, XXXI, XXXVIII, LIX, LXIV, LXVI, LXXV, LXXVIII, CXXII. Arrian, *Techne Taktike* 35.1–6. Sarcophagi: Coulston 1991, Fig. 5–6. Imagery: Tudor 1969, No. 36–7, 42–3, 45, 47, 49, 73, 75, 149–50; Robinson 1975, Pl. 273–6, 378–83, 391–6, 407–10, 522, 524; Garbsch 1978, Pl. 4.2, 5.1, 6.2, 11.1, 28, 31–2, 38.2. Vindolanda: Toynbee and Wilkins 1982. Ritual: Stoll 2003a.
 87. Aquincum: Schober 1923, Fig. 77; Hoffmann 1905, Fig. 56. Cf. *ibid.*, Fig. 59. Apamea: Balty and van Rengen 1993, 52. Istanbul: Speidel 1976, Fig. 2; Pfuhl and Möbius 1977, No. 308; Meucci 1987. Chersonesus: Behn 1912, Pl. 5.4; Speidel 1976, Fig. 9. *Tuba* finds: Behn 1912, Fig. 1; Speidel 1976, Fig. 10; Flügel 1998b; Fontana 2000. Saalburg: Behn 1912, Fig. 3–4.
 88. Horse burials: Palágyi 1986; 1989. Dura: Frisch and Toll 1949; James 2004, 67–9, Cat. No. 325–69. Germany and Raetia: Oldenstein 1976. Mauretania: Boube-Piccot 1980.

89. *Phalerae*: e.g. Frisch and Toll 1949, Pl. III,20; Oldenstein 1976, Nos. 1131, 1133–4; Boube-Piccot 1980, Pl. 37,106–11. Studs: e.g. *ibid.*, Pl. 118,589; Allason-Jones and Miket 1984, 3.766, 3.870–2; Oldenstein 1976, Nos. 542–57. Strap terminals: e.g. *ibid.*, Nos. 261–8; Frisch and Toll 1949, Pl. IV,47–9. Pendant streamers: e.g. Boube-Piccot 1980, Pl. 48,183–4; Allason-Jones and Miket 1984, 3.591; Oldenstein 1976, No. 885. Check-pieces: e.g. Frisch and Toll 1949, Pls. II,15, 17–8, III,19, 23; Boube-Piccot 1980, Pl. 30,92–4.
90. Bishapur reliefs: Herrmann 1989, Pl. XV. Contemporary harness: *Ann. Soc. Arch. Bruxelles* 17, 1903, Pl. 17; *SJ* 5, 1913, 61, Fig. 17.
91. Robinson 1975, Pls. 522–28; Garbsch 1978, Pls. 4–7.
92. Rostovtzeff *et al.* 1936, 440–49, Pls. XXI–II; Robinson 1975, 194, Pls. 529–30; Hopkins 1979, 125–6, 189, 191; Hyland 1990, 149–51; James 2004, 113–14, Cat. No. 449–52.
93. Graffiti: Baur *et al.* 1933, Pl. XXII,2; Rostovtzeff *et al.* 1952, Fig. 6; James 2004, Fig. 17.D, 23. Xenophon, *On Horsemanship* XII,8; Arrian, *Technē Taktikē* 4; Heliodorus, *Aethiopica* IX,15. Crimea: Keiseritzky and Watzinger 1909, No. 650; Desyatchikov 1972. Tang-i-Sarvak: Vanden Berghe and Schippmann 1985, Fig. 12, Pl. 47; von Gall 1990, Pl. 3–4. Cf. sculpture: Pugachenkova 1966; Bivar 1972, 277–81; Robinson 1975, Figs. 198–200; Coulston 1986, 60–8.
94. Coulston 1986, 60–8; Hyland 1990, 148–56; Diethart and Dintsis 1984; Mielczarek 1993; Harl 1996. *Catafractarii*: Herodian, VIII,1,10; Zosimos, *Historia Nova* I,50.

8 The Dominate

Under the Tetrarchy, the emperors of the House of Constantine, and Valentinian I and Theodosius I, the frontiers were maintained and strengthened. Diocletian increased the size of the army, whilst continuing to rely upon the frontier legions. Constantine and his successors built up more centralized field armies drawing upon frontier forces. New types of units were also created, with a western emphasis on German officers and recruits. Old army regiments, some dating back to the Augustan period, had a continuous life in more peaceful areas like Egypt, perhaps up to the 7th century.

However, Germanic pressure on the northern frontiers during the 4th century could not be resisted indefinitely. The Goths, with accompanying groups, crossed *en masse* into the Danubian provinces and crushed the eastern Roman army at Hadrianopolis in AD 378. The Roman forces were rebuilt, initially using large numbers of barbarian *foederatae*. German military and political dominance was avoided in the East, but western emperors came increasingly under the control of their German generals. The Rhine frontier finally collapsed at the beginning of the 5th century, and the western provinces generally slipped away from Roman control. The term 'dominate' is a convenient and persistent modern convention used to distinguish the period of Diocletian onwards from the preceding 'principate'. However, emperors were addressed as '*dominus*' from at least the early 2nd century, and they had become far more than just 'principal citizen' (*princeps*) long before then.¹

Cities which were chosen to be Tetrarchic and later capitals, such as Trier and Milan, other strategic and administrative nodes, such as Aquileia and London, and even Rome herself, required imperial bodyguard formations, garrisons and ancillary forces. Late Roman military equipment is turning up at these centres, for example a full set of 'chip-carved' belt-plates in a grave in London's east cemetery, and another suite in Rome's Crypta Balbi excavations.²

Frontier reorganizations from the Tetrarchy onwards involved the establishment of some new installations, thus dating Dominate period material between foundation and final Roman abandonment. However, the latter usually did not involve the orderly deposit of equipment as in earlier periods. Material was sometimes simply left where it had been stored, as at Housesteads, Intercisa and Lambaesis, or where it had been installed, as at Gornea and Orşova.³

Ritual deposition of equipment in water continued in 4th- to 5th-century Free Germany, as at Nydam, Kragehul and Ejsbøl Mose. Funerary deposition took on a new importance, especially within the Roman frontiers. In cemeteries outside forts, such as Oudenburg and Intercisa, near towns, like Winchester and Ságvár, and 'new' refuge sites such as Vireux-Molhain, soldiers were more commonly buried with their clothing, brooches, knives and military belts. Weapons were occasionally included in what may have been specifically Germanic, rather than Roman provincial, practice. Weapon-graves in northern Spain, northern France and the Rhineland ('*Laetengräber*') have been associated with units of German warriors (*laeti*), known from the *Notitia Dignitatum* to have been located in these areas. However, the deposited equipment

itself need not have been 'Germanic'. Equine and archery equipment were placed in Hunnic graves alongside some Roman items, and Hunnic material was sometimes included in Germanic funerary deposits.⁴

Weapons

Shafted weapons (Fig. 127)

Vegetius lists a series of shafted weapons in his description of legionary equipment. Amongst them are the *spiculum*, which used to be termed *pilum*, with a head 9 Roman inches (200 mm) long on a 5.5 Roman foot (1.628 m) shaft. Elsewhere he says that the *pilum* had an iron head 9–12 Roman inches (222–96 mm) long, and its equivalent, the *bebra*, was carried in twos or threes by contemporary barbarians. The length of iron head might seem conservative by comparison with earlier *pila*, but, as the preceding chapters demonstrate, '*pila*' at any one time exhibited a range of dimensions and head types.⁵

Several heads from northern Britain and elsewhere had a long iron shank like a *pilum* and were more substantial than those Vegetius described. Undated examples from Carvoran, Lauriacum and Vindonissa with flat, double-barbed heads were 549 and 590 mm long respectively. Close parallels occurred at Vimose, Illerup (3rd century), Ejlsbøl and Nydam (4th century), suggesting a Germanic link. In similar fashion German heads from Nydam, Kragehul and Illerup with a long, narrow point and barbs close to the socket, were analogous with a head from Roman Pilismarót. Perhaps some Roman spear variants were adopted in Free Germany and reintroduced to the Empire during the 3rd–4th centuries, thus indirectly linking the *pilum* with the German *ango*.⁶

Another type of missile advocated by Vegetius was the '*plumbata*'. He gives no dimensions, but it must have been comparatively short, because five were carried behind the infantryman's shield. They were also called '*mattiobarbuli*' or '*martiobarbuli*', perhaps linking them with the German Mattiaci, or with 4th-century units of *Mattiarii*. Vegetius noted that two *legiones* in Illyricum used them. The anonymous *De Rebus Bellicis* includes a section on '*plumbatae tribolatae*' and '*mamillatae*'. Both types are described as having flights like arrows and a lead weight on a wooden shaft. The *tribolata* had a hunting (barbed?) head and caltrop spikes (*tribuli*) attached to the weight so as to be dangerous even if it missed its target and fell on the ground. The *mamillata* lacked the spikes and had a pointed, round-sectioned head specifically designed for penetration. Accompanying manuscript illuminations represent them as shafted weapons of arrow or quarrel proportions.⁷

Lead-weighted projectile-heads have been found on a number of British sites. They consisted of an iron shank with a wickedly barbed head. Those from Wroxeter and Burgh Castle (L. 118–58 mm) had a shank attached to a wooden shaft either by socket or tang, with the junction encircled by a barrel-shaped lead jacket. Examples come from both towns and forts and datable heads belong to the 4th–5th centuries. Continental examples are found along the Rhine and Danube frontiers. *Plumbatae* from Pitsunda in Georgia had lead weights but had small, narrow leaf-shaped heads.⁸

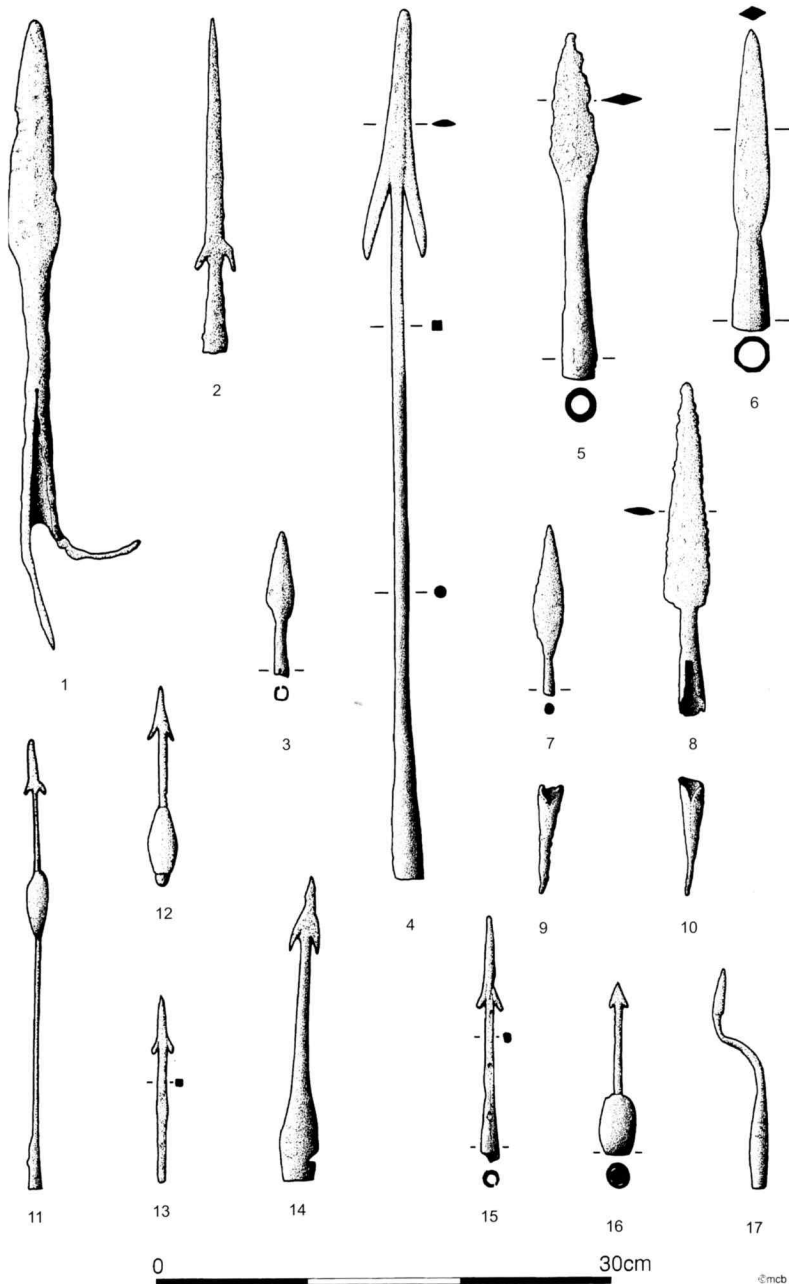


Figure 127: Dominate spearheads. 1, 3, 13, 15 Catterick; 2 Pilismarót; 4 Carvoran; 5, 7, 9–10 Gundremmingen; 6, 8 Gornea; 11, 14, 17 Sisak; 12 Wroxeter; 16 Carnuntum.

Reconstruction experiments used replicas of the Wroxeter finds (overall L. 600 mm); accuracy at 60 m was achieved with under-arm delivery, a plunging course making the target's head and shoulders vulnerable, despite the use of a shield. Barbed heads would have discomforted unarmoured barbarians, whilst the Pitsunda points would have penetrated armoured targets more efficiently.⁹

These new types of projectile-heads stand out in the archaeological record precisely because of their novelty, but spear- and javelin-head forms of early periods, with their attendant butts, continued in use through into the 5th century. A range of broad- or narrow-shouldered blades (and the triangular-section type) are datable by context rather than form. At Vireux-Molhain, a suite of eight different head forms was found together in one grave, along with a set of belt fittings. In another grave from the same site, a butt and ribbed spearhead were found *in situ* allowing an original shaft length of 1.10 m to be calculated. Danish spear-shafts continued to have carved ornament and decorated shafts were carried by Roman guardsmen.¹⁰

Infantry gravestones and the catacomb painting at Syracuse show a single spear with a substantial blade. The Via Latina catacomb painting and some Aquileia *stelae* depict a pair of javelins with triangular or barbed heads. Vegetius described a javelin called '*verutum*', previously '*vericulum*', which had a head of 9 Roman inches (222 mm) on a shaft 3.5 Roman feet (1.03 m) long. He also used '*lancea*' equivalently (distinguishing it from lighter *plumbatae* and heavier *spicula*), and the short shaft and small head find parallels in five weapons on the Apamea *lanchiarius stela* (see Chapter 7). In AD 296 the soldier Paniskos wrote to his wife from Koptos in Egypt asking her to bring various items of equipment including five '*lonchia*'. '*Lanciarii*' appeared as a regimental title from the later 3rd century onwards, and some units were formed by separating out *lanciarii* from their parent legions. None the less, a variety of shafted weapons clearly continued in legionary use. A grave at Vermand perhaps belonged to a field-army soldier, and it included one decorated spearhead (L. 500 mm) and 10 lighter heads (L. 200–50 mm) (see below, p.214).¹¹

Gravestones of *catafractarii* from Worms and Lyon depict spears and javelins in conjunction with shields. However, the Lyon *stela* also shows a *contus*, perhaps denoting eastern tactical usage (see Chapter 10).

Bladed weapons (Figs. 128–30)

Long swords continued to be the main type of bladed weapon. Vegetius refers to these as '*spathae*' and also mentions the use of short swords (*semispathae*), but there is as yet no 4th-century artefactual evidence for the latter. *Spathae* presumably continued with Ulbert's two types, and *Laetengräber* usually include swords. Swords from Nydam are stamped and pattern-welded, whilst one from Augst may represent a late example of the 'Lauriacum' type. A *spatha* from a 4th-century burial at Köln had a blade 720 mm long and 52 mm wide (c. 14:1). It also had a surviving ribbed ivory grip, a narrow guard, an elliptical pommel, and a niello-inlaid, gilded silver disc-chape (W. 110 mm). Long swords are depicted on porphyry imperial statues, gravestones and paintings, some with eagle-headed pommels.¹³

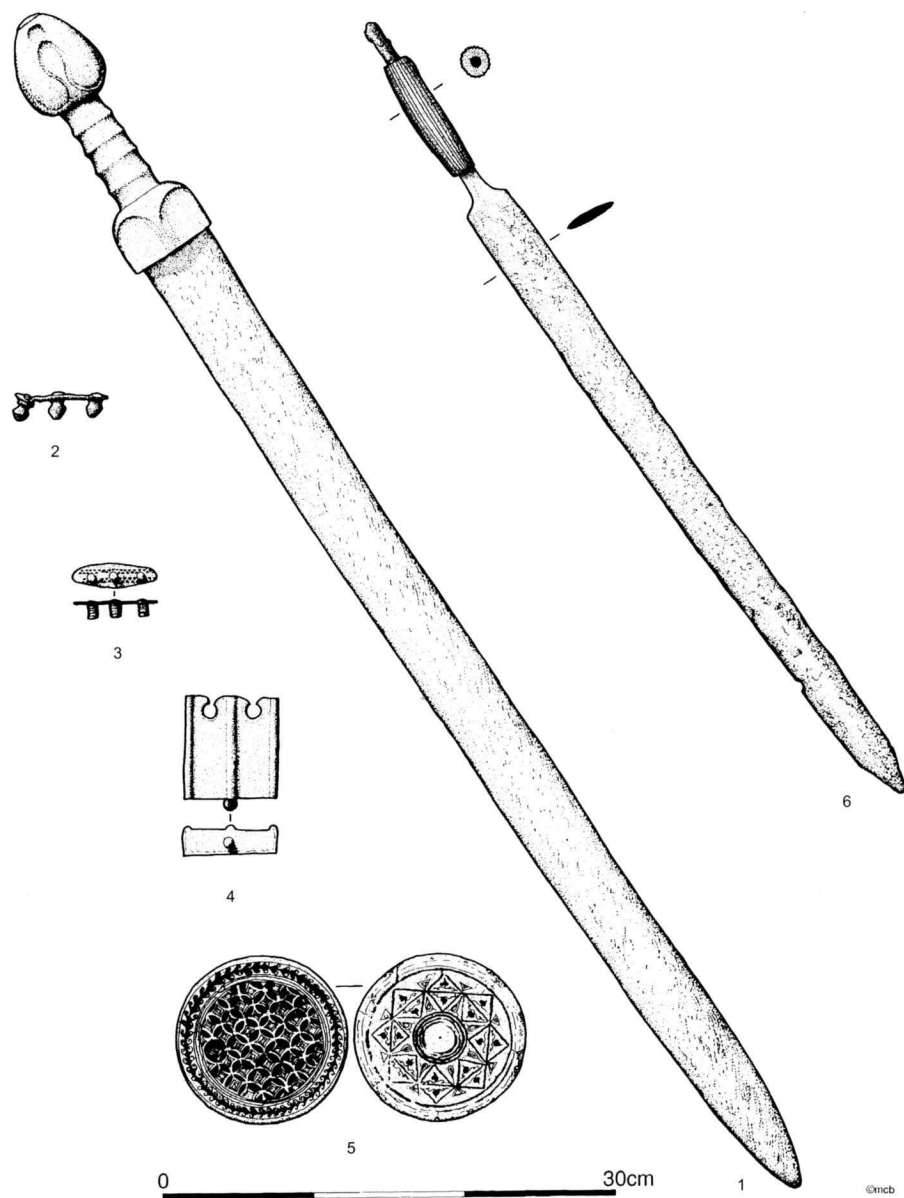


Figure 128: Dominate swords. 1 Sword (Köln); 2-5 chapes (2 Trier; 3 Gundremmingen; 4 unknown; 5 (Köln); 6 sword (Alzey).

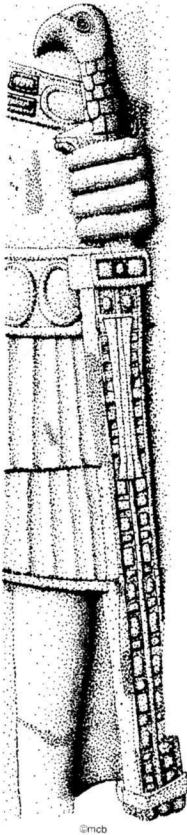


Figure 129: Details of one of the swords of the Venice Tetrarchs (Not to scale).



Figure 130: The Stilicho diptych (Monza).

A fragmentary leather scabbard-cover (W. 60 mm) was associated with the Deurne helmet (see below, p.209). Chapes from Vermand, Gundremmingen, Liebenau and Trier represent a new type with an elliptical copper-alloy plate attached to the end of the scabbard by three ribbed cylindrical or dome-headed copper-alloy rivets. These date to the 4th and early 5th centuries, and are clearly depicted carried by the porphyry Venice Tetrarchs.¹⁴

Large, waisted scabbard-slides on these Venice scabbards are closely paralleled by bone slides from Niederbieber, Worms, Lauriacum and Nydam. The first is 3rd-century in date, whilst the others may be later. Fourth-century porphyry statues at Ravenna and Berlin depict large rectangular slides, whilst the ivory diptych of Stilicho at Monza shows a slide of German form with splayed ends. From the Tetrarchic period onwards, scabbards are occasionally represented suspended from a narrow baldric, but more usually from a hip-belt. This is also often narrow, corresponding with finds of narrow belt-fittings; the broad 3rd-century type of baldric, with its characteristic plates, went out of use.¹⁵

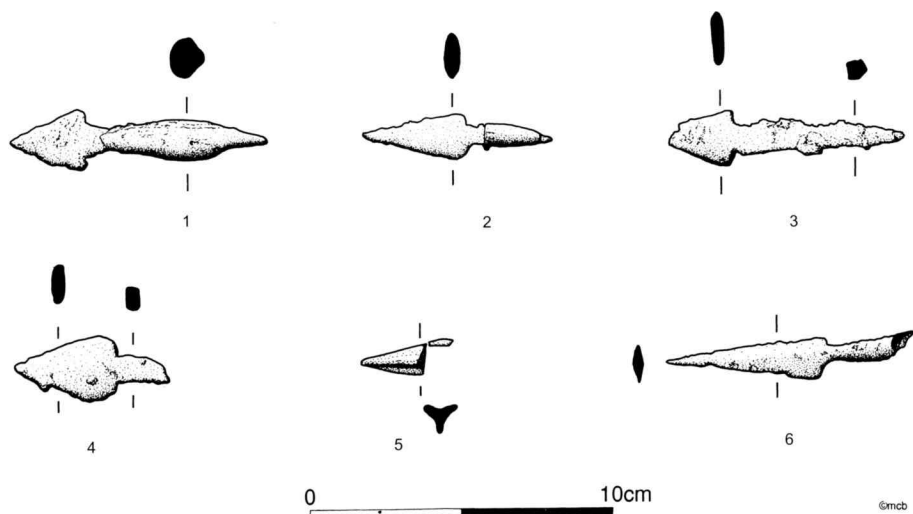


Figure 131: Dominate archery equipment. 1–6 Arrowheads (1–4 Housesteads; 5 Klosterneuberg; 6 Gundremmingen).

Germanic weapons, the sax and the throwing-axe (*francisca*), were introduced by barbarians into the Empire from the 4th century onwards. More conventional axes were used by Roman cavalry, and one is shown on a Tetrarchic *stela* from Gamzigrad. As yet there is little evidence that the traditional double-edged Roman military dagger continued in use after the 3rd century. Short, single-edged knives are commonly found in 4th-century graves in association with military belt-fittings. Examples from northern Spain have been found with their copper-alloy openwork sheaths, which may represent a local, Iberian variant.¹⁶

Archery equipment and slings (Fig. 131)

Units of *sagittarii* in the *Notitia Dignitatum* were predominantly located in the eastern theatre. Vegetius advocated the arming of rear ranks in legionary battle formations with bows, presumably continuing a 3rd-century practice.¹⁷

There are few securely dated 4th-century bow laths, although some of the Intercisa examples may belong to the very end of site occupation. Sarmatian bows now had laths as a result of Hunnic contacts, and burials of steppe nomads along and within the Roman frontiers complicate the picture. Early Medieval scholars have been quick to claim laths on Roman sites as evidence for nomad presence, but conflict with such peoples also necessitated Roman adoption of steppe archery equipment. Hunnic bows had pairs of ear-laths, and three laths on the grip. Such a bow was found in a building destroyed in the mid-5th century at Stobi.¹⁸

Vegetius also mentioned the '*arcuballista*' which may have been a crossbow using a composite bow-stave attached to a tiller, as shown on the 3rd-century Gallic reliefs (see Chapter 7).¹⁹

Broken ears of yew self-bows were found in the Nydam deposits, one with carved decoration. This is not a stave type directly attested by evidence from within the Roman empire, perhaps because little from such a weapon would survive archaeologically without the antler or bone laths of composite bows. Pre-Roman archery in north-western Europe presumably involved use of self-bows but the more effective composite construction was clearly dominant within the army. However, details of the numerous pine or ash arrows from Nydam are of direct interest. Tanged or socketed heads were attached to the shaftment using birch tar. The area to be fletched was covered in tar then the fletchings were pressed on and held in place by spiral sinew whipping. The latter and the (lost) fletchings left impressions in the tar, possibly representing a temperate European construction tradition, different from the Asiatic method seen at Dura and further east.²⁰

Arrowheads from Gundremmingen and Gornea are socketed with flat, narrow triangular blades. Some 800 flat, tanged, triangular heads were found in the *principia* at Housesteads, where they were being manufactured and stored. They date to the abandonment of the fort in the late 4th or early 5th century. Tanged, lobate forms continued in use by Roman and nomad archers. One was found lodged in a man's spine in the 4th-century cemetery at Klosterneuberg. It is not clear when the 'hour-glass' steppe form of quiver came into Roman use, but it was possibly derived from the Huns during the 4th century, if not later from the Avars.²¹

A group of lead sling-bullets apparently came from a 4th-century context at Vindolanda. Some 6000 baked clay and c.300 stone sling-bullets remained in the legionary *principia* at Lambaesis after Tetrarchic abandonment. Otherwise finds of late Roman sling-missiles are rare. Vegetius advocated the use of the sling and staff-sling (*fundibulus*), a sling on the end of a wooden stave measuring 4 Rft (1.18 m), within legionary formations. Slingers were present in the eastern battles described by Ammianus and Julian, and one specialist unit of *funditores* is recorded in the eastern *Notitia*. Their missiles would have been especially effective against Persian heavy armour and elephants.²²

Artillery (Fig. 132)

Fittings from artillery-pieces found at Orşova and Gornea date to site abandonments in the late 4th century. At Orşova a field frame (*kambestrian*; Ht. 360 mm) and an arched strut (*kamerion*; L. 1.45 m) were located in a corner-tower. They belonged to a small bolt-shooting *ballista* of the type represented on Trajan's Column. At Gornea three *kambestria* (Ht. 133, 144, 147 mm) were found in two corner-towers. These were from smaller weapons corresponding to the *cheiroballistra* described and illustrated by Heron and the 'manuballista' of Vegetius. Like Heron's belly-bow (*gastraphetes*), the *cheiroballistra* was cocked by pushing down with the stomach on a curving butt, forcing back the slider and string. The *gastraphetes* and, presumably, Vegetius' *arcuballista* were composite crossbows, whilst the Gornea weapons and his *manuballista* were torsion crossbows. Orşova-type *ballistae* were mounted on carts (*carroballistae*) for use in battle, or on walls, as in the eastern sieges described by Ammianus, and shot with great accuracy and penetrative effect. Bolt-heads did not change from earlier periods. Ammianus

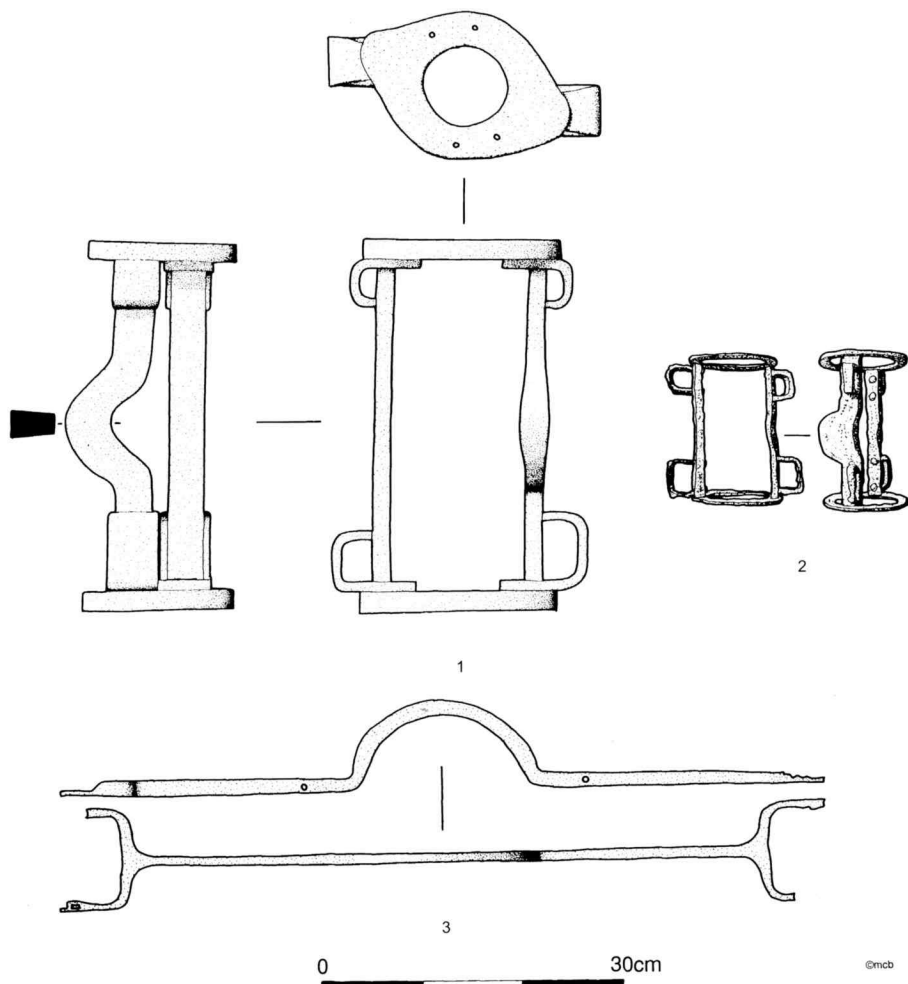


Figure 132: Dominate artillery fittings. 1–2 Kambestria (1 Gornea; 2 Orşova); 3 arched strut (Orşova).

and Procopius referred to bolts with wooden flights, and Ammianus also described incendiary bolts similar to the Dura example.²³

The main stone-throwing engine according to Vegetius and Ammianus was the *onager*, sometimes referred to confusingly as a '*scorpio*'. This was a weapon for siege-warfare, not open battle, which lobbed its missile with a vertical arm action like the staff-sling.²⁴

Marsden suggested that the integral legionary artillery enumerated by Vegetius was formed into the separate units of *ballistarii* listed in the *Notitia*. Units of *ballistarii* are also attested in Danubian bridgehead forts where the considerable range of crossbows and artillery could have been employed advantageously. *Ballistarii* force-marched with Julian in Gaul, perhaps implying mobility and lightness of weapons. How late these

forms of sinew-powered torsion artillery continued in use beyond the 5th century is a matter of some discussion.²⁵

Armour

Body armour (Fig. 133 and Pl. 6b)

Fourth century copper-alloy scales have been found at Trier, as has part of a *lorica hamata* placed inside parts of a Late Roman helmet bowl and neck-guard. Large pieces of mail have also been recovered from Weiler-la-Tour and Independența, both dating to the late 4th or early 5th century. Monuments of the Tetrarchy, Constantine and the House of Theodosius show mainly unarmoured soldiers, or men in scale. Muscled cuirasses followed archaizing styles rather than reflecting contemporary equipment.²⁶

The sculptural record has traditionally been interpreted as evidence for the disuse of metallic armour, especially by infantry. This appears to be supported by Vegetius' assertion that helmets and armour were rarely worn by infantry from the time of Gratianus (AD 367–83). However, the sculptures cannot safely be interpreted in this way, and it is possible that Vegetius was writing about eastern forces in the aftermath of the Hadrianopolis disaster (AD 378). His remarks cannot be extended to the whole Empire for the entire late Roman period, as some scholars have done.²⁷

Other artworks do depict armour. A fragmentary Tetrarchic(?) relief in the Vatican Museo Chiaramonti shows two soldiers wearing long-sleeved mail and scale cuirasses. An Egyptian wood sculpture of the 4th–6th(?) century depicts a battle around a town, with Roman infantry clad in mail or scale cuirasses. A painting of a standing soldier in the Via Latina Catacomb, Rome, depicts a mail shirt extending to wrists and knees. Metallic coifs illustrated in the *Vergilius Vaticanus* have already been mentioned (see Chapter 7), and illuminations in the *Notitia Dignitatum* and the anonymous *De Rebus Bellicis* depict helmets, cuirasses and segmental metal limb-defences. In the latter manuscript there is a rare reference to a padded garment ('*thoracomachus*') of a type which would have been worn under mail in all periods.²⁸

This pictorial evidence is still unsatisfactorily sparse and some of it may be relevant to cavalry as well as to infantry. Epigraphic and literary evidence indicate important reliance on especially heavily-armoured cavalry. The terms '*catafractarii*' and '*clibanarii*' used for these troops were employed interchangeably. Predictably, they were more numerous in the East than in the West.²⁹

Vegetius advocated heavy armour, including greaves, for the front ranks of his legionary infantry formation, and this is consistent with Ammianus' references to infantry helmets and body armour, and with known 6th-century and later practice. In the late 3rd to early 5th centuries the tactical climate continued to demand that close-order Roman infantry wear armour.³⁰

