

MANUFACTURE AND SUPPLY OF THE ROMAN ARMY WITH BRONZE FITTINGS¹

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In this paper, I should like to put forward my ideas concerning the manufacture and supply of bronze fittings to the Roman army.²

First, I wish to explain my theories relating to the production of material with the aid of some examples; I am well aware that the material base for them is not very strong. Principally I want to present a model for the manufacture and supply of Roman military equipment.

During my research into this subject on the limes in Germany in the second and third centuries, I had the feeling that the organisation of manufacture and distribution of military equipment during the first century was different to that of the second and third centuries. However, I did not then have sufficient time to work on first century equipment, but now that it is possible, I can see the problems more clearly than before.

I want to begin by outlining my theories. I think the situation in the fourth century, with those central Roman weapon factories which appear in the 'Notitia Dignitatum', is not the same as that found in the first three centuries. From the time of Diocletian, perhaps as early as Gallienus, we have to reckon with weapon and equipment production by the state authorities. To work in state weapon factories was a military duty, as we learn from various inscriptions and from the 'Notitia Dignitatum'.³ It was long thought that the situation described in literary and epigraphic sources for the fourth century would also apply for the first three centuries: namely weapon manufacture by the state authorities.

The large number of finds of very similar equipment, from Britain to Syria and Africa, seemed to justify these ideas.⁴ Especially the finds from Dura Europos, which are sometimes identical to those from the Danube and Rhine limes, and from Britain; these seemed to prove that there were large central factories which produced the equipment and sent it to different units throughout the empire. It was thought that those factories were stationed in Gaul or in Italy; even now, however, no factory has been found in these areas.

However, there are many finds from the forts and fortresses

along the Rhine- and Danubian frontier, from Britain and from Africa, which contradict this argument. In well-excavated forts, and in their vici, substantial evidence for metalworking had come to light.⁵ We know of crucibles from various forts. These clearly show that, at those places, we can reckon with a smaller or larger bronze industry. In addition, collected waste bronze material - broken and cut pieces, failed castings and moulds for example - found in the forts and vici show that the fabricae of the forts and fortresses produced or repaired bronze items to a greater or lesser extent.⁶ The discovery of moulds plainly shows that new articles were also produced.

We can infer a similar picture from literary sources and inscriptions. They give no hint of weapon factories under state authority during the first three centuries. On the other hand, there is evidence for a lot of private craftsmen and traders, producing and dealing with weapons and military equipment. The army was a customer of these craftsmen and traders: in all probability, larger orders were given to the bronze manufactories in the provinces only when a lot of equipment was needed rather quickly. I think the reason for giving large orders to such bronze-working factories was the existence there of highly specialized craftsmen and the equipment for producing military equipment. I do not believe that these factories only produced military equipment, but they had the capacity to make it if desired.⁷

Thus far on general suppositions. It is hardly possible, without intensive special studies in this subject in the different provinces, to give any more than a general approach to the question of the production and distribution of Roman military equipment at the moment.⁸ Still more difficult is a further problem - that of the structure of the workshops and the manufactories and how they were organized. Were there large factories or only small workshops? How were the products bought or sold? Were there markets, where military personnel could buy larger amounts of equipment, or have we to think in terms of traders, going from fort to fort, offering their goods? What proportion of equipment was produced in the fabricae of the legions and the auxiliary units?

For the moment I do not think that any one of these various possibilities is the whole answer. We have to count on a whole range of production and trading methods existing side by side. As already mentioned, some evidence of bronze working has been found in forts and fortresses.⁹ In my opinion, those fabricae were not able to equip a legion or an auxiliary unit completely. Nor was this at all necessary: when a new unit occupied an old fort, or built a new one, the soldiers normally arrived fully equipped. The work of the fabricae is mainly to be seen in the

repair of weapons. It is also conceivable that these fabricae were able to complete parts of belt mountings which had been broken, for example. To make a mould, the craftsmen could use a similar belt fitting. Master inscriptions on swords and sword scabbards show that weapons and equipment were produced away from the forts and their vici.¹⁰ In the case of the sword scabbard from Straßburg, the master Quintus Nonienus Pudes calls the place where he made the piece "ad ara", at Cologne.¹¹ Just how large the workshop of Quintus Nonienus Pudes was, we do not know. Whether he produced only sword scabbards and no other equipment unfortunately also remains unknown. Furthermore, there are inscriptions from Italy of private sword and shieldmakers,¹² and in Mainz the inscription of a sword trader was found.¹³ This evidence makes it clear that the weapons were produced and sold by private persons.

