

Footwear in the North-Western Provinces of the Roman Empire

This chapter is intended as a guide to the identification of Roman footwear from archaeological excavations, based mainly on evidence from the Roman provinces of Gallia Belgica and Germania Inferior (*i.e.* roughly the area south of the Rhine to a line between Bonn and Boulogne) but also drawing on information from important collections of footwear from northern Britain (the fort of Vindolanda¹) and southern Germany (Welzheim²).

When the Roman legions conquered the Northern Provinces, they brought with them not only their own very distinctive styles of footwear, but they also introduced the technique of vegetable tanning to the native peoples.³ The Roman presence therefore, marks a very real break with native traditions. In the Prehistoric period and in the areas not conquered by the Romans, skins were treated with oils and fats or by methods such as smoking, none of which give long lasting, waterproof leather. As a result, artefacts made of animal skin only survive under very special environmental conditions, such as extreme dryness (as in Egypt), salinity (such as the central European salt mines) or where a sort of natural tannage has taken place, as in the bogs of Drenthe, Niedersachsen and Denmark (see the contribution by Prof. W. Groenman-van Waateringe, this vol.). In contrast, true tanning, using vegetable extracts, survives well in wet, anaerobic conditions. It is as a result of this technological change that leather begins to form such an important find category from the Roman period onwards.

No Late Iron Age footwear survives in Gaul or the Rhineland, and though scarce depictions suggest some quite sophisticated footwear in the single-piece tradition was known, this is not the sort of evidence which can be compared to the surviving footwear from Roman contexts. Certainly, the Greeks and Romans had developed more complex styles long before, with soles and uppers cut separately. Etruscan shoes seem to have been sewn, but by the 1st century B.C., soles and uppers were also being nailed together.⁴ It is this nailed construction which sets the Roman footwear tradition so very much apart from the native developments in the North. The nailing made footwear loud and obvious, clattering on roads and leaving distinctive tracks in the sand: it is a very potent symbol of the new order and the acceptance of Roman footwear undoubtedly reflects political choices.⁵

Roman footwear finds in Europe

Almost any sealed, damp environment will preserve artefacts made of vegetable tanned leather in good condition for many

centuries. On excavation, however, deterioration begins immediately, resulting in severe shrinkage and distortion. Leather should, therefore be kept sealed, damp and cool before being sent with minimum delay to a conservation laboratory where it can be preserved either by freeze-drying or by immersion in PEG.⁶ It should be noted that PEG can react unfavourably with the iron hobnails of Roman shoes.

Situations where Roman leatherwork, particularly footwear, is to be expected are:

- Riverside rubbish dumps and land reclamations: Mainz, Köln, Velsen, London, Zwammerdam, Vechten, Woerden, Valkenburg *vicus*, Pommeroeul⁷
- Waterlogged levels of ditches: Nijmegen, Bar Hill⁸ Vindolanda
- Backfill and raised levels: Valkenburg⁹ Vindolanda
- Wells and waterholes: Saalburg, Zugmantel, Welzheim, Newstead¹⁰
- Rubbish dumps which have sealed wet levels: Vindonissa, Bonn¹¹

The most prolific locations are - as might be expected - the towns and, particularly, military camps, where there were large concentrations of population: there is much less evidence from rural sites.

During the Roman period, shoes in wells and water-holes form an intriguing group since many were deliberately placed at the construction of the well (Figs 82, 84, Venray and Katwijk). As is the case with prehistoric shoes deposited in bogs, the definite preference for depositing the left shoe in such locations continues in the Roman period.¹² Although other shoes might be included in the rubbish used to fill up a well shaft after it had ceased to function, there is increasing evidence that shoes were regularly deposited in springs and wells and it is, therefore, important to record the exact depth of soles (or hobnail concentrations) when excavating such features. The shoes seem to have functioned as a sort of signature accompanying requests made to the gods, and it is possible that the right shoe was retained by the dedicant as a reminder of the 'contract'. Thus the three sandal soles from a well at the Gallo-Roman temple of Matagne-le-Petit (B)¹³ are just as much offerings as the coins, *fibulae* and bracelets found there, while the left shoe from a well at Erps-Kwerps (B),¹⁴ found together with an inscribed ring, an undamaged axe head and a belt fastening also forms a clear ritual association. In riverside dumps and the mixed rubbish in the fills of pits and ditches, this ritual aspect is less obvious, but the careful cross-wise placing of a pair of shoes in an otherwise unremarkable layer raising a small house terp in Midden Delfland (Fig. 81) warns us against a too easy assumption of

casual discard. And although the leather from Pommerouel looks like ordinary household rubbish, the nature of some of the Iron Age finds from this river channel is such that we must keep an open mind.¹⁵

Shoemakers

Though tombstones of both shoe and last makers are known from Gaul and Germany, none have been found in the northernmost provinces (Fig. 1). Corporations of shoemakers are known from inscriptions in Rome, but even a small town like Nijmegen (Ulpia Noviomagus) had an association of shoemakers. Here, a man called Rusticus dedicated a silver ring on their behalf to the god Salus (*sutoribus Noviom.*)¹⁶ (Fig. 2). Some sort of guild testing or control is perhaps implied by a category of official looking stamps on outer soles. What the letters stand for is unclear, but almost all have the letters PS set slightly apart. Identical stamps have been found in Valkenburg and Köln (PS/RPA), Vechten, Woerden and perhaps also Köln (PS/CATATS set around M) (Fig. 3).¹⁷ Though a stamp from Zwammerdam PS/CVT suggests an interpretation in the sense of "passed by the shoemakers of Colonia Ulpia Trajana" (Xanten), none of the other stamps form a

recognisable combination. The stamps are too infrequent to be simply quality control marks and it is in any case curious that these stamps all seem to date to the period II d/III a, are generally placed on the outer soles of cork slippers and more rarely on sandals, and the practice is, apparently, confined to the province of Germania Inferior. An association with cork sandals may, however, point in the direction of official authorisation (and payment of taxation) for the use of particular materials in their manufacture - and in the case of both slippers and certain sandals, this material could well have been gold (Case Studies VIII).¹⁸

Fig. 1. Tombstones showing shoemakers at work. Reims (Espérandieu 3685) and Bourges.