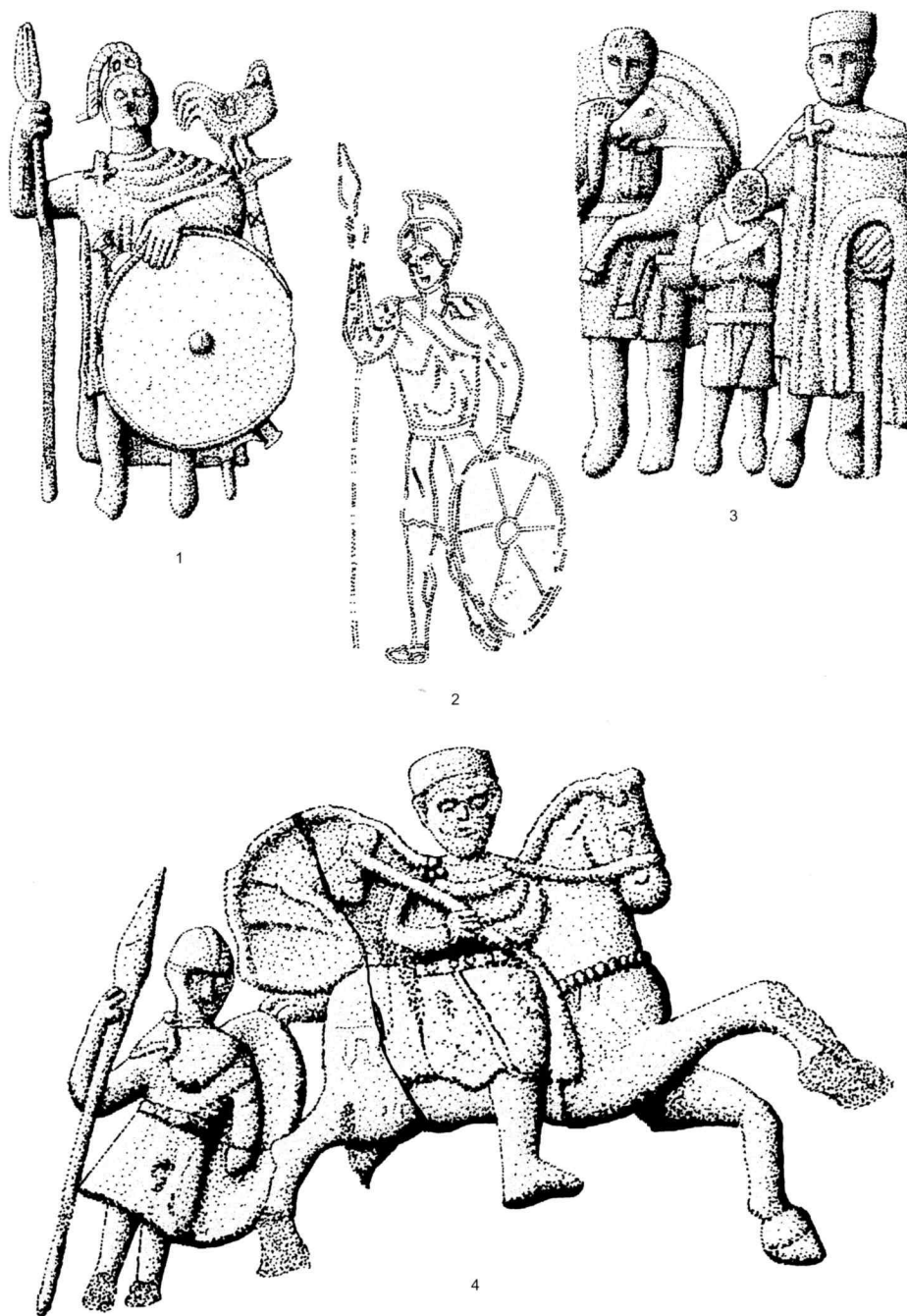


Figure 133: Dominate tombstones. 1 Lepontius (Strasbourg); 2 unknown protector (Aquileia); 3 Flavius Augustalis, legio XI Claudia (Aquileia); 4 unknown (Gamzigrad). (Not to scale)

Helmets (Figs. 134–6 and Pl. 6c)

The helmet forms represented by the Heddernheim and Buch finds went out of use in the latter half of the 3rd century, seemingly bringing to a comparatively abrupt end to the tradition of fashioning helmet-bowl and neckguard in one piece. The most simple form of the 'Ridge' helmets that replaced them is represented by some 15–20 iron examples found in a store-building at Intercisa. The four which have been restored each had a bowl made of two pieces, plus the ridged strip. There were no further metal fittings such as hinges, carrying-handle or peak. Cheek-pieces and neck-guard (W. 93–125 mm) were not directly attached to the bowl, but had holes around their edges for stitching to a leather or textile lining, itself stitched to the bowl-rim. Cuttings in the sides of each bowl and in the tops of the cheek-pieces indicate that the latter were worn over, not in front of, the ears.³¹

Helmets from Augst and Worms were also of the 'Intercisa' type. The Worms example had cheek-pieces with ear-cuttings, but had an additional metal strip riveted all around the outside of the bowl-rim. Slots in the neck-guard suggest attachment to the bowl by means of a pair of straps. Similar slots also occurred on a neck-guard from Carnuntum.³²

The traces of silver on and around the rivets of Worms and Intercisa examples, suggest that the iron components may have been concealed beneath a decorated silver sheathing like that on two bipartite bowls from Augsburg-Pfersee.³³

Two helmets from Berkasovo represent a more complex constructional form. In each case the gilded silver sheathing survived to reproduce the structure of the lost iron helmet beneath. Helmet No. 2 had a two-part bowl, whilst No. 1 was divided up into four quarters. Each bowl had an additional band riveted around the inside of the rim. This band curved over each eye and a 'T'-shaped nasal plate was riveted to the front for additional protection. The cheek-pieces were a completely different shape from those on 'Intercisa' helmets. Each one covered almost the whole side of the wearer's head and neck (W. 160mm), coming right forward to the cheek-bone and extending back almost to touch the narrow neckguard (W. 150 mm). Additional metal bands, decorated with inscribed *ansae*, were riveted to the sides of the rim-band to mask the joints between rim and cheek-pieces. Each neck-guard exhibited a pair of buckles for strap attachment to the inside rear of the bowl. Rim-band, cheek-pieces and neck-guard have rows of stitch-holes along their edges. One of two reconstructable iron helmets from Iatrus was similarly constructed with a surviving neck-guard, two parts to the bowl and a 'Berkasovo' cheek-piece. It was sheathed in gilded copper.³⁴

Four-piece bowls also occurred at Burgh Castle and Concești. The former example survived as an undecorated iron bowl with an axial ridge-band. Each half consisted of two non-touching plates riveted together by a wide, tapering band. The same arrangement on the Concești helmet was accomplished in silver with the addition of a riveted rim-band and 'Berkasovo'-type cheek-pieces. A gilded silver helmet sheath from Deurne had a four-piece bowl, but the connecting bands were so wide that it may be said to have six segments. The rim-band curved over the eyes and had a riveted nasal-piece. The cheek-pieces and buckled neck-guard had stitch-holes around their edges.³⁵

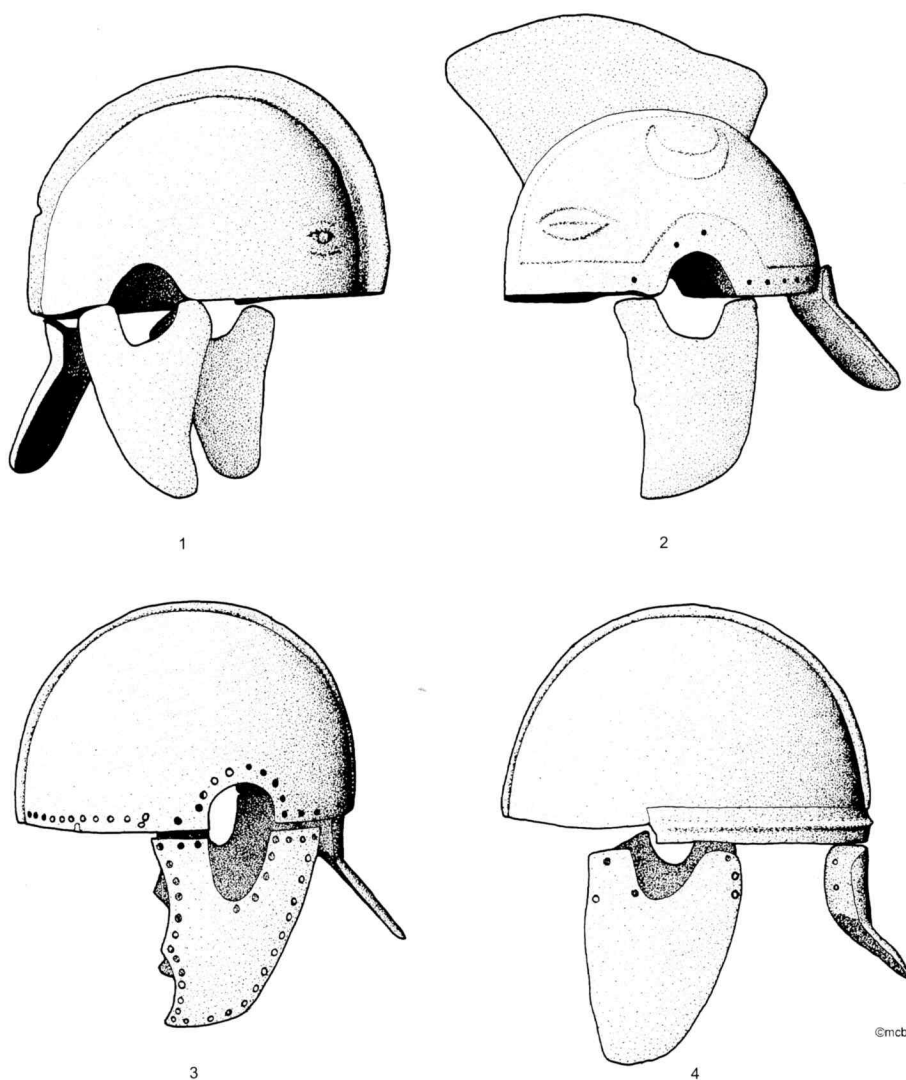


Figure 134: *Dominate* helmets. 1–2 *Intercisa*; 3 *Augst*; 4 *Worms*. (Not to scale.)

A helmet recently discovered at Independența is apparently similar to the Concești find. Isolated finds of cheek-pieces and neck-guards all had stitch-hole edging. A 2nd-century copper-alloy 'Imperial'-series helmet, now at Florence, has had its neck-guard cut away and the resulting horizontal rim pierced with a series of holes. This suggests continuous use for at least a century, possibly much longer.³⁶

With few exceptions, 'Ridge' helmets were highly decorated. Even the *Intercisa* bowls, without sheathings, all had decorative motifs chiselled or embossed on their bowls (one had crosses, another crescents, and all had a pair of lentoid 'eyes' at the front). Other sheathings had decorative domed or spherical rivet-heads and all shared

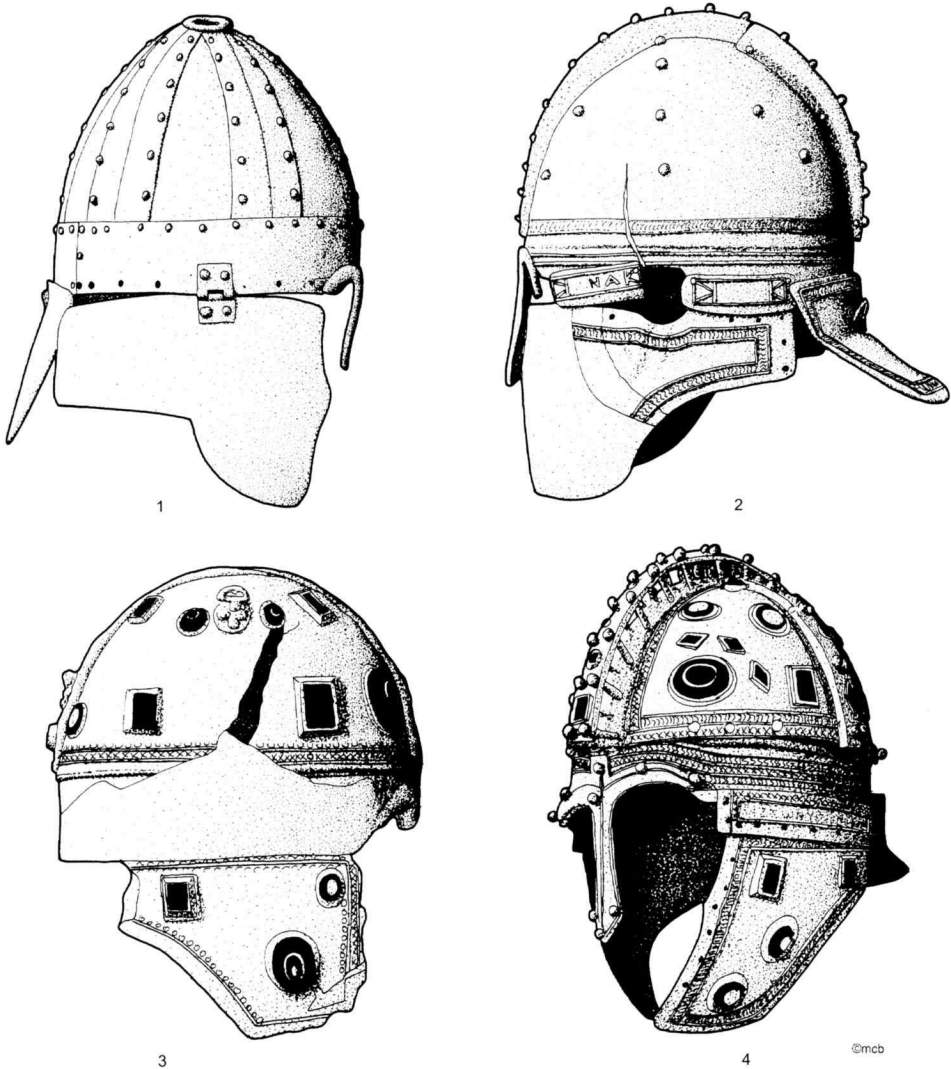


Figure 135: Dominate helmets. 1 Dar al-Madinah; 2 Berkasovo 2; 3 Budapest; 4 Berkasovo 1. (Not to scale.)

in a common repertoire of circle, 'S'-shaped *strigil*, crescent, cross and dot motifs embossed in rows. The Deurne helmet had an embossed anchor on each of its six segments.

A gilded, silver-sheathed iron 'Berkasovo'-type helmet with a two-part bowl from Budapest had its rim-band embossed with *cantherus*, lion, Victoria and Jupiter figures. Like Berkasovo 1, it had glass-paste settings imitating onyx, chalcedony and emerald. They were positioned along the ridge, on the bowl, and cheek-pieces, and both helmets had large settings forming 'eyes' at the front.³⁷



Figure 136: Coin of Constantine showing stylised Berkasovo-type helmet.

Berkasovo 1 had high-profile side-to-side bowl-bands delineating its four-part construction, but the main ridge axis was maintained by the attachment of a second ridge-band standing up on long-shafted rivets forming a crest. Ridge, crest, side-bands and rim-band bristled with paired globular rivet-heads. The Augst helmet had three axial slots on its ridge strip, presumably for the attachment of a crest. The crescent-decorated Intercisa helmet had a solid iron crest on its ridge.

The dating of 'Ridge' helmets depends on only a few examples. The Intercisa helmets were most likely deposited in the late 4th or early 5th century. An inscription on Berkasovo 2 has been tentatively restored as [*Lic*]INIANA, in reference to the emperor Licinius, dating the helmet to the period AD 314–25. Figures on the Budapest helmet are closely paralleled by ingot-stamps of AD 367–75, whilst the Concești helmet was found in an early 5th-century Hunnic grave. A two-part iron helmet from a grave at Al-Haditha in Jordan was found in association with ceramics dating to *c.* AD 350–420, and the Iatrus helmets were recovered from a late 4th to early 5th century context. More conclusive is the hoard of 39 coins accompanying the Deurne helmet and containing nine pieces of AD 315–17, and 30 of AD 319.³⁸

Crestless 'Ridge' helmets are depicted on a Tetrarchic gravestone from Gamzigrad and on heads broken off 4th-century porphyry sarcophagi. Fourth- to 6th-century coin portraits represent emperors wearing crested four-part 'Ridge' helmets with jewel decoration. Constantine I and Valentinian I certainly owned jewel-encrusted gold helmets, as would, presumably, all Dominate emperors. A coin of Constantine I exactly reproduces the riveted ridge and metal crest-band of Berkasovo 1. Ammianus described Valentinian's helmet as decorated with gold and precious stones when it was lost in a marsh with his *primicerius*. 'Ridge' helmets with frontal 'eyes' are seen on a funerary panel from Aquileia (AD 352), and on a 4th-century fresco in the Villa Maria catacomb at Syracuse, painted yellow to suggest copper alloy or gilding. The general shape of crested 'Intercisa' helmets is shown on the Via Latina soldier fresco and on a Valentinianic silver dish at Geneva.³⁹

Crest representations correspond with the solid iron Intercisa example and, presumably, with the crest originally attached to the Augst helmet, and Ammianus mentioned *cristae* in the second half of the 4th century. Helmets with small pairs of horns attached to the front of the bowl on the Arch of Constantine may allude to the *Cornuti*, a regiment raised by Constantine. Medallions of Constantine I have been interpreted as showing a Christian monogram (*chi-rho*) as a badge attached to the emperor's helmet in front of the crest. Alone, this is not altogether convincing, despite ancient literary support, but it has led to a class of gilded copper-alloy artefact bearing a *chi-rho* in a circle to be classed as a helmet label, attached to the front of a solid crest by a loop or a rivet. Direct and incontrovertible evidence for the adornment of 'Ridge' helmets with the monogram is provided by a find made at Alsóhetény in Hungary. Two folded packages of gilded silver sheet were concealed in a fort wall, together making up the incomplete sheathing components from two, perhaps more, helmets. One helmet was quite simply decorated, whilst another sheathing was originally attached to its underlying iron structure with silver, globe-headed rivets. Both were two-part 'Ridge' helmets and the context of the packages dates their concealment to after c. AD 375–80. A simple *chi-rho*, not in a circle, was embossed on the one almost complete 'T' nasal sheathing present, positioned on the vertical bar, level with the wearer's eyes.⁴⁰

Discussion about the origins, decoration and development of 'Ridge' helmets has been dominated by attempts to relate them to early medieval segmental helmets (*Spangenhelme*) of the 'Baldenheim' type. However, there was no straightforward progression in 'Ridge' helmets from simple two-part construction to four- or six-piece precursors of the *Spangenhelme*. The latter had cheek-pieces and neck-guard attached to a lining, not directly to the bowl, but they did not have an axial ridge.⁴¹

The decoration of helmet sheaths is largely Late Roman in style with two exceptions. It is significant that the only two examples which incorporated paste settings were found on the Danube front. These settings may be linked stylistically to actual semi-precious stone ornament on Sarmatian metalwork. There is direct evidence for gem-settings 'eyes' on Sarmatian helmets, but its further appearance on Roman shield-bosses (see below), a class of artefact alien to contemporary steppe nomads, suggests that here was another example of a barbarian trait being transferred into a Roman cultural context.⁴²

However, comparison of 'Ridge' helmets with Mesopotamian-Iranian helmet traditions is more productive. A true 'Ridge' helmet, with a 'T' nasal and mail aventail, was found in the mine by Dura Tower 19 and it probably belonged to a Sassanid Persian. It provides a chronological link between Parthian bowls and 'Ridge' helmet representations on Arsacid coins on one hand, and 4th-century Roman helmets on the other. James convincingly suggested that a technically undemanding oriental 'Ridge' helmet model was adopted by Roman armourers faced with supplying a greatly expanded Diocletianic army.⁴³

The intrinsic value of the helmets led to some surviving as bullion hoards; the Berkasovo find included silver belt-fittings. In contrast, the Intercisa helmets survived through site abandonment, probably because they had been stored for scrap after having had their silver sheathings removed. 'Ridge' helmets have been termed '*Gardehelme*', but silver-sheathed helmets may have been widely worn by field-army

soldiers, and given to individuals as a form of pay or reward, the decoration merely enriching a practical battle helmet. The Deurne helmet was inscribed STABLESIA VI, so the owner belonged to a cavalry unit of *equites Stablesiani*. Thus, helmets of the 'Berkasovo' type may have been designed for cavalry, with 'Intercisa' helmets being used by infantry.⁴⁴

Two undated helmets from Egypt do not come within the 'Ridge' classification. One, now at Leiden, had four plates joined together by four broad strips. The second is from Dar al-Madinah and had six plates. Both bowls were conical and had a circular plate riveted to the apex over the junction of the bowl strips. A broad band riveted over the rim had a line of stitch-holes near its bottom edge. A pair of narrow cheek-pieces with stitch-holes was hinged to the rim of the Leiden helmet, whilst 'Berkasovo' cheek-pieces (W. 192 mm) without holes were hinged to the Dar al-Madinah rim. The latter curved over the eyes and had a 'T'-shaped nasal-protector. A hinged neck-guard (W. 148 mm) was riveted to the back. Both helmets may be classed as *Spangenhelme*.⁴⁵

Banded segmental bowls were first represented near the Roman frontiers on 1st-century AD Crimean frescoes. On Trajan's Column they occur amongst captured barbarian equipment with the nasals or pointed rims seen on 3rd-century Roman helmets. Cavalry on the Arch of Galerius are the first Roman troops to be shown wearing *Spangenhelme*, and one appears on a porphyry sarcophagus head.⁴⁶

Spangenhelme represent a constructional tradition parallel to 'Ridge' helmets, perhaps being adopted by Roman troops under trans-Danubian barbarian influence. The Egyptian artefacts have been dated to the 5th or 6th centuries AD to form a typological link between 'Ridge' and 'Baldenheim' helmets. However, their hinges link them with earlier techniques, and they may be Tetrarchic, bridging the gap between 2nd-century *Spangenhelme* depictions and early medieval artefacts. A *Spangenhelm* from Herakleia Lynkestis in Macedonia has holes around its rim and cheek-pieces for lacing to a leather or fabric backing. Its decoration marks it as a helmet of Roman manufacture, and may be related to numismatic designs and Christian iconography to suggest a date as late as the 520s. Thus it would appear that the 'Baldenheim' type of helmet, contemporaneously common in the barbarian successor kingdoms of the west, also continued in eastern Roman use in the Balkans and North Africa. This helmet form – with a mail or scale aventail, or worn over a mail coif, but without the cheek-pieces – persisted in mainstream European use until at least the 12th century. Similar helmets bearing 5th- and 6th-century decoration were used within the Sassanid empire, and contributed to a continuous tradition of conical cavalry helmets in use across Africa, the Levant, Persia and India up to the 19th century.⁴⁷

Taking the surviving Roman artefactual evidence at face value, it would appear that *Spangenhelme* were the exclusive design of the future, and that 'Ridge' helmets did not outlast the early 5th century. On the contrary, it may confidently be expected that more 'Ridge' helmets will be found in future that may take the type forward within the Roman context. This is a safe assertion because 6th- to 8th-century helmets from Britain and Scandinavia were related to Roman 'Ridge' designs. The Sutton Hoo helmet had a fore-and-aft ridge, a nasal-guard and 'Berkasovo' cheek-pieces. Quite extraordinarily, it also had a one-piece bowl and a separate, broad-flaring neck-guard. It seems to have been old when deposited in the 7th century and may have been made in the first

or second half of the 6th century. Closely related in terms of ridge and 'T' nasal were the Scandinavian Vendel helmets. Examples from Vendel, Ulltuna and Vallsgårde in Sweden, and from York, date to the 7th century and extend into the 8th. They informed even helmet designs found alongside later *Spangenhelme* in Viking artefacts and iconography. Originally they derived their bowl features from Late Roman 'Ridge' helmets, combined with forms of neck and face protection from the *Spangenhelm* tradition. Interestingly, distributions of 'Baldenheim' *Spangenhelme* and Vendel 'Ridge' helmets hardly overlap on distribution maps. Thus it would appear that vagaries of survival have conspired to create a spatial and a temporal gap between Late Roman and Scandinavian developments.⁴⁸

The carriage and storage of helmets when they were not being worn may have differed from period to period. In 1st- to 2nd-century iconography, troops on the march are depicted with their helmets hanging down the front, slung around the neck or over the shoulder, peak downward, using the carrying-handle attached to the neck-flange. Late Roman helmets lacked the handle and the fixed neck-flange so were not suspended in this manner. However, quite extraordinarily, the Deurne helmet seems to have been found in a drawstring bag made of two sewn pieces of calfskin, 355 mm wide and 380 mm deep. The helmet could slip comfortably into the bag because the neck-guard could be unbuckled and folded inwards, something rather more awkward for 1st- to 3rd-century fixed-flange helmet designs. The Deurne bag is a representative of a class of leatherwork custom-designed to protect items from impact damage and dampness, well known for shields, but presumably also used for a wide range of other items, such as helmet-crests, sports armour, bows, artillery-pieces, standards and musical instruments.

Vegetius referred to the '*pilleus Pannonicus*', which may be identified with the round, flat-topped cap worn in Late Roman iconography by Tetrarchic emperors, by soldiers on the Arch of Constantine, and on 4th-century gravestones, sarcophagi, paintings and mosaics. It is always brown when depicted in colour, and on the arch it is clear that it was furry on the outside, rather like a Russian hat. Late helmets already had a leather or fabric lining to the cheek-pieces and neck-guard and the soft fur liner gave the bowl a firm and comfortable seating on the wearer's head. In some respects it was similar to the knitted helmet-liners worn under Second World War American helmets. Worn without the helmet it would have made a warm and waterproof hat as well as being an immediate visual indicator of military identity. One may originally have been present in the Deurne assemblage.⁴⁹

Shields

There are few 4th-century shield-fittings from Roman sites, but grip bars have been found at Liberchies I and Taviers. Fragmentary bosses from Vindolanda and Gundremmingen, for example, had circular flanges. Domed bosses continued to be used in Free Germany alongside pointed, conical bosses, like that which occurred in a grave at Misery (Dia. 150 mm). Made of silvered iron, it had four rivets for attachment to the shield-board, and an imperial(?) figure stamped on the flange with the inscription MAR(*tenses seniores?*), clearly identifying it as Roman. Another example from

Vermand (Dia. 200 mm) had a gilded silver sheath and stone settings in the style of helmets (see above, p.212). Both may have belonged to members of field-army units. A pointed boss is depicted on the Stilicho diptych at Monza.⁵⁰

Other troops on the Arch of Constantine, on catacomb frescoes and on gravestones bear oval shields of size and proportions comparable to 3rd-century use. Imperial bodyguards carry very large, broad oval shields. Circular boards are depicted with cavalry and infantry on the Arches of Galerius and Constantine, on Theodosian monuments, and on funerary *stelae*, perhaps signifying the adoption of the circular German shield-form.⁵¹

Circular boards found at Nydam were of vertical plank construction, 0.8–0.9 m. in diameter, covered in painted leather and edge-bound with stitched rawhide. The majority used alder, but spruce, aspen, lime and oak were also employed. Not only was the construction similar to Dura oval shields, but so was the shape of the double cut-out for the central handgrip. The back of one Nydam shield was painted grey with a red area around the centre and concentric geometric motifs. Painting helped to waterproof the shield, thus lessening water absorption and protecting the integrity of the glue between the planks. Rawhide edging shrank as it dried to improve structural cohesion. It also prevented downward cuts from exploiting the vertical plank-joints or wood-grain, whilst being lighter than the copper-alloy bindings of 1st- to 2nd-century shields. Ammianus related how a shield used by the emperor Julian at exercise shivered apart leaving him holding the grip and boss alone.⁵²

Eagle and Hercules blazons (and one lion) on the Arch of Galerius may identify guard units accompanying Diocletianus Iovius and Maximinus Herculius, or may merely be Tetrarchic propaganda symbolism. Confronting wolf- or goat-heads are seen on the Valentinianic Geneva dish (see Fig. 8) and on a pedestal relief of the Arch of Constantine. The goat-blazons may identify the *Cornuti*. Moreover, Ammianus stated that barbarians recognised units by their blazons (*insignia*) before the Battle of Argentorate (Strasbourg).⁵³

Some pieces of leather from Egypt have been convincingly identified as shield facings with painted blazons. One depicts Romans and North African natives in combat. Another is richly decorated in purely geometric fashion. A third depicts a hunting scene and a full-length soldier (or emperor, or Mars?) below the boss wearing a white tunic and a brown cloak, fastened with a prominent 4th-century crossbow brooch. He holds a spear and rests on a shield, which in turn bears a running lion blazon. All these elements are very reminiscent of 3rd-century shields from Dura-Europos, particularly the *Amazonomachia* and Mars oval shields, and the lion blazon on a rectangular shield. The 'soldier' blazon also brings to mind the Minerva figure on a Hadrianic Bonn shield-cover (see Chapters 3 and 5).⁵⁴

Considerable evidence for 4th-century shield-blazons is provided by the *Notitia Dignitatum* manuscript illuminations (a shield for each regiment). These have been viewed as an invaluable guide to unit emblems, and the types of blazons (Pl. 6a) with imperial busts, Victories, totemic animals, confronting animal-heads and geometric shapes certainly find late parallels, and positive identifications have been attempted based on other corroborative sources.⁵⁵

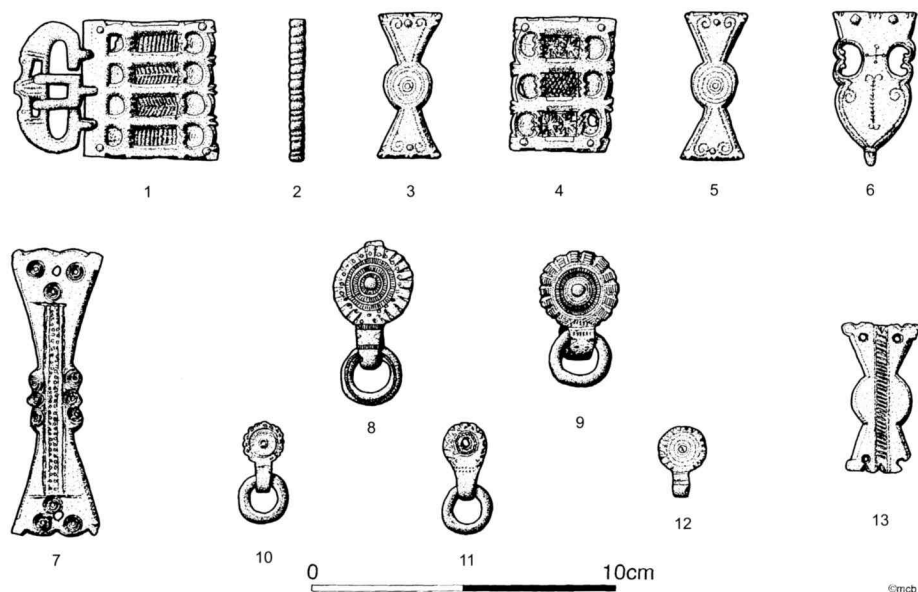


Figure 137: Dominate belt-fittings. 1–6 Zenkövarkony (1 buckle and plate; 2 stiffener; 3, 5 propeller-stiffeners; 4 plate; 6 strap terminal); 7, 13 propeller-stiffeners (7 Neuss; 13 Richborough); 8–12 rings (8–9 Vermand; 10–12 Richborough).

Unfortunately for this neat picture, Grigg's detailed analysis of the *Notitia* manuscripts concluded that the original scribe/illustrator mixed known badges with reasonable suppositions based on unit titles, and pure invention. As he progressed, his inventiveness declined and blazons became increasingly stereotyped and plain. It is revealing that the Christian *chi-rho* motifs seen on Theodosian and later monuments are relatively rare in the *Notitia*. The manuscript included many plain or simple geometric designs and when these correlate with other sources to seemingly identify a specific regiment this may be simple coincidence. In any case, the original document from which the surviving copies were derived may itself have been a copy of an official, working text, which was only subsequently and imaginatively illustrated as a deluxe presentation version.⁵⁶

Other Equipment

Belts (Figs. 137–42)

Funerary contexts provide most evidence for belt-types, but they have serious limitations. Few graves are numismatically dated, the remainder depend upon even less secure means. Moreover, the geographical spread of fitting-types reflects the distribution of burial practices, not necessarily the whole area of artefact-use. Thus the evidence is biased towards southern Britain, northern France, the Rhineland and the

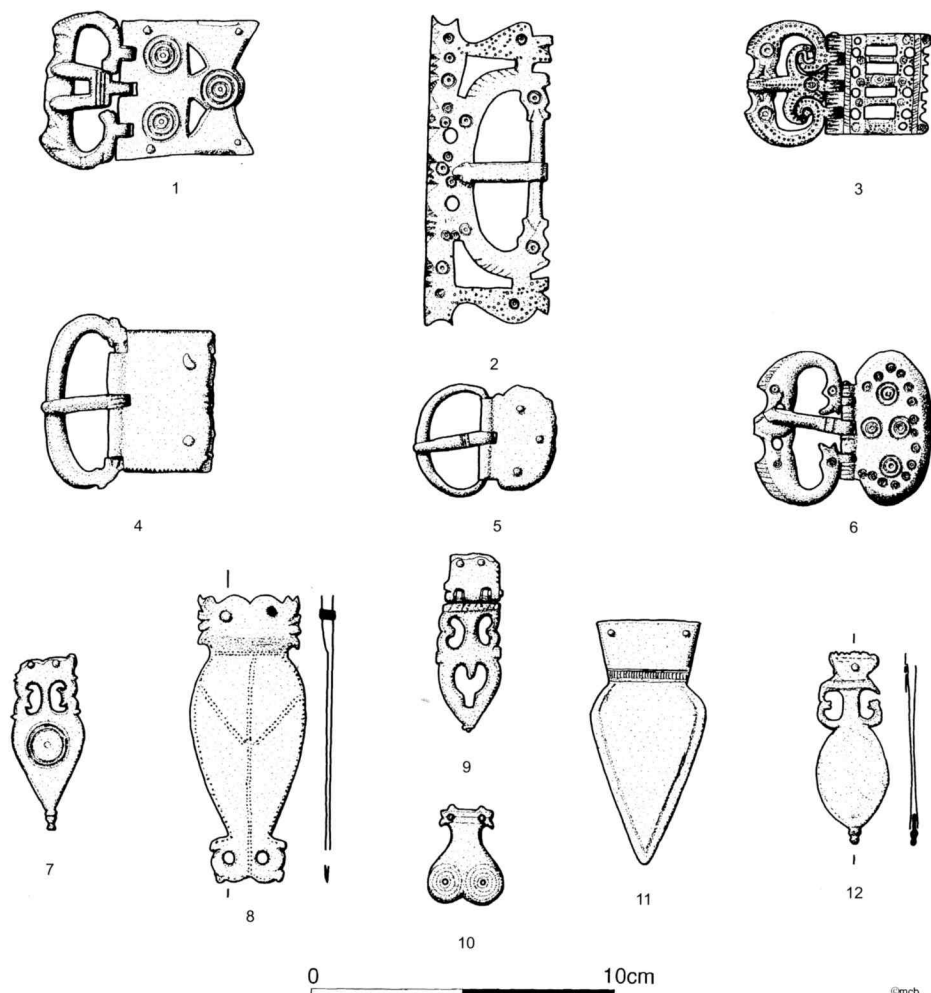


Figure 137: Dominate buckles (1–6) and strap-ends (7–12). 1 Niederbreisig; 2 Catterick; 3 Colchester; 4–6, 12 Winchester; 7 Aquileia; 8 Winchester; 9 Ságvár; 10–11 Carnuntum.

Upper Danube. Considerably less is known about 4th-century belts used in other regions, although slowly but surely, the wider picture is being revealed with new finds made in Rome, Northern Italy, Southern France, Spain, North Africa and along the Lower Danube.⁵⁷

Broad belts continued to be worn throughout the period and belt-stiffening appliqué continue to be depicted. Ring-buckles do not appear in Tetrarchic representational sources, although some individual items of 3rd-century equipment had a residual life. Varying widths of belt were worn (W. 21–83 mm), fastened by many loop- or tongue-buckle types with lancet, amphora and circular-shaped strap-ends. The motto *VTERE FELIX* was occasionally inscribed on buckle-plates, but not applied as separately cast letters.⁵⁸



Figure 138: Piazza Armerina 'Great Hunt' mosaic figures.

The 4th-century military 'propeller' belt-stiffener had a central roundel and two opposing triangular projections (L. 22–37; 40–56 mm). These first appear decorating a woman's belt on a 2nd-century gravestone from Intercisa, suggesting a Danubian origin, and are next seen in military use on the Arch of Constantine and on the Piazza Armerina animal-gathering mosaic.