Unfortunately, the inscriptions do not give any criteria by which the extent of the craftsman's work, or that of his workshop, can be judged. But the mere question of the capacity of such a workshop is very important, if we want to get on the track of the production and distribution of Roman military equipment.

On what occasions was it necessary to produce a large amount of weapons and equipment suddenly? There are various answers. First of all, when a legion was newly founded: this was, however, a rare occurrence from the first to the third century. There were (for example) the XXII, raised by Caligula,¹⁴ VII by Galba, I and II Adiutrix, IV and XVI by Vespasian. During the Marcomannic wars the legions I, II, and III Italica were raised and Septimius Severus recruited three new legions, the I, II, III Parthica. Most of the auxiliary units were founded during the first century, while the second saw the foundation of many numeri.¹⁵ On average, then, it seems likely that only every ten years was a unit equipped.

Another situation calling for the production of a great deal of equipment was in advance of a campaign of conquest. Normally such campaigns were not hastily planned and there was enough time to collect weapons and equipment, which were then stored in the armamentaria, or to produce new weapons. After the middle of the first century the pace of conquest slackened. Britannia and Upper Germany came into the empire. Dacia, Mesopotamia and Arabia were conquered by Trajan. In cases of disputed succession to the throne and of civil war, quick decisions were necessary. Rapidity of action was important for the victory. We have passages in literary and epigraphic sources showing what happened in two such cases. When Vespasian came from the east to fight against Vitellius, he had the weapons for his army produced in large, rich cities.¹⁶ We know furthermore from an inscription,

found in Mainz, that a high-ranking decorated officer, Annianus, was sent to Northern Italy to recruit soldiers and to procure weapons in Milan.¹⁷ This happened at the time when Maximinus Thrax came from the east to fight against Balbinus, who was chosen by the senate.

Both situations have a similar background. Although there are nearly one hundred and seventy years between them, both are civil war situations. It seems, furthermore, that in both cases Vespasian and Balbinus were not able to call on a reserve of weapons and equipment in their own provinces, and in both cases larger, rich cities were chosen for the manufacture of the missing weapons. One further situation where a lot of weapons would be needed is, in my opinion, after bloody campaigns and defensive battles: the loss of weapons and equipment had to be made good. It must be considered whether the capacity of military fabricae was sufficient for this or whether the resources of private workshops were also needed. All the arguments I have so far adduced show that there is no necessity to think that there was a state monopoly of weapon production in the first three centuries. The examples of both Vespasian and Balbinus demonstrate this. On all those occasions where a large number of weapons and equipment was needed, no workshop was seemingly able to deliver the required weapons, except for a lot of workshops specializing in iron, bronze, bone and leather working. Those workshops had the technical "know how" to produce the necessary equipment extremely rapidly.¹⁸

However, original finds from the forts and fortresses also support this thesis. During the second and third centuries, we find a lot of mountings and belt fittings which are typical of only one province.¹⁹ On the other hand, there are still pieces common to all parts of the Roman empire.²⁰ These pieces are only similar and not from the same mould.²¹ Pieces made from the same mould are seldom widely distributed; such pieces are even found in neighbouring forts but never over any distance.²² I have tried to interpret this different distribution as follows. We have to count, on the one hand, with large factories in one province supplying many forts and fortresses; on the other with a lot of smaller workshops producing equipment at the same time. Those workshops supplied some in the closer or more distant surrounding area. The fabricae of the forts and fortresses repaired and produced for the needs of their own unit. Sometimes I think it possible that this or that piece was exchanged with a soldier from the next fort. It is not necessary to think that all those pieces, being similar and found in a number of provinces of the empire, were produced in large equipment and weapon manufactories. The fittings were normally of such a form that it was possible to make clay impressions from them. A specialist is not necessary for this work. If the patterns came

from only one source, it is no longer necessary to think that all similar pieces were produced in central workshops or factories. Centurions, for example, very often came from the praetorian guard at Rome. From this point, they moved over the whole empire and to different units. If they bought parts of their equipment in Rome, before they went to their new units, very similar material would reach the furthest corners of the empire. The craftsmen in the fabricae of Dura Europos, Alexandria, Cologne and York would now have patterns for producing new pieces, pressing these new fittings in clay, to get their moulds. They could now produce belt fittings in York or Dura Europos of the form currently "en vogue" at Rome. High ranking officers of the legions and auxiliary units likewise changed province.²³ With them, or the companions of such officers, patterns for equipment could be spread from province to province very quickly. This kind of distribution and production assumes a special kind of economic structure in a province. It is hard to believe that we would find a lot of craftsmen and workshops during a campaign. A Roman province had to reach a special grade of Romanization before these things would come about. This implies that there had to be a certain level of prosperity and public safety in such a province, before traders and craftsmen would come to earn their money.