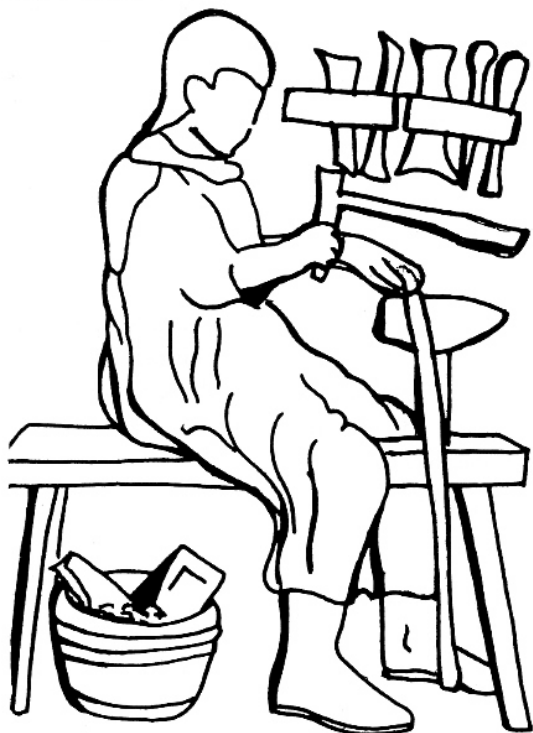
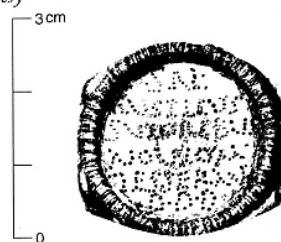


Fig. 2. Silver ring dedicated to the god Salus, from Nijmegen (courtesy Gemeentelijke Archeologische dienst).



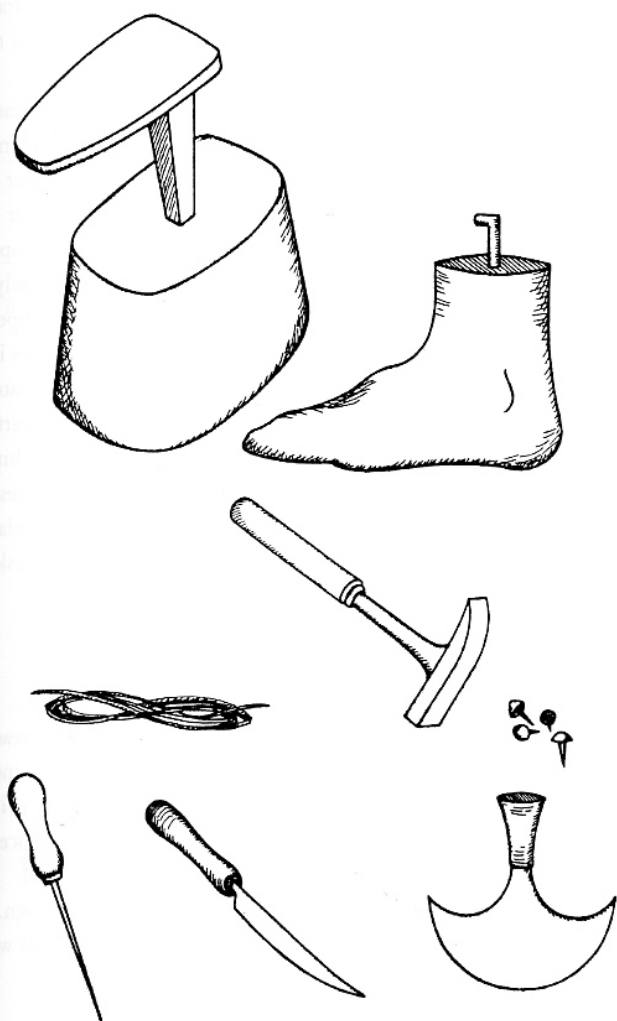
Tools

Roman shoemakers tools are little different to those used in Medieval times - knives, awls, wooden lasts - but for the special nailed construction they also required an iron 'anvil', a hammer and a good supply of variously sized nails (Figs 4, 5).¹⁹ Noticeable knife cuts in the corners of even the most

Fig. 3. Control stamps on soles.
Zwammerdam, Vechten, Woerden,
Köln.



Fig. 4. Shoemaker's tools.

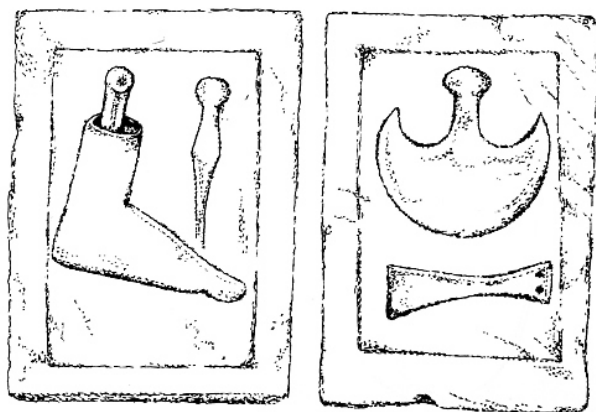


complex openwork suggests the shapes were cut out individually with a sharp knife. Circular and semi-circular metal punches were used to make lace holes and decorative roundels as well as impressed surface decoration. More complex figural stamps (vegetable and animal forms as well as inscriptions, Fig. 6) must also have been applied with metal dies, but none survive. Except for the half-moon knife, none of these tools are exclusive to shoemakers. Various qualities of twine and thong would also be required. Thin twine was used for sewing the upper, with thicker cord for bracing and the assembly of the bottom unit: during the 4th century leather thong or rawhide began to be used more frequently for both purposes. For many types of footwear, a jointed last would have been necessary. Depictions show lasts either hanging on a hook or set out on shelves, but we do not know whether lasts were made to individual specifications or whether the Roman shoemaker employed some kind of standard measurement enabling him to make his stock in advance. The effects of wear, soil action and post-excavation shrinkage in addition to differences in hide quality make it impossible to trace any system using statistical methods on surviving footwear.