Full sets of up to ten propeller-stiffeners occur in graves: odd propellers are common site-finds along the northern frontiers, and two silver examples were found with the Berkasovo helmets. Sometimes propellers alternated with circular appliques, as at Pécs and Köln. Propellers are found with a variety of buckle types. They were also cast with buckle-plates (W. c. 40–50 mm) found on Rhenish and Danubian sites, but not so far in Britain. Propeller-stiffeners continued to be used into the early 5th century, increasing in length up to 105 mm to accommodate broader belt fashions.⁵⁹

Another type of buckle associated with propeller-stiffeners had a rectangular openwork frame-plate (W. 38–66 mm) with a hinged tongue-and-buckle-loop. Finds from Britain, the Rhineland and northern France had loops which were curved and plain, or curved with confronting, head-to-head dolphin decoration. In the Danubian region the loops were normally rectangular. The same distribution of loop-types applies for propeller-buckles.⁶⁰

During the second half of the 4th century, very broad, highly-decorated belts were worn (W. 50–100 mm), with rectangular and pentagonal copper-alloy plates on both

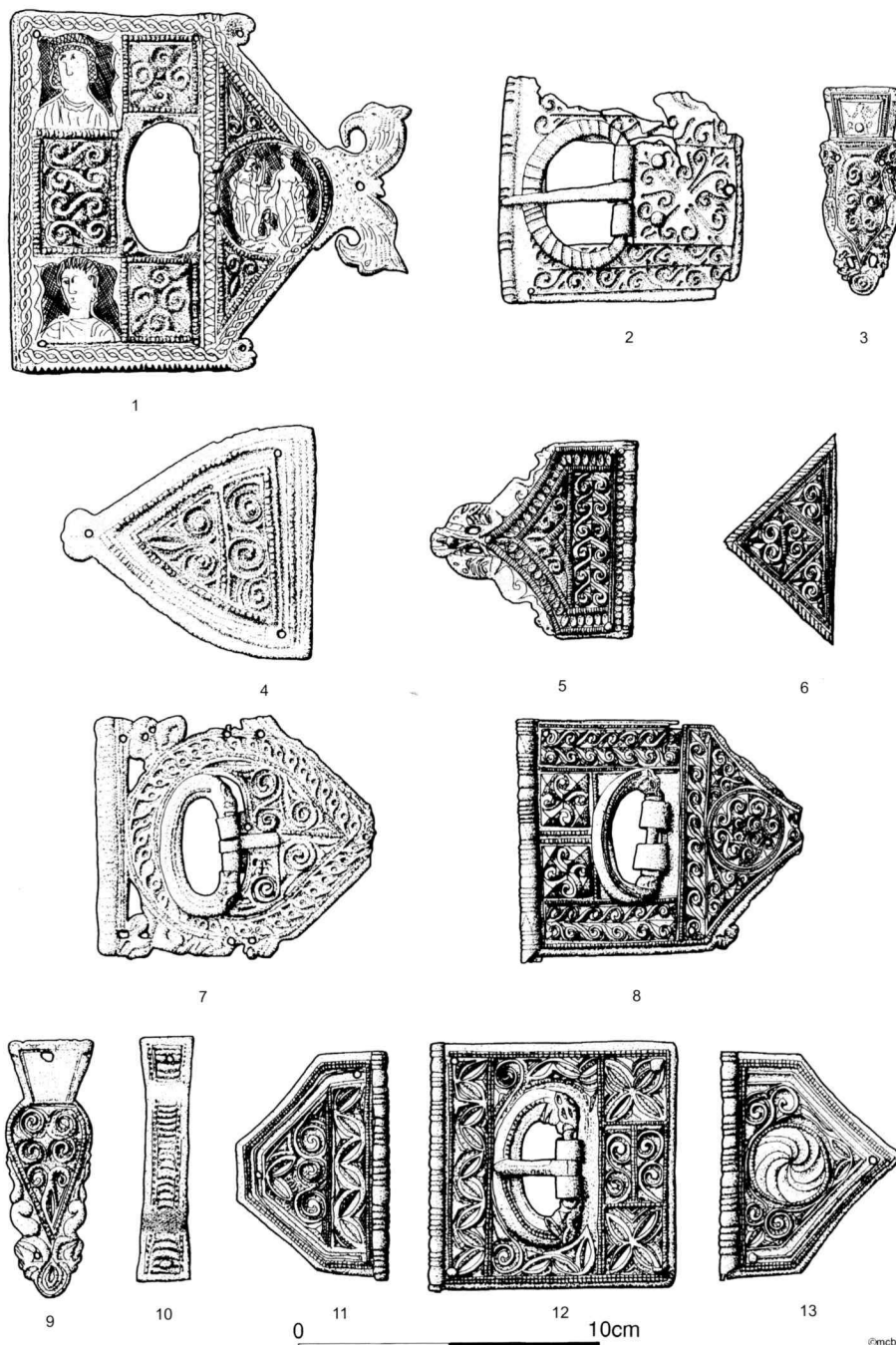


Figure 139: Dominate chip-carved fittings. 1–2 Buckle-plates (1 'Italy'; 2 Lambaesis); 3 strap terminal (Trier); 4–6 belt mounts (4 Alzey; 5 Orşova; 6 Carnuntum); 7–8 buckle-plates (7 Alzey; 8 Bad Kreuznach); 9–14 set of fittings (Oudenburg).

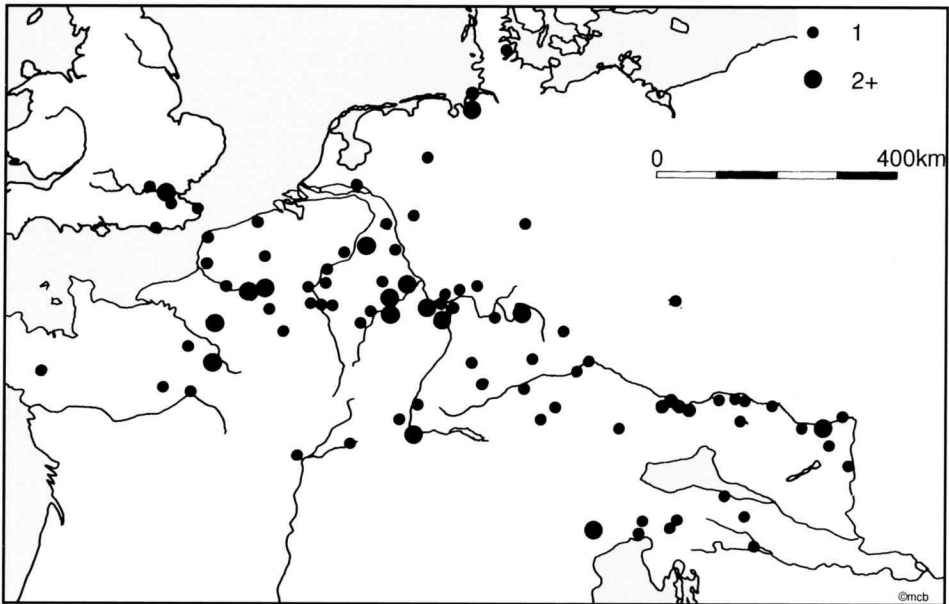


Figure 140: Distribution map of chip-carved fittings (after Sommer 1984; Böhme 1986).

ends, some of which had tubular edging. The latter were fastened by a narrow strap attached behind one plate and running through a buckle on the other. The buckle-loop had ornamental dolphins facing towards the hinge, not head-to-head. Various-shaped additional plates stiffened and decorated the body of the belt, some also having tubular edging. All the plates and the strap-end were covered with 'chip-carved' geometric decoration. An undisturbed full set came from a grave at Oudenburg, for example, and another was recently found in London. Odd pieces occurred on fort sites such as Alzey, Carnuntum and Lambaesis. They are mainly distributed in south-east England, across northern France, along the Rhine and Upper Danube, in north-eastern Italy and northern former Yugoslavia, but with odd finds from Spain and North Africa. Comparatively few occur beyond the Roman frontiers.⁶¹

A less ornate wide belt-type, up to 140 mm wide, and lacking the large chip-carved plates, is represented by relatively undisturbed grave finds from Winchester, Oudenburg and Galdenberg bei Cuxhaven. Some belts had long, narrow stiffeners vertically applied around the wearer's waist. The belt-ends butted together with narrow tubular-edged plates. A narrow strap bearing a dolphin-loop buckle with a small plate was stitched or riveted to the face of the belt near one end, whilst a second narrow strap was attached to the other end. After the latter was locked by the buckle it passed through a vertical slide, before hanging down loosely with a tongue, lancet or circular terminal. Some belts had rings attached to their lower edges by rivets with small circular, rosette plates. These fittings occur in southern England, and across northern France to north-western Germany beyond the frontier. Most scholars date them to the second half of the 4th and first two decades of the 5th centuries, contemporary with the large chip-carved plate belts. Böhme ascribed them to the first half of the 5th century.⁶²

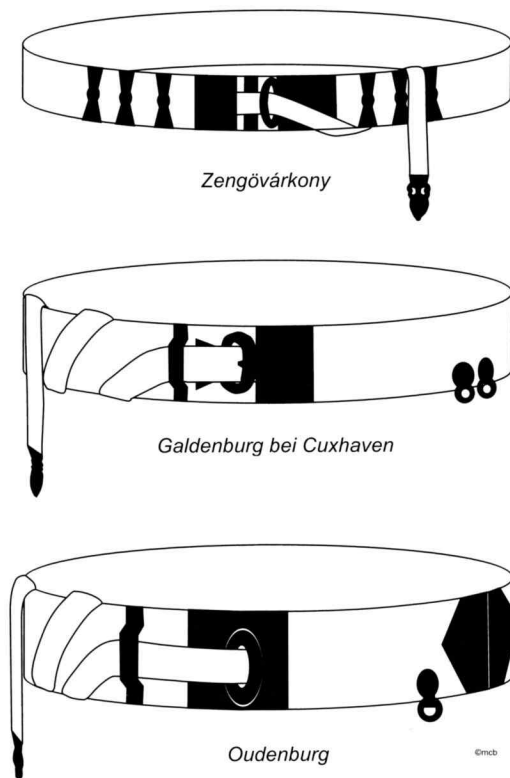


Figure 141: Dominate belt reconstructions (Not to scale.)

Bullinger interpreted the rings-with-rosettes on belt edges as attachment-points for a narrow shoulder-belt. However, the waist-belt was probably not weighed down by a sword on one side, so shoulder-support was unnecessary. These rings were more likely for the attachment of a knife, pouch or utensils. A similar provision may be observed below some 'E' letters on 3rd-century VTERE FELIX belts.⁶³

Buckles on a propeller-belt in Zengővárkony Grave 10, and a belt with narrow stiffeners in the Winchester Lankhills Grave 376, were both worn with the buckle-tongue pointing to the wearer's right and the narrow strap passing through from right to left. A porphyry imperial statue at Vienna shows the same alignment, but the buckle is positioned on the wearer's right hip. However, belts in the Piazza Armerina mosaics clearly have a strap-end tucked up on the right hip of the wearer, suggesting both a buckle-tongue pointing to the left, and a very long strap. Likewise a porphyry statue at Ravenna has a long strap wrapped twice around the belt before hanging down at the right hip and ending in a hinged terminal. It would thus appear that 4th-century belts were worn with the buckle facing in either direction and positioned on the stomach or hip.⁶⁴

Scholars have associated chip-carving with the recruitment of Germans into Roman armies. However, some plates incorporate Classical motifs within the geometric scheme; chip-carved fittings are not usually found in the so-called *Laetengräber*; and

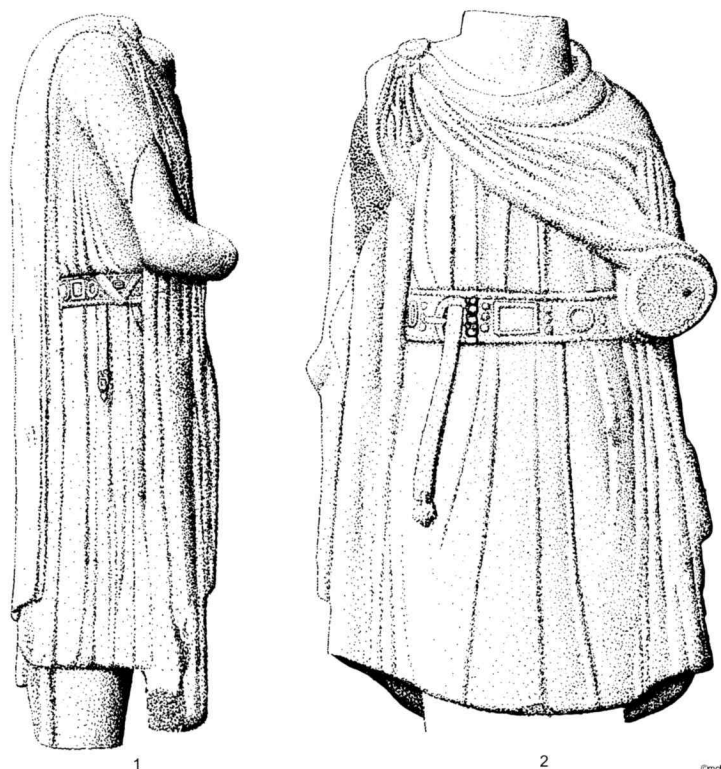


Figure 142: Belts on chlamys statues from Ravenna (1) and Vienna (2) (Not to scale).

few occur in Free Germany, suggesting development and use by regular Roman troops. These belts were worn by Roman soldiers, militarized late Roman government officials, and, doubtless, by Germans equipped by the regular army.⁶⁵

Clothing and Footwear (Fig. 143)

Long-sleeved tunics, tight trousers and *saga* continued to be worn. Wrap-around 'puttees', covering and protecting the bare leg from knee to ankle, were not worn by soldiers. They appear in Late Roman art, for example on the Piazza Armerina mosaics, to identify countrymen, hunters and peasants. Although crossbow brooches were used during the 3rd century, they are much more common in the artefactual and representational sources for the Dominate.⁶⁶

Exceptionally, the Syracuse catacomb fresco depicts a red tunic and there is some literary support for this. However, white tunics continue to be shown on the Luxor and Via Latina frescoes (Pl. 6b), and on the Piazza Armerina mosaics. They have the purple bands on cuffs, hem and chest which are seen on earlier garments, but exhibit additional large, patterned, purple roundels (*orbiculi*) on the shoulders and skirt. Both red and white tunics were mentioned in the *Historia Augusta*, details perhaps based on 4th-century clothing (see below, p.226). Cloaks (*saga*) are brown in artworks and also

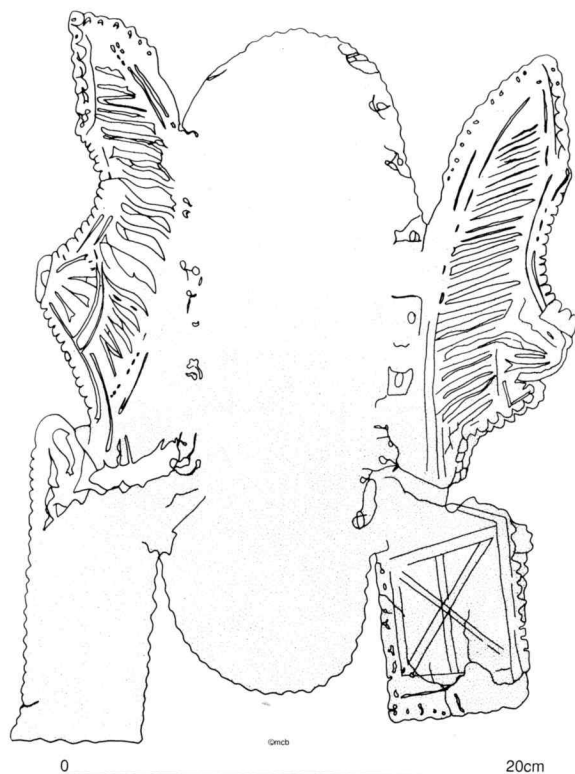


Figure 143: *Dominate footwear. Decorated shoe from Deurne.*

have large *orbiculi*, whilst trousers or tight hose with integral feet are usually dark in colour.⁶⁷

Contemporary bleached or natural wool tunics found in Egypt were woven in one piece from sleeve to sleeve, with a slit neck-opening, and sewn up the sides. Purple decoration was woven into the fabric, or tapestry panels were sewn on. 'Purple' shades vary from dark red and reddish-blue to brown; true purple obtained from *Murex* shell-fish was too costly for general use, indigo and madder or kermes dyes being substituted.⁶⁸

There is a striking similarity between tapestry-woven motifs and chip-carved metalwork, with the former perhaps directly influencing the latter in a deliberate matching of decoration on different items of dress.⁶⁹

A variety of open and closed shoes are depicted in paintings, mosaics and sculpture. It is likely that there were originally three pairs of open shoes found with the Deurne helmet. They were tied by integral thongs, fastened by studs, and of a type known as *campagi*. This form first appears in the 3rd century.⁷⁰

Other implements

Officers continued to be shown on gravestones, frescoes and mosaics carrying long, domed-headed staffs. Guardsmen escorting 4th-century emperors are shown wearing neck-*torques* with large central jewel-settings.⁷¹

Soldiers in transit, especially field-army units away from towns and in the field, would have required tents. In AD 296 the soldier Paniskos wrote to his wife asking her to bring fittings for his tent (*papilionos*). The Deurne assemblage was wrapped in a leather sheet made up of stitched rectangular goat skin panels (720 mm by 520 mm). The leather and stitching share features with similar sheets from Newstead, Vindolanda and Valkenburg, and with *contubernium* tents. At c. 2.08 m by 2.16/2.85 m, it has been suggested that the sheet is a one-man, bivouac-tent. Digging tools would have been used by troops engaged in construction work.⁷²

The *Historia Augusta* itemized equipment issued on imperial orders to the future emperor Claudius II when he was a tribune in Syria: two red military tunics; two cloaks; two gilded silver brooches; one gold brooch; one gilded silver belt (*balteus*); one ring with gem-stones; one armlet, one torque; one gilded helmet; two gold-inlaid shields; one *lorica*; two javelins or spears (*lanceas Herculianas*); two more shafted weapons (*acilides*); two sickles; two scythes for hay; one white part-silk tunic with Girbitan purple; one tunic with Moorish purple; two white tunics; one pair of leggings(?); and two togas. Clothing and pieces of equipment would have been worn in a variety of military and social contexts, not all at one time, and the foraging implements were for servants' use. It is likely that the 4th-century writer drew upon contemporary practice to provide detail for a 3rd-century personality.⁷³

Standards and musical instruments

It is not known for how long legions continued to carry the *aquila* into the 4th century and beyond, although it would seem likely that the new, smaller legions of the Tetrarchy did have eagles, and two standards consisting of an eagle over an *imago* appear on a pedestal relief of the Arch of Constantine. Similarly, a *manus* appears above an *imago* on two other standards, so perhaps these represent centurial *signa*, abbreviated to fit the space. Legionary emblems were figured on the coins of the British usurper Carausius, to advertise which legions were loyal to him and to appeal to them individually. *Imagines* of emperors would have become increasingly elaborate, especially under the Tetrarchy of four emperors, and it is likely that they reflected iconography of the régime's surviving in other media. Pilasters from the east gate at the late Tetrarchic fortified villa at Gamzigrad were decorated with *signa*. Two each bear three *imagines* representing a pair of emperors' busts. A third relief depicts statuettes of two emperors and a Victory, mounted on a staff. These are probably to be identified with members of the Second Tetrarchy. A *signum* figured in a Constantinian fresco at Piazza Armerina is gilded and bears a single imperial bust on one of its *phalerae*. Fourth century coins represent legionary *signa*, sometimes three or four together, with multiple *phalerae*, often topped by small *vexilla*, but these become rarer after Constantine. Occasionally eagles also appear atop *signa* as they had done since the 1st century, but true

legionary *aquilae* are not much seen on coins after the 2nd century. Large *vexilla* also appear early on coins, but in increasing numbers from the time of Constantine, first with a *chi-rho* mounted on the cross-bar, then emblazoned on the flag itself. *Vexilla* appear on monuments such as the Arches of Galerius and Constantine, and on the obelisk base in Istanbul they bear the Christian monogram. At the Battle of Pons Mulvius (AD 312) Constantine had his own personal standard, the '*labarum*', in the form of a large *vexillum*.⁷⁴

Imagines as statues may also have continued and indeed become dominant as one of the main standards of individual regiments. Victories appear on the Arch of Constantine and other motifs appropriate to unit titulature may have been carried (*Ioviani, Herculiani, Martenses, Solenses* etc.), as some shield blazons suggest. A cockerel standard is figured on the gravestone of Lepontius from Strasbourg and an attempt has been made to link this with the *Galli Victores* (Fig. 133). The other standard type which came to great prominence was the *draco*. During his entry into Rome (AD 357), Constantius II was surrounded by purple-embroidered *dracones* with gem-encrusted staffs, perhaps in the 'Sarmatian' style seen also on some Late Roman belts, brooches, helmets, shield-bosses and *torques*. The emperor Julian was recognised at the Battle of Argentorate (AD 357) by his purple *draco*. Cavalry *dracones* are figured on the Arches of Galerius and Constantine, but by the 4th century, if not before, the *draco* had spread to use by infantry. Vegetius stated that one was carried by each legionary cohort, and they are mentioned quite frequently by other 4th-century sources, their bearers holding the rank of *draconarius*. *Dracones* appear floating above the heads of infantry on bronze plaques from Săgvár. When the usurper Silvanus was elevated by the soldiery at Köln (AD 355), his purple imperial attire was improvised in haste from the purple cloth of *dracones* and *vexilla*, and when Julian was raised (AD 360), his diadem was a torc donated by a *draconarius* of the *Petulantes*. According to both Arrian and Ammianus, the *draco* hissed as it was moved, presumably a reed was 'played' by the air rushing in through the mouth. The fabric body moved sinuously so that the overall effect was convincingly serpentine.⁷⁵

Vegetius continued to discuss the *cornu*, *bucina* and *lituus*, although he may well be drawing on earlier sources. The first is mentioned several times in the 4th-century *Historia Augusta*, with the *lituus*, and it is depicted for the last time in monumental art on the Arch of Constantine.⁷⁶

Equine equipment

Few items of riding harness are known from this period, but the continued use of the horned saddle is shown on the Sevso Hunting Dish from the former Yugoslavia and on the Arch of Constantine. This type of saddle may have been finally replaced by the steppe arched type in the 5th century. Bits are known from Orşova and Berkasovo. A copper-alloy spur with one off-centre iron prick was found at Deurne.⁷⁷

None of the 4th-century gravestones of western *catafractarii* depict horse-armour, perhaps due to artistic convention. Heavily-armoured *Notitia* cavalry units undoubtedly wore the horse-armour necessitated by archery in the eastern theatre, as they certainly continued to do after the 4th century.⁷⁸

Notes

1. Army: Jones 1964, 607–86; Hoffmann 1969; Frank 1969; Tomlin in Connolly 1981; MacMullen 1988, 199–217; Lieberschutz 1990, 7–46; Casey 1991; Speidel 1992; Treadgold 1995; Coello 1996; Elton 1996, 89–107; Southern and Dixon 1996; Richardot 1998; Nicasie 1998; Cromwell 1998; *CAH* 2, 13, 1998, 211–37; Tomlin 2000; Coulston 2002; Syv  nne 2004. Hadrianopolis: Matthews 1989, 296–301; Lieberschutz 1990, 24–5.
2. Trier: *Trier* 1984, Cat. No. 60, 154–5, 157–60. Cf. Cat. No. 20, 110, 186. Milan and Aquileia: Buora 2002, 65–97, 183–206. London: Barber and Bowsher 2000, 206–8, B538.4, Fig. 105. Rome: Consoli 2000, 52.
3. New sites: von Petrikovits 1971; M  csy 1974, 266–96; Johnson 1983; Soproni 1985; Maxfield 1989. Housesteads: Bosanquet 1904, 224–5, 290–1. Intercisa: Klumbach 1973, 103–5. Lambaesis: Cagnat 1913, 496. Gornea: Baatz 1978, 14. Or  ova: *ibid.*, 9.
4. Water: Ilkjaer and Lenstrup 1982; Hines 1989, 26–43; J  rgensen *et al.* 2003, 251–87. Oudenburg: Mertens and van Impe 1971. Intercisa: Vago and Bona 1976. Winchester: Clarke 1979. S  gv  r: Berger 1966. Vireux-Molhain: Lemant 1985. Weapon graves: B  hner 1963; Blazquez 1980; Sommer 1984, 88–93; Schulze-D  rlamm 1985; Vallet and Kazanski 1993, 109–23, 157–86, 355–65; von Carnap-Bornheim 1994a, 169–88; Swift 2000, 50–2. Huns: Werner 1956, 46–50, Pl. 16.3a, 25, 36–7, 61; Bona 1991, 167–74, Fig. 2–5; Kazanski 1999.
5. *Spiculum*: Veg. II, 15. Cf. III, 14; Amm. XVI, 12, 46. Cf. Isid. XVIII, 8, 2. *Bebra*: Veg. I, 20.
6. Carvoran: Richmond 1940; Cowen 1948; Manning 1976a, 20–1, Fig. 13, 22; Scott 1980, 339, Fig. 24, 4. Lauriacum: *RL  * XV, Fig. 59, 4. Vindonissa: Unz and Deschler-Erb 1997, Cat. No. 332. Pilismar  t: Soproni 1978, Pl. 37, 3. Cf. Engelhardt 1865, Pl. XI, 46; 1867, Pl. III, 20; 1869, Pl. 14; Swanton 1973, Fig. 3; Ilkjaer and L  nstrup 1963, Fig. 3, 1; J  rgensen *et al.* 2003, 269. *Ango*: Swanton 1973, 22–35, Figs. 3–5; von Schnurbein 1974.
7. Veg. I, 17; II, 16; III, 14; IV, 29. Mattiaci: Hoffmann 1969, 156–8, 172. *Mattiarii*: *ibid.*, 12–3, 221–3. *De Rebus Bellicis* 10–1; Hassall and Ireland 1979, Pl. IX.
8. Musty and Barker 1974; Barker 1979 (Wroxeter); Scott 1980, 339 (Kenchester); Wachter 1971, Fig. 26, 4–5 (Catterick); Sherlock 1979 (Burgh Castle); Bushe-Fox 1949, Pl. LIX, 295–6 (Richborough); Casey and Davies 1993, Fig. 10.12, 275–7 (Caernarfon); Buckland and Dolby 1971–72, 275–6 (Doncaster); *AufVV.V.3*; *ORL* B24, Fig. (Mainz); Unz 1973, Fig. 6, 30; Unz and Deschler-Erb 1997, Cat. No. 334–5 (Vindonissa); Cahn 1989, W50 (August); *RL  * IX, Fig. 47.3 (Lauriacum); X, Fig. 36, 3 (Carnuntum); Intercisa Museum pers. obs. (Intercisa); Mr  v 2000, 48 (Dunaszeko); Hoffiller 1910–11, Fig. 16; Radman-Livaja 2004, Nos. 31–5 (Sisak); Gudea 1977, Fig. 48, 1–8 (Gornea); Bennett 1991 (Pitsunda). V  lling 1991, 295–8 adds 13 additional site-finds.
9. Eagle 1989. Cf. Sim 1995a. Later use: Kolias 1988, 173–6.
10. Heads: Wachter 1971, Fig. 26; Cunliffe 1975, Fig. 124, 171, 175, 177–8; Blazquez 1980, Fig. 25, 3; Mertens and van Impe 1971, Fig. 68, Pl. XLI, 3; Bersu 1964, Pl. 9, 1–2; Soproni 1978, Pl. 37, 2; Gudea 1977, Figs. 47–8; Brulet *et al.* 1995, Fig. 28, 14–16, 42, 12, 49, 7–12. Vireux-Molhain: Lemant 1985, Fig. 19, 13–20, Plate 10; 23, Fig. 29, a–b, Plate 15. Shafts: Engelhardt 1867, Pl. II–III; J  rgensen *et al.* 2003, 77, 178, 278, 283, 288. Guards: Delbr  ck 1933, Pl. 96–7; Paolucci 1971, 46–7. Decorated heads: Trier 1984, Cat. No. 155a–c.
11. *Stelae*: Esp. 5496, 3943; Eckhardt 1981, No. 57; Franzoni 1987, No. 12–14, 22–3. Syracuse: Wilson 1990, Pl. XII. Via Latina: Tronzo 1986, Fig. 92. Verutum: Veg. II, 15; cf. Amm. XVI, 12, 46; XIX, 11, 10; XXVII, 10, 15; XXXI, 10, 8. *Lancea*: Veg. II, 14, IV, 22. Cf. Isid. XVIII, 8, 2. *Lanciar  *: Hoffmann 1969, 176, 218–22, 226; Drew-Bear 1981, 100, 103–4. Vermand: B  hner 1963, 154–5; Sommer 1984, Pl. 74, 5–6.
12. Worms: Esp. 6044; Schleiermacher 1984, No. 49. Lyon: *ibid.*, No. 93; Esp. 1780. See Coulston 1986, 63; Kolias 1988, 191–2.
13. Veg. II, 15. Cf. Isid. XVIII, 6, 5. Nydam: Engelhardt 1865, Pl. VII; J  rgensen *et al.* 2003, 268. August: Ulbert 1974, 207, Fig. 2. K  ln: Schulze-D  rlamm 1985, Fig. 4; Martin-Kilcher 2003. Cf. Sommer 1984, Pls. 27, 49, 56, 65. Representations: Delbr  ck 1932, Pls. 31–2, 35, 47–8, 50–1; Esp. 5496; Tronzo 1986, Fig. 92. Cf. Barnett 1983.
14. Chapes: Bersu 1964, Pls. 7, 6; 20, 8; Werner 1966; Gilles 1979; B  hner and Weidemann 1980, No. 204; Sommer 1984, Pl. 74, 11; Trier 1984, Cat. No. 155d; Tejral 1999, Fig. 11, 27. Cf. Gilles 1979, Fig. 3, 5. Venice: Delbr  ck 1932, Pl. 31–2. Cf. *ibid.* 1929, No. 2; 1932, Pl. 35; Esp. 5496.

15. Slides: Engelhardt 1865, Pl. VIII,32; Oldenstein 1976, No. 64–5; *RLÖ* XIII, Fig. 92,3. Statues: Delbrück 1932, Pls. 47, 50–1. Monza: Delbrück 1929, No. 63 (cf. No. 69). Cf. Engelhardt 1865, Pl. VIII,25–6. Belts: Delbrück 1932, Pls. 31–2; 35; 47–8; 50–1; 1933, Pls. 30, 46; Eckhardt 1981, No. 57; Franzoni 1987, No. 3, 12–22; Esp. 5496; Tronzo 1986, Fig. 92.
16. Possible dagger: Brulet *et al.* 1995, Fig. 49,3. ‘German’ weapons: Bushe-Fox 1949, Pls. LXI, LXIII; Bohner 1963; Mertens and van Impe 1971, Pl. XL,4; Dahlmos 1977; Schulze-Dörlamm 1985; Lemant 1985, Fig. 19,12, 37,2, 40,4, 65,1, Pl. 19,41; Brulet *et al.* 1995, Fig. 42,13. Böhme 1986, 509–19. Cavalry: Bivar 1972, 291; Coulston 1986, 67; Srejevič *et al.* 1983, No. 42. Knives: e.g. Berger 1966, Figs. 89, 98, 100–2, etc.; Mertens and van Impe 1971, Pls. XCI–II; Vago and Bona 1976, Pls. 19–21, etc.; Sommer 1984, Pls. 25, 28–31, etc.; Blazquez 1980, Fig. 25,3–4.
17. Hoffmann 1969, 160–3, 210–1, 240–4, 264–5; Veg. II,2; 15; 17; III,14; cf. Julian, *Or.* 57D.
18. Intercisa: Salamon 1976, 48–50, Pls. 24–6; Coulston 1985, 233. Hunnic bows and burials: *ibid.*, 242–4; Werner 1956, 46–50, Pls. 25; 36–7; 70,4. Stobi: Aleksova and Wiseman 1981, 220–1, Fig. 8–10.
19. Veg. II,15; IV,21. See Marsden 1969, 7–16, Fig. 1; Kolias 1988, 240–53.
20. Nydam: Jørgensen *et al.* 2003, 269–70. Cf. Raddatz 1987, Pl. 38. North-western archery: Caesar, *Gallie War* VII,36, 80; Todd 1975, 175. Asiatic method: Coulston 1985, 266–9; James 2004, 195–6, 207.
21. Gundremmingen: Bersu 1964, Pl. 9,6–9. Gornea: Gudca 1977, Figs. 47–8. Housesteads: Manning 1976a, 22–3, Fig. 14. Lobate: Werner 1956, 49; Neugebauer and Neugebauer-Maresch 1990, Fig. 3. Quiver: Coulston 1985, 273–4.
22. Vindolanda: Greep 1987, 191. Lambaesis: Cagnat 1913, 496. Veg. I,10; 20; II,15; 17; 23; III,3; 14; IV,29. Cf. Haldon 1975, 38–9; Kolias 1988, 254–9. Slingers: Amm. XIX,5,1; XXIV,2,15; Julian, *Pan. Or.* 57D; *ND Or.* VII,52. Elephants: Veg. III,24.
23. Gudca 1977, 82–3, Figs. 46, 59; Gudca and Baatz 1974, Figs. 3–10; Baatz 1978, 9–16, Figs. 8–9, 12. Heron: Marsden 1969, 3, 188–90, Fig. 8,1; 1971, 18–61; Gudca and Baatz 1974, 59–72; Baatz 1978, 14–16. *Carroballistae*: Veg. II,25; IV,22; 24. Wall-mounted: IV,9–10, 22, 29. Cf. Amm. XIX,1,7; 5,6; 7,2; 5–7; XX,7,2; 10; 11,20; 22; XXIII,4,1; XXIV,2,13; 4,16. Heads: Cunliffe 1975, Fig. 124, 170; Bersu 1964, Pl. 9,3–5 (?); Gudca 1977, Figs. 47–8. Amm. XXIV,4,16. Procop. *Wars* V,21,16; cf. Veg. IV,18.
24. Veg. II,10; 25; III,3; 14; IV,8; 9; 22; 28; 44; Amm. XXIII,4,4; 7; XXXI,15,12. *Scorpio*: XIX,2,7; 7,6; 7; XX,7,10; XXIII,4,4; 7; XXIV,4,16; 28; XXXI,15,12. See Marsden 1969, 179–80, 189; Charretté 2001–2.
25. Veg. II,25; Marsden 1969, 195–7. *ND Or.* VII,43; 57; VIII,46–7; IX,47; *Occ.* VII,97; XLI,23. Danube: Brennen 1980; Bondoc 2002. Julian: Amm. XVI,2,5. Continuity: Procopius, *Wars* 5.21.14–18, 23.9–12; Maurikios, *Strategikon* 12.B6; Chevedden 1995, 138–42; Haldon 1999, 134–6.
26. Scales: *Trier* 1984, Cat. No. 60. Helmet: *ibid.*, Cat. No. 154. Weiler-la-Tour: *ibid.*, Cat. No. 153. Independenta: Zahariade 1991, 315. Monuments: Coulston 1990, 139–47.
27. Disuse: Couissin 1926, 448; 512–13; 517–18; Alfs 1941, 104; MacMullen 1960, 30–1; Robinson 1975, 171; Harmand 1986, 197–9. Veg. I,20. Cf. Coulston 1990, 148–9.
28. Chiaramonti: Koeppl 1986, No. 48. Wood: Alfs 1941, Fig. 9. Via Latina: Tronzo 1986, Fig. 92. *ND Or.* XI; *Occ.* IX. *Thoracomachus*: Hassall and Ireland 1979, 105–10, Pls. XVI–II; *De Rebus Bellicis* XV.
29. Hoffmann 1969, 265–77; Bivar 1972, 276–81; Speidel 1984; Diethart and Dintsis 1984; Coulston 1986, 60–3; Mielczarek 1993; Harl 1996.
30. Veg. II,15–6; III,18; Amm. XVI,10,8; XIX,8,8; XXIV,6,9; XXV,1,16; XXVI,6,16; XXXI,10,11; 17; 13. Later: Kolias 1988, 37–54.
31. Klumbach 1973, 103–9, Pls. 45–57.
32. Augst: *ibid.*, 115–17, Pls. 61–4; Worms: *ibid.*, 111–4, Pls. 58–60; Carnuntum: *RLÖ* IV, Fig. 47,6.
33. Klumbach 1973, 95–101.
34. Berkasovo: *ibid.*, 15–38, Pls. 1–9; Manojlovic-Marijanski 1964. Iatrus: Gomolka-Fuchs 1999; Born 1999; von Bülow 2005.
35. Burgh Castle: Johnson 1980. Concești: Klumbach 1973, 91–4, Pls. 32–7. Deurne: *ibid.*, 52–89, Pls. 19–21; Iriarte 1996; van Driel-Murray 2000.
36. Independenta: Zahariade 1991, 315. ‘Berkasovo’ cheek-pieces: Hoffiller 1912, Fig. 21; Klumbach 1973, Fig. 1 (iron, Vinkovci); *ibid.*, 85–9, Pl. 30; *Milano* 1990, 1 a7b (silver, S. Giorgio di Nogara). ‘Intercisa’ cheek-pieces: Peterson 1990, Fig. 1 (iron, Germany); Klumbach 1973, Fig. 19 (copper-alloy, Brunchaut-Liberchies); neckguards: *ibid.*, Pl. 31,1 (silver, S. Giorgio di Nogara); *RLÖ* IV, Fig. 47,6 (iron, Carnuntum); Bushe-Fox 1949, Pl. 179; Lyne 1994 (iron with copper-alloy edging plus bowl and cheek-piece fragments, Richborough); *Trier* 1984, Cat. No. 154 (iron, Trier); Brulet *et al.* 1995, Fig. 33,1 (silver, Liberchies II). Florence: Robinson 1975, Figs. 104–6.