If we follow this model, the supply of equipment to Roman troops would take different forms at different times. Take, for example, the Roman province Britannia. When the conquest of the British Isles was planned by Claudius, the legionaries and auxiliaries brought their equipment with them from the continent. Now Britain was not conquered in one day: the Roman troops needed nearly eighty years, until Hadrian's Wall was built as the northern frontier. During the expedition of Claudius, the large expeditionary army could not be supplied from the land that it was conquering. There were no Roman towns and hardly any Roman or romanized traders and craftsmen. Supplies, especially of equipment and weapons, had to come from the continent; large issues came from Italy or Gaul. The situation in the two Germanic provinces would be similar, I think. In a second phase, after a certain consolidation in the province, the economic branches in a province would develop in such a way as to be able to take over the largest of the supply of the units stationed in the new province. In a third phase, the provinces would become self-sufficient, so that they only imported those things which could not be produced in the province itself because of the lack of particular resources and the craftsmen who worked with them.

If we try to verify this model with the material found in the forts and fortresses, I believe that it is possible to come to similar conclusions. There is one example which is especially qualified to demonstrate it. I want to show it with the aid of

those silvered, nielloed and cast pendants which are heart-shaped and belong to horse harness.²⁴ Pieces of this kind are seldom found in Augustan contexts. From Claudian times, they are very often found in Northern Africa, Germany, Britain and Syria.²⁵ In the later Flavian period we do not find such fittings any more; from this time, we have only simple bronze-sheet pendants without any decoration. These pieces imitate the earlier ones. It is noticeable that the pieces of the Claudian/early Flavian period are finished to an extremely high technical standard. They must have been produced in a two-part mould or in a mould with a wax impression which could be used only once: I think these pieces were cast by the lost-wax process. Silvering and niello are also indications of highly trained specialists. This kind of equipment can not be seen as the work of small workshops. I think this fact points to production by large specialized manufactories in Gaul or Italy: in those factories the equipment of an expeditionary army was produced. The supply of the equipment during the first phase of conquest also came from here. In the new provinces, there was no industry and no trading organization yet capable of taking over the supply of an army.

It is important that we only find the fine silvered pendants during a relatively short period and not in all parts of the empire. After the Claudian period, we only find them in those provinces which were parts of the empire for a short time, or where conquest was still in progress. Britain is a good example for clarifying what I mean. Heart-shaped pendants from horse harness, which we can date in the Claudian/Neronian period, are distributed up to the Longthorpe-Wroxeter line, and in the West up to the beginning of the Welsh mountains.²⁶ This area is that part of Britain which was conquered by the Roman army up to the rebellion of Boudicca. We find typical pendants of the Neronian/Flavian period in the south too, but more so in those parts of the province which were conquered after A.D. 60 - in the Welsh mountains and in the area north of the Longthorpe/Wroxeter line up as far as Newstead.²⁷

A similar picture, albeit not so clear, is to be seen in those parts of Upper Germany lying to the right of the Rhine valley, which came to the province during the period of Vespasian.²⁸ We can find similar pendants in Pannonia, Syria and Africa.²⁹ It is not impossible that these pieces are connected with the civil war of 68/69 in these provinces.

Most striking is the fact not only that these fittings are mostly found in those areas where conquest was taking place or where we can consider military action likely, but also that as yet no heart-shaped silvered pendant is known from any military context after the period of Domitian. In the Domitianic period, the conquest of Britain and Upper Germany was completed and the

position was consolidated in these provinces; the occupation was no longer of the same nature.

In the forts of the Upper German/Raetian limes, which were built in A.D. 83/85, we do not find these silvered heart-shaped pendants; instead simple bronze-sheet pendants without any decoration suddenly appear.³⁰ It seems to me that these pendants are products of workshops in the new province, which now slowly begin to take over the supply of the provincial units.