Shoemaking

In contrast to Prehistoric and Medieval practice, Roman shoemakers employed a variety of techniques to construct a very diverse range of footwear. Shoes were assembled from several different components (which is why they are termed 'complex constructions'): insole, outer sole, heel stiffener, internal cushioning and the upper, utilising different types of leather for each purpose. Thick, specially treated cow hide was used for the soles, goat and calfskin for the uppers, sheepskin for the

Fig. 5. Cinerary urn of the shoemaker Donatus from Altino, Italy.



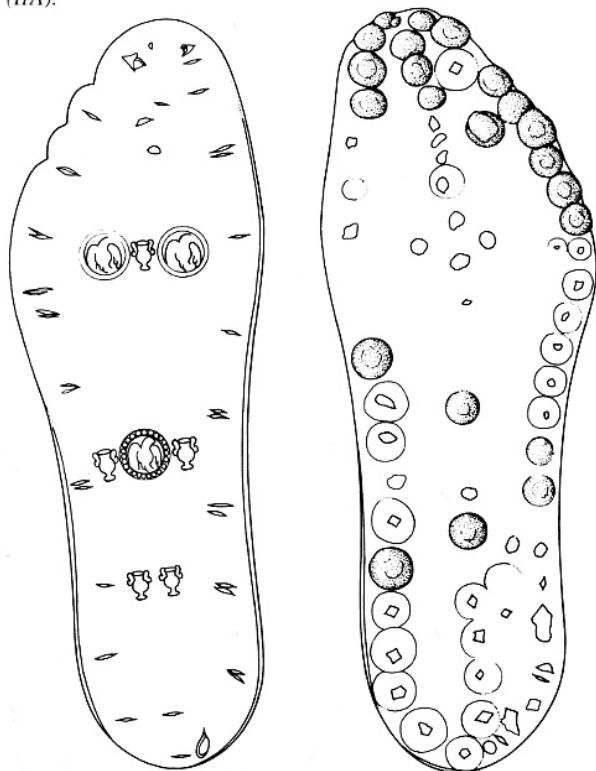
linings, and fine, soft leathers like deerskin for luxury items like slippers. Although many exotic skins are known from Classical sources, none of these have been identified outside Egypt (where crocodile hide as well as the skins of felines and other desert mammals have been noted). Due to its high fat content and deep hair follicles, pigskin was not used to make leather in antiquity, nor has horse hide ever been identified with certainty.

Often the techniques of manufacture are specific to particular styles of footwear, though there is sufficient overlap to make it unlikely that shoemakers were particularly specialised, at least in the smaller towns of the northern provinces, where the frequency of shoemaking off cuts in excavations suggests that every vicus would have had several shoemakers. Actual details of shoemaking practices are scarce. Excavators do not always collect the off cuts carefully, frequently only the eye-catching shapes are retained and it is difficult to assess the nature of the deposit or the degree of specialisation. A further complication is that the patterns for the shoes were very closely arranged on the leather, leaving very little in the way of distinctive shapes which could identify the products (compare the left-overs from the cutting patterns Fig. 17 with off cuts Figs 7-8). From Maastricht there are indications for a special-

ist maker of *carbatinae* throughout the early part of the 2nd century (so presumably for at least 2 generations) in the same location.²⁰ On the other hand, in Vindolanda, a single large deposit of shoemaker's waste contained evidence for the manufacture of several types of shoes and soles as well as *carbatinae*, and the same picture emerges from analysis of the off cuts from *vici* such as Liberchies, Pommeroeul and Bavay.²¹

At these workshops there were of course no shoes to assist in identification. It is a serious - although very common - misconception to regard heaps of worn out shoes as indicators for a shoemakers workshop.²² Naturally, the products would all be sold and dispersed and only the off-cuts will be left behind at the place of manufacture. Old shoes end up on rubbish dumps, not back in the shoemaker's shop and if we are surprised at the quantities, we need only to consider the huge amounts of footwear in use. There are indications that soldiers could expect 3 pairs of boots per year, which means that 3,000 shoes would be thrown away annually at a small *cobort* fort like Valkenburg! In addition, many people in the Roman period possessed several different sorts of shoes at a time. The sizes of shoes left behind on a ship which sank in the Rhine at Woerden rather suggest that the crew each owned at least one pair of closed shoes as well as a pair of sandals. When we reflect on the quantities, we can also see how very little has survived and, unfortunately, how very restricted our evidence is. A further limitation is low rate of survival of the upper leather, probably a result of wear, sweaty feet, and the fact that thinner, more supple leather was often used for the upper. As a result, many Roman complexes consist almost entirely of soles, with, at best a few small scraps of disintegrated upper. Furthermore, since only vegetable tanned leather survives in waterlogged contexts, we lack all the luxury leathers, treated with alum (to make white shoes) or with oils (to make particularly soft, pliable leathers). It is noticeable that, when thin leather is preserved, it is often in an oak-lined well, suggesting that a sort of secondary, natural, tannage has taken place, leading to the preservation of unusual items, like the doeskin slippers (Case Studies VIII).