37. Thomas 1971, 17–25, Pls. XXIX–XXXVII; Klumbach 1973, 39–50, Fig. 3, Pls. 12–18. Recently restored: Kocsis 2000, 37.
38. Berkasovo: Klumbach 1973, 28, 36–7. Stamps: *ibid.*, 44–5, 48–50, Fig. 3, Pls. 17–18. Concesti: *ibid.*, 14, 91–2. Al-Haditha: Parker 1994a; 1994b. Iatrus: Gomolka-Fuchs 1999, 216. Deurne: Klumbach 1973, 66–72.
39. Gamzigrad: Srejevič *et al.* 1983, No. 42. Heads: Delbrück 1932, Pl. 102. Coins: Alföldi 1932, Pls. II–III; 1934, 99–104, Figs. 1–4; Overbeck 1974, Pls. 23–4; Klumbach 1973, 10–11, Pl. 65. Constantine: Alföldi 1932, 12. Valentinian: Amm. XXVII,10,11. 'Berkasovo' coin: Klumbach 1973, Pl. 65.2. Aquileia: Franzoni 1987, number 12–14, 22–3; Syracuse: Wilson 1990, Pl. XII. Geneva: Delbrück 1933, Pl. 79.
40. Amm. XXIV,6,9; XXVI,6,16. *Cornuti*: l'Orange and von Gerkan 1939, 43, Pls. 7, 8a, 9–10, 18c; Alföldi 1959a, 173. Medallions: Alföldi 1932; Klumbach 1973, 11, Pl. 65.1; Kocsis 2003, 531–2, Fig. 4. Bronze labels: Lyne 1994, Fig. 2.7; Prins 2000, 316, Fig. 4, 6; Lusuardi Siena *et al.* 2002, 54–7, Pl. IX; Kocsis 2003, Fig. 5–10; Radman-Livaja 2004, No. 129. Alsóhetény: Kocsis 2003, Fig. 1–3.
41. Alföldi 1934; Post 1951–53; Werner 1949–50; 1989.
42. Sarmatian settings: Párducz 1944, 74–6, Pl. XXV.5; Zaseckaja 1993, Fig. 1–5; Sarov 1994, Fig. 1–5, Pl. 14, 16; 2003, Fig. 4, 9–11, 19–21, 23; Kazanski 1995, Fig. 5.13, 16–17, 6.1–2; Sarmates 1995, Cat. No. 85, 95–102; Coulston 2003a, 432. Sarmatian helmet: Sarov 1994, Fig. 5.1; Simonenko 2002, 266, Fig. 38.4.
43. James 1986; 2004, 101, Cat. No. 371; Lusuardi Siena *et al.* 2002, 40–3.
44. Belt-fittings: Klumbach 1973, 25, Pl. 10.3–4. Terminology: *ibid.*, 9; James 1986, 112. Reward: Casey 2000. Deurne: Klumbach 1973, 60.
45. Leiden: Ebert 1909. Dar al-Madinah: Dittmann 1940.
46. Frescoes: Rostovtzeff 1913, Pls. LXIV,1, LXXVIII,1, LXXIX, LXXXVIII,2. Trajan's Column: Cichorius 1896–1900, Pl. II–III. Cf. Scenes XXXI, XXXVII, LXVI, LXX, LXXXVIII, CVIII, CXV. See Gamber 1964; Brentjes 2000; Simonenko 2001; Coulston 2003a. Galerius: Laubscher 1975, Pl. 12.2, 31–2, 65. Sarcophagus: Delbrück 1932, Pl. 103.
47. Roman *Spangenhelme*: Maneva 1987, Fig. 3; Werner 1989, 424–6, Fig. 2 (Herakleia); Kajzer and Nadolski 1973 (Novae); Pirling 1974 (Lepcis Magna). Twelfth century: Stenton 1957, 58–60, Fig. 31–3, 35; Nicolle 1999, Fig. 414, 545–6, 892–3. Sassanid helmets: Werner 1949–50, Pl. 4–7; Grancsay 1963; Overlaet 1982; Lusuardi Siena *et al.* 2002, 40–3, Tables 5–6.
48. Sutton Hoo: Bruce-Mitford 1978, 138–231. Vendel: Tweddle 1992, Fig. 537–40, 543–55. Vendel derivation: Werner 1949–50, 192–3; Klumbach 1973, 14; Bruce-Mitford 1978, 220–3; Tweddle 1992, 1087–90. Distributions: Werner 1989, Fig. 1; Tweddle 1992, Fig. 523, 525.
49. Iconography: Trajan's Column Scenes IV, XXXIII, XLVIII, XLIX, LXXXVI, LXXXVIII, XCVIII, CI, CII (Cf. LXIX); Coulston 1988b, Fig. 1–3, 5–7. Deurne: van Driel-Murray 2000, 296, Fig. 3–4. *'Pilleus Pannonicus'*: Veg. 1.20. Representations: Delbrück 1929, No. 69; 1932, Pls. 31–7; l'Orange and von Gerkan 1939, Pls. 6, 19b–c, 23a; Esp. 870; Speidel 1984, Pl. 16; Franzoni 1987, No. 21; Srejevič *et al.* 1983, No. 42; Bandinelli 1971, Pl. 73; Trier 1984, Cat. No. 20; Via Latina Catacomb fresco, brown cap – pers. obs.; Carandini *et al.* 1982, Figs. 16–17. Amm. XIX,8,8. See Ubl 1976. Deurne: van Driel-Murray 2000, 307.
50. Bars: Brulet *et al.* 1995, Fig. 28.17 (Liberchies I), 42.14–5 (Taviers). Vindolanda: Bidwell 1985, Fig. 47.1. Gundremmingen: Bersu 1964, Pl. 9.12. Domed and pointed: Bushe-Fox 1949, Pls. LXIII–IV; Sommer 1984, Pls. 58,16, 74,12, etc.; Schulze-Dörlamm 1985, Figs. 2, 15–17, etc. Misery: Sommer 1984, 95–6, Pl. 56.3. Vermand: *ibid.*, 96, Pl. 74. Stilicho: Küllerich and Torp 1989, Fig. 15.
51. Constantine: l'Orange and von Gerkan 1939, Pls. 6–9, 12–13, 24c, 30c. Frescoes: Tronzo 1986, Fig. 3; Wilson 1990, Pl. XII. Gravestones: Esp. 1780, 3943, 5496; Franzoni 1987, Nos. 12–14, 22–3. Bodyguards: Delbrück 1933, Pls. 79, 94, 108. Cf. Berger 1966, Pl. XCV; Mócsy 1974, Pl. 44b–c. Galerius: Laubscher 1975, Pls. 30–4, 36, 65. Theodosian: Delbrück 1933, Pls. 86, 88; Becatti 1960, Pls. 51–5; Freshfield 1922, Pls. XV–VI, XVIII–XXIII. Funerary: e.g. Esp. 4300; Barkóczi 1944, Pl. XII.2. German: Raddatz 1987, Fig. 21–2; Jørgensen *et al.* 2003, 313.
52. Nydam: Jørgensen *et al.* 2003, 260–2, 268, 308, 313, 322, 350. Cf. Tacitus, *Germ.* 6; *Ann.* 2.14; Dio 56.21.3. Ammianus 21.2.1.
53. Eagle: Laubscher 1975, Pl. 12.2; 38.1; 42.2; 65.2. Hercules: Pls. 34–5, 38, 51, 56.2. Lion: Pl. 35. Geneva: Deonna 1920, 95–101; Delbrück 1933, 180–1, Pl. 79; Bohner and Weidemann 1980, No. 68. *Cornuti*: l'Orange and von Gerkan 1939, 43, Pls. 28c, 32i; Alföldi 1935; 1959a; Berger 1981, 45–7. Cf. Küllerich and Torp 1989, 326–30. Amm. XVI,12,6.
54. Goethert 1996.

55. *Notitia*: Seeck 1962; Berger 1981, 43–57. Positive identifications: Speidel 1990; Woods 1996b, 45–8; 1998, 33–4.
56. Grigg 1979, 111–12; 1983. *Chi-rho*: Delbrück 1929, Fig. 14, 26; Becatti 1960, Pl. 51; Freshfield 1922, Pls. XVII, XX, XXIII. *Notitia* Christian(?) blazons: *ND, Or.* V.7–9, 22, VII.8, 21.
57. New finds: Koscevič 1991, Pl. XXVI–VII; Tejral 1999; Aurrecochea Fernandez 1999; Consoli 2000, 52; Buora 2002; Feugère 2002. Positions: Berger 1966, Figs. 6–80; Bullinger 1969, Fig. 62. Leather: Sommer 1984, 4 (Cf. Pl. 48).
58. Stiffener depictions: Delbrück 1932, Figs. 40, 42; L'Orange and von Gerkan 1939, Pls. 33a, 34a, c; Carandini *et al.* 1982, Figs. 107, 118, 125, 130. Residuals: Berger 1966, Fig. 117, 284; Oldenstein 1979. Buckles and strap-ends: Hawkes and Dunning 1961, Fig. 13, 15; Bullinger 1969, Figs. 9–10, Pls. XII–V; Simpson 1976; Blazquez 1980, Fig. 25, 5–8; Sommer 1984, Pls. 1–8, 19–24; Böhme 1986, Figs. 5, 25–8. 'Utere felix'. Bullinger 1972, Fig. 1.
59. Propellers: Bullinger 1969, Pls. XXVII–XXXII; Sommer 1984, Pls. 29, 32–5, 40, 42, 54; Böhme 1986, Fig. 13. Intercisa: Bullinger 1969, Pls. LXVII, 1; LXIX. Arch: L'Orange and von Gerkan 1939, Pl. 33a. Piazza Armerina: Carandini *et al.* 1982, Fig. 118. Pecs: Fülep 1984, Pl. XXXI, 1; Bullinger 1969, Pl. XXVII, 1. Köln: *ibid.*, XXIX, 2. Propeller buckles: Bullinger 1969, Pl. III, 2; XXVII, 2, etc.; Sommer 1984, Map 2, Pls. 14–15, 40, 42, 54; Böhme 1986, Fig. 12. Berkasovo: Klumbach 1973, Pl. 10.3–4; Sommer 1984, 95. Long propellers: Bullinger 1969, Pls. LII, LXV; Sommer 1984, Figs. f, h, Map 3, Pls. 53, 55, 77; Böhme 1986, Figs. 21.9, 24.
60. Openwork: Hawkes and Dunning 1961, Figs. 17–19; Bullinger 1969, Fig. 56, Pls. III, XXVIII, XXXI–II; Blazquez 1980, Fig. 25, 7; Sommer 1984, Pls. 4, 13–6, 29, 31–2, 35; Böhme 1986, Figs. 8–10. Distribution: Sommer 1984, Map 1–2; Böhme 1986, Fig. 11.
61. Chip-carved fittings: Bullinger 1969, Figs. 19–34, 54, 58–61, Pls. IV–VIII, XXXIV–L; Sommer 1984, Pls. 9–12, 17, 43–5, 55, 66; Böhme 1986, Figs. 1–2; *Milano* 1990, 1 c7a, 1 c3b, 1 c8c, 1 c8e. Oudenburg: Mertens and van Impe 1971, 54–6, Figs. 24–6, Pls. II, LXXXIII. London: Mills and Whittaker 1991, 160. Forts: Sommer 1984, 88–93. Distribution: *ibid.*, Map 4–6; Böhme 1986, Fig. 3.
62. Winchester: Clarke 1979, 267–9, Fig. 33, Pl. XIVb. Oudenburg: Mertens and van Impe 1971, Pls. XLII, LXXXVII; Bullinger 1969, Pl. LIII. Galdenberg: *ibid.*, Pl. LV. Cf. Hawkes and Dunning 1961, Figs. 1–2, 23–4; Bullinger 1969, Figs. 35–46, Pls. LI–LXV; Sommer 1984, Pls. 46–53, 57–62, 67–79; Böhme 1986, Figs. 19–21. Distribution: Sommer 1984, Map 7; Böhme 1986, Fig. 22. Dating: *ibid.*, 492–501; Bullinger 1969, 65–7; Clarke 1979, 268, 286–8; Sommer 1984, 74–80.
63. Bullinger 1969, Figs. 50–1. 'E'-loops: *RI.Ö* IV, Fig. 23, 2; Bullinger 1972, Figs. 2–3; Petculescu 1991a, Fig. 74, 2. Cf. Klumbach 1973, Fig. 11; Schulze 1982; Ilkjaer 1989, Fig. 7.
64. Zengővárkony: Bullinger 1969, Fig. 62, 5. Winchester: Clarke 1979, 267–9. Vienna: Delbrück 1932, Fig. 40. Piazza Armerina: Carandini *et al.* 1982, Figs. 17, 122, 127. Ravenna: Delbrück 1932, Fig. 42.
65. Ownership: Sommer 1984, 87–101.
66. Clothing: Rinaldi 1964–65; Coulston 2002, 7–8; Sumner 2003. 'Puttees': Carandini *et al.* 1982, Fig. 12–13, 90–6, 98–100, 113–15. Brooches: e.g. Berger 1966, Pls. LXXXIX–XCI; Mertens and van Impe 1971, Pls. LXXIX–LXXXII; Vago and Bona 1976, Pls. XXXV–VI; Sommer 1984, 74; Trier 1984, Cat. No. 31, 156; Brulet *et al.* 1995, Fig. 21.1, 26.1–2, 33.4; Barber and Bowsher 2000, B538.3. Representations: Esp. 5496; Franzoni 1987, No. 21; L'Orange and von Gerkan 1939, Pls. 6–7; Carandini *et al.* 1982, Figs. 16, 18, etc.; Delbrück 1929, No. 63; 1933, Pls. 86–8.
67. Syracuse: Wilson 1990, Pl. XII. Literature: Woods 1998, 31–2. Luxor: Kalevrezou-Maxeiner 1975, Pls. II–IV. Via Latina: pers. obs. Piazza Armerina: Rinaldi 1964–65, 218–36. Cf. Laubscher 1975, Pl. 32, 1. *HA, Gallieni duo* VIII, 1; *Claudius* XIV, 5.
68. Baginski and Tidhar 1980, 19–33; Donadoni Roveri 1988, 208–10, Fig. 299; Sumner 2003, 4–12.
69. Kendrick 1920, Pls. IV, XVIII, XIX, XXVII–XXX; Du Bourguet 1964, Al 1–12, 16–18, 23, B4, 6–8, 10, 31. Cf. Speidel 1997; van Driel-Murray 2000, 307.
70. L'Orange and von Gerkan 1939, Pls. 6–11, 24c, 30c, 31a. Kalevrezou-Maxeiner 1975; Carrandini *et al.* 1982, Figs. 12, 16. Deurne: Klumbach 1973, 73–5, Fig. 12; van Driel-Murray 2000, 296–8, Figs. 5–7.
71. Staffs: Franzoni 1987, Nos. 16–17, 20–1; Kalevrezou-Maxeiner 1975, Fig. 8; Carandini *et al.* 1982, Figs. 12, 16–17. *Torques*: Delbrück 1933, Pls. 96–7, 86–8, 108; Vollbach 1961, Pl. 234; Speidel 1996. Cf. Amm. XXIX, 5, 20.
72. Paniskos: Winter 1936, 278. Deurne: van Driel-Murray 2000, 299–303, Figs. 8–9.
73. *HA, Claudius* XIV, 5–10.

74. Eagle: L'Orange and von Gerkan 1939, Pl. 26a. *Manus: ibid.*, Pl. 25c. Carausius: *RIC* V.2, Pl. XVI.12–13, 16–17; XVII.12. Iconography: Andrae 1977, 326–32; Laubscher 1999; Rees 2004, 73–6, 188–96. Gamzigrad: Srejskovic 1993, 208; 1994, 145–6, Figs. 1–5, 8–9; Laubscher 1999, 247–9, Figs. 25–8. Piazza Armerina: Carandini *et al.* 1982, Fig. 34. Latest *signum* coins: *RIC* VIII, Pl. 1.21; 2.111; 7.243, 248; 19.49; 20.25, 158; 23.131; 24.8; 25.39A; *RIC* IX, Pl. IV.3–4; V.3. *Vexillum* coins: *RIC* VIII, Pl. 1.153; 9.135, 162, 179, 188, 191; 10.250; 13.2; 14.124; 15.9; 16.203, 234, 260, 283, 294, 303, 318, 319; 18.112; 19.110, 125, 132, 146; 20.167, 229, 23.176; *RIC* IX, very numerous. Cf. Renel 1903, 275–80; Southern and Dixon 1996, Fig. 21, Pl. 13. Sculptures: Laubscher, 1975, Pl. 30–1, 34, 36, 48; L'Orange and von Gerkan 1939, Pl. 14–15; Delbrück 1933, Pl. 86–8. *Labarum*: Renel 1903, 270–5.
75. Statues: L'Orange and von Gerkan 1939, Pl. 7, 29c, 30a. Lepontius: Esp. 5496; Woods 1998, 32–4. Rome: Amm. 16.10.7. Argentorate: Amm. 16.12.39. Arches: Coulston 1991, Fig. 9–10. Veg. 2.13. Cf. *ibid.*, 1.20, 2.7, 3.5; *HA, Gallieni duo* 8.1; *Aurelianus* 31.7; Zosimus, *Historia Nova* 3.19. SÁgvár: Mócsy 1974, Pl. 44c; Coulston 1991, Fig. 11. Köln: Amm. 15.5.16. Diadem: Amm. 20.4.18. Hissing: Arrian, *Technē Taktikē* 35.1–6; Amm. 16.10.7. Cf. Prudentius, *liber Cathermerinon* 5.55–6; Claudian, *Panegyricus* 7.138–41. Sarmatians: Coulston 1991, 106–8; 2003a, 430. Sassanids: *HA, Aurelianus* 38.5.
76. Veg. 2.22; *HA, Gallieni duo* 8.1; *Aurelianus* 31.7. Arch of Constantine: L'Orange and von Gerkan 1939, Pl. 7.
77. Sevso Dish: Mundell Mango and Bennett 1994, Fig. 1.4, 1.10, 1.37. Arch: L'Orange and von Gerkan 1939, Pl. 8a. Saddles: Herrmann 1989; Werner 1956, 50–3. Deurne: Klumbach 1973, 61–2, Fig. 7; van Driel-Murray 2000, 298. Cf. Brulet *et al.* 1995, Fig. 33, 5.
78. Gravestones: Schleiermacher 1984, No. 49, 88, 93; Nuber 1997. *Notitia*: Hofmann 1969, 265–77. Later: Coulston 1986, 60, 67; Syv  ne 2004, 44, 169–81.

9 Production and Technology

Production

The question of how Rome produced matériel to equip her armies is central both for an understanding of military equipment at the artefactual level, and for an appreciation of the wider relevance of the whole subject to the study of Roman society and culture. Older, simplistic views – that there were vast factories in Rome churning out equipment to supply the frontier armies – will no longer suffice. More recently, it has become generally accepted that arms were privately manufactured, perhaps with some sort of state control. However, this view may now also be modified and refined.¹

From the time of the Punic Wars, Republican armies depended heavily (but not exclusively) upon classical cities to supply their material needs when in the field. In this, they were merely following the traditions established by earlier military powers; in 399 BC, Dionysius I hired the best craftsmen from around the Mediterranean to equip his forces. He supplied them with examples of the equipment his men already used and set them to work wherever there was space in Syracuse; Diodorus Siculus mentioned porticoes, back rooms in temples, gymnasia, colonnades in the market place, and even in houses. Offering financial incentives, he got them to produce 140,000 sets of shields, daggers, and helmets, and 14,000 cuirasses.²

During the Second Punic War, the Carthaginians used Carthago Nova (Cartagena) as a huge arsenal and, when Scipio took it in 210 BC, he put the 2,000 captive artisans to work to provide munitions for him in '*officina publica*'. The production potential of the classical city was spectacularly demonstrated during the Third Punic War when the people of Carthage, having been persuaded to give up their weapons (enough armour for 200,000 men) to Rome, changed their minds and started re-arming. Using everybody in the city, working day and night, a daily production figure was achieved of 100 shields, 300 swords, 1000 artillery missiles, and 500 darts and javelins, as well as catapults.³

In Spain, Sertorius replaced the equipment of his troops with the help of his allies, and set up a workshop (*officina publica*) staffed with smiths, for whom he provided a production schedule. Cicero mentions that Calpurnius Piso ran an arms factory (*officina armorum*) in Macedonia and that his father had been responsible for arms supply during the Social War. Some needs were also met by contracts: in 209 BC, money was allotted for contracts to supply clothing to the army in Spain. In Africa, Scipio Africanus was sent clothing, grain, and weapons from Sicily for his troops.⁴

The army was capable of producing its own weaponry, however, as greave presses from Cáceres demonstrate. Likewise, the very fact of military equipment surviving from Cáceres and the Numantine sites hints at recycling of scrap and some involvement in production.⁵

Production during the Principate is much more problematical than manufacture in the other periods. The once predominant view was formulated by MacMullen in 1960, based upon inscriptions on armour. He saw the Praetorian Guard supplied by

the *armamentarium* at Rome, whilst for the rest of the army 'the main source of supply for arms in the earlier Empire was small shops and dealers. Fine armor [*sic*] beyond the call of duty could be ordered by the military swell from local artists, or was hawked about in the camps.' However, he also recognised the role of the army in production, even going so far as to suggest that the West Compound at Corbridge could have supplied most of the needs of the entire British garrison.⁶

In his introduction to *The Armour of Imperial Rome*, Robinson followed this line, seeing army workshops as normally serving just to repair equipment and only actually producing material in emergencies. However, Oldenstein used the evidence of scrap and half-finished items to show that the 2nd and 3rd century army was producing equipment along the German and Raetian frontiers. He subsequently outlined a process which moved away from long-distance hinterland supply towards manufacture by the army, dependent upon Romanization of the frontier zone. Other commentators have sought to involve civilian Celtic metalworkers, perhaps even in slave-labour camps.⁷

However, it is not necessary to insist that production was either the preserve of some centralized authority, or farmed out to vast numbers of civilian craftsmen, and it is a mistake in equipment studies to treat the Empire as a single, culturally homogeneous entity. The movement of Rome's armies away from the Mediterranean littoral and regions of classical urbanization meant that one of the main means of re-equipping armies under the Republic – relying on the *poleis* – was no longer available, especially in the northern European theatres. As a result, armies in these regions developed self-sufficiency in equipment manufacture, seen in Vegetius' discussion of legionary production.⁸

As we saw in Chapter 2, one of the main forms in which military equipment entered the archaeological record during the 1st century AD was as scrap awaiting recycling. This implies that the army was directly involved in reworking metal, possibly even in the production of finished items. This is convincing evidence when considered alongside traces of actual production activities on military sites (ingots, crucibles, moulds, unfinished items, tools).⁹

A collection of copper-alloy offcuts, together with crucibles, came from the 1st century AD fort at Rheingönheim, whilst the base at Colchester Sheepen produced crucibles and an ingot of *orichalcum* with a very high zinc content. Smithing is more difficult to identify, not least because the hearths used for this were in all probability raised to a comfortable working height. Part of an iron cavalry 'sports' helmet mask was found at the Augustan base of Haltern corroded to an anvil, and whilst this is not proof, it suggests manufacturing activity at the site.¹⁰

Fabricae have not often been clearly identified in the archaeological record, perhaps because attention has been diverted by metalworking in other excavated structures, probably last-minute activity prior to demolition. One class of courtyard building, typified by examples at Oberstimm and Valkenburg, has long been thought to represent *fabricae*, but this view is unfounded. More convincing are structures at Inchtuthil, Exeter, and Hofheim, which were closely associated with substantial industrial processes (Fig. 144).¹¹

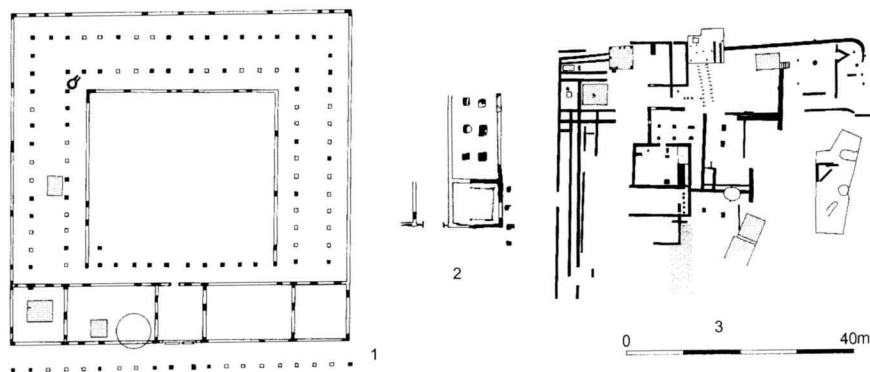


Figure 144: Fabricae plans. 1 Inchtuthil; 2 Exeter; 3 Hofheim.

The large courtyard building at Inchtuthil produced little in the way of evidence of production, although it did contain the famous pit with the nails and wheel tyres, suggesting (as has already been mentioned), the deliberate concealment of valuable scrap iron upon abandonment of the base. On its eastern side were a range of four rooms and an entrance hall, evidently designed to be large enough to permit the entry of wheeled vehicles. The remaining three sides were taken up by one large, aisled hall, which contained traces of partitions or work-benches in places. The hall contained one isolated hearth with a tile-lined flue, the purpose of which was unclear.¹²

One corner of a similar building was excavated within the legionary base at Exeter, complete with part of the aisled hall, whilst the corner room seemed to have a work bench running around three of its walls. A series of shallow troughs in the floor of the hall appear to have been designed to catch waste from industrial processes, notably copper-alloy working. Finds included the usual range of offcuts and half-finished artefacts so familiar amongst the waste of Roman military sites of the Principate.¹³

The most convincing example of a *fabrica*, however, was excavated by Ritterling in the timber fort at Hofheim. Although the internal plan of this base is confused by the interpolation and amalgamation of several phases, the fact of the industrial functions associated with this complex is undeniable. To the north of his building U (itself associated with metalworking), a large clay hearth was burnt red-brown to a depth of 10 cm, and here were found thick deposits of coal interspersed with iron and copper-alloy slag. This immediate area also produced tools, weapons, and iron fittings, as well as wire, bars, and round and flat pieces of iron discovered in the form of large lumps. Elsewhere, large, rectangular pits (one of which was timber-lined and accessible by a flight of steps) were involved in leather production. Another pit contained large amounts of animal bone, pieces of antler, horn plugs, and both complete and smashed skulls. In fact, there is considerable evidence in this complex for hide-processing and apparently random postholes mark the setting-out to dry of fresh skins on raised frames.¹⁴

At the Magdalensberg, convincing evidence of the activities of an Augustan-period workshop producing military equipment have been identified in building OR/17. Besides copper-alloy ingots, scrap, and unfinished objects, hearths and slag suggesting both copper-alloy and iron working were found.¹⁵

Elsewhere, the evidence for production within military bases is more fragmentary, but persistent. Smelting ovens for copper alloy were located within the Augustan and Tiberian bases at Neuss, whilst metalworking debris associated with military equipment, including an unfinished cavalry helmet cheek-piece, was found in the base at Kingsholm. At Sheepen, west of Colchester, excavation recovered large amounts of equipment from a furnace in Region 3, along with smith's tongs, metal offcuts, lumps of iron and copper alloy, and crucibles. Recent excavation recovered a stamped brass ingot with a very high zinc content. Commentators have fancifully suggested production by veterans in the face of the Boudican rebel advance, or by slave-labour in a concentration camp supplying the Colchester fortress. Army production offers a more realistic explanation.¹⁶

Literary, sub-literary, and epigraphic evidence demonstrates that the legionary rank-structure provided all the expertise and manpower necessary for production. A 2nd or 3rd century AD Egyptian papyrus documented the activities in a legionary *fabrica* on two successive days (Fig. 17). Introduced by the date and the phrase '*operati sunt in fabricam legionis*' ('these are worked upon in the legionary workshop'), it mentions legionary soldiers, *immunes*, *cohortales* (presumably auxiliary soldiers), *galliarum* (camp servants), and even civilians (with guards) as working within the establishment, with at least 100 personnel (probably legionaries) in one entry. Evidently, on the first day ten swords had been made ('*spathar[um] fabricatae X*'), six of something else ('*fabricatae VI*'), and 125 of something had been completed ('*peractae CXXV*'). Other items listed include *laminae levisatares* ('light strips'? – ten of these), weapons (*telaria*), and nails for carts. The next day saw shields of two different types, *planata* (flat) and *talaria* (wicker?), more *laminae levisatares*, some bows completed, and *capitula ballistarum* (artillery frames).¹⁷

An early 2nd-century tablet from Vindolanda recorded the number of men working for the *fabrica* on a given day: 343 in total. Most were engaged on construction tasks, but 12 men were appointed as cobblers (*sutores*).¹⁸

These documents do suggest that soldiers of a unit were assigned to the *fabrica* when specific tasks required work. They would have required guidance and coordination, both perhaps provided by the *immunes* listed by Tarrutienus Paternus in the *Digest*, copper-workers (*aerarii*), smiths (*ferrarii*), sword cutlers (*gladiatores*), arrow (*sagittarii*) and bow (*arcuarii*) makers, who possessed the requisite skills for supervising equipment manufacture. He also mentions an *optio fabricae* who presumably ran the workshop. Vegetius mentions legionary 'workshops for shields, cuirasses, and bows,' where 'arrows, missiles, helmets, and all sorts of weapons' were made.¹⁹

Independent references to shieldmakers (*scutarii*) occur on writing tablets from Vindolanda and Vindonissa, whilst *gladiarii* are recorded at the latter base on a plaque dedicated to Mars and on the same Vindolanda tablet.²⁰

Production of composite bows demanded specialist skills, preferably learnt from childhood. For a really good bow, the construction phases were timed with the seasons to pace the rate of glue-setting. It thus took a minimum of one year to complete, and long-term maturation at different stages could extend this to three, five or even ten years. An established workshop would make batches for staggered future completion. Unfinished laths have been found at Caerleon, Corbridge and Micia, and

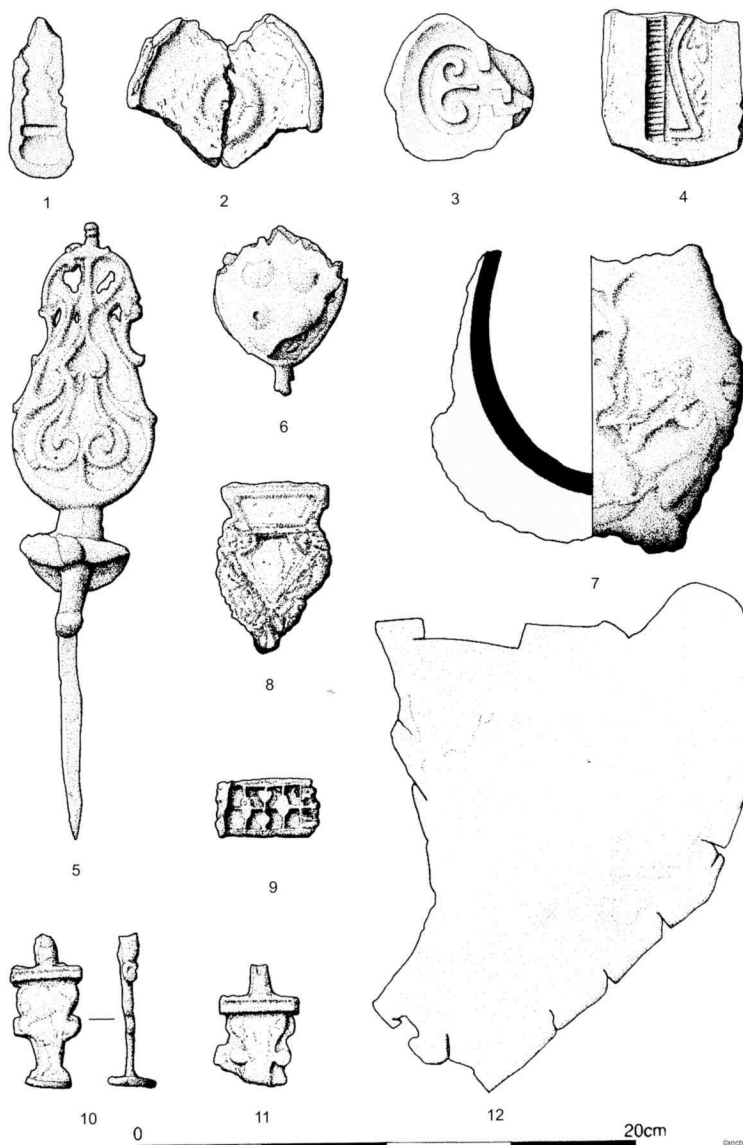


Figure 145: Moulds, crucibles and unfinished items. 1–4 moulds (1–2 Alesia; 3 Tibiscum; 4 Emmerich-Praest); 5 lead trial piece cart fitting (Brigetio); 6 failed chape casting (Corbridge); 7 crucible (Colchester Sheepen); 8–12 unfinished items (8 Bonn; 9 Brigetio; 10–11 Rheingönheim; 12 Eining).