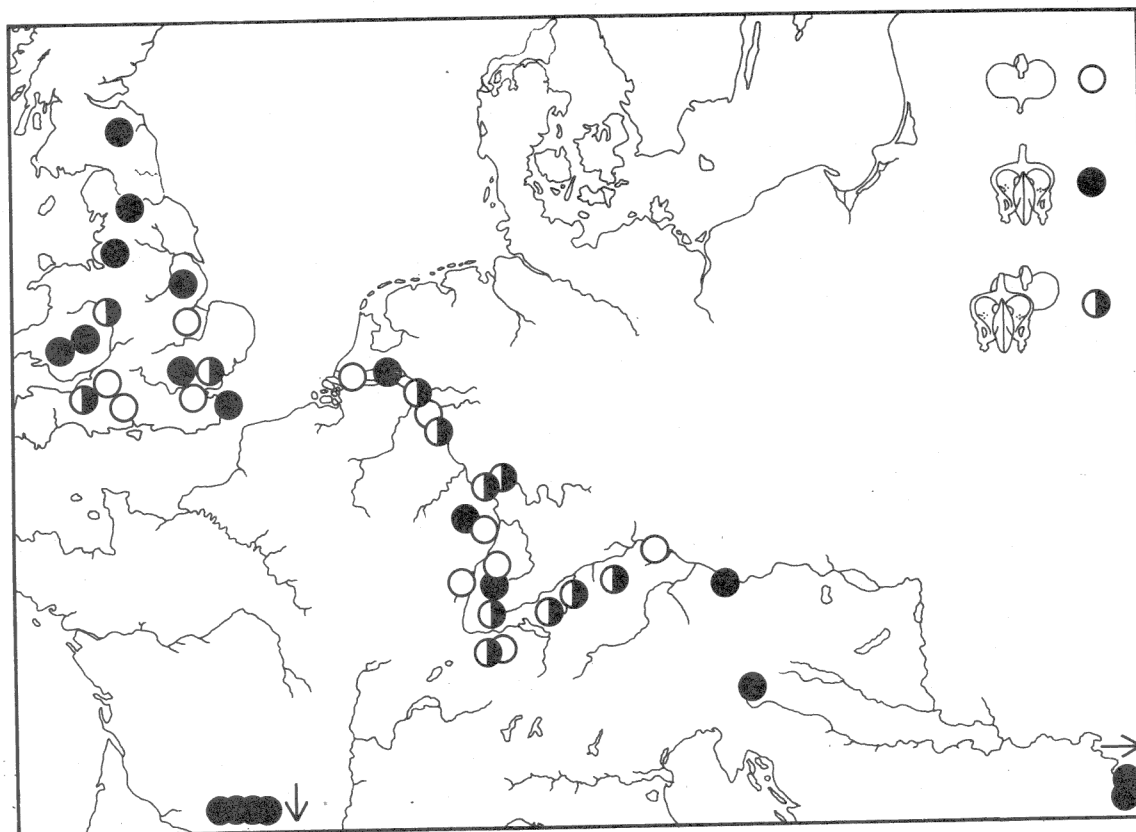


Fig. 1: Distribution of Claudian/Neronian (white) and Neronian/Flavian (black) pendants (after A. Böhme in SCHÖNBERGER, 1978, Abb.78 & 79)

From the beginning of the second century, we find more and more hints in the forts and in civil centres of the various provinces that repair in the main, but also production, has begun. I have collated the different evidence in my thesis. This position began to change from the middle of the third century, with the rapid deterioration in the economic condition of the provinces, so that private industry was no longer able to supply the Roman army. Under Diocletian, the equipment and weapon industry became a state monopoly. The inscriptions and the literary sources of that time also clearly reflect the

changed situation.³¹

It seems sensible to me look at another branch of industry, samian production, in the same way. We can recognize similar phenomena. The highly specialized potters begun to produce in Italy and distributed their goods up to the Rhine and to the Danube. With increasing Romanization, the pottery centres came over from South and Central Gaul, nearer and nearer to their customers at the Rhine and Danube frontier. In the middle of the second century, the large potteries of Trier and Rheinzabern came into production. They now had more or less direct contact with their customers.³²

To summarize my ideas on the supply of Roman weapons and equipment, it must be said that such a summary can only be in the form of a model, but I think this model is more than probable.