Fig. 6. Sandal sole from Vindolanda with decorative stamps (IIA).



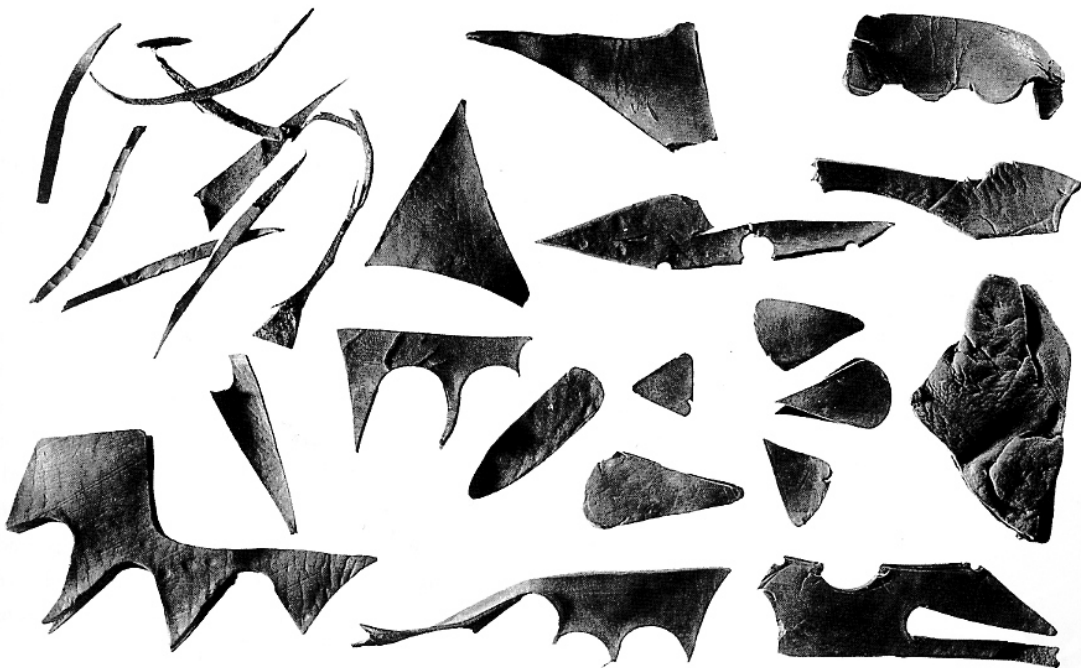
Decoration and colour

Waterlogged leather is usually black in colour due to a reaction between tannins and iron salts in the soil and since most dyes used in antiquity were water soluble there is little evidence for coloured footwear in N. Europe. Occasional traces of paint on tombstones, as well as coloured mosaics or wall paintings generally show the shoes as black or dark brown. The pair of shoes in a girl's burial at Southfleet (Fig. 68) were purple with gold thread, and it is likely that the finer

Fig. 7. Shoemaking off cuts from
Liberchies. The leather of those at
the upper left is folded double.



Fig. 8. Shoemaking off cuts from
Bavay (photo IPP).



footwear was much more brightly coloured than we would suspect from the archaeological finds. The rich and varied colours of Egyptian shoes which have been preserved under dry conditions, should not be regarded as unique.²³

Additional coloured accents would be provided by the use of coloured linings or socks behind elaborate openwork, and the used of coloured twine in stitching.

In some periods the uppers could be decorated with impressed and incised lines and swags, or with rouletted and pricked designs. Such surface treatment is particularly popular in the mid and late 2nd century (Fig. 10.12-13, 15). Small punched out roundels and lozenges give an elaborate 'fish-net' appearance to shoes and boots transforming plain styles to expensive luxury products worn not only by women and children (Köln, London, Vechten, Vindolanda) but also by senior officers (Vindolanda and the Saalburg) (Fig. 9; Fig. 10.8). Decorative arrangements of small metal studs appear in the mid 3rd century (as with the hobnails, these would survive in burials, and should be looked out for, cf. Figs. 10.27 and 62) at about the same time that vamps are occasionally slashed, presumably to expose puffed linings, similar to the late 16th century examples illustrated by Goubitz (Goubitz, this vol.). The edges of the uppers could be cusped and strap joins in openwork were often reinforced by small roundels. The centre back of shoes and boots is frequently marked with a tab or roundel, which is accompanied by dangles with decorated ends, especially on the military boots of the 1st and early 2nd century. Similar dangles sometimes hang from the topmost fastening tab of shoes, boots and even some *carbatinae*. By the time the shoes have been excavated and cleaned, many of these features will

have been damaged and lost. It is therefore important to be alert to the various possibilities, because even a small and inexplicable stump or torn area can provide a clue to the original appearance.

Footwear fashion (Figs 10, 11)

Throughout the Roman period, shoe styles change rapidly, with particular styles popular all over the Empire at exactly the same time.²⁴ Regional variation is not very pronounced, and it is remarkable how widespread even the more unusual shoe styles can be (see Case Studies). Many shoe styles were only used for a generation or so, before being replaced by something completely different: for instance, the ankle boots of the late 1st and early 2nd century were entirely superseded by shoes for the rest of the century, with short boots only coming back into fashion at the beginning of the 3rd century. There were always several popular styles at any one time for people to choose from, in addition to numerous individual styles which only occur sporadically. Thus of the 74 complete shoes found in a well dating to about 210 at the fort of Welzheim (Baden Württemberg) 36 belong to just 3 distinct styles and there are over 20 completely different forms (10 of them highly individual children's *carbatinae*) which only occur once or twice.