construction probably continued at Intercisa until site-abandonment. Expertise would have been provided by eastern personnel during the Principate, but there may have been problems in procuring skilled bowyers in the Dominate west, leading to the centralization of some bow-production in a *fabrica* at Turin. In the East, the cities

would have had indigenous artisans and long-established workshops, and thus no need for such organization.²¹

Insistence by Vegetius on the self-sufficiency of the army does not appear to leave much room for the putative private arms industry under the Principate. A few items do hint at it: inscriptions on sword scabbards from Vindonissa and Strasbourg, and on a dagger sheath from Oberammergau, name Roman citizens as the producers of the individual pieces. The first two actually name the place of production (LVGV and AD ARA) which could be Lugdunum (Lyon) in both cases. However, the fact that these men were citizens means we cannot rule out the possibility of military production or, perhaps more likely, manufacture by veterans.²²

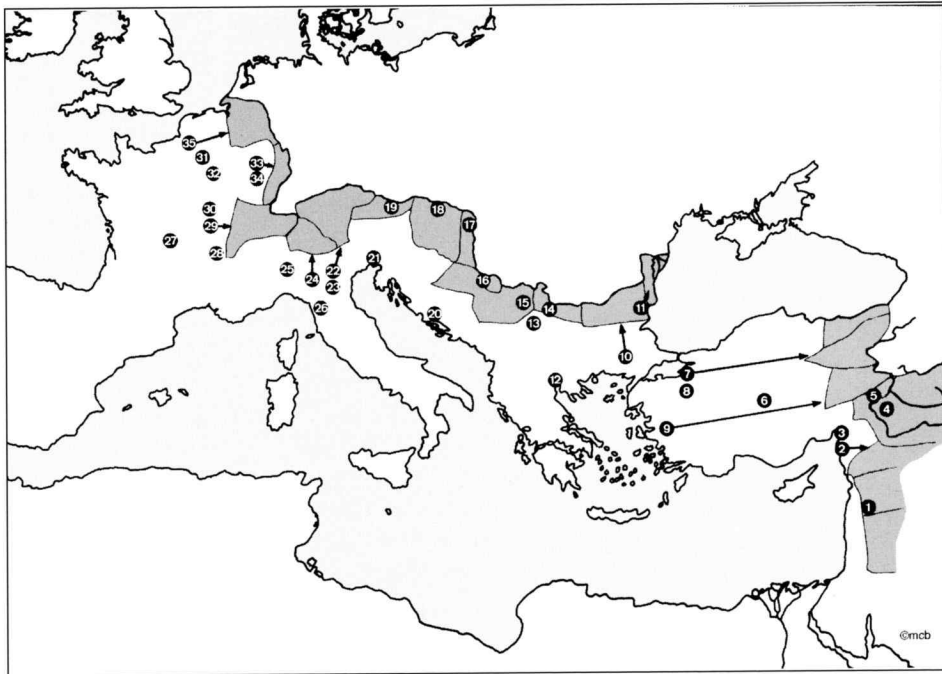
Finds of unfinished 2nd- and 3rd-century equipment, crucibles and industrial waste (Fig. 145) have been made along the northern frontiers, both within forts and in the extramural settlements. Often exact findspots would have been dictated by site-abandonment, and thus do not necessarily indicate the location of manufacture. Moreover, 'military' buildings were not confined to the area enclosed by walls, thus finds in *vici* say little about the military or civilian identity of the artisans.²³

In reality, the mode of manufacture varied across the Empire according to regional, cultural traditions and developing urbanization. Egyptian papyri show the army buying in such items as hospital blankets, cloaks, tunics and spear-shafts from civilian suppliers. In the eastern Empire the role of classical cities as production centres continued into the Principate, as Tacitus and Dio indicated, which was logical in regions where legions were habitually based in or beside cities. The only time that large amounts of equipment were needed at one time was when new legions were raised, and this was done during the Principate in Italy, where cities could supply the demand without overstretching the *fabricae* of other legions.²⁴

An inscription records M. Ulpius Avitus, centurion successively in *legiones III Augusta* and *III Flavia*, overseeing workmen manufacturing cuirasses amongst the Aedui. According to another inscription, one Annianus was overseer of recruitment and equipment manufacture at Milan in AD 242, in order to deal with 'enemies of the state' in Transpadana. He was working in a western region with some tradition of urban development.²⁵

For the Dominate, the *Notitia* lists *fabricae* in the northern and eastern provinces, naming their locations and specifying their products (Table 1, Fig. 146). There were 15 centres in the east and 20 mainly along the northern frontiers, in Italy, and in Gaul. Many manufactured shields (*scutaria*) or swords (*spatharia*) and/or armour (*loricaria*, *armorum*). James observed that the distribution of shield factories corresponded with European frontier provinces, and that paired armour producers went with *dioceses*. Specialized *fabricae* were more eccentrically placed. Arrow and bow factories appeared in the West alone, as did the only two *fabricae ballistariae*.²⁶

The distribution of shield and armour centres suggests an overall plan rather than piecemeal development, and there is general agreement that the *Notitia* reflected a Diocletianic programme of production centralization. Most *fabricae* were located in cities or, along the Danube, at legionary fortresses. Some may be linked directly with Tetrarchic building programmes, as at Nicomedia, Salonika and Augustodunum. However, the specialist factories were more a reflection of regional cultural variations.



<i>Oriens</i>			<i>Occidens</i>		
1	Damascus	<i>scutaria et armorum</i>	16	Sirmium	<i>scutorum, scordiscorum et armorum</i>
2	Antiochia	<i>scutaria et armorum</i>	17	Aquincum	<i>scutaria</i>
3	Antiochia	<i>clibanaria</i>	18	Carnuntum	<i>scutaria</i>
4	Edessa	<i>scutaria et armorum</i>	19	Lauriacum	<i>scutaria</i>
5	Irenopolis	<i>hastaria</i>	20	Salona	<i>armorum</i>
6	Caesarea	<i>clibanaria</i>	21	Concordia	<i>sagittaria</i>
7	Nicomedia	<i>scutaria et armorum</i>	22	Verona	<i>scutaria et armorum</i>
8	Nicomedia	<i>clibanaria</i>	23	Mantua	<i>loricaria</i>
9	Sardis	<i>scutaria et armorum</i>	24	Cremona	<i>scutaria</i>
10	Hadrianopolis	<i>scutaria et armorum</i>	25	Ticinum	<i>arcuaria</i>
11	Marcianopolis	<i>scutaria et armorum</i>	26	Luca	<i>spatharia</i>
12	Thessalonica	?	27	Argentorate	<i>armorum omnium</i>
13	Naissus	?	28	Matisco	<i>sagittaria</i>
14	Ratiaria	?	29	Augustodunum	<i>loricaria, ballistaria et clibanaria</i>
15	Horreum Margi	<i>scutaria</i>	30	Augustodunum	<i>scutaria</i>
			31	Suessiones	?
			32	Remi	<i>spatharia</i>
			33	Treberi	<i>scutaria</i>
			34	Treberi	<i>ballistaria</i>

Figure 146: Distribution of Dominate fabricae (after James 1988). List of fabricae in the Notitia Dignitatum (N.D. Or. IX,18–39; Oc. XI,16–39).

Three in the East, and only one in the West produced heavy cavalry (specifically horse?) armour, corresponding with the predominantly oriental deployment of *catafractarii* and *clibanarii*. In contrast, the bow, arrow and artillery factories were presumably not necessary in the East because the cities there traditionally produced such equipment.²⁷

In this respect the *fabricae* reflected the earlier production situation. However, sub-literary and epigraphic evidence suggests that the artisans (*fabricenses*) who worked them formed one of the tied, hereditary late Roman professions. The economic crisis of the 3rd century severely strained the supply of equipment, not least because of inflation overtaking the currency system. Thus the army had to be fed and equipped through taxation in kind, and production controlled to ensure adequate supplies. James further suggested that mass, centralized quota-production occasioned the change in helmet design from one-piece bowls to simple, multi-part construction (Chapter 8).²⁸

Tetrarchic army expansion may have provided further need for an assured supply-system. From Constantine's reign onwards, the emphasis on mobility would have made it difficult for field-army units to meet their own equipment needs. Strategically-placed *fabricae* would have fulfilled this function. It might be best to see the *Notitia fabricae* as mass-producing material for these troops, and for specific campaigns, but they were not the only sources of supply.

Indeed, forces in Britain, Spain and North Africa were probably not served by centralized *fabricae*. As the eastern cities continued manufacture from the Principate, so the fortress, fort and extramural *fabricae* supplied the needs of frontier units. Moulds and unfinished 4th-century belt-fittings, including a cast belt-terminal from Bonn awaiting chip-carving, come from a variety of sites. Bow-construction at Intercisa, arrow manufacture at Housesteads, and copper-alloy-working at Novae continued until site-abandonment. Production activities in the *principia* of the last two sites relate to the changing functions of intramural buildings, not to the use of such structures in earlier centuries.²⁹

We can now summarize military equipment production as follows. During the Republic, most manufacture was carried out by civilian contractors based on cities. However, the extended service of armies in the West led to increased production by the military. Principate forces in the European North, beyond areas of Mediterranean urbanization, were self-sufficient, relying upon their own *fabricae*. What little evidence there is for civilian work may derive from veteran craftsmen. On the other hand, armies in the East were based in or near cities, many of which had long-established equipment industries. From the later 3rd century onwards, mass-production for a proportion of the armies was centralized at state factories based on major cities and legionary fortresses, whilst the frontier bases continued manufacture alongside this system.

Technology

Iron and Steel

Scientific analysis of Roman weapons has only recently been undertaken (Fig. 147). However, tests have now been conducted on sword blades which shed important light on Roman technical capabilities. Although numerous references exist to the inadequacy of the edged weapons of Rome's enemies, there are a few hints of technical superiority amongst at least some of them. Philon, a writer on artillery, described the manufacture of Celtic and Spanish swords and the *Suda* confirmed Spanish mastery.³⁰

The weapons of the early Principate were not at all complex in their construction, yet Roman sword smiths were able to carburize iron, weld different metals together, quench for hardening, and (possibly) temper. Lang's work showed that three Mainz-type weapons (Chichester, Fulham, and Mainz – the 'Sword of Tiberius') had all been quenched and were of generally better quality than three others she examined (two from London, one from Hod Hill) which she took to be later in date, suggesting that the change in quality matched the change from Mainz to Pompeii type swords. The 'Sword of Tiberius' had been constructed by sandwiching a softer, low carbon iron between two carburized steel strips. Its edge had been formed by grinding, as had that of the Chichester sword, whereas the Fulham example showed no sign of this.³¹

The examination of a Pompeii-type sword blade from Bonn revealed even simpler construction than that of the three Mainz type examples, with little sign of the use of several pieces of metal or of quenching. Conversely, a piece from Vindonissa had apparently been tempered, so perhaps it is a matter of the individual preferences of smiths, rather than any great change brought about by the transition from Mainz to Pompeii type. Similarly, the Vindonissa sword was made up from three different pieces of metal, harder on the outside. A *spatha* from Augst had likewise been quenched and tempered, giving the blade both flexibility and strength.³²

However, the blades of some 3rd-century daggers, and of 3rd- to 4th-century *spathae*, were not manufactured from single bars of iron as they had been earlier. Rods were twisted together, hammered, cut up and re-combined to make a composite blade by the 'pattern-welding' or 'damascening' method. This is seen in swords from Augst and Nydam, for example, and the Canterbury swords with simpler 'piled cores' show its development from the 2nd century.³³

Williams' analysis of '*lorica segmentata*' showed that the iron plates had not been hardened in any way, although the Romans certainly knew how to do this. Williams suggested that they had deliberately intended to produce a 'soft' armour that would absorb the energy of a blow, which would fit in with what we know about the design of '*lorica segmentata*'. However, Sim has shown that such armour plates could be steeled, in which case the energy-absorbing properties of an arming doublet would be even more important. Recent analysis has indicated that such plate could be made to fine tolerances of very high quality metal.³⁴

It is often stated that the rings in Roman mail (Fig. 148) were alternately riveted and stamped. Although this method has indeed been suggested for mail of the medieval period, that on the neck-guard of the Coppergate (York) Anglian helmet proved to

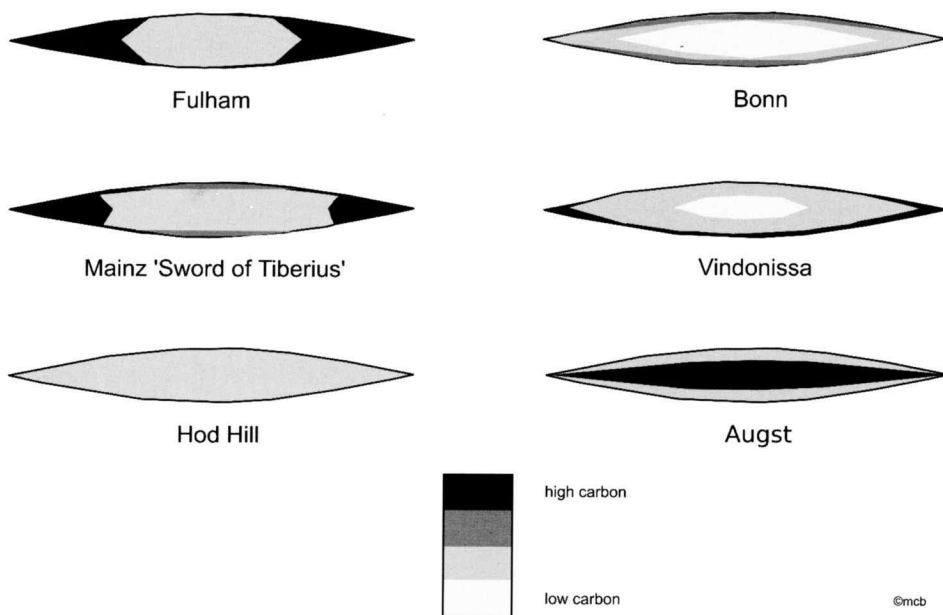


Figure 147: *Sword section diagrams.*

be of riveted and welded rings. Curle commented that riveted and welded rings appeared to have been used on mail from Newstead. Likewise, mail from the Danish bog deposits, some at least of which may be Roman in origin, used welded and not stamped rings, which tend to have a rectangular, rather than circular, section. One possible example of Roman stamped-ring mail came from Carlingwark Loch. Sim's recent examination of some rings has confirmed that they could be made by stamping, using reconstruction to show how they would be stamped and filed down to size.³⁵

Iron helmets had to be forged, since there were too many impurities in Roman iron to permit spinning. Also, the first iron helmets in regular Roman use had oval, not hemispherical bowls and thus were not suited to this process.³⁶

We know little of how the Roman army dealt with the problem of corrosion on items of ferrous equipment. Modern reconstructions of '*lorica segmentata*' only serve to confirm its qualities as a rust trap, a tendency discussed elsewhere (see p.98). We can only assume that some obvious measures (such as rigorous and regular cleaning) were undertaken.

Copper Alloys

Bronze helmets of the Republican period were regularly forged, but by the early Principate, Montefortino and Coolus bowls could be produced by spinning, a process which could easily lead to weaknesses in the metal. Spun helmets frequently display damage in the bowl area. Shield bosses were also spun throughout the Roman period.³⁷

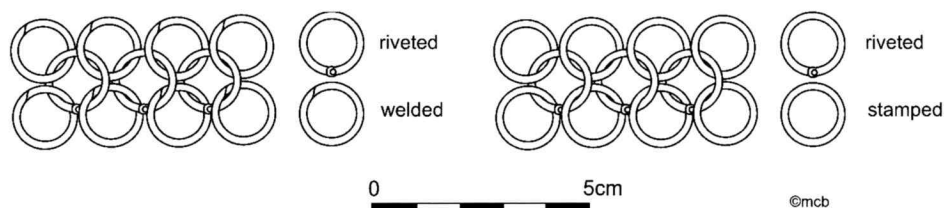


Figure 148: The arrangement of ring mail. Each ring interlocks with four others.

When Augustus reformed Roman coinage, he introduced *orichalcum* for the *sestertius*, *dupondius*, and *semitis*. This was an alloy of zinc and copper, much closer to 'low brass' or 'red brass' than to normal modern brass. This metal was also used by the army for most copper-alloy objects in the early Principate. Roman brass could not achieve a zinc content much greater than 26% due to the process, known as cementation, which produced the alloy. An ingot of *orichalcum*, from Colchester Sheepen, was shown by analysis to have had 26.8% zinc.³⁸

There seem to have been three types of *orichalcum* in use, broadly speaking. First there was the sort used for sheet metal fittings, such as '*lorica segmentata*' fittings, with an 80/20 (copper/zinc) composition. The rivets used to fix these to the armour, on the other hand, generally had a higher copper content (85/15 to 90/10) which meant they were not only softer (and thus better as rivets) but also a different colour (more coppery than the 'golden' sheet fittings). This is best seen on objects preserved in anaerobic conditions. The third alloy of this kind, used for producing cast items, included a proportion of lead, which improved the flow of the alloy into the mould.³⁹

These variations were deliberate on the part of the Roman smiths, but variation in compositions confirms the element of guesswork involved. Mixing of alloys through the widespread re-use of scrap makes it almost impossible to source ores from the study of trace elements.⁴⁰

Cast equipment could be produced either by the lost wax ('*cire-perdue*') process, or by using a two-part mould. The former probably required less finishing, but had the major disadvantage that the mould could only be used once, as it had to be broken to remove the object. Two-part moulds, on the other hand, were reusable and could be tested with a (lead) trial-casting. They would be prone to deterioration through frequent use and the product required more finishing, due to the inevitable presence of casting flash. Ceramic lost-wax moulds are known for a cavalry junction loop from Nijmegen and, on a massive scale, for a range of cavalry harness fittings from Alesia. Two-part moulds, which could be of either clay or stone, occur on a number of sites, as do unfinished castings ('*Halbfabrikate*'), and lead trial pieces.⁴¹

Moulds for artillery washers were found at the Auerberg, a supposedly civilian site that has produced a number of important finds of military equipment, and recent work by Drescher has suggested that it would take two man-days to produce the four washers necessary for one artillery piece, from starting to make the wax model, to the finished casting. Each washer would require around 2 kg of metal in three two-pound (Roman) crucibles heated for between 30 and 45 minutes.⁴²

Amongst military equipment of the 1st century, the only items which were regularly made of bronze (a copper/tin alloy) were *paterae*. However, these were imported from private firms working in Italy and, later, in Gaul. Other alloys might be used on occasion, bronze and impure copper occurring amongst armour scales, but this was not a consistent practice. It is conceivable that the government had a monopoly on *orichalcum* production, precisely because it was bullion which could be turned into coinage by the unscrupulous forger, although Dungworth is sceptical. *Orichalcum* was still used for helmets in the 3rd century (Worthing and Buch). It was softer than bronze, thus easier to work, yet harder than copper, so it could be used for a complex shape like the Buch helmet. Analysis has shown the recently-discovered 4th-century London belt-fittings to have been cast in *orichalcum*; then the chip-carved design was cold-worked with a chisel.⁴³

However, the thin copper-alloy components on '*lorica segmentata*' were not only vulnerable to damage, but also fostered electrochemical corrosion at points of contact with the iron plate.⁴⁴

Plating and Inlay

Copper-alloy artefacts were frequently tinned or silvered, a technique which Pliny the Elder said the Gauls developed at Alesia. Tinning simply requires the object to be dipped in molten tin (which has a lower melting point than copper alloy). Tinning was rarely undertaken on iron objects, although a plate of '*lorica segmentata*' from Xanten appears to have been treated in this way. Silvering is more complex and requires greater skills. Silver foil was beaten out by hand and attached to the object with a lead/tin solder. If the foil is missing, the remnants of this process are sometimes difficult to distinguish analytically from genuine tinning. In the early Principate, tinning was used for helmets, scabbard and belt fittings, cavalry harness, and even armour (brass scales from Ham Hill were alternately tinned). Silvering was used on cavalry equipment, particularly from the Claudian period onwards, and on other items that were normally tinned, such as belt-plates. The Mainz type sword from Rheingönheim, dated to the Augustan period, had a silvered handle and an inscription recording the fact: *L(ucius) Valerius fec(it) p(ondo) £(semuncia) (sicilicus) VII* ('Lucius Valerius made it, seven halves and one quarter of an ounce by weight': $3\frac{3}{4}$ Roman ounces, or 102 g).⁴⁵

Artefacts could also be sheathed in another metal purely for artifice. Early Imperial cavalry helmets, although made of iron, often had a sheathing of copper alloy over the bowl, embossed with hair and crown or circlet motifs. More substantial than foil, this was nevertheless a decorative, rather than protective, measure. Later Roman helmets were sheathed in gilded-silver, as were some shield-bosses (see Chapter 8). The 4th century London belt-fittings were tinned.⁴⁶

In the early Imperial period, niello inlay was used on belt and cavalry harness fittings, whilst metals (silver, brass, and gold) were used for inlaying dagger sheaths. From the 2nd century onwards, enamel inlay became very popular in the Roman army and is found employed on a wide range of fittings. It had earlier only really been popular for inlay on decorated dagger scabbards of the first half of the 1st century AD.⁴⁷

Embossing

Decoration that was not cast into copper alloys could be wrought, frequently using embossing (or 'raising') techniques. This is well illustrated by 1st-century AD belt-plates, which were placed face down on a pitch bed and worked from the rear (probably stamped); this technique was also employed for the copper Kingsholm cheek-piece sheath. Comparatively thin sheet metal was used in most cases and, rather than each piece being meticulously produced by a craftsman, there is some evidence for a degree of mass production employed by the army. More substantial items, like embossed helmets, might be raised from the rear initially, but the fine detail was applied from the front with gravers, chisels, and punches, again using a pitch backing.⁴⁸

Finished and unfinished items provide many clues to the *modus operandi* of the craftsmen, and the discovery at Colchester Sheepen of a belt-plate stamp (Fig. 149) is especially instructive. The stamp was a cast rectangle of leaded gunmetal (copper alloyed with tin, zinc, and lead) with a short, stubby shank projecting from its rear and four low lugs at each corner of its rear face. The front bore a series of hunt animals in high relief, processing around a central boss, whilst both the short sides were raised at the edge. The shank may have originally fitted into a wooden handle. Although it has been interpreted as a leather stamp, this object exactly matches the size and form of embossed belt-plates employing a hunt motif, found in Upper Germany, Noricum (especially Magdalensberg), and southern Britain. A similar stamp, used for producing the decorative bosses found on helmets and 'lorica segmentata', is known from Oulton.⁴⁹

Robinson suggested that such a stamp may have been used with a female former. Several rough belt-plates could be stamped into one piece of metal sheet at one time, cut out, and finished off. A complete example of a similar plate

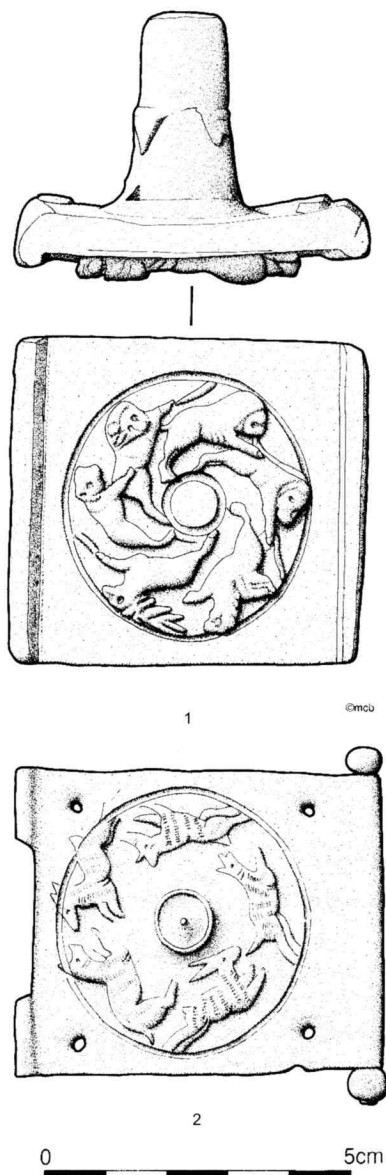


Figure 149: Belt-plate manufacture. 1 Stamp (Colchester Sheepen); 2 belt-plate of similar 'hunt' type (Magdalensberg).

from Chichester with additional light pouncing shows the sort of finishing touches that might be made.⁵⁰

Modern scholars have been all-too willing to elevate what must have been common items to the status of 'works of art', a good example of this tendency being the 'Sword of Tiberius', although the technology required to produce its embossed scabbard-plates was not particularly complex.⁵¹

Wood

Wood found many uses in the Roman world, and it is not surprising that the differing properties of various woods were understood and appreciated. The Elder Pliny specified which woods were preferred for which tasks, but scientific analysis provides more reliable information.⁵²

Part of the technology of wood lies not only in knowing how to use it, but also how to manage the raw material. Spear shafts, for example, had to be grown from coppiced stands of the favoured woods, usually ash, although hazel was also frequently employed. Poles were cut when they had reached the correct age for the desired diameter. Poles produced in this way benefited from the natural strength and flexibility of the tree, whereas a dowel cut from timber lacked these qualities and would have required more work to shape it. A *pilum* shaft had to be shaped, on the other hand, because it was manufactured in one, and the piece of wood had to be of the diameter of the broadest point, the expansion where the shank met the shaft.⁵³

Plywood was used in the construction of Roman shields. Both the Kasr al-Harit (birch) and Dura-Europos (plane) curved shields were made of three layers of wooden strips, laid at 90° to each other. This increased the strength of the shield board, because whichever way it was struck, the grain would always be running in two different directions, thereby reducing splitting. The inner and outer layers were horizontal, so the emphasis was on the effects of vertical blows. Structural integrity was further enhanced by the use of binding and covering materials. Certain types of woods were recommended by the Elder Pliny for shield construction, and examination of the Doncaster board has suggested that alder was used for the outer, vertical strips, and oak for the inner, horizontal ones.⁵⁴

Some of the Dura oval shields were constructed of plane wood planks glued edge-to-edge. No attempt at tongue-and-groove jointing was made, so the shields had to rely upon strengthening bars, rawhide binding, and the strength and elasticity of glue. Plank shields occur in northern European bog finds of the same period.⁵⁵

Wood was also used for sword handles, sword and dagger sheaths, tool handles, arrows, and practice weapons. Composite bows required a spliced, multi-part core, maple, mulberry and cornus being favoured in later periods. Timber was required for the construction of siege engines and artillery pieces.⁵⁶

Shields made of sticks woven through a sheet of rawhide were found at Dura and may either have been used by the Roman defenders or, perhaps more likely, by attacking Persian infantry. Wicker work was utilized for the construction of practice shields. These were designed to be double the weight of the normal battle shield, so probably had weighted frames. Vegetius discusses *scuta viminea* (made of osiers or wicker), whilst

scuta talaris are mentioned on an Egyptian papyrus, *talaria* being a (Greek loan) word for basketry.⁵⁷

Bone and Horn

Bone was used for sword handles (formed of three elements – pommel, grip, and handguard – riveted onto the tang). Grips were carved from cattle metapodia and were characteristically hexagonal in section during the Principate. Scabbard chapes and slides were made of bone from the late 2nd century onwards (see Chapter 7).⁵⁸

Composite bow laths were carved from antler and bone, keratin strips sawn from long, straight horns being glued to the wooden bow core. Caraboa and mouflon horn was used in later periods, and the unsuitability of European cattle horn may have presented supply problems in the Roman west. Horn was also used as a lamination in the construction of dagger handles.⁵⁹

Ivory was occasionally used for sword handles (there are literary references to this), scabbard slides, and chapes. The Khisfine sword scabbard was made entirely from it.⁶⁰

Leather and Sinew

Apart from tentage, leather was used for footwear, belts, baldrics, horse harness, shield covers, shield covering (actually attached to the face of the shield), sword and dagger sheaths, as ties for helmets and '*lorica segmentata*' (and internal straps for the latter), as backing for armour, and as items of personal equipment such as bags and purses. The evidence for leather clothing is minimal and Robinson demonstrated that leather armour was not shown on sculptural monuments. To be protective, it had to be hard rawhide and when Pliny the Elder discussed hippopotamus-skin armour, he said that it was useless when wet – a practical reason why leather armour was not used in the Roman army. Two 4th-century belts from Augst were made of goat leather, whilst a scabbard of goatskin was found at Deurne (see Chapter 8).⁶¹

Particular types of leather seem to have been used for specific purposes. Recent detailed work has confirmed that, as with their metalwork, the Roman army frequently repaired and recycled its leatherwork.⁶²

The discovery of intact portions of tents at Vindolanda has shown how carefully panels of goat leather were joined together with a range of ingenious seams which ensured water run off, not penetration. The size of panels was dictated by the available individual goat-hides. Each tent required some 70 hides, so to put a *cohors quingenaria* '*sub pellibus*' would require the lives of more than 4,200 goats, and a legion something in excess of 46,000!⁶³

Although the excavation of waterlogged sites has greatly added to our knowledge of Roman military leatherwork, it seems fairly certain that it cannot tell us the whole story. The leather from such sites is usually prepared by vegetable tanning, but this is not the only technique available. Oiled or alum-tawed leather could have been used for belts and horse harness, items which have not yet been identified in the archaeological record (a fragment of horse harness survives only as a corrosion product on the rear face of a cavalry *phalera* from Xanten). Where straps have been identified, as with the

Xanten *phalera* or on the apron strap from Mainz, stitching ran along either edge to help prevent undue stretching of the leather.⁶⁴

One of the Vindolanda tablets mentions a transaction involving 100 pounds of sinew, which was the recommended material for artillery torsion coils. Under siege conditions, however, resort might be made to women's hair. The sinew had to be made into sinew-cord and then stretched on a special machine before it could be fitted to a catapult frame.⁶⁵

Strips of glue-impregnated sinew were attached to composite bow cores on the opposite side to the horn. Analogy with later practices and modern reconstruction work suggests that cattle and deer leg-tendons were most suitable. Neck-tendons were used to bind the bow-stave overall, and covered with bark and paint for further weather-proofing. Sinew whipping was used to attach arrow-heads to stele. Sinews and fish products were also boiled down to make glue, being necessary for shield and composite bow construction. Oozed, solidified glue survives on a completely preserved Roman(?) bow ear from Egypt. Heads and fletchings were secured to arrows from Dura-Europos using sinew whipping and glue, and from Nydam using whipping and birch tar.⁶⁶

Techno-borrowings

One of the great strengths of the Roman army was its willingness and ability to learn from contacts with enemies who possessed some sort of technological superiority. Thus, by the 1st century AD, much of the equipment of a soldier was derived from enemies of earlier days. The Montefortino-type helmets of the Republican period were descended from Iron Age models current in central Europe. Likewise, the Coolus and Imperial-Gallic types came from Celtic ancestry, but developed comparatively rapidly once in Roman use. 'Native' helmets were made with a brim that went around the entire lower edge and sometimes had neck-guards riveted onto the back of the helmet; the Romans forged the helmet bowl and neck-guard in one piece (difficult to accomplish competently with an iron helmet). Further modifications seem to have been made to meet particular shortcomings – the brow-guard added to protect against downward blows to the face; guards to protect the ears; neck-guards enlarged and angled to protect the back of the soldier's neck. When the large state *fabricae* centralized production of equipment from the late 3rd century, the new easily-manufactured, simple multi-part helmets they made were probably modelled on types used in Mesopotamia (see Chapter 8).⁶⁷

Body armour forms were borrowed, particularly ring mail from Celtic peoples (who probably invented it), and scale armour, which had a long history in Greece and the East. The origins of segmental armour, on the other hand, are far more obscure. Gladiatorial equipment included segmental armguards, and similar armour is shown in Hellenistic sculpture, but nobody before the Principate appears to have made a complete segmental cuirass. In fact, even that may have come to the Roman army from the arena.⁶⁸

Flat shields of the type associated with auxiliaries and shown on tombstones and propaganda monuments were probably brought into the army by Celtic and Germanic

auxiliaries, but the origins of the curved legionary body shield are more complex. Whilst the Etruscans used the dished, circular Greek hoplite shield, they also appear to have had oval and rectangular shields which, it has been argued, were ancestors of the Republican curved shield.⁶⁹

Both the short infantry sword and the long cavalry *spatha* had foreign origins. The *gladius Hispaniensis* seems to have been descended from Spanish prototypes as classical authors insist. Likewise, the *spatha* closely resembles Celtic slashing swords, and commentators attribute its origin to this quarter.⁷⁰

The question of the origin of the *pilum* has long been disputed. Links with both Iberian *soliferrae* and Etruscan antecedents have been suggested.⁷¹

Artillery was one of the few pieces of equipment which the Romans took over (and retained) from Hellenistic Greek military science, and they were initially dependent on the Greeks in the sphere of military theory and siege technique. However, as with so much 'copying' of Greek culture and technology, through experimentation and experience, the Romans developed and improved on what they inherited. This is especially true in the field of bolt-shooting artillery.⁷²

Finds of ear and grip-laths on Roman military sites throughout the Imperial period demonstrate the use of composite bows of Asiatic and Levantine type. The literary and epigraphic evidence points to the Roman employment of Levantine archers, and thus eastern variations of composite bow construction (see Chapter 10). When new bow designs were brought in from Asia during the 4th century by the Huns, they were adopted by Roman forces as a matter of urgency.⁷³

Composite bows had a thin core of wood to give the basic proportions, a layer of sawn horn strips on the surface facing the archer (the belly) and glue-impregnated sinew on that facing the target (the back). When such a bow was drawn, the string pulled back the ears, the horn belly was compressed and the sinew back was stretched. When the string was released the constituents returned to equilibrium with tremendous force and projected the arrow towards the point of aim. Grip-laths served to prevent the handle bending when the bow was drawn, and thus 'kicking' when the stave came to rest, causing inaccurate shooting. On the ends of the stave, ear-laths functioned mechanically as rigid levers bending back the flexible sections of each limb. A purely wooden stave would have been snapped by this action.⁷⁴

All of these examples illustrate processes whereby Roman forces borrowed the technology of other peoples. Once adopted, the equipment continued to evolve within a cultural and institutional framework which allows the umbrella term 'Roman' to be applied to it.

Notes

1. Central production: Cf. Toynbee and Clarke 1948, 21–2. Private production: Parker 1928, 218 n.1; MacMullen 1960; Wierschowsky 1984, 173–203.
2. Diod. Sic. XIV,41–3.
3. New Carthage: Livy XXVI,47. Carthage: Appian VIII,93.
4. Sertorius: Schlesinger and Geer 1959, 188–90, Frag. 18. Piso: Cicero, *In Piso* 87. Contracts: Livy XXVII,10; Appian XXX,3.