In a phase of occupation, most of the equipment and weapons needed by the expeditionary army were produced in Italy or Gaul. These well-romanized parts of the empire had the economic base for producing and trading large masses of used material. Freshly occupied provinces are not yet able to take over the full supply of the army. If one unit is in garrison at the same place for any length of time, it might attempt to become more independent of supplies coming from Gaul or Italy. Some samian ware, for example, was made at the legionary fortress at Haltern;³³ nevertheless this production was not sufficient to supply the whole legion, as is proved by a mass of contemporary Italian samian ware that was found at Haltern.³⁴

The beginnings of phase two are to be seen in this production, starting in the final phase of conquest or shortly after that. The province would gradually want to become independent of expensive imports from Italy or Gaul. In this second phase, I think most equipment would be produced in the fabricae of the forts or their vici when the situation became more settled. The mass of the troops are not fighting any longer and they have to hold the occupied parts of the province. During this first period of consolidation, private craftsmen and traders come to the new province slowly. We have to count further with native traders and craftsmen. At this point, imports from Italy and Gaul are still necessary to supply the needs of the troops fully. With continual romanization, phase three slowly begins with more or less full economic independence of the new province. The main burden of supply was now taken over by smaller or larger local workshops or manufactories, or by the fabricae of the forts and fortresses. Phase four is reached in late Roman times, when private industry was no longer able to supply the army. From that point onwards, the government takes over the supply of the army with weapons and equipment.

As far as the dating of the different phases is concerned, I can give only a general review. Phase one covers the period from Augustus to the Claudian/Neronian period, phase two from the Neronian to the Flavian period; phase three was from the late Flavian period up to the middle of the third century, whilst from the middle of the third century, phase four slowly began, and is obvious in the Diocletianic era.

NOTES

1. I would like to thank Mr. David P. Davison M. Phil., Oxford for reading my English manuscript and for some interesting discussions.
2. OLDENSTEIN, 1976, 68ff., cited below as Ausrüstung.
3. Notitia dignitatum Or. XI, Oc. IX.; HOFFMANN, 1969, 61ff.; Ausrüstung 83f. esp. notes 161-7.
4. For these finds see Ausrüstung passim.
5. Ausrüstung 68ff., FISCHER, 1984, 299ff.; MACKENSEN, 1983, 565ff. esp. 571ff.
6. For the German limes see OLDENSTEIN, 1982, 117 Nr. 8 s.v. Geräte zur Herstellung von Bronzeguß.
7. Ausrüstung 80ff.
8. See the new paper of M. Feugère (1983, 45ff).
9. See notes 5 and 6.
10. MACMULLEN, 1960, 12ff; NUBER, 1972, 483ff. with older literature.
11. ULBERT, 1971, 44ff.
12. Ausrüstung 82 note 155, CIL VI 1952, IX 3962, X 3986 (gladiarii), CIL VI 9043, X 3971 (scutarii).
13. Ausrüstung 82, CIL XIII 6677.
14. See the article by E. Ritterling in the RE s.v. "legio" passim.
15. OLDENSTEIN-PFERDEHIRT, 1983, 303ff.
16. Ausrüstung 80f., Tacitus, Historien 2,12 and Vegetius, Ep. rei milit. 4,8.
17. Ausrüstung 80f. with notes 135 and 136, CIL XIII 6763.
18. Ausrüstung 81 and Vegetius Ep. rei milit. 4,8.
19. Ausrüstung 152ff. Nrs 353-87 Taf.39, 40 for example.
20. Ausrüstung 160f. Nrs 425, 426 Taf.43 for example.

21. To that problem see MACKENSEN, 1983, 571ff.
22. Ausrüstung 78 Nr. 951 and 1058 Taf. 72 (Pfünz) Taf.79 (Weißenburg), or Nrs. 1110 (Heftrich) 1111 (Zugmantel) Taf.84; Nrs. 1139 (Niederbieber) 1138 (Zugmantel) Taf.88.
23. For the career of Roman officers see MAXFIELD, 1981, 24ff. esp. Map 4.; DOBSON, 1978, passim, esp. 165ff.; SPEIDEL, 1978, esp. 67ff.
24. A. Böhme in SCHÖNBERGER, 1978, 211ff. Abb.73.
25. See distribution map op. cit. 225 Abb.79 and list of the finds 223, 6.
26. See distribution map op. cit. 224 Abb. 78 and list of the finds 222, 5.
27. See note 25.
28. See note 25.
29. See note 25.
30. Ausrüstung Taf. 29.
31. Ausrüstung 83ff.
32. See the article by H. Comfort in the RE s.v. Terra Sigillata.
33. VON SCHNURBEIN, 1974, 77ff.; VON SCHNURBEIN, 1981, 69ff.
34. VON SCHNURBEIN, 1982.

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