Roman footwear is so diverse in form that I prefer to distinguish the individual styles by "trade name" (usually a site or location with which it had a particular affinity) rather than construct typological schemes or numbered sequences, both of which lead to problems of definition. In both cases, spurious links are created, and chronological developments implied which cannot be substantiated, quite apart from numbered sequences becoming clogged with variants as new discoveries are made, and leading to increasingly cumbersome descriptions. Indeed, the most striking feature of the seriation diagram (Fig. 11) is the lack of logical development over time: completely new styles seem to emerge quite suddenly. We must simply recognise that our information is not yet complete, and it is impossible to present a definitive overview of all Roman footwear, in all its visual and technological diversity.

Figure 10 shows a selection of popular styles from the early 1st century (top left) to the end of the 4th century (bottom right), drawn from various North West European locations. If the numbers of particular styles present at the Roman forts of Vindolanda and Bar Hill (both in N. Britain) are plotted by the occupation phase, then the manner in which they come into fashion, reach their peak of popularity and then gradually go out of favour, is clearly revealed (Fig. 11). The relatively short life of particular styles means that footwear is a sensitive indicator for the dating of archaeological complexes.

Fig. 9. Fish net shoe from Vechten (photo IPP).

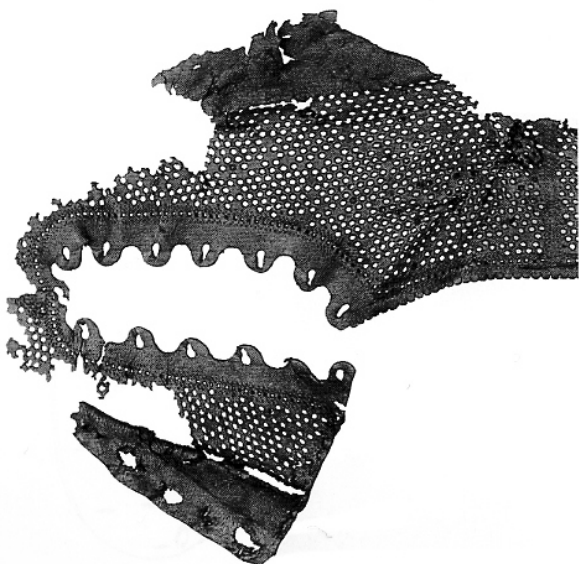


Fig. 10. The development of Roman footwear from the First Century (top left) to the Fourth century (bottom right). Nos 1 and 2 from Free Germany.