5. Mutz 1987.
6. MacMullen: 1960, 25. Corbridge: *ibid.* 28–9.
7. Robinson: 1975, 8; Oldenstein: 1974; 1976, 68–75; 1985. Metalworkers: Robinson 1977, 558–9. Camps: Webster in Niblett 1985, 114.
8. Vegetius: II, 11.
9. Cf. Oldenstein 1974.
10. Rheingönheim: Ulbert 1969a, 10, Pls. 59, 61. Sheepen: Niblett 1985, 112; Hawkes and Hull 1947, 346, Fig. 65, Musty 1975. Smithing hearths: Manning 1976b, 143–4. Haltern: *MAKW* 5, Pl. XXXIX, 2.
11. Oberstimm and Valkenburg: Schönberger 1979; Groenman-van Waateringe 1991.
12. Pitts and St Joseph 1985, 105–15.
13. Bidwell 1980, 31–5.
14. Ritterling 1904, 8–14, Pls. I–II; 1913, 59–65, Pl. III.
15. Magdalensberg: Dolenz *et al.* 1995.
16. Neuss: von Petrikovits 1961, 479. Kingsholm: Hurst 1985, 95–6. Sheepen: Hawkes and Hull 1947, 93, 341, 346.
17. Papyrus (P. Berlin inv. 6765): Bruckner and Marichal 1979, No. 409.
18. Bowman and Thomas 1983, No. 1.
19. *Digest* 50, 6, 7; Vegetius: II, 11.
20. *Scutarii*: Bowman and Thomas 1983, No. 3; *AE* 1926, No. 3. *Gladiarii*: *CIL* XIII, 11504; Bowman and Thomas 1983, No. 3.
21. Bow production: Coulston 1985, 248–59. Caerleon and Corbridge: *ibid.* 226, 229. Micia: Petculescu 1991b, 10; 2002, 765. Intercisa: Salamon 1976, 50. Turin: *N.D.*, *Oc.* XI, 28.
22. Vindonissa: Ertlanger and Hartmann 1984, 7–8. Strasbourg: *ibid.*, 38; Forrer 1927, Pl. LXXV, A. Oberammergau: Ulbert 1971.
23. Bonis 1986; Benca and Petrovsky 1987; Petculescu 1991b.
24. Blankets: Lewis and Reinhold 1966, 515–6 (P. Berlin 1564). Shafts: Speidel 1981. Tacitus: *Hist.* II, 82; Dio: LXIX, 12, 2. Cities: Hodgson 1989. New legions: Mann 1963.
25. Avitus: *CIL* XIII, 2828. Annianus: *CIL* XIII, 6763.
26. *N.D.*, *Or.* IX, 18–39; *Oc.* XI, 16–39. James 1988, Figs. 4–6.
27. *Ibid.*, 262–5.
28. *Ibid.*, 265–73.
29. Belt fittings: Sommer 1984, Fig. i. Intercisa: Salamon 1976. Housesteads: Bosanquet 1904, 224–5, 290–1. Novae: Sarnowski 1985.
30. Inadequate weapons: Polyb. II, 33. Philon: 71, in Marsden 1971, 141–2. *Suda* s.v. 'machaira'. Cf. Pleiner 1993, 157–64.
31. Lang 1988.
32. Biborski *et al.* 1985.
33. *Ibid.* 73–80; Maryon 1960; Rosenquist 1967–68, 164–89; Engelhardt 1865, Pls. VI–VII; Jørgensen *et al.* 2003, 268; Bennett *et al.* 1982, 189. Cf. Pleiner 1993, 117–8, 123, 126, 142–3, 167.
34. Soft armour: Williams 1977, 77. Design: Allason-Jones and Bishop 1988, 100–2. Hard armour: Sim 1998. Recent analysis: Sim pers. comm.
35. Stamped: Robinson 1975, 164. Coppergate: Tweddle 1992, 999–1011. Newstead: Curle 1911, 161. Danish: Engelhardt 1863, 26. Carlingwark: Piggott 1951–53, C74. Roman date: Manning 1972, 233; Robinson 1975, 171–3. Filing: Sim 1997.
36. Paddock 1985, 147.
37. Spinning helmets: Paddock 1985, 146. Spun bosses: Thomas 1971, 34, 37, 38.
38. Augustus: Kent 1978, 19. Nature: Caley 1964; Craddock 1978. Zinc content: Musty 1975, 411. 'Low brass' and 'red brass': Bishop 2002, 77. Cementation: Caley 1964, 93–4. Sheepen: Musty 1975.
39. '*Lorica segmentata*': Bishop 1989d, Table 2 Nos. 3, 7, 9; 2002, 77. Rivets: *ibid.* 1989d Nos. 4 and 8; Bishop 2002, 77. Lead: *loc. cit.* No. 2; *id.* 1989c, 13.
40. Alloys: Bayley in Niblett 1985, 115. Trace elements: cf. Craddock and Lambert in Jenkins 1985, 162.
41. Lost-wax: Tylecote 1962, 110. Two-part mould: *ibid.*, 107–10. Nijmegen: Bogaers and Haalebos 1975, 156, Pl. LII, 1a–d. Alesia: Rabeisen 1990, 75. Moulds: Bonis 1986, Fig. 1, 1; Benca and Petrovsky 1987, Fig. 5, 4–9; Sommer 1984, Fig. i, 5; Frisch and Toll 1949, Pl. IX, 35. Unfinished: Petculescu 1991b, Figs. 1–2; Sommer 1984, Fig. i, 4; Bonis 1986, Fig. 2, 1–6. Trial: *ibid.*, Fig. 3; Sommer 1984, Fig. i, 1.
42. Handlesbank 1989, Monatsbild Januar.

43. *Paterae*: den Boesterd and Hoekstra 1965, 106–7. Other alloys: Dungworth 1997, type.html#xtocid19557. *Orichalcum* monopoly: *ibid.*, culture.html#xtocid19571. Buch shape: pers. comm. cohorts V Gallorum. London: pers. comm. Dr S. James.
44. Rollason 1961, 127–8; Bishop 2002, 80–1.
45. Alesia: Pliny *NH* XXXIV,48. Tinning: Brown 1976, 39. Xanten: Schalles and Schreiter 1993, 50, 228, Taf. 47,84. Silvering: Craddock *et al.* 1973, 16. Helmets: Oldenstein 1990, 27. Scabbards: Ettlinger and Hartmann 1984, 8. Belts: Rupprecht 1987, 223. Harness: Hassall 1980, 343. Ham Hill: Webster 1958, No. 105, Pl. XI,c. Silvered: Jenkins 1985, 145 (Xanten). Belts: Morel and Bosman 1989, 180. Rheingönheim sword: Ulbert 1969a, 44–5.
46. Sheathing: Klumbach 1974, No. 32. London: pers. comm. Dr S. James.
47. Niello: La Niece 1983. Belts: Grew and Griffiths 1991, 56–60. Cavalry: Craddock *et al.* 1973, 14–15. Sheaths: Scott 1985, 168. Enamel: Bateson 1981, 54–5. Scabbards: Scott 1985, 168.
48. Embossing: Brown 1976, 37–9. Belts: Grew and Griffiths 1991, 54. Kingsholm: Robinson in Hurst 1975, 287–9. Cavalry: Robinson 1975, 110.
49. Stamp: Niblett 1985, Fig. 66,61, Pl. 14. Cf. Robinson in Hurst 1975, 288. Composition: Bayley in Niblett 1985, 115. Belt-plates: Böhme in Schönberger 1978, 218–22, Fig. 76; Deschler-Erb *et al.* 1991, 142, Fig. 16. Magdalensberg: Deimel 1987, Pl. 77,13; cf. 77,14. Oulton: Jackson 1990.
50. Pitch: Robinson in Hurst 1975, 288. Former: *loc. cit.* Chichester: Down 1978, Fig. 10.30,13.
51. Lippold 1952.
52. Pliny: *NH* XVI,186–219, 222–33. Analysis: E.g. Allason-Jones and Bishop 1988, Nos.26, 31, 38.
53. Wood and timber: Rackham 1986, 67. Coppicing: *loc. cit.*, Fig. 5.1. Ash: Allason-Jones in Bishop and Dore 1989, 193, Nos.9 and 18; cf. Pliny *NH* XVI,159. Hazel: Tagg in Curle 1911, 360, Table II. Characteristics: Taylor 1981, 45–6 (ash); 50 (hazel). *Pilum*: Albrecht 1942, Pl. 48.
54. Kasr al-Harit: Kimmig 1940, 106–8. Dura: Rostovtzeff *et al.* 1936, 456–7; James 2004, 162–3. Rawhide: Rostovtzeff *et al.* 1936, 457. Guttering: *RLÖ* II, Pl. 24,1–4. Doncaster: Buckland 1978, 251, 268–9.
55. Dura: Rostovtzeff *et al.* 1939, 328–30; James 2004, 160–2. Bog: Raddatz 1987, 34–57, Figs. 21–2, Pls. 84 and 85,1.
56. Handles: Fellman 1966. Sheaths: Ulbert 1969b, 98; Bonnamour 1990, No.103. Dagger: Scott 1985, 165; Gerhartl-Witteveen and Hubrecht 1990, No.10, Fig. 12,A. Tool: Tagg in Curle 1911, 360, Table II. Arrows: Coulston 1985, 266–8. Practice weapons: Veg. I,11; I,14. Bows: Coulston 1985, 250. Engines: Veg. IV,14–18. Artillery: Amm. XXIII,4,4.
57. Dura: Baur and Rostovtzeff 1929, 16–17, Fig. 4; James 2004, 163, 169–70, Cat. No. 635–8. Cf. Amm, 24.2.10. Cf. Amm. XXIV,6,8. Wicker: Veg. I,11. Egypt: Bruckner and Marichal 1979, No.409.
58. Pommels: Oldenstein 1976, 92, 240, Pls. 10–11. Handgrips: Greep 1983, 20. Guards: Oldenstein 1976, 94–5, 241, Pl. 11.
59. Laths: Coulston 1985, 224–34, 251. Horn: *ibid.*, 252. Dagger handles: Ypey 1960–61, 347.
60. Handles: Braat 1967, No. 1, Pls. II,1–2; *HA, Hadrianus* X,5 Scabbard: Trousdale 1975, 236, Pls. 18–19; Gogräfe and Chehadé 1999, 75–6, Fig. 2–4.
61. Tents: van Driel-Murray 1990; 1991; Padley and Winterbottom 1991, 251–307, Fig. 223. Footwear: *id.* 1986a, 140–4; Groenman-van Waateringe 1967, 129–46; Göpfrich 1986, 16–25. Baldrics: Oldenstein 1976, 228. Horse harness: Jenkins 1985, 148, Pl. X,B. Shield covers: Groenman-van Waateringe 1967, 52–72; van Driel-Murray 1986a, 139–40; 1988. Covering: Rostovtzeff *et al.* 1936, 457; Buckland 1978, 256, 269. Sword sheaths: Klumbach 1973, 73. Dagger: Scott 1985, 165. '*Lorica segmentata*' ties: Robinson 1975, 181. Helmet ties: *ibid.*, 14. Armour straps: Robinson 1975, 177. Backing: *ibid.*, 156–7; pers. obs. (Vindonissa Museum). Personal items: Robertson *et al.* 1975, Fig. 28,39; Klumbach 1973, 72–3, Fig. 11. Leather armour: Robinson 1975, 164–9; Pliny *NH* VIII,9,5. Augst: Sommer 1984, 4.
62. Van Driel-Murray and Gechter 1983, 19.
63. Van Driel-Murray 1990. Seams: *ibid.*, 116, Fig. 4. Numbers: van Driel-Murray 1991, 118; Coulston 2001a, 110.
64. Oiled: 44, 69 n.1. Xanten *phalera*: Jenkins 1985, Pl.X,B. Mainz strap: *AuhV* 2, Heft X, Pl.4,2.
65. Vindolanda: Bowman *et al.* 1990, 43, line 3; cf. Birley 1991, 92. Artillery: Marsden 1969, 87–8. Sinew recommended: Veg. IV,9. Hair: *loc. cit.*; Marsden 1969, 83. Frame: Birley 1991, 92.
66. Coulston 1985, 233–4, 250–1, 253–5. Arrows: James 2004, 195–6; Jørgensen *et al.* 2003, 269–70.
67. Montefortino ancestry: Robinson 1975, 13. Coolus: *ibid.*, 26; Imperial-Gallic: *ibid.*, 45; Connolly 1989a.
68. Celtic: Varro V,116. East: Robinson 1975, 153. Greece: Connolly 1981, 58. Armguards: Gamber 1968, Fig. 10; Grant 1967, Pls. 4–6.

69. Celtic: cf. Stary 1981. Hoplite shield: Connolly 1981, 97. Rectangular: *ibid.*, 95–6.
70. *Suda*, s.v. '*machaira*'; Polyb. VI.25. Prototypes: Sandars 1913, 228–31; Sanz 1997, 62–5. *Spatha*: Curle 1911, 184; Connolly 1981, 236; 1993, 28; Pleiner 1993.
71. Origin: Reinach 1907; Schulten 1911; Sanz 1997, 325–43. *Solliferrea*: Sandars 1913, 272–6, Figs. 44–6, Pl. XIX; Sanz 1997, 308–25. Etruscan: Connolly 1981, 100.
72. Artillery: Marsden 1969, 174. Theory and technology: Marsden 1971; Lendle 1975; Stoll 1998; La Regina 1999; Baatz 1999.
73. Bivar 1972, 281–6; Coulston 1985, 234–45; Syv  nne 2004, 31, 38–40.
74. Coulston 1985, 245–8.

10 The Study of Military Equipment

The study of military equipment is not just about the development of weaponry and ever more efficient means of inflicting slaughter. In fact, we would argue that that is its least important aspect, for it is a valuable window onto the cultural influences and interactions, personal tastes and abilities of the ordinary Roman soldier. When all is said and done, it is not the weapons themselves, whether they be *pila*, Brown Bess muskets, or 'smart bombs', but what is done with them that determines the course of history and affects the lives of the many: the hardware is always just a means to an end and should be studied in precisely that context.

The Identity of Roman Soldiers

In connection with military equipment, the 'identity' of Roman soldiers can have a number of meanings. It may refer to the identity of soldiers as military men with their own language of rank and position within the armed forces community. It may situate soldiers within the broader world of Roman society, and in some ways bridge the divide between 'Roman' and 'barbarian', both as perceived by the Roman elites but also on the ground within the material cultural realities of the frontier zones. More prosaically, for archaeologists and specific sites, there is the possibility that military equipment might help to identify types of military formations, to define their functions, and to characterise their cultural affinities.

In a real sense, the ownership of military equipment and the legal right to bear weapons, beyond the narrow bounds allowed to civilians, defined the soldier in Roman society. Dark coloured leggings or trousers were practical for dirty work and riding. That cloaks appear brown in all periods suggests the waterproofing and insulation of unbleached wool with the natural oils retained. Against these dark backgrounds white tunics with decorative ornament and brightly polished, tinned and gilded metalwork would have stood out prominently. Clothing worn by military men in Europe up to the second half of the 17th century AD was part of general contemporary dress fashion, and thus usually distinguishable from civilian attire only perhaps by its quality. There is no evidence to suggest that textile colours, or any form of 'uniform' in the modern sense, was used to identify the Roman soldier. Rather it was the military equipment which visually proclaimed his identity.

The soldier enjoyed a privileged, well-paid position in Roman society, one which, if the literary and sub-literary sources are to be believed, was generally abused at the expense of civilians! Soldiers probably spent only a small proportion of their time actually wearing armour and carrying shields and shafted weapons. Thus the 'unarmoured' convention in the representational sources, especially on gravestones, is readily understandable. Wearing only tunic, cloak and trousers (depending on region and period) the soldier could most obviously advertise his status by carrying a sword suspended from the variety of belt types dealt with in earlier chapters. The lavish

decoration and multiplicity of belt-fittings may thus be accounted for in terms of display. Moreover, the importance of the characteristic metallic noises made by such equipment should not be under-estimated. Hob-nailed *caligae* were remarked upon by Roman writers for, as with the rowel-spurs, jingling scabbard-fittings and crunching jack-boots of later periods, they may have contributed audibly to the soldier's 'presence'. Metalwork, white tunics, ornate embroidery and at least the suggestion of rich dyes bespoke wealth, and they drew attention to the soldier's person.¹

First- to 2nd-century 'aprons' served no significant protective function, and indeed could have been a liability to the running soldier. Similarly, the strap-ends of 3rd- to 4th-century belts were lengthened for display, not practical purposes. Paired 3rd-century terminals would have clinked together and contemporary representations often show the wearer nonchalantly holding (and perhaps twirling?) the strap-ends by his side. In the 4th century the militarization of government service naturally involved an extension of military belt use. Belts were employed as badges of office which could be conferred or confiscated with changing imperial favour.²

Soldiers of all periods have used equipment, attire, and jargon to form their own society, separated from the wider civilian context. Within the Roman version of this military sub-culture the regional differences in equipment detail may have provided a subtle language of unit or army-group identification and personal status (not necessarily synonymous with rank). More overtly, rank would have been signalled by differing staffs, crests and shafted weapons. Whilst auxiliary cavalry had 'sports' armour, other troops did not have duplicate 'parade' equipment, as such. For special events, such as Titus' pay parade during the siege of Jerusalem, the soldiers removed the protective covers from their armour and the cavalry led their mounts decorated in all their trappings. All these visual traits, together with an epigraphic testimonial, were advertised through the medium of figural gravestones, whereby in death the soldier could gaze out to remind the living of his proud service achievement.³

The topic of legionary and auxiliary differentiation is frequently discussed, but the ability of modern scholars to identify specific units of the Roman army from their equipment is only now beginning to reveal something of its potential.

Legionary and Auxiliary Equipment

It has been a long-standing tacit assumption that auxiliary and legionary soldiers were differently equipped. This notion is founded on Trajan's Column, which shows several types of troops in Roman use, particularly two distinct classes of infantry. On the one hand there are those equipped with curved, rectangular shields, segmental armour, and practising engineering and specialist duties; on the other, there are those with flat oval shields, mail shirts, and leggings. Suffice to say, the men in segmental armour perform tasks expected of legionary troops and are associated with legionary and Praetorian standards. The other class of infantry are identical to cavalrymen with horses, so they may be identified as auxiliary infantry. But there are assumptions behind assumptions here: we have already seen that there are problems with the accuracy of the Column in its strictest sense. Might the supposed differentiation be

symbolic and part of the greater scheme of the frieze? Most importantly, why should there be any attempt to differentiate?⁴

In considering the finds from Rißtissen, Ulbert first voiced misgivings about the discovery of large amounts of '*lorica segmentata*', the type of cuirass usually identified with the supposed legionaries on Trajan's Column. It seemed out of place in what ought to have been an auxiliary fort. Later, in his report on the excavations at the so-called 'vexillation fortress' of Longthorpe, Frere again remarked upon the presence of '*lorica segmentata*' and wondered whether it could not have been a cavalry cuirass. Maxfield took these doubts even further in 1986, to the point where she questioned whether there was any real distinction between legionary and auxiliary equipment at all.⁵

Summarizing the representational evidence, Maxfield noted that whilst legionaries and Praetorians were found in '*lorica segmentata*', no auxiliaries were shown thus, and, given the (to her mind) questionable nature of the evidence of the Column, she felt that 'the fact that the impression created by Trajan's Column is clearly erroneous, must leave open as to whether the auxiliary could be issued with *segmentata*'. When it came to the archaeological data, she felt that the amounts of fittings from segmental armour being recovered, particularly from the Danubian forts of Rißtissen, Aislingen, Hüfingen, and Oberstimm were too great to be explained away as originating with legionary building parties, although none of these had produced conclusive epigraphic evidence of their garrisons. Frankfurt-Heddernheim, on the other hand, had produced both '*lorica segmentata*' fittings and details of the auxiliary garrison, both infantry and cavalry. Moreover, the province of Raetia, within which the Danubian sites lay, had no legion of its own based there (at least until the reign of Marcus Aurelius). The nearest legions were those in Upper Germany, with responsibilities stretching from north of the Main to south of the Hochrhein.⁶

In re-examining this issue, we shall, for the time being, avoid resorting to the 'evidence' of Trajan's Column, precisely because it is such a contentious source. Nevertheless, it is apparent that an important key to the understanding of the legionary-auxiliary relationship lies not in the study of representational evidence for '*lorica segmentata*', which is virtually non-existent with a few possible (and debatable) exceptions before the 2nd century AD, but rather in the depiction of the armament of the respective troop types. In instances where figured 1st-century tombstones record the unit concerned and preserve their weapons, there can be no dispute: legionaries (such as Flavoleius Cordus at Mainz or Valerius Crispus at Wiesbaden) carry the *pilum* and the curved body shield (Fig. 3), whilst auxiliary infantrymen (such as Annaius Daverzus from Bingen or Firmus at Bonn) have spears (usually two) and a flat shield (Fig. 150). Now both auxiliary and legionary shields can be oval or rectangular, but the essential difference lies in their curvature.⁷

There is thus a germ of truth in equipment differentiation between legionaries and auxiliaries, and when we broaden the scope of enquiry to include other representational sources, we do not find it contradicted. The pairing of *pilum* and curved shield, spear and flat shield is everywhere evident. It is to be found on fragmentary tombstones which have lost their inscriptions, on the Mainz column bases (Fig. 5), and on the Adamclisi metopes (Fig. 53). Whether this was originally the case on Trajan's

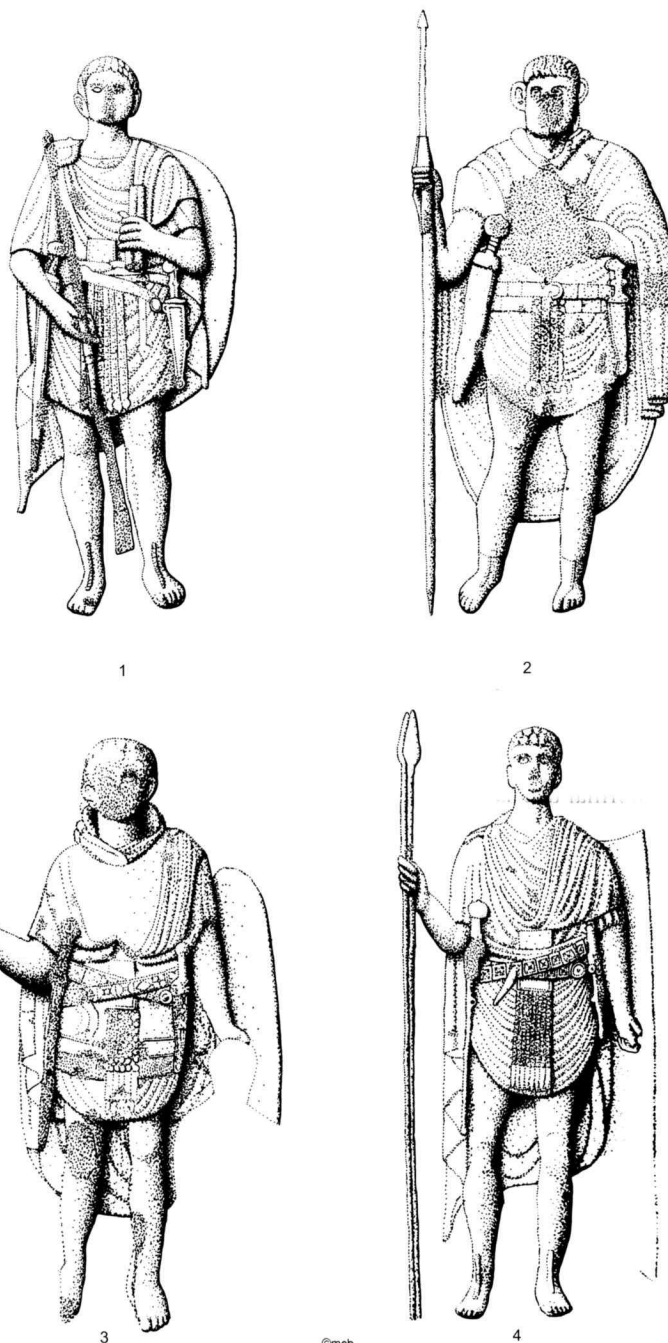


Figure 150: Tombstones of legionaries (top) and auxiliaries (below). 1 *Flavoleius Cordus*, legio XIV Gemina (Mainz); 2 *Petilius Secundus*, legio XV Primigenia (Bonn); 3 *Firmus*, cohors Raetorum (Bonn); 4 *Anniaus Daxerzus*, cohors IV Delmatarum (Bingerbrück). (Not to scale.)

Column is no longer capable of proof, since the weapons on that monument were inserted separately in bronze and have long since vanished (Pl. 8c). The association of curved shields with segmental armour and flat shields with mail nevertheless remains.⁸

One of the best-known Mainz column bases depicts a running infantryman who holds one spear in his hand, with two more retained behind his flat oval shield (Fig. 5,a). Other bases show soldiers with curved body shields, one with his sword drawn in the approved offensive posture and a companion with a shouldered *pilum* (Fig. 5b); on another relief a marching soldier also has a shouldered *pilum* and curved shield (Fig. 5d). The Adamclisi metopes depict soldiers equipped with curved body shields, articulated armguards, and either short swords or *pila*.⁹

Amongst the archaeological evidence, the only curved shield boss to bear an inscription that betrays its unit, that from the River Tyne, belonged to Iunius Dubitatus of *legio VIII Augusta* (Fig. 49). A fragmentary twin piece, found at Vindonissa, bears the same motifs and totemic bull, and so presumably belonged to the same legion.¹⁰

The distinction between legionaries and auxiliaries that is apparent from the representational evidence was a functional one. The *pilum* was a short range, armour-piercing, shock weapon, thrown shortly before physical contact was made between the Roman line and its foe; the curved shield was the defence of an infantryman who fought in close order, but who was concentrating his interest in front and to the right, effectively enabling him to ignore his left side. This would be protected by the man to his left (it was not the sort of shield for forming an overlapping shield wall). Legionaries are further associated with the *pilum* by the literary sources.¹¹

The spears carried by an auxiliary infantryman (and carrying more than one is indicative of their normal use as missiles) and the flat shield were, on the other hand, dual purpose. Such a soldier could equally well skirmish in open order, hurling spears to harry an enemy, deflecting enemy missiles with his shield, as he could fight in line, either with overlapping shield and projecting spear, or with his flank covered by the shield and with his short sword for stabbing. The legionary was thus equipped as a specialist for one particular type of combat – the set-piece battle with both sides arrayed in textbook formations – whereas the auxiliary was adaptable to a variety of combat scenarios, from a role similar to that of the legionary (and here we may recall the Batavians at Mons Graupius) to skirmishing and more general policing duties.¹²

There are numerous literary references to the legions providing close-order troops whilst the *auxilia* supplied screening and flanking forces, as well as missile support. Although it is always wise to be wary of Tacitus' literary flourishes, he contrasts the formations of the legionaries and auxiliaries before the battle of Placentia in AD 69 as '*densum legionum agmen, sparsa auxiliorum*'. Furthermore, this is graphically illustrated in Arrian's order of battle against the invading Alani, where the enemy assault was to be countered by auxiliary missiles, then repulsed by the legionary centre, and finally cautiously pursued by auxiliary cavalry and infantry.¹³

Vegetius, in a passage which Schenk suggested derived from the 1st-century encyclopaedist Celsus, records that 'the *auxilia* were always connected with the legions in line of battle as light troops (*levis armatura*), so that fighting in this way, they should have been a greater support than the main reserves.'¹⁴

The reality of equipment differentiation is also explicitly stated by Tacitus, describing events in Rome during Otho's coup of AD 69:

'He then ordered the *armamentarium* to be opened. Weapons were promptly carried off without regard for military custom and rank, which distinguished the praetorian from the legionary by their *insignia*. Helmets and shields meant for auxiliaries added to the confusion.'¹⁵

Even if this is a construction purely for literary effect, we must not lose sight of the fact that there is no representational evidence that it was ever used by auxiliary infantry, something that Maxfield admitted. Moreover, the function of segmental armour was highly specialized. It offered a lighter defence than mail, with special attention paid to the protection of the shoulders from downward blows, a characteristic of combat with an enemy using long swords – the peoples of Northern Europe. In line, the soldier's torso was concealed behind his shield and only vulnerable around the head and shoulders from such blows; Roman helmets were designed to deflect these blows, so they had to be taken on the shoulders. Mail, even with shoulder doubling and the padded shoulders which we now suspect had to be worn with it, would be inferior to curved plate armour with its energy-absorbing properties. The trunk, with its overlapping girth plates, was protected, but not nearly as well as the shoulders; in one-to-one combat or in skirmishing, the possibility of penetration by missiles or thrusts can have been little different to that of mail, although deflection was probably enhanced by the curvature of the plates. Mail offers more even protection over the whole of the body; whilst its weight handicap over segmental armour cannot be denied, this is hardly a consideration in its supply to troops. The manufacture of mail is undeniably easier and less specialized than '*lorica segmentata*', even if it was composed of a mixture of riveted and welded rings (see Chapter 5). '*Lorica segmentata*' was over-engineered and undeniably prone to fall apart (see Chapter 9).¹⁶

All of the sites Maxfield considered when studying '*lorica segmentata*' have also produced either *pilum* heads or catapult bolts, and usually both. Now, as we have seen, there is little room for doubt that the *pilum* was a legionary weapon, and Baatz has argued that artillery (in the 1st century AD, at least) was exclusively legionary, so it is difficult to counter the assertion that the recovery of these two classes of artefact is indicative of a legionary presence in some form. The implications of this are profound, for as Maxfield admitted:

'To postulate a small legionary detachment for each of these sites implies the extreme fragmentation of units designed to function with an establishment strength of about 5000 men.'¹⁷

Accepted notions about Roman garrisoning behaviour, which can be summarized simplistically as legionaries in legionary bases, auxiliaries in forts, are in fact a stereotypical impression derived from perceived 2nd century and later military 'policy'. Projecting this backwards into the 1st century, still assuming legionaries belonged in fortresses, auxiliaries in forts, runs counter to the literary, epigraphic, and

archaeological evidence. The surprise engendered by the discovery in Britain of so-called 'vexillation fortresses', seemingly designed for mixed part-units, would surely have been tempered if it was thought that it was standard practice for the Roman army to brigade infantry with cavalry, auxiliaries with legionaries, both in time of war (when it made most sense), and in post-conflict military policing of an area. The detachment of legionary units and even parts of auxiliary regiments is well attested during the Tiberian war against Tacfarinas, and later by *legio III Augusta* (also in North Africa), as well as elsewhere in the epigraphic and sub-literary sources.¹⁸

It is now possible to see that, on Trajan's Column, the distinction between Praetorian/legionary and auxiliary troops, or rather citizens and non-citizens, was deliberately signposted for the viewing audience by distinctions in equipment, but that these differences reflected the true state of affairs. The technical skills of citizen forces were played up whilst the auxiliaries bore the brunt of the fighting in order to glorify Trajan and his army in traditional manner.¹⁹

None of this serves to prove that auxiliary infantry did not wear '*lorica segmentata*', but at the same time there is no unequivocal evidence to show that they did. Whilst it would be foolish to say that auxiliary infantry *never* used segmental armour, we might venture to suggest that it was normally only found as the armour of certain legions, notably those facing enemies whose style of fighting posed a particular threat to the head and shoulders of the line infantryman.

Ironically, there are areas where differentiation is harder to demonstrate. Roman marines appear to have been equipped in a similar fashion to land forces, excavation in the naval base at Köln-Alteburg producing a familiar range of items, late-1st to early-2nd-century tombstones confirming this impression. The figural tombstone of a member of the *classis Ravennensis* has been recently discovered at Classe. The deceased is depicted wearing a cuirass and holding a weighted *pilum* and an oval shield. Moreover, if the suggestion that some of the military equipment from Bay of Naples sites may derive from the presence of marines of the *classis Misensis* is correct, the similarities would render it impossible to distinguish fleet from land forces by their equipment alone, without some other clue (such as presence within a known naval base or Pliny the Younger's description of the eruption of Vesuvius), and even that can seldom prove definitive. This would also explain why it was possible to raise land units (notably *legiones I* and *II Adiutrix*) from naval forces and must strengthen the case for identifying the Herculaneum soldier as a marine.²⁰

Similarly, our evidence suggests that, by the early 3rd century, differentiation between legionaries and auxiliaries had practically disappeared. The long sword was brought in as the sidearm of infantry and the flat, if slightly domed, oval shield became the normal equipment for both troop types. '*Lorica segmentata*' continued in use during the 3rd century, as did the *pilum*, although the latter appears to have undergone several name changes. Nevertheless, the implications seem to be that the fighting styles of legionaries and auxiliaries were coming closer together, preferring the versatility of the earlier auxiliary style of weaponry to the specialized legionary heavy infantryman of old. New light troop types began to be incorporated within the legion, echoing the Republican practice.

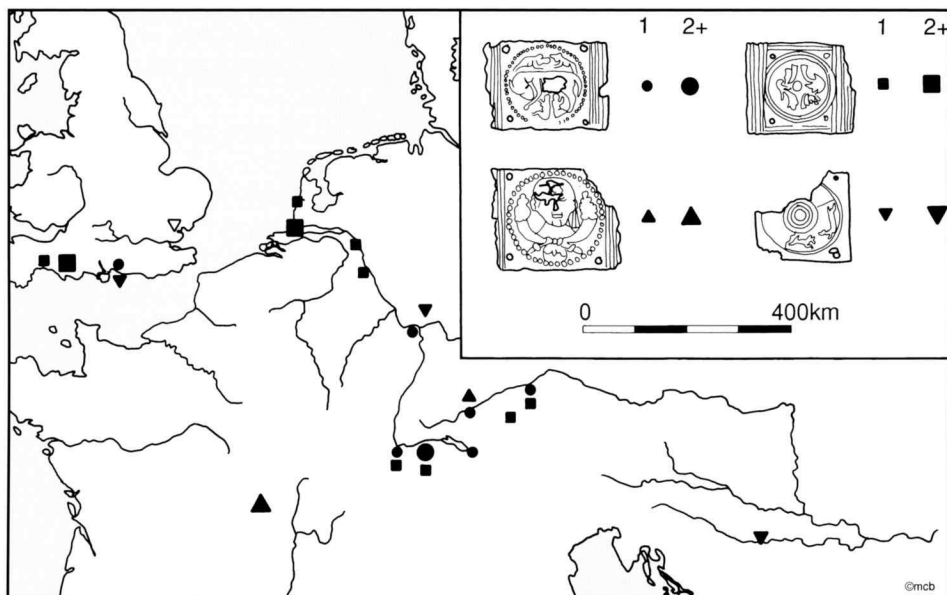


Figure 151: Distribution map of early Principate embossed belt-plates.