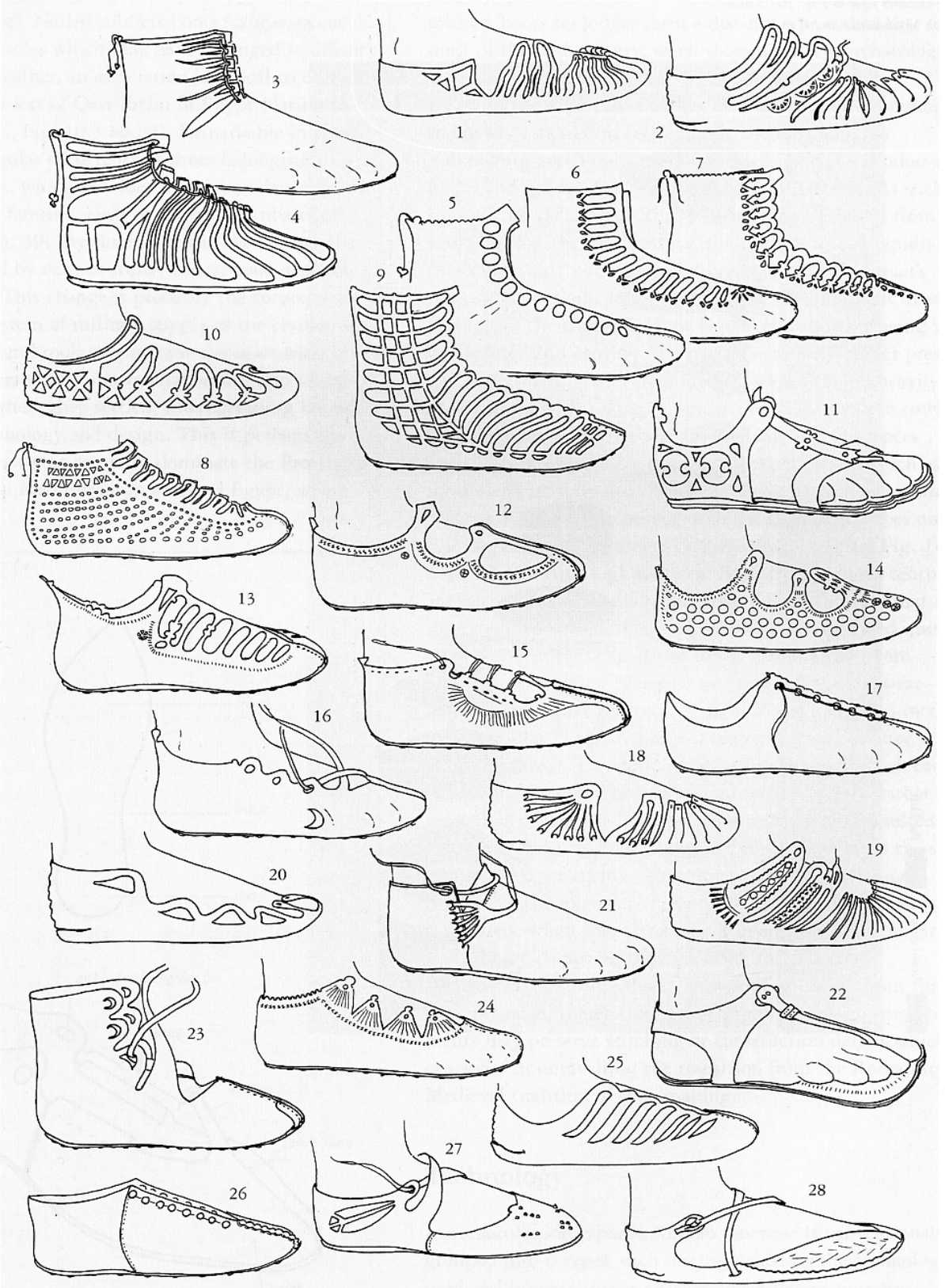
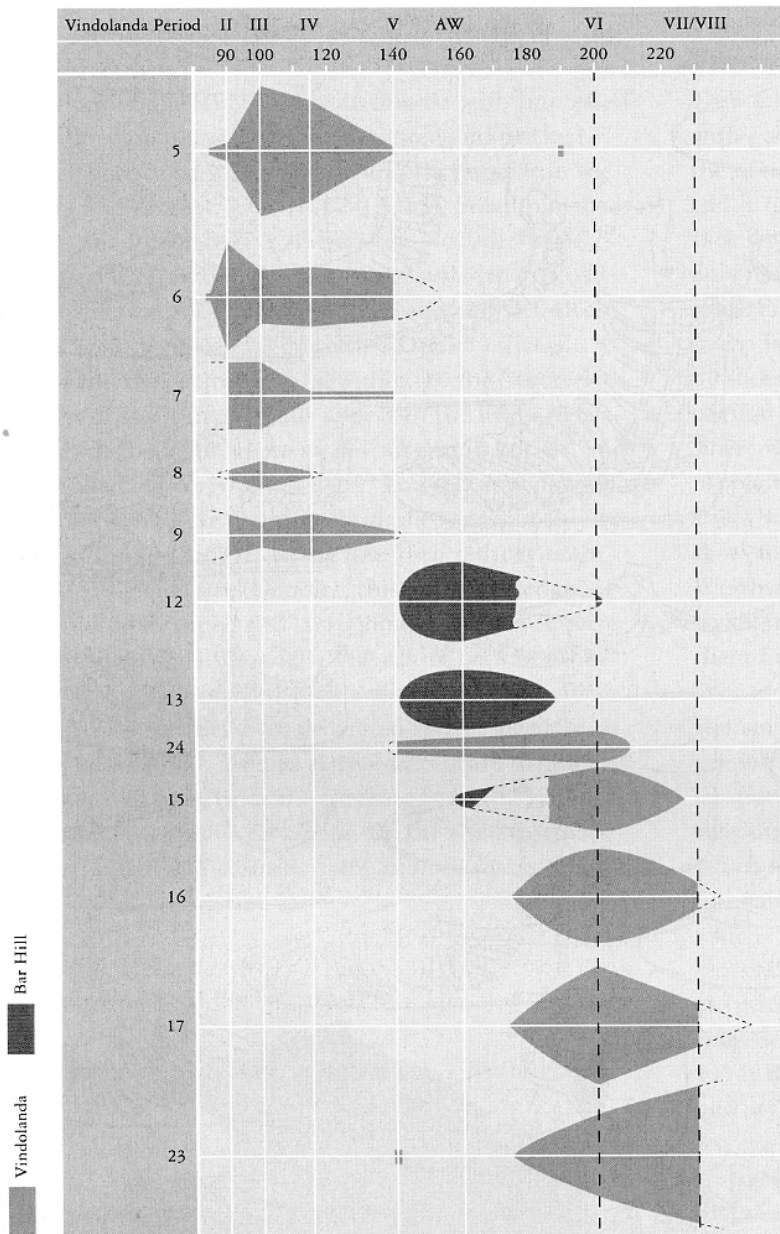


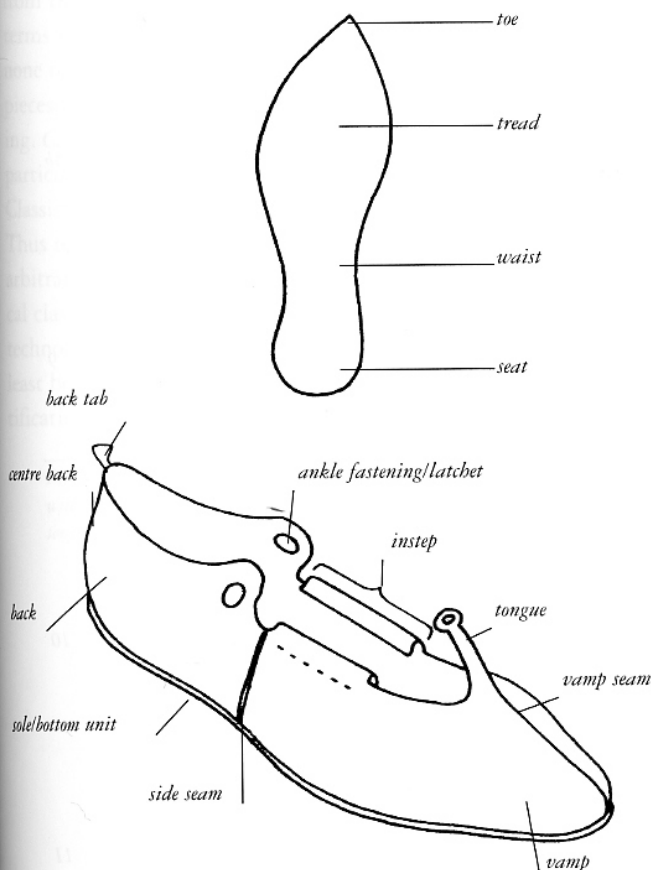
Fig. 11. Changing popularity through time of selected shoe styles (numbers refer to Fig. 10), based on Vindolanda and Bar Hill.



The earliest Roman footwear in our region is found in the military camps associated with the conquest (Mainz, Velsen, Vechten, Valkenburg). Nailed soldiers boots (*caligae*) occur together with sewn soles which may have belonged to officer's boots made of fine leather, an association identical to that found at the Roman fort of Qasr Ibrim in Egypt (dating to the first decades B.C, Fig. 10.3 and 4). Remarkable in these complexes is the regular occurrence of shoes belonging to women and children, which provides definite evidence for the presence of soldier's families, even in the earliest phases of conquest (Graph Fig. 39). By the end of the 1st century the *caligae* were replaced by various sturdy boots, none of them specific to soldiers. This change is probably the consequence of changes in the system of military supply as the civilian settlements developed and took over certain manufacturing tasks from the army. Veteran army shoemakers would also set up shop in the places where they settled, thus spreading knowledge of Roman technology and design. This is perhaps the reason why nailed footwear comes to dominate the Provincial scene, whereas in the Mediterranean area and Egypt, where

the influence of the army is less pronounced, civilian footwear employs predominantly sewn constructions. But the fact that soldiers boots no longer form a distinct type means that for most of the 2nd century, when shoes dominate archaeological complexes, soldiers did not wear boots at all. As might be expected, the new elements are most obvious in the newly established settlements, the forts (such as Valkenburg and Vindolanda) the towns (such as London and Köln) and the *vici* (such as Bavay and Liberchies). At such sites all the varieties of Roman footwear are present from the start. During the 2nd century, these styles spread rapidly to the countryside - and these are not rough, countryman's copies, but well-made shoes reflecting the dominant urban fashions of the times. Elegant ladies' sandals were being worn in the later 2nd century in a native settlement under present-day Rotterdam, and nearby, farmers were wearing heavily nailed shoes with a sharply pointed toe, like modern cowboy-boots (Fig. 83). During the 3rd century new influences appear, some apparently from the Eastern empire (such as sewn constructions and the use of lavish decoration) while others point to close contact with the Germanic tribes outside the Empire (asymmetrical *carbatinae*, compare Fig. 10.2 with 10.19). Although footwear finds from the 4th century are infrequent, hobnails found with burials indicate that nailing remained common till mid century, but declined quite rapidly thereafter. This is not to say these burials were 'unshod', since sewn, thonged and single piece footwear which would leave no trace in the soil was becoming increasingly popular at this time, part of trend towards softer, more flimsy footwear. The developments in the 4th and 5th century remain obscure. The lack of surviving material rather suggests that the decline in urban life in this period resulted in the loss of tanning technology, as people reverted to the simpler methods of curing. There are evidently also major changes in the footwear of the northern tribes at this time, as is apparent when shoes from the Roman Iron Age (2nd-3rd century) are compared to those from, for example, Wedelspang and Elisenhof.²⁵ Any find of leather from this dark period is, therefore of great importance: even small fragments may preserve stitching or construction details which can assist in unravelling the transition from the Roman to the Medieval tradition of shoe-making.

Fig. 12. Terminology for Roman footwear.



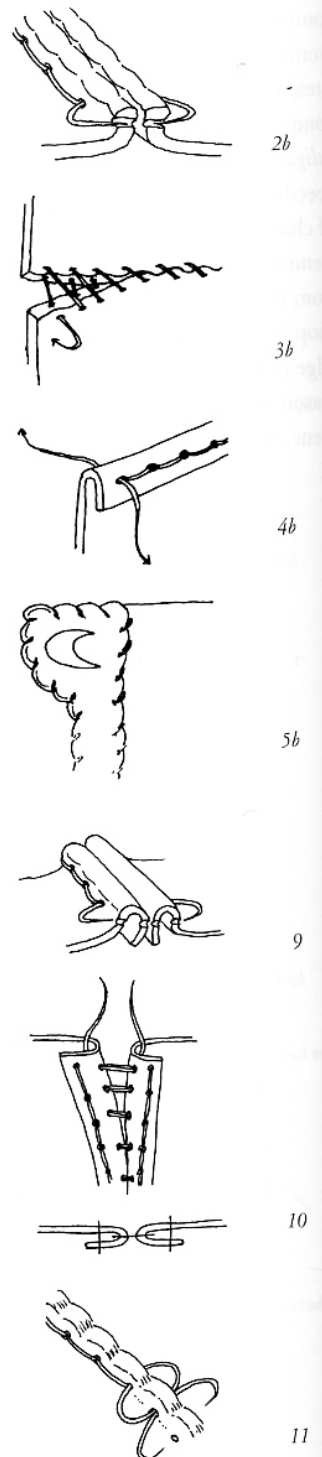
Technology

In archaeological reports, Roman footwear is conventionally grouped into 6 types, each distinguished by the technology used and to some extent also serving different purposes.

Fig. 13. Stitching used on Roman footwear.

Stitch	Form	Section	Drawing convention
1. Lap seam			
2. Plain seam			
3. Edge/ flesh seam			
4. Whip stitch and felling stitch			
5. Whip stitch and felling stitch			
6. Tunnel stitch			
7. Tacking 8. Running stitch			

Fig. 14. Additional seams and stitches for Roman footwear.