Unit Identity

It has long been known that cavalry equipment could be distinguished amongst the finds from Roman sites, and comparison of funerary sculpture has helped in the interpretation of this material. However, the possibility that particular cavalry units might have identifiable traits in their equipment is of immense importance to students of the disposition and movements of the army. The same is true of infantry units and, whilst the initial work is only now being carried out, some examples might be quoted to demonstrate the specificity of equipment to units. There are many caveats here, however, given the small number of items with which the scholar is usually dealing and the unreliability of the archaeological record.²¹

The known distribution of embossed belt-plates of the 1st century AD reveals a marked emphasis on material from Upper Germany (although this is partly a product of the unusually high archaeological activity in that area in recent years), with a few examples from Lower Germany (Fig. 151). When we come to examine Britain, however, it is soon apparent that the distribution is limited to southern (and south-western) England, more or less corresponding to the area covered by *legio II Augusta*, especially during the initial phases of the conquest. The sites at Chichester, Waddon Hill and Hod Hill have all produced them, whilst the belt-plate stamp from Colchester Sheepen belongs in the same tradition; interestingly, there are other items seemingly characteristic of *II Augusta* from Sheepen. The dating of these belt-plates is well-known from examples found in the *Schutthügel* of *legio XIII Gemina* at Vindonissa, which it left *c.* AD 45, so they were in use at the time of the invasion of Britain.²²

Large, bird-headed 'winged' pendants are now known from a number of pre-Flavian sites in the north-western regions of the Empire, but their distribution in Britain is quite interesting. Examples are known from London, Colchester, Cirencester, Kingsholm, and Wroxeter, all of which (with the exception of London) have produced evidence for the presence of mounted Thracian units. The body of data is hardly a statistically viable sample, but it is perhaps sufficient to at least indicate some lines of research for the future.²³

When *legio XXI Rapax* was finally transferred from Vindonissa after the events of AD 69, it campaigned under Cerialis against Civilis, together with *legio II Adiutrix*. It was based in Bonn in 71, with *II Adiutrix* not far away at Nijmegen, before being transferred to Britain. It is probably no coincidence, therefore, that dagger scabbards from Chester, the base of *II Adiutrix*, show very similar designs to examples from the *Schutthügel* at Vindonissa. Significantly, a cheek-piece from Chester is closely similar to a piece from Aquincum, the new base of *II Adiutrix* after leaving Britain.²⁴

Cavalry equipment has been thought to provide problems for unit identity, scholars usually noting the possible presence of draft and baggage animals, officers' mounts, and the legion's mounted contingent. In fact, it seems likely that such equipment did belong to troopers of either *alae* or *cohortes equitatae*. Draft and baggage animals required completely different types of harness to that used for riding, but the number of mounts for officers was very small by comparison. One group of 'cavalry' equipment stands out from the whole assemblage because its decoration closely resembled the grammar of ornament on 1st century niello-inlaid infantry belt-plates. This is distinct from the standard cavalry motifs derived from viticulture. It may thus be possible to differentiate between the horses of the *alae* and *cohortes equitatae*, or even between auxiliary and legionary cavalry.²⁵

Geographical differentiation in 3rd- to 4th-century equipment suggests that regional variants continued to develop according to army groups. This may become increasingly apparent as more 3rd-century scabbard and belt-fittings are systematically published. So far, circular chapes are rare in Britain, but prominent amongst German finds. Ornate geometric openwork baldric *phalerae* from Dura and some North African sites differ from examples found at northern frontier forts. Copper-alloy ring-buckles are uncommon in Britain, and the distribution of decorated types may have a Danubian bias. Likewise, 4th-century belt-buckle types form regional groupings. Rectangular buckle-loops occur predominantly on the Danube, and curved loops further west. Thus, a rectangular-looped buckle from Traprain Law (where there is also an Ostrogothic-style brooch) suggests Illyrian contacts. On the other hand it is interesting to observe how much of the Dura assemblage would have looked totally at home on the German frontier. It is not clear if this is because equipment forms had become much more ubiquitous during the Antonine and Severan periods through widespread troop movements between northern and eastern theatres, or because when Dura fell it was occupied by forces recently posted to the east.²⁶

The Ownership and Storage of Equipment

There are basically two ways for an army to manage the distribution of equipment to its men. First, it could hold the material in central stores, only distributing it when it was necessary. Second, it could issue equipment to the men and make them personally responsible for it, obviating the need for stocks. The former provides close control over the material and avoids the danger of rebellious troops causing problems, whereas the latter method means arms do not have to be distributed whenever they are needed, and by introducing personal responsibility, makes the individual more respectful of and careful with them. Moreover, forcing the soldier to pay a small amount towards their 'purchase' can reinforce this bond between the man and his equipment.²⁷

When describing the mutinies after the death of Augustus, Tacitus puts a famous speech into the mouth of one of the mutineers' leaders:

'Body and soul are reckoned at ten asses [16 *asses* = 1 *denarius*] a day: this covers clothing, weapons, a share of a tent, a brutal centurion, and immunity from chores.'²⁸

These deductions are also found in papyri which record deductions for weapons, clothing, and boots, and refunds made to the mother of a dead soldier. Ammonius, in AD 143, includes amounts for arms (21 *denarii* and 27½ obols) and a share of a tent (20 *denarii*, which suggests a total cost of 160 *denarii* for a tent). The process of purchasing arms from the army thus seems to have been standard practise, but the sums involved are of little real help in assessing the true value of equipment, particularly if the army were themselves involved in arms production. Such amounts may therefore have been nominal and perhaps paid off over several years.²⁹

Men were quite willing to use their equipment as collateral in loans. One papyrus mentions a sum of 50 *denarii* lent '*in pretium armorum*' ('against the cost of equipment'). In another, Caecilius Secundus used a silver-plated helmet and inlaid dagger sheath as collateral on a loan of 100 *denarii* (incidentally hinting that some cavalrymen could be equipped with daggers).³⁰

Equipment might also be given as gifts and the bullion value of 4th-century brooches, silver belt-fittings, silver-sheathed helmets and shield-bosses suggests they formed part of pay or military donatives to high-status troops. In the early 2nd century, the Younger Pliny gave his fellow townsman Metilius Crispus 10,000 *denarii* '*ad instruendum se ornandumque*' ('for equipping and embellishing himself') when he took up a post as a centurion, although it is possible this was in the Praetorian Guard at Rome. Hadrian presented men called up for military service with horses, mules, clothing, expenses, and all their equipment, while Caesar equipped whole legions at his own expense, most notably the *legio V Alaudae*. Suetonius specifically mentions that they were provided with inlaid equipment to improve their appearance and make them less inclined to lose it in battle. Claudius Terentianus (fl. AD 138) received much of his equipment from his father Tiberianus, a *speculator* with a legion, although Terentianus apparently sent various other items in exchange.³¹

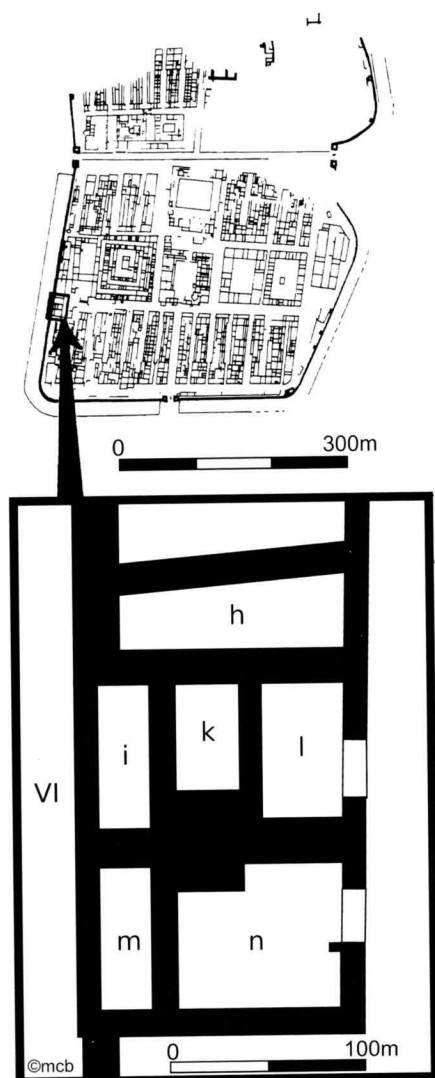


Figure 152: Plan of the 'Waffenmagazin' (armamentaria?) at Carnuntum

That equipment could be 'lost' is attested by a writing tablet from Carlisle, where a *decurio* reported to his commander on three specific items of equipment missing from the *ala*. These are javelins (*lanciae pugnatoriae*), 'minores subarmales' (possibly the shorter *subarmalis* required by a cavalryman), and 'regulation' swords (*gladia instituta*). The nature of the loss (combat, carelessness, or even votive offering) is not clear from the document.³²

Technically, his military equipment, whether purchased or given to him by a benefactor, formed part of a soldier's *castrense peculium*. This was a special military privilege which meant that anything pertaining to a man's military service belonged to him rather than to his guardian (normally his father), and that the soldier could dispose of it in his will as he saw fit. This concept lies behind the will of Ammonius, who left 15 *denarii* to one executor, 10 to the other, and 210 *denarii* 14½ obols to his mother (including the sum *in armis*).³³

Closely related to questions of ownership and storage is the identification of the *armamentarium*. The term is found on a number of inscriptions and some archaeologists have suggested that *armamentaria* are to be associated with the rooms around the courtyards of headquarters buildings in forts and fortresses. An inscription from Lanchester, for example, records '*principia et armamentaria conlapsa restituit*', and dedications by *custodes armorum* in headquarters buildings have been cited as additional evidence for this location.³⁴

Equipment has been found in or around *principia* at Lambaesis, and at smaller sites, such as Housesteads, and Künzing. Well deposits from the headquarters yards at Bar Hill and Newstead provide the most important clues to the archaeological processes involved in such deposition.³⁵

MacMullen suggested that some fragmentary inscriptions from Lambaesis (*arma antesignana* XXX and *postsignana* XIV) had

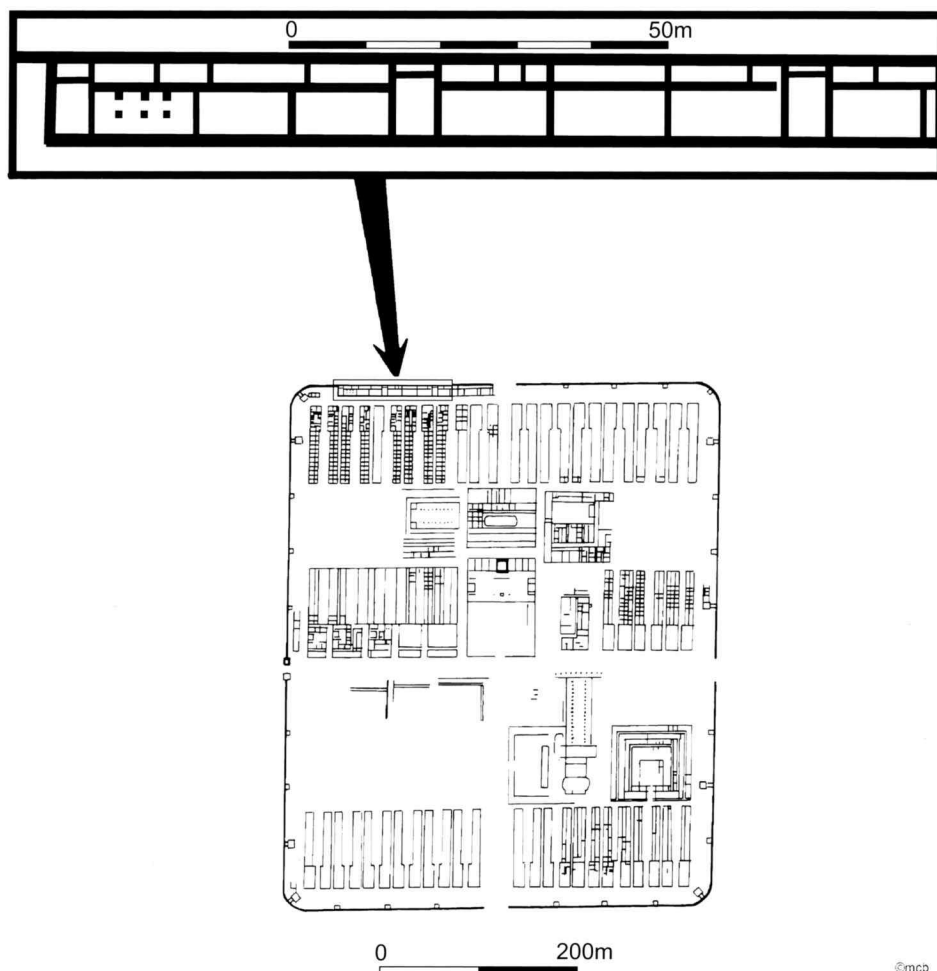


Figure 153: Plan of the Caerleon rampart-back building of the 3rd century AD.

belonged over the doors into the *armamentaria*, showing the soldiers whence they could collect their equipment when it was needed. However, the inscribed blocks were in fact re-used (one of them was even found near the east gate of the fortress) and the lettering was 2nd century AD in style: in other words they could have come from anywhere within the installation.³⁶

The assumption is generally made that the finds are characteristic of normal use of the rooms concerned, but the archaeology of Roman military sites is always heavily event-orientated: that is, a major event, such as the abandonment of the fort, will effectively mask the everyday deposition of objects (if such deposition indeed took place). Material from the Newstead and Bar Hill wells is clearly suggestive of abandonment (we do not find many scholars arguing that the Roman army habitually stored its equipment at the bottom of wells), and it does not take much imagination to see that all of these deposits represent only what was happening in the final stages of

occupation of a site, probably the demolition and clearance phase, and are in no way characteristic of everyday use.³⁷

However, the logic of the epigraphic argument is open to question. Where building inscriptions refer to pairs or groups of structures that have been constructed or repaired, it is noticeable that these are usually separate, if related, entities, rather than one being part of another. Where they are connected, as with a bath-house and its basilica, or a gate and walls, the phraseology tends to be different (*balneum cum basilica; portam cum muris vetustate dilapsis*). More convincingly, there are cases where just the *armamentaria* are mentioned, as at Leiden-Roomburg.³⁸

The evidence is confused, but it seems to point to the conclusion that the *armamentarium* was a separate building within a fort or fortress. Nevertheless, this does not tell us the purpose of the building. Robinson doubted that a central store could effectively distribute arms in times of trouble and the fact that equipment like armour was marked with personal identification certainly argues against collective ownership. This is only sensible, because items such as helmets, or particularly the '*lorica segmentata*', would have been designed to fit the individual. It would thus be impractical to collect and distribute these in even the most serene conditions.³⁹

Tacitus mentions an *armamentarium* at Rome in his account of the events surrounding the death of Galba and the suggestion has been made that it may have manufactured equipment, as well as stored it. However, this is of little help to a more general enquiry into the function of these buildings, because of the special circumstances pertaining in Rome.⁴⁰

Perhaps the *armamentaria* of provincial bases were stores for those things which were in general ownership. *Cheveux de frise* stakes from Oberaden were marked with the names of the centuries to which they belonged, but not attributed to individual soldiers, so perhaps items like these would be kept here. However, it would make sense if a unit had some sort of reserve of matériel that could be called upon in time of need, in particular spare missiles, which would be rapidly expended in a conflict. Likewise scrap that was to be reprocessed would have to be stored somewhere (although the *fabrica* may have been more appropriate for this). Speidel has shown that a wax writing tablet from Vindonissa was addressed to the *armamentarium* of Agilis, coincidentally the name of a man who appears on a votive tablet (dedicated to Mars) described as a *gladiatorius*. So whilst it seems probable that *fabricae* produced equipment and *armamentaria* were used for equipment storage, it is conceivable that these roles were occasionally reversed.⁴¹

There are two possible candidates for *armamentaria* known from the archaeological record, and both of these are rampart-back buildings. The so-called *Waffenmagazin* excavated by von Groller at Carnuntum is perhaps the strongest candidate (Fig. 152). Within four stone-built rooms of Building VI, beneath the east rampart of the legionary base, he found an astounding collection of over 1000 pieces of arms and armour protected by a layer of corrosion products. These included fragments of 38 spearheads, 11 *pila*, 209 arrowheads, 121 pieces of scale armour, 302 of segmental armour, 16 pieces of mail, and 10 of armguard, together with 62 pieces of shield and 58 of helmet. This remains one of the most dramatic discoveries of military equipment of the Roman period, not least because it led to one of the major (albeit incorrect) attempts at

reconstructing the '*lorica segmentata*'. Von Groller found traces of shelving or racks (0.45m wide) around the walls, upon which the equipment had evidently been stored, noting that the distribution of equipment was highly localized: room i contained arrowheads and shield bosses, l spearheads, m helmets and '*lorica segmentata*', everything else coming from room k. As this important material was not excavated stratigraphically, it is impossible to be certain about the date of deposition, but the material appears to be transitional between the pre-Antonine and Antonine periods.⁴²

The second possible *armamentarium* lies within the legionary base at Caerleon, behind the north-west defences (Fig. 153). A massive 3rd-century stone building contained a similar range of material to that from Carnuntum. The projecting rooms of the latest rampart-back building here included finds of artillery bolts, *pilum* and arrow heads, spearheads, caltrops, mail, and bone scabbard and bow elements, all of which appear to date to the late 3rd century. Some areas of the building may also have been used as a workshop.⁴³

One final point for consideration is the role of the *custos armorum*. He has been seen by some as an appropriately titled figure to go with the 'central store' theory of equipment management. Since every *centuria* or *turma* seems to have had such a post, it might be argued that it was he who was responsible for distributing equipment to, and collecting it from, the men of his unit. In this context, an inscription from Durostorum records a *custos armorum* dedicating an altar to Mars and the *genius armamentarii*, whilst a tombstone from Bergamo depicts a man of this rank standing in front of a range of weaponry (*frontispiece*).⁴⁴

Against this, however, there might be proffered a more complex scenario, whereby the *custos armorum* would be responsible for ensuring that the men of his unit owned all of the required equipment, sold kit to new recruits, bought it back from those retiring, and supervised the repair or scrapping of damaged items. Vegetius wrote that it was the responsibility of the *centurio* or *decurio* to monitor the state of his men's armaments and it is possible that this duty could have been delegated to the *custos*.⁴⁵

Finally, it is likely that most cities had their own *armamentaria*. These may have been used by troops or local militia based there, and to store materials in times of trouble. Vegetius recommended that a besieged city should have laid in supplies of iron and coal for weapons manufacture and wood for spear and arrow shafts.⁴⁶

Individual Taste and Decoration

What determined the appearance of Roman military equipment? There are no surviving records of pattern books (and analogies with more recent armies can be misleading here), whilst the communications infrastructure simply did not exist to permit central control and dissemination of equipment design. Nor do models requiring central manufacture appear to work, not least because of the horrendous transport and distribution problems inherent. Instead, as we have seen, the army of the Principate evolved its own manufacturing capability, using its own manpower. Even when the large *fabricae* of the Dominate were established, they were still regional, rather than Empire-wide.⁴⁷

This meant that the final product was, to an extraordinary degree seldom seen in more modern armies, designed and made by serving soldiers for themselves, during the Principate. A natural consequence of this involvement in production would be for the soldiers' tastes to find rapid expression in the items they produced; since they were made to pay for their equipment, they would have a natural pride and interest in equipping themselves in a manner that they found pleasing.⁴⁸

With the sort of mechanisms envisaged here, it is not surprising that surviving military equipment shows such a rich diversity of design. Objects such as spearheads had functional considerations determining their final shape, but the range of forms surviving from the Roman period suggests not only that certain broad categories were designed for specific purposes, but also that the individual smith produced something that was, in a way that is difficult to define, personalized – making a spearhead that conformed to his own idea (or 'mental template') of a spearhead, rather than copying a plan (and this is essentially the Platonic concept of *mimesis*).⁴⁹

The equipment of units under the Principate must have been very much a result of fashion and taste within a provincial army group or even unit. Hence, when a unit from one end of the Empire met one from the other, they must have differed in many respects. Movement of the armies, either by reassignment of whole units, or the common practise of vexillation to assist in emergencies, naturally brought men from different army groups into contact and this must have led to the mutual exchange of ideas and tastes. Such a hypothesis explains why equipment design may have had more to do with loose imitation than it did with slavish copying.

The prominent role of propaganda imagery in the decoration of military equipment requires some explanation. Whether it be on 1st-century AD sword scabbards or belt-plates, or 2nd- or 3rd-century 'sports' (and even some combat) armour, a state message is clearly being conveyed. Some scholars have chosen to see such messages as a deliberate (and thus rather clumsy) state ploy, imposed from above. It seems more likely that there was an element of free will involved, and that the soldiery actually coveted this equipment. A modern comparison might be the popularity of garments bearing the logo of certain brands of sports wear.⁵⁰

Innovation and Change

Scholars have seen the Roman army as a 'regular', almost 'modern', institution, and have considered the development of military equipment as a consciously directed process. Indeed, the senatorial historians very occasionally credit an emperor with personal interest in equipment improvement, but such panegyric cannot necessarily be taken at face value. There is a tendency in modern writing to say 'such-and-such was introduced by Hadrian', for example, rather than 'under Hadrian' or 'during Hadrian's rule'. The distinction is much more than merely semantic, and the tacit assumptions involved may prove to be quite misleading.⁵¹

Some developments undeniably did depend upon practical considerations. Indeed, certain arms and armour combinations did develop to serve particular battlefield roles (see above, p.264). There certainly was deliberate recruitment and deployment of

specialist troops, such as lancers and archers, on selected frontiers. However, the point at issue is whether equipment innovations were made over a short time (involving 'invention' and 'policy'), or were long-term evolutions subject to a variety of factors.⁵²

The development of infantry fighting styles, for example, may be traced through changing helmet and sword design. Montefortino and Coolus helmet neck-guards allowed the head to angle back for a crouched stance, whilst the deep necks of most 'Imperial' and all 3rd-century forms dictated (or, rather, were dictated by) a more upright pose. Thus, it is not surprising that the Roman soldiers fighting bent forward underground in the Dura Tower 19 mine lacked helmets.

The long point of 'Mainz' type swords may have been best suited to stabbing in the manner described so graphically by Livy. Parallel-sided 'Pompeii' blades were also well-adapted to cutting blows, so were used in the upright stance shown by the representational sources. Both were used with long, curved shields. From the later-2nd century AD onwards, infantry used long *spathae* and flat shields in the upright stance, even more restricted by helmet-form. Swords were both long and slim ('Straubing/Nydam'), and wide and heavy ('Lauriacum'), denoting a variety of fencing styles (see Chapter 7). The 'Lauriacum' form was for (mounted?) slashing use, whilst 'Straubing/Nydam' swords were presumably wielded to deliver thrusts as well as cuts.⁵³

Short-sword evolution in the 1st century may have been caused by changing tactical circumstances. In the northern theatres, adversaries with long-swords were replaced predominantly by Germans using spears rather than swords. The Roman adoption of infantry long-swords could be seen as part of a very long-term trend away from thrusting to slashing, rather than a result of radical changes in German tactics (for which there is no evidence in this period). On the other hand, an additional part may have been played by warfare against the Danubian Sarmatians and the Partho-Sassanid empires in the east. In both these areas the enemies were mounted lancers with long-swords, perhaps making the long reach of *spathae* desirable for Roman infantry. However, Roman armies fought the Parthians from the 1st century BC onwards, and Sarmatians from the second half of the 1st century AD, so, whatever factors were at work, change took place over a long period of time.

However, it must always be borne in mind that, like many modern fencing styles, use of the shield was essential to Roman sword-fighting. Roman shields of all periods had a horizontal grip within the boss, at or near the centre of balance. Flat, dished or laterally curving, this became the dominant European form of shield, developed and spread from the 5th to 4th centuries BC onwards, often associated with 'Celtic' peoples, but quickly adopted in Italy. It could be used offensively by thrusting the boss or the lower edge into an opponent, defensively to cover the owner from shoulder to knee. When 'armour' is discussed, shields have often been accorded a subordinate place to helmets, cuirasses and limb-defences, but the shield was the most important piece of armour upon which the user would prefer to receive blows. This avoided the bruising, internal haemorrhaging and other injuries sustained under even the most padded body armours. Without his shield the Roman soldier could not function as a swordsman.⁵⁴

Another instance of 'practical' innovation may be the Roman development of the '*lorica segmentata*'. The very design of the cuirass sought to counter a specific threat posed by a particular enemy, using technology that was readily available in both the military and civilian spheres – laminated armour articulated on leather straps. There may have been many links between gladiatorial and army equipment practices, and the use of armguards by legionary infantry may be another interrelated example.⁵⁵

Scholars have been slow to explore the interrelationships between weapons technology, battlefield formations and tactics, but now these areas of concern are opening up together with enquiry into the 'arts' of war of Rome's adversaries.⁵⁶

Adoption of additional limb-defences in the face of Dacian scythe-weapons (*falces*), as seen on the Adamelisi metopes, would at first sight provide a clear example of short-term innovation. However, greaves and armguards were in use on other frontiers, earlier or contemporaneously, without the involvement of Dacian adversaries (see Chapter 5). Many changes were probably not dictated primarily by 'practical' considerations. The exact shape of legionary shields in use from the 3rd century BC to the 3rd century AD did not matter much, as long as they were large and curved. Similarly, methods of sword-suspension, by rings or by slides, made little practical difference as both could be used on either side of the wearer, and with both baldric and waist-belt. These features changed with fashion and dominant cultural influences.

Thus equipment evolution was subject to two main impulses: technical determinism and culture-change. In many categories the former was a constant, so the development was part of the normal processes of material change over time, and no 'planned' explanation need be entertained. Perhaps the cultural background of northern peoples recruited into the army played an important part in the change over to infantry *spathae*. The Roman Empire was of course neither homogeneous, nor sealed off from outside influences. Whilst the tactical climate may have changed slowly, or even remained static on some fronts for much of the Roman period, there were less technically deterministic cultural interactions which surely brought about change in Roman military equipment.

In answer to the question 'how well did Rome respond to the changing nature of the threat to her continued existence?', it might well be argued that, in the early days, the very dynamism of her military response was a key factor in her rise: never slow to dismiss old equipment and adopt proven pieces from an enemy, she could quickly have developed the most effective fighting force. However, such a view is over-simplistic and runs the risk of compressing hundreds of years of development into a comparatively quick, smooth evolution: from Republican contractors, to the army foundries of the Principate, to the later *fabricae* of the Dominate.

In the end, the most compelling picture (whether it is true or not is another matter) is of soldiers desperately riveting reinforcing bars to the bowls of their helmets (Fig. 154) – not least because it is so evocative of the sort of improvisation that saw tank crews in the Second World War fixing spare tracks or wheels to the armour of their machines at vulnerable points. Innovation in the field was the key to survival and the Roman army seems to have been peculiarly well-adapted to such an approach. The naming of the *lancea Lucullanea* may have been an ill-judged piece of conceit by a

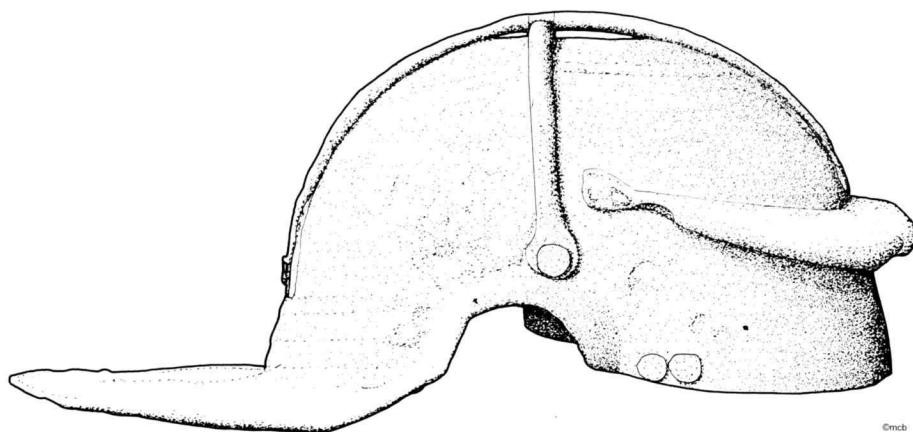


Figure 154: Imperial-Gallic helmet from Berzobis with reinforcing cross-pieces on bowl. (Not to scale.)

politically naïve governor, but his only crime seems to have been in naming the weapon after himself: development was the name of the game.⁵⁷

Only when we break away from the image of emperors dictating the details of equipment design can we begin to appreciate the manner in which the Roman army operated. Indeed, it was cause for comment in the *Historia Augusta* that Hadrian chose to interfere with military equipment design, just as he had done in camp layout, hinting that other emperors saw fit to leave well alone. Overall cultural development and influence may be seen as a background to local technical determinism. The latter might stimulate innovations which subsequently spread widely (helmet cross-pieces), or had more restricted use (*'lorica segmentata'*), depending upon a variety of factors.⁵⁸

Interaction with Other Peoples

Scholars often emphasize the impact of the Roman army upon the peoples of the ancient world, but it must not be forgotten that this was a two-way process, whereby the Romans themselves were influenced by the various cultures and technologies which they encountered.⁵⁹

At the simplest level, this was manifested in the adoption of equipment used successfully against Roman forces, but there was a more subtle and invidious way by which the Roman army was changed. This was a natural concomitant of the manner in which the Romans had always relied heavily upon allied peoples to supply them with additional troops, frequently bringing with them arms and methods of fighting that the Romans did not themselves practice.

'Celtic' peoples had been enemies of Rome from very early on in her history, but it is unfortunately too easy to see them as technically and sociologically inferior to the Romans. This was not always true; Rome herself was once a small hill top Iron Age settlement not unlike those of the Celtic world. It is more helpful if these Celtic peoples

are considered as rivals to Rome's struggle for superiority in Italy then the western Mediterranean region, rather than as 'barbarian' inferiors.

Interaction with Celtic peoples had a profound effect on Roman military equipment for a very long period – arguably until Germanic impact upon the frontiers of the Roman Empire in the 3rd century AD. Such peoples certainly seem to have been the originators of most of the forms of helmet used by the Romans during the late Republic and early Empire (Montefortino, Coolus, Imperial-Gallic and -Italic). They also invented ring mail armour, a technology which the Romans used from the 3rd century BC onwards, but on a far wider scale than the status-conscious Celtic warrior classes were ever to envisage. Lastly, the long sword, used by auxiliary cavalry in the 1st century AD, but gradually introduced throughout the army by the 3rd century, was derived from Celtic models. Iberian influences probably lay behind the short sword and dagger, whilst the Etruscans or Samnites may have been responsible for the *pilum*. Nor should the influence of wars with other Italic peoples be ignored.⁶⁰

Germanic contacts seem not to have been influential until perhaps the later 3rd century. Thereafter, some changes in equipment, such as the use of round shields, some scabbard-fittings and spearhead types may be attributed to German influence, perhaps even to the increased recruitment of Germans into the army (see Chapter 8). Traditionally, such changes have been seen as 'barbarization' of that army, but now they may be viewed as part of a process which took place continuously throughout Roman history.

Rome's eastern expansion led to conflicts with Parthian, Armenian and, later, Sassanid Persian forces. These were made up predominantly of horse-archers, the wealthier of them heavily armoured. Accordingly, Roman auxiliaries were recruited in the areas of the eastern Empire which shared in the same cultural tradition of composite bow archery.

In addition to the essential employment of oriental archers in the East, such troops were used against western barbarian enemies who themselves had few archers and little defensive armour. With the *sagittarii* went their bow-case, quiver, bow and arrow types – laths and lobate tanged heads appearing in the artefactual record as a result. Heavy armour for man and horse was adopted for Roman units in the east, together with the requisite penetrative weapons (lance, axe). These cavalry, some probably both lance and bow-armed in the Mesopotamian fashion, were also used in the West against comparatively lightly armoured enemies. Oriental helmet design influenced the development of 4th century Roman 'Ridge' helmets (see Chapter 8).⁶¹

The North African javelin-armed light cavalry which fought so effectively for Hannibal, were employed in Republican and Imperial Roman armies. They were used particularly on the Danube against Germans and Sarmatians, and in the East, presumably to catch light horse-archers. Such cavalry were usually kept in irregular units, but became more formalized from the 3rd century onwards in regiments of *equites Mauri*. Even in the later 6th century light javelins were called 'Moorish'.⁶²

The Danubian zone was another important region of interchange. First to 2nd century AD 'Thracian' type burials are notable for their inclusion of Roman cavalry equipment, but assemblages at Čatalka in Bulgaria elucidate the Danubian cultural *mélange* remarkably. These included swords and scabbard-fittings of Chinese, Asiatic

and Celtic design, a quiver of arrows, spearheads and shield-bosses, a Roman full-face sports helmet, a plate armour gorget, sections of scale and mail corselets, and full-length splint armour for the legs.⁶³

Contacts with steppe peoples across the Danube, from the second half of the 1st century AD onwards, also led to the formation of specialist auxiliary units. Judging from their titles, some were heavily armoured, others armed with lances. The ancient literature makes it clear that Sarmatian armour and lances impressed the Romans most, and before the 4th century Danubian nomad archery was less influential than Mesopotamian practice. However, other forms of Sarmatian equipment adopted for Roman use probably included scabbard-slides, ring-pommel swords, *Spangenhelme* and *draco* standards. In the 4th century, Hunnic warfare brought a new emphasis on horse-archery which necessitated further Roman adaptations.⁶⁴

The Roman Empire represented a rich source of military equipment for less developed societies beyond the frontiers, and this was Rome's reciprocal influence on the barbarians. Roman military equipment crossed the northern frontiers to be used in inter-Germanic wars and eventually to be ritually deposited in graves and lakes. A *negotiator gladiarius* attested at Mainz may well have been involved in cross-border arms trade, since such *negotiatores* make no sense in the context of army supply. This equipment was presumably also turned back against the Empire, and the artefactual record suggests that during the Imperial period the northern barbarians became progressively better armed.⁶⁵

Some states, particularly the Hellenistic Successors of the eastern Mediterranean, consciously imitated Roman weaponry: the Roman-style sword from Jericho may illustrate this process. Rome even helped equip those viewed as friendly states 'in the Roman fashion', as happened with the army of Deiotarus.⁶⁶

In the East, mail armour was adopted from the Romans by the Sassanids perhaps as late as the 3rd century AD. In addition, Rome was influential in the specialized area of siege-technology. Unlike the Parthians, the Sassanids were quite capable of besieging and capturing walled cities and Roman sources ascribe this to the expertise of Roman prisoners and deserters. The latter are reported in many periods, representing an unavoidable leakage of information and technology out of the Empire. Even the Dacians in the late 1st century AD apparently had Roman artillery and technicians working for them. Ironically, the very existence of the Roman state and the efficiency of its army strengthened the Empire's enemies.⁶⁷

Scholars and Students

Whilst the earliest (if somewhat whimsical) example of military equipment scholarship may be Aulus Gellius' discussion of the terminology of spear types, it is not until the Renaissance that serious interest in the subject becomes apparent. Justus Lipsius' work *De Militia Romana*, originally published in 1596, was instrumental in bringing the subject of the study of arms and armour to the fore for the first time: other contemporary authors were more concerned with Roman military prowess in general. Like all works that were to follow, Lipsius was inevitably heavily influenced by Trajan's Column.⁶⁸

The increasing use of the major rivers of Europe for shipping, particularly the Rhine and the Danube, necessitated frequent dredging and this brought with it an impressive booty of well-preserved, often more-or-less intact, pieces of military equipment, most notably helmets and sidearms. However, it was not until the latter part of the 19th century that the study of the subject began to be placed on a more scientific level with the work of Ludwig Lindenschmit. The founder of the Römisch-Germanisch Zentralmuseum Mainz (RGZM), quite apart from producing a stunning series of volumes which illustrated actual archaeological artefacts (including much Roman military material), wrote a small guide to Roman military equipment. *Tracht und Bewaffnung des Römische Heeres* was a short illustrated essay published in 1882 and this was the first serious attempt to tie in the literary, representational, and artefactual evidence for the study of Roman arms and armour.⁶⁹

With the development of serious archaeological excavation, as opposed to the antiquarian dilettantism of the 17th to early 19th centuries, finds in context began to arrive in appreciable quantities. The activities of the Reichslimeskommission in Germany and the various bodies encouraged by Francis Haverfield in the United Kingdom saw a peak in Roman military archaeology immediately before the First World War. Scholars like Schulten were excavating in Spain, Ritterling in Germany, and Curle in Britain, and all of them were finding military equipment in large amounts. In Austria, Oberst Max von Groller was fortunate enough to find a rich haul of weaponry in (what he called) the *Waffenmagazin* (armoury) of the legionary base at Carnuntum and this included the first substantial finds of the segmental armour that was so prominent on Trajan's Column. His publication of the material incorporated an important essay on Roman armour in general which is still of value today, despite the lack of dating evidence and apparent ignorance of the principles of stratigraphy. In the meantime, one of Kaiser Wilhelm's officers, Ernst Schramm, was leading the way in experimental archaeology in his reconstructions of Roman artillery pieces and Hoffiller was producing his substantial two-part survey of Roman military equipment from Croatia.⁷⁰

The inter-war years of the 20th century saw a less frenzied and, arguably, more considered approach to Roman military archaeology, but it also brought a worthy successor to Lindenschmit's *Tracht und Bewaffnung*, Paul Couissin's *Les Armes Romaines* (1926). Unfortunately, although providing an extremely thorough (chronologically organised) monograph, Couissin tended to underemphasise the importance of the archaeological record, preferring the comfort of familiar literary and representational evidence. In this, it is clear he had not progressed much beyond Lindenschmit, despite the wealth of new evidence being provided by archaeology. Excavation continued, with major campaigns of significance for military equipment studies at Caerleon, Wroxeter, and Richborough in Britain, and Oberaden in Germany. This was also the time of the Franco-American excavations at Dura-Europos which, because of the unusual conditions of preservation, was to shine a light into many previously dark areas of the subject.⁷¹

The Second World War did not completely halt scholarship on military equipment (one of the seminal papers on decorated dagger sheaths was published by Exner in 1940) but the allied bombing campaigns on Germany did put paid to some of the more impressive finds of earlier periods, including a particularly fine 'Imperial-Gallic'

helmet from Mainz-Weisenau, the rear end of the horse on Cantaber's tombstone, and the printing plates for the volumes that included the details of the Oberaden *pila*.⁷²

Immediately after the war, careful stratigraphic excavation in the *Schutthügel* of the legionary base at Vindonissa in Switzerland was to produce a wealth of new material, although it was to take nearly 50 years before this was fully published. As Europe settled down after the upheaval of the war and the scholars shed their uniforms, the period of most intensive study of Roman military artefacts was about to begin. In West Germany, in particular, the tradition begun by Lindenschmit continued with Hans Klumbach publishing catalogues of helmets from various areas and periods. Günter Ulbert was excavating in the south of the country and producing major studies on dagger scabbards, as well as the extremely influential catalogues of finds from the forts of Rheingönheim, Aislingen, Burghöfe, and Rißtissen. Elsewhere, based in the museum and reconstructed Roman fort at the Saalburg, Dietwulf Baatz followed where Schramm had led and became the doyen of Roman artillery studies. Hansjörg Ubl's seminal 1969 thesis examined the equipment of the Roman army using representational evidence from Noricum and Pannonia as his starting point. In the United Kingdom, one of the leading Roman military archaeologists and an extremely important figure in military equipment studies, Graham Webster, nurtured an interest in Roman arms and armour evident in his many papers on the subject and its frequent appearance in his books on wider themes. His teaching in extramural studies at Birmingham and his excavations at Wroxeter also reached a very wide, non-academic audience. It was friendship with Webster that led Russell Robinson (Tower of London Armouries) to make his first tentative moves away from the field of oriental armour into the Roman period. The British contribution to artillery studies was provided by the classicist (and enthusiastic builder of working replicas) Eric Marsden, who produced the major English-language work of reference on the subject, including texts and commentaries on the principal ancient sources.⁷³

The final quarter of the 20th century saw many leading figures who, whilst specialists in a range of fields, are significant to the development of the study of Roman armour. Prime amongst these were Ernst Künzl and Götz Waurick of the RGZM, whilst in 1976 Jochen Garbsch of the Staatsmuseum in Munich produced one of the two most important works on Roman 'sports' armour. The other work, a book published by H. Russell Robinson in 1975, revolutionised the study of Roman arms and armour. Considering all aspects of Roman helmets and body armour (it was originally intended to be accompanied by a second volume covering weaponry), *The Armour of Imperial Rome* was lavishly illustrated and presented in a large format (although it was definitely not a 'coffee table book' in the derogatory sense) and provided the first publication of reconstructions of the '*lorica segmentata*' from Corbridge. This material, although excavated in 1964, had effectively been in scholarly limbo for years, because of the complexity of the task of conserving the contents of the chest. Robinson was brought in by Charles Daniels (who was introduced to him by his fellow excavator at Wroxeter, Graham Webster) during the late 1960s to help with the task of interpreting the armour and, by 1969, in time for the Eighth Congress of Roman Frontier Studies, had produced reconstructions of the Corbridge cuirasses and was well on his way to working out the one excavated by James Curle at Newstead.⁷⁴

The technical illustrator who provided the line illustrations for Robinson's book (as well as the colour reconstruction used for the dust jacket), Peter Connolly, was arguably the first to exploit the combination of practical and critical interpretation of the source material found in that work, with the public taste for attractive reconstructions, to produce a series of illustrated volumes on the Roman army. Unfortunately, Connolly's undoubted scholarly (and practical) abilities were overlooked by a series of publishers who (in complete contrast to the academic community) saw his work only as children's books. Despite Robinson's untimely death in 1978, what might be termed 'The Robinson Effect' did not end with Connolly, however. A generation of students, inspired by his work (and many of them, curiously enough, with a background in wargaming), founded the Roman Military Equipment Seminar series, with the first being held in Sheffield in 1983. Rapidly gaining international venues and credibility for the study of Roman arms and armour, these continue as ROMECA (the Roman Military Equipment Conference) and provide a forum for all who are interested in the subject, whether they be academics or re-enactors. The conferences usually have a chosen theme, but their value lies not least in the presentation of both old, unpublished finds, and fresh, new discoveries.⁷⁵

The final manifestation of The Robinson Effect is one of the most interesting and serves to combine the academic with the amateur (in the best sense of that word). Robinson's knowledge of Roman armour led him to assist the Ermine Street Guard, the first of the Roman military re-enactment groups, to produce arms and armour that were as accurate as the limits of scholarly knowledge permitted during the 1970s. At the same time, as this and other groups were to show, using reconstructed equipment provided valuable data that were not available from the more traditional sources, since this was a form of reconstruction archaeology (see above, Chapter 2). Although beginning as a British phenomenon, interest in reconstructing Roman arms and armour has now spread worldwide and the value of being able to demonstrate meticulously-researched replicas of Roman arms and armour as 'living history' to an enthralled public, as well as noting intriguing details of usage, is unquestioned.⁷⁶

Ultimately, the future of the study of the arms and armour of ancient Rome depends upon such interdisciplinary initiatives and a willingness to explore all avenues of research, whether historical, archaeological, scientific, or experimental. Here, labels such as 'professional' or 'amateur' are irrelevant and unhelpful, for anyone can be a student of Roman military equipment.

Notes

1. Privileges and abuse: Campbell 1984, 207–63; Isaac 1990, 282–304; 2002. Cf. Apul. IX,39–42. Belts: Petronius, *Satyr.* 83; Tac., *Hist* II,88; Herodian II,13,10; Carandini *et al.* 1982, Fig. 12.
2. Strap-ends: e.g. Esp. 5507; Hofmann 1905, No.59; Pfuhl and Möbius 1977, Nos.315–6; Franzoni 1987, No.43. Militarization: Jones 1964, 565–6; Sommer 1984, 96–7. See Amm. XXIII,10,53; Zos. III,19; V,46. Cf. Strong and Brown 1976, Pl. 264.
3. Identity and community: MacMullen 1984; Coulston 1988a; 2004; forthcoming b; Pollard 1996; Pegler 1997; Obmann 1999; James 1999b; 2004, 245–54; Goldsworthy and Haynes 1999; Hope 2000; Stoll 2001d; Gardner 2001; van Driel-Murray 2003. 'Parade': Jos., *BJV*.348–55; Bishop 1990c.

4. Assumptions: Webster 1985b, 122–30, 151–5. Column: Coulston 1989.
5. Ulbert 1970, 12; Frere and St Joseph 1974, 40; Maxfield 1986. Cf Sauer 2000, 22–8; 2005, 122.
6. Auxiliary equipment: Maxfield 1986, 68.
7. *Pilum* and curved shield: Esp. 5835, Esp. *Germ.* 11; Schober 1923, No.162. Spears and flat shield: Esp. 6125, 6207, Esp. *Germ.* 16.
8. *Pilum* and curved shield: Esp.6254. Mainz: Esp. 5816, 5819, 5822. Adamclisi: Florescu 1965, Inv. Nos.12, 28, 31, 35, 38, 43. Inserts: Coulston 1988b, 20 n.82.
9. Running infantryman: Esp.5819. Curved body shields and *pila*: Esp.5822. Adamclisi: Florescu 1965, Inv. Nos.12, 28, 31, 35, 38, 43.
10. Tyne: Allason-Jones and Miket 1984, 3.724. Vindonissa: Simonett 1935; Hartmann 1986, Fig.99; Unz and Deschler-Erb 1997, Taf. 26; Unz and Deschler-Erb 1997, Cat. No. 565.
11. Pliny, *Pan.* 56,5; Tac., *Ann.* I,64; II,14; III,46; XII,35; *Hist.* II,42; III,20; IV,29.
12. Tac., *Ag.* 35–7. Cf. *Hist.* IV,20.
13. Tac., *Ann.* II,52; XII,35; XIII,38; XIV,34, 36–7; *Hist.* III,21–3; Josephus, *BJ* II,512; Veg. II,17; III,14–17. Placentia: Tac., *Hist.* II,22; Arrian: *Ek.* 25–31.
14. Veg. II,2.
15. Tac., *Hist.* I,38.
16. No representations: Maxfield 1986, 68. Protection: Allason-Jones and Bishop 1988, 102. Blows: Connolly 1991a, 362. Helmets: *ibid.*, 359–60. Weight: Connolly 1981, 231–3.
17. *Pilum*: Ulbert 1970, Pl. 29,483; Ulbert 1959, Pl. 27,1–3; *ORL* B62a, Pl. XII,41; Schönberger 1978, Pl. 18,B21–2. Artillery: Ulbert 1970, Pl. 17,260–6; Ulbert 1959, Pl. 27,4–6; *ORL* B62a, Pl. XII,31–4, 39–40, 42–3, 45; Ulbert 1959, Pl. 53,1–2; Schönberger 1978, Pl. 18,B24–7, B29–49; Maxfield: 1986, 70.
18. Garrisons: Johnson 1983, 19; Webster 1985b, 167; Coulston 1988b, 13–15; Bishop 1999a. Vexillation fortresses: *ibid.*, 175. Tacfarinas: Tac., *Ann.* III,20–1, 74. *Legio III*: Le Bohec 1989; Mattingly 1995, 84–8.
19. Coulston 1989; forthcoming a.
20. Köln-Alteburg: Fischer 2005. Tombstones: *CIL* III 566a; 557; 6109; <http://www.archeobo.arti.beniculturali.it/comunicati_stampa/stele_clas_en.htm>. Bay of Naples: Ortisi 2005, 149–50. Pliny the Younger: *Ep.*, VI,16. *Legiones Adiutrix*: Keppie 1984, 187.
21. See Bishop 1987, 122–6.
22. Plates: Böhme in Schönberger 1978, 218–22; Bishop 1987, 122–3, Fig. 11; Deschler-Erb *et al.* 1991, 25–6, 142, Fig. 16. Sheepen: Niblett 1985, Fig. 66,61, Pl. 14. Dating: von Gonzenbach 1966, 184–7.
23. Pendants: Webster 1958, Fig. 6,141 (London); *ibid.*, Fig. 4,69 (Colchester); Wachter and McWhirr 1982, Fig. 36,100 (Cirencester); Lysons 1817, Pl. XV,10 (Kingsholm); Webster 1958, Fig. 8,256 (Wroxeter). Thracian: Schleiermacher 1982, Nos.76 (Colchester), 75 (Cirencester), 79 (Kingsholm?), 81 (Wroxeter).
24. Vindonissa: Hartmann 1986, 68–71. Cerialis: *RE* s.v. 'legio', 1785–6. Bonn: *loc. cit.* Nijmegen: *ibid.*, 1440. Britain: *ibid.*, 1440–1. Daggers: Anon n.d., 2–3, No.2; pers. comm. Dr P. Carrington. Vindonissa: Ulbert 1962a, Fig. 6. Cheek-piece: Anon n.d., 3, No. 2. Aquincum: Robinson 1975, Pl. 144. Aquincum transfer: *RE* s.v. 'legio', 1444.
25. Cavalry differentiation: e.g. Maxfield 1986, 66. Draft and baggage: cf. Palágyi 1986. Officer: Bishop 1988, 114–5. Decoration: *ibid.*, 115.
26. *Phaleræ*: cf. Frisch and Toll 1949, Pl. VII; James 2004, Cat. No. 1–4, 16–17, 21; Boube-Piccot 1980, No. 199–200, 562 with Oldenstein 1976, Nos. 1110–1. Buckles: Sommer 1984, Maps 1–2; Böhme 1986, Figs. 11–12. Traprain: *ibid.*, Figs. 15,2, 21,1. Dura: James 2004, 251–4.
27. Breeze *et al.* 1976, 93–5.
28. *Ann.* I,17.
29. Deductions: *P. Gen. Lat.* 1 recto i; Fink 1971, No.68. Refunds: P. Columbia inv. 325; Gilliam 1967.
30. Cost: *P. Fouad* I,45; Cavenaile 1958, No.189. Helmet: *P. Vindob.* L135; Harrauer and Seider 1981.
31. Pliny *Ep.* VI,25,2–3; *HA, Hadr.* XVII,2; Suet., *Div. Iul.* 67. Terentianus: Youtie and Winter 1951, Nos. 467–8.
32. Carlisle: Tomlin 1998, 55–63. *Minores subarmates*: *pace ibid.*, 62.
33. *Castrens peculium*: *Digest* XLIX,17; Campbell 1984, 231–6. Ammonius: Gilliam 1967.
34. *Armamentarium*: Johnson 1983, 108–9. Lanchester: *RIB* 1092. *Custodes armorum*: Cagnat 1913, 171–2.
35. Lambaesis: Cagnat 1913, 496. Housesteads: Bosanquet 1904, 224–5. Künzing: Schönberger and Herrman 1967–68, 54–5. Bar Hill and Newstead: Manning 1972, 244 n.129.
36. MacMullen 1960, 23 n.2; Cagnat 1913, 495.

37. Normal use: Johnson 1983, 108. Abandonment: cf. Manning 1972, 244 n.129.
38. *RIB* 1091, 1234; *CIL* XIII,8824.
39. Robinson 1975, 9.
40. Tacitus, *Hist.* I,38; Parker 1928, 218 n.1; Durry 1938, 115; Stoll 1998, 208–9.
41. *Cheveux*: Albrecht 1938, Pl. 21. Speidel: 1983, 33. Agilis: *CIL* XIII, 11504.
42. *RIÖ* II, 39–44.
43. Nash-Williams 1931, 126–33; Chapman 2002. Cf. Hoffmann 2002.
44. *Custos armorum*: von Domaszewski 1967, 44, 55. Durosturum: Speidel and Dimitrova-Milceva 1978, 1551–3. Bergamo: Franzoni 1987, No.56.
45. Veg. II,14.
46. City stores: Tac. *Hist.* I,80; Veg. IV,8. Cf. Ortisi 2005, 150.
47. Infrastructure: Millar 1982. Late *fabricae*: James 1988. Patterns: cf. Robson 1997.
48. Pride and interest: Pliny *NH* XXXIII,152; Tacitus, *Hist.* I,57. Cf. Suet. *Div. Iul.* 67.
49. Bishop 1987, 111. Mental template: Clarke 1978, 153, Fig. 48. *Mimesis*: Plato, *Republic* X,1.
50. Propaganda imagery: Künzl 1994; 1996; 1997; 1999.
51. *HA, Hadr* X,7.
52. Specialists: Coulston 1985, 284–98; 1986, 63, 69.
53. Livy VII,10; Connolly 1991a; Coulston forthcoming c.
54. Cf. Tac. *Hist.* V,22.
55. Wahl 1977; La Roux 1990; Coulston 1998a; Junkelmann 2000b.
56. Bell 1965; Bivar 1972; Wheeler 1979; Coulston 1986; forthcoming c; Junkelmann 1986, 236–54; 1991, 118–36; Connolly 1991a; 2000a; 2000b; Speidel 1992; 2000; Goldsworthy 1996; Elton 1996; Lee 1996; Rawlings 1996; Sabin 1996; 2000; Ilkjaer 1997; Geyer 1998; Gilliver 1999; Randsborg 1999; Zhmodikov 2000; Campbell 2002, 47–76; Hansen 2002; Jørgensen *et al.* 2003, 310–27; Burns 2003; Syvänne 2004.
57. Helmets: Sim 2001–2. *Lancea*: Suet. *Dom.* 10.
58. *HA, Hadr* X,7.
59. E.g. Vettters and Kandler 1990, 83–160; Maxfield and Dobson 1991, 411–54.
60. ‘Celtic peoples’ not ‘the Celts’: James 1999a; Carr and Stoddart 2002. Italic peoples: Burns 2003.
61. Oriental influence: Coulston 1985, 239–41, 271–3; 1986, 62–3; James 2004, 246–51.
62. Moors: Speidel 1975, 208–11. Javelin: Maurikios, *Strategikon* XII,2,20. Cf. Carandini *et al.* 1982, Fig. 103.
63. ‘Thracian’ burials: Velkov 1928–29; Mansel 1938; Abdul-Hak 1954–55; Radulescu 1963. Catalka: Nikolov 1976, 48–50, Figs. 103–9; Bujukliev 1986, 71–4, Pls. 7–12; Werner 1994. Cf. Khazanov 1971, Pl. XIV–V.
64. Sarmatians and Huns: Coulston 1985, 241–5, 273–8; 1986, 69–70; 1991; 2003a; Negin 1998; Syvänne 2004, 38–40. Cf. Mielczarek 1999.
65. *Negotiator*: *CIL* XIII,6677. Trade: Kunow 1986; Lønstrup 1986; Rankov 1999.
66. Hellenistic states: Sekunda 2001, 117–24. Jericho: Stiebel 2004. Deiotarus: Cicero, *Ad Att.* VI,i,14.
67. Sassanids: Herodian III,4,9. Dacians: Dio LXVIII,9,5–6.
68. Aulus Gellius: *Noct. Att.* X,xxv. Lipsius: 1598.
69. Lindenschmit volumes: Lindenschmit 1858; 1870; 1881; 1900; 1911 (*AuhV*); 1882 (*Tracht*).
70. Reichslimeskommission: *ORL*. Haverfield: P.W.M. Freeman, pers. comm. Carnuntum: von Groller 1901. Schramm: 1980. Hoffiller: 1910–11; 1912.
71. Coussin: 1926. Caerleon: Nash-Williams 1931; 1932. Wroxeter: Bushe-Fox 1913; 1915; 1916. Richborough: Bushe-Fox 1926; 1928; 1932; 1949; Cunliffe 1968. Oberaden: Albrecht 1938; 1942. Dura-Europos: Cumont 1926; Baur *et al.* 1929; 1931; 1932; 1933; Rostovtzeff 1934; Rostovtzeff *et al.* 1936; 1939; 1944; 1952.
72. Daggers: Exner 1940. Helmet: *AuhV* V, Taf.22. Cantaber: Esp. 5784. Oberaden: Albrecht 1942.
73. *Schutzhügel*: Hartmann 1986, 92–4. Klumbach: 1973; 1974. Ulbert: 1969a (Rheingönheim); 1959 (Aislingen and Burghöfe); 1970 (Rißtrissen). Baatz: 1966; 1978; 1979; 1980; 1985; 1994b; 1999. Ubl: 1969. Webster: 1958; 1960; 1979; 1982; 1984; 1985a. Marsden: 1969; 1971.
74. Leading figures: Künzl 1975; 1977; 1978; 1994; 1996; 1997; 1999; 1999–2000; 2001; Waurick 1972; 1981; 1983; 1986; 1988; 1989; Garbsch 1976; Robinson 1969; 1974; 1975.
75. Connolly: Robinson, 1975, pl. 1 etc; Connolly 1975; 1978; 1981; 1983; 1988a; 1988b; 1991. Roman Military Equipment Seminars: Bishop 1983a; Bishop 1985; Dawson 1987. ROMEc: Coulston 1988a; van Driel-Murray 1989a; thereafter proceedings in *JRMES* 1–, 1990–; *GpV* 2001; Jilek 2005. Venues: I Sheffield (GBR), II Sheffield (GBR), III Nottingham (GBR), IV Newcastle upon Tyne (GBR), V

Nijmegen (NLD), VI Bonn (DEU), VII Magdalensberg (AUT), VIII Newcastle upon Tyne (GBR), IX Leiden (NLD), X Montpellier (F), XI Mainz (DEU), XII South Shields (GBR), XIII Windisch (CH), XIV Wien (AUT), XV Budapest (HUN).

76. Ermine Street Guard: Haines 1998. Re-enactors: Eckardt 1996.

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Abbreviations

<i>Abbreviation</i>	<i>Journal title</i>
<i>AA</i>	<i>Archaeologia Aeliana</i>
<i>AAASH</i>	<i>Acta Archaeologica Academiae Scientiarum Hungaricae</i>
<i>A Camb</i>	<i>Archaeologia Cambrensis</i>
<i>Acta A</i>	<i>Acta Archaeologia (Copenhagen)</i>
<i>AE</i>	<i>L'Année Epigraphique</i>
<i>AJA</i>	<i>American Journal of Archaeology</i>
<i>AK</i>	<i>Archäologisches Korrespondenzblatt</i>
<i>Amm.</i>	<i>Ammianus Marcellinus</i>
<i>AMN</i>	<i>Acta Musei Napocensis</i>
<i>AVNAG</i>	<i>Annalen des Vereins für nassauische Altertumskunde</i>
<i>Ant.J</i>	<i>Antiquaries Journal</i>
<i>AJ</i>	<i>Archaeological Journal</i>
<i>Apul.</i>	<i>Apuleius, Metamorphoses</i>
<i>ArchS</i>	<i>Archäologie der Schweiz</i>
<i>Arrian Ek</i>	<i>Arrian, Ektaxis kat'Alanon</i>
<i>AuhV</i>	<i>L. Lindenschmit, Die Altertmer unserer heidnischen Vorzeit</i>
<i>BAR</i>	<i>British Archaeological Reports, Oxford</i>
<i>BJ</i>	<i>Bonner Jahrbücher</i>
<i>BRGK</i>	<i>Bericht der Römisch-Germanischen Kommission</i>
<i>Brit</i>	<i>Britannia</i>
<i>BV</i>	<i>Bayerische Vorgeschichtsblätter</i>
<i>CA</i>	<i>Current Archaeology</i>
<i>Caesar, BC</i>	<i>Caesar, De Bello Civilo</i>
<i>Caesar, BG</i>	<i>Caesar, De Bello Gallico</i>
<i>CAH</i>	<i>Cambridge Ancient History</i>
<i>CarnuntumJb</i>	<i>Carnuntum Jahrbuch</i>
<i>CIL</i>	<i>Corpus Inscriptionum Latinarum</i>
<i>CRAI</i>	<i>Comptes Rendus de l'Académie des Inscriptions et Belles-Lettres</i>
<i>CSIR</i>	<i>Corpus Signorum Imperii Romani</i>
<i>Diod. Sic.</i>	<i>Diodorus Siculus</i>
<i>DOP</i>	<i>Dumbarton Oaks Papers</i>
<i>Esp.</i>	<i>Éspérandieu, E. 1907–66: Recueil général des bas-reliefs, statues et bustes de la Gaule romaine, Paris</i>
<i>Esp. Germ.</i>	<i>Éspérandieu, E. 1931: Recueil général des bas-reliefs, statues et bustes de la Germanie romaine, Paris</i>
<i>Gellius, Noct. Att.</i>	<i>Aulus Gellius, Noctes Atticae</i>
<i>Ger</i>	<i>Germania</i>
<i>GpV</i>	<i>Gesellschaft pro Vindonissa. Jahresbericht</i>
<i>GR</i>	<i>Germania Romana, Ein Bilderatlas, III, Die Grabdenkmäler, Bamberg, 1926</i>
<i>HA</i>	<i>Historia Augusta</i>
<i>Isid.</i>	<i>Isidorus, Etymologiarum</i>
<i>JAK</i>	<i>Jahresberichte aus Augst und Kaiseraugst</i>
<i>JAS</i>	<i>Journal of Archaeological Science</i>
<i>JDAI</i>	<i>Jahrbuch des Deutschen Archäologischen Instituts</i>
<i>JKSW</i>	<i>Jahrbuch der kunsthistorischen Sammlung in Wien</i>

JÖAI	<i>Jahrbuch des Österreichischen Archäologischen Instituts</i>
Josephus,	Josephus, <i>Bellum Iudaicum</i>
JRA	<i>Journal of Roman Archaeology</i>
JRGZM	<i>Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz</i>
JRMES	<i>Journal of Roman Military Equipment Studies</i>
JRS	<i>Journal of Roman Studies</i>
JSGUF	<i>Jahrbuch der Schweizerischen Gesellschaft für Ur- und Frühgeschichte</i>
MAKW	<i>Mitteilungen der Altertumskommission für Westfalen</i>
MZ	<i>Mainzer Zeitschrift</i>
ND (Or.; Occ.)	<i>Notitia Dignitatum omnium tam civilium quam militarium (in partibus Orientis; in partibus Occidentis)</i>
OED	<i>Oxford English Dictionary</i>
OM	<i>Oudheidkundige Mededelingen</i>
ORL	<i>Der obergermanisch-raetische Limes des Römerreiches</i>
PBA	<i>Proceedings of the British Academy</i>
Pliny Ep.	Pliny, <i>Epistulae</i>
Polyb.	Polybios, <i>Historia</i>
Procop.	Procopius, <i>Wars</i>
PSAN	<i>Proceedings of the Society of Antiquaries of Newcastle upon Tyne</i>
PSAS	<i>Proceedings of the Society of Antiquaries of Scotland</i>
RE	<i>Paulys Realencyclopädie der classischen Altertumswissenschaft</i> , Stuttgart 1893–
RIB	<i>The Roman Inscriptions of Britain</i> , Oxford 1965–
RLÖ	<i>Die Römische Limes in Österreich</i>
SJ	<i>Saalburg-Jahrbuch</i>
Tac. Ag.	Tacitus, <i>Agricola</i>
Tac. Ann.	Tacitus, <i>Annales</i>
Tac. Hist.	Tacitus, <i>Historiae</i>
TCWAAS	<i>Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society</i>
TPAPA	<i>Transactions and Proceedings of the American Philological Association</i>
TransLAMAS	<i>Transactions of the London and Middlesex Archaeological Society</i>
TZ	<i>Triester Zeitschrift</i>
UoÅ	<i>Universitetets Oldsaksamling Årbok</i> (Oslo)
Veg.	Flavius Vegetius Renatus, <i>Epitoma rei militaris</i>
VHAD	<i>Vjesnik Hrvatskoga Arheoloskoga Društva</i> (Zagreb)

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Plate Captions

Plate 1 Oberammergau dagger and sheath, first half of 1st century AD. A fine example of iron-work inlaid with silver, the decoration on this Type A sheath incorporates traditional classical motifs, such as Greek Key, wave crests, and the vine leaf. The contrast between the iron and silver would have been very fine, when in pristine condition, and might be thought to show considerable sophistication of taste on the part of the owner. On the reverse of the dagger handguard, it bears the name of the man who made it, C. Antonius. (Photo: Archäologische Staatssammlung, München).

Plate 2 a. Xanten cavalry helmet, 1st century AD. An iron cavalry battle helmet with tinned brass sheathing over the bowl. The sheathing imitates human hair wearing a laureate crown, with the bust of a deity over the brow. The helmet has very pronounced ear-guards and a cheek-piece, similarly sheathed, which covers the entire ear. (Photo: Rheinisches Landesmuseum, Bonn). **b.** Cavalry 'sports' (or face-mask) helmet of the 1st century AD made of copper alloy. Private collection. **c.** Theilenhofen helmet, late-2nd or early-3rd century AD. A tinned brass cavalry battle helmet with embossed decoration in the form of an eagle crest. Based on the Attic type of helmet, it has large cheek-pieces covering the ear. It bears three punched ownership inscriptions, one of which shows the helmet belonged to Aliquandus, in the *turma* of Nonus, of *cohors III Bracaraugustanorum*. (Photo: Prähistorischen Staatssammlung, München). **d.** Buch helmet, 3rd century AD. This *orichalcum* helmet, from Well 9 in the *vicus*, is unfinished, and the angled peak, for which rivet-holes have been cut, may never have been affixed. Bowl cross-pieces are embossed, not applied. The large cheek-pieces cover the wearer's ears and overlap on the chin. (Photo: Landesdenkmalamt Baden-Württemberg). **e.** The Berkasovo1 helmet, 4th century AD. The iron core is covered with gilded silver plates inset with imitation precious stones. The wearer's face now has the additional protection offered by a nasal (Photo: Hungarian National Museum).

Plate 3 a. Copper-alloy medallion, Cabinet de France, Paris, 3rd century AD. Two ranks of soldiers wearing peaked helmets and carrying bossed oval shields are headed by a pair of *vexilla*. They are identified by the standards, inscriptions and badges as forming detachments from the British *legiones II Augusta* and *XX Valeria Victrix*. The date is suggested by the motto 'UTERE FELIX', the style of animal decoration and the owner's name, Aurelius Cervianus. The latter may have commanded the combined force. (Photo: Bibliothèque National, France). **b.** Openwork silver baldric *phalera* with a central semi-precious stone surrounded by 'running dog' tendril motifs incorporating and encircling four large and four small vine leaves. Unprovenanced. (Private collection).

Plate 4a. Curved rectangular shield, Tower 19, Dura-Europos, 3rd century AD. Reconstruction painting of the decorated front. The boss was surrounded by concentric motifs, including laurel garlands. A lion in the lower field may be a legionary badge. It is flanked by stars or sun-bursts which are reminiscent of earlier designs. An eagle in the upper field is crowned by two Victories, presaging some Dominate blazons. From Rostovtzeff *et al.* 1936, painted by Herbert J. Gute. **b.** Flat oval shield, north side of Tower 24, Dura-Europos, 3rd century AD. Reconstruction painting of the decorated front. The boss was encircled by a laurel wreath, and motifs on both this board and Pl.4a are paralleled by copper-alloy boss ornament (Cf. Fig.116). which depicts combat between Greeks and Amazons (Amazonomachy). From Rostovtzeff *et al.* 1939, painted by Herbert

J. Gute. **c.** Rear of Pl.4b, reconstruction of painted decoration with attached shield-bar. The radiating hearts and rosettes anticipate later blazons. Painting courtesy Simon James.

Plate 5a. Reconstruction of a Roman legionary of the first half of the 1st century AD. Watercolour courtesy Andrei Negin. **b.** Digital reconstruction of a legionary infantryman at the beginning of the 2nd century AD. Modelled and textured using the 3D modelling package *XSI* and then finished with the bitmap editor *Photoshop*. Illustration courtesy Jim Bowers. **c.** The Ermine Street Guard. Reconstruction equipment for Flavian centurion, standard-bearers and legionaries. Display at Corbridge, August 1991. (Photo: JCNC).

Plate 6a. *Notitia Dignitatum* shield blazons (*ND Oc. V*, 44-63, *magister peditum praesentalis*), Bodleian Manuscript. Late 4th to early 5th century AD. The confronting animal heads, imperial figure and eagles find parallels in the representational sources (cf. Fig.8), so the types of designs were based on contemporary usage. However, there is no certainty that each named regiment carried the particular attributed blazon. (Photo: Bodleian Library). **b.** Painting of a biblical Pharaonic warrior in the guise of a 4th-century AD Roman soldier, Via Latina Catacomb, Rome. He is wearing a wrist-length mail cuirass and a crested helmet, and is equipped with oval shield, long sword and two shafted weapons. (Photo: JCNC). **c.** Painting of a 4th-century AD soldier, Via Maria Catacomb, Syracuse. He is wearing a gilded(?) and crested 'Ridge' helmet with frontal 'eyes'. This is an exceptionally rare representation of a soldier in a red tunic. (Photo: Roger Wilson).

Plate 7a. Selection of 2nd- and 3rd-century baldric *phalerae* from Vimose. (Photo: National Museum of København). **b.** Decorated copper-alloy shield boss depicting Roman victory over the Dacians and bearing a Latin inscription transliterated into Greek commemorating a member of the *equites singulares*. The object has sustained a horizontal blow to the *umbo*. Private collection.

Plate 8a. Silver brooch in the form of a sword scabbard with peltate chape and scabbard runner. Private collection. **b.** Silver brooch in the form of a 2nd- or 3rd-century AD helmet of the Niederbieber (Robinson's Cavalry) type showing the method of creasing, a detail not attested by surviving helmets of this type. Private collection. **c.** Trajan's Column, Rome, detail of Scene LXXII. Carrara marble with (lost) metal inserts. Citizen troops wearing '*lorica segmentata*'. Shields and cheek-pieces have been scaled down in size so as not to obscure the human subjects. The sculptor has omitted to show the belts, apron and sword which appear in other scenes. Small armour fittings are also not carved, and the scalloped short sleeves of mail have been mistakenly added below the shoulder plates. The helmets are based on the 'Imperial' types, not stylised 'Attic' forms. These figures demonstrate the mixture of empirical observation, stylisation, confusion and lassitude which went into composition of the frieze. (Photo: JCNC).

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**Dedicated to the Study of the Weapons, Armour, and
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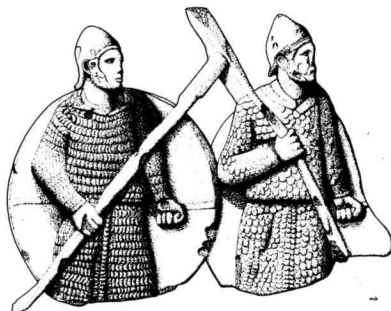
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(photo: Archäologische Staatssammlung, München)

Back cover: Xanten cavalry helmet
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