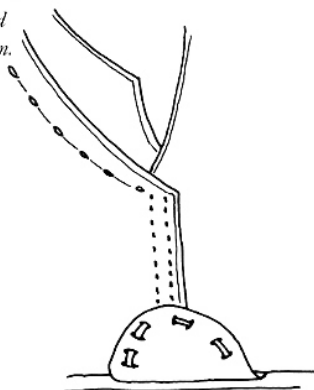


- *carbatinae*: single piece un-nailed footwear
- *caligae*: military boots
- *calceii*: closed shoes
- *socci*: slippers
- *soleae*: sandals
- *sculponeae*: wooden soles

In fact, Roman sources record a much more extensive footwear terminology, though we no longer know whether these names refer to practical matters such as style, the technology used, the leather sort, the colour or even to intangibles such as the occupation and status of the wearer. Words used to designate clothing tend to change as fashions and usage change, and to judge from the character of the archaeological finds, it is highly unlikely that a term used in the early 1st century could possibly refer to the same kind of footwear if used a century later. Alterations in style and technology are simply too great for Classical terminology to be in any way consistent and the use of Latin or Greek terms should be avoided in archaeological reports since they are essentially meaningless. There are, however, two exceptions to this rule: *carbatina* and *caliga*. In both cases archaeologists use the terms as a convenient form of short-hand to describe shoe constructions for which there is no parallel in the modern world. Quite apart from the ethnic and historical implications of the modern terms like 'moccasin' or 'pampootie' (opank, bundschuh), none of these accurately describe the Roman form of single pieces footwear and the use of these terms would be misleading. *Caliga*, when used in an archaeological context refers to a particular type of military boot (see below), regardless of what Classical writers may have understood by it.

Thus to some extent, every system of classification will be arbitrary, but for archaeological purposes, a purely technological classification of footwear is the most logical. Given the technological diversity of Roman footwear, fragments can at least be assigned to a generic category for purposes of quantification. In detail, however, there is considerable overlap,

Fig. 15. Double stitched side seam with racked reinforcements and tongue attached with a lap seam.



which reinforces the impression that shoemakers were versed in all the techniques and made conscious choices between methods, for reasons which are not always clear to us now.

Basic Roman Classification of Footwear by Construction

- 1) Complex constructions
 - a) Nailed bottom unit:
 - I) separate layers
 - II) upper cut together with middle sole (*caliga*)
 - b) sewn bottom unit:
 - I) outer sole alone
 - II) separate sole and upper
 - III) cork slippers
- 2) Single piece constructions
 - a) *Carbatinae*
 - I) symmetrical
 - II) asymmetrical
 - b) late sewn shoes
- 3) Sandals
 - a) multi-layer nailed and/or sewn
 - b) single layer
- 4) Wooden soles/pattens
- 5) Fibre sandals

Common features

Many of the stitches and construction methods associated with the multi-layer footwear of the 17th and 18th century were already being used by Roman shoemakers. This is not a case of continuity, but simply the materials used dictating the methods necessary to achieve a particular end. We can, therefore refer to Olaf Goubitz's charts for seams and stitching, but although the methods are basically the same, they tend to be used in a slightly different way, resulting in a different effect (Figs. 13-15).

- while the Medieval shoemaker sought to make his seams invisible, the Romans exploited seams and stitching as an additional decorative effect. Seam edges are turned to the outside and there is no attempt to mask overlapping edges or stitching.
- Instead of the Medieval edge/flesh seam, the Romans favour an edge/grain seam, sewn with an over stitch. This seam is not used to attached uppers to soles.

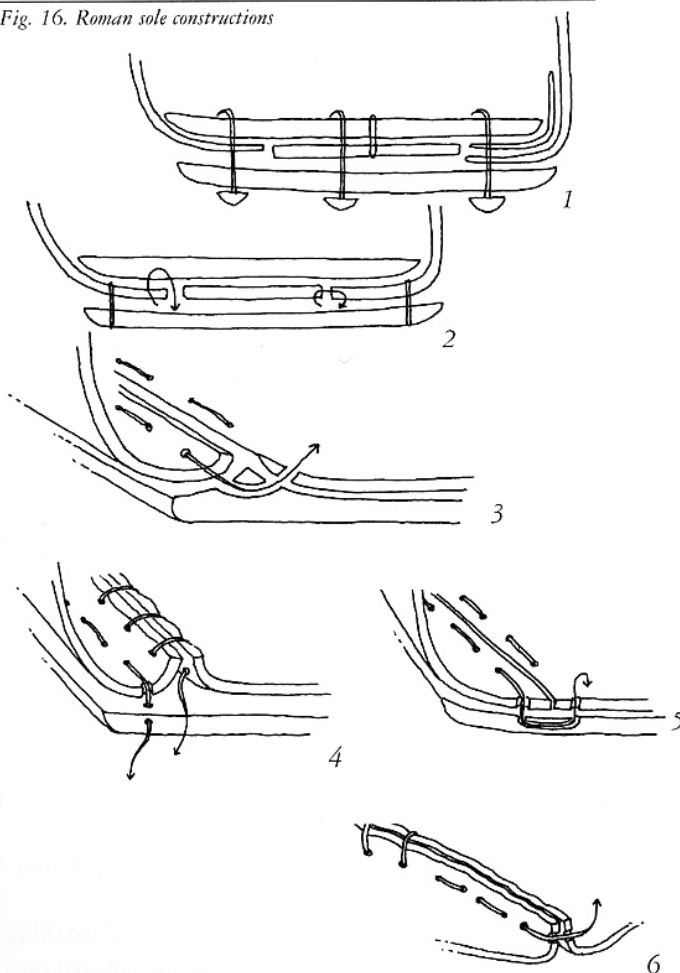
Uppers

- Vamp seams: plain seam with the edges turned to the outside and forming a prominent ridge (Fig. 14.2b). This may be imitated by a line of saddle stitching (Fig. 14.11) if there is no vamp seam as in Cutting Pattern B (Fig. 17). Uppers of thinner leather may be joined with a double top seam, sewn through folded edges (Fig. 14.9).
- Side seams: usually as a lap seam (two lines of stitching) with extremely small stitches, occasionally covered by a

reinforcement tab on the outside (Fig. 15). More rarely the butted edges are folded back (to the inside) and sewn with a double top seam (Fig. 14.10). A true edge/flesh seam (Fig. 14.3b) is first noted on late 3rd/4th century shoes from London and from Magor, South Wales, and is used as a side seam, not to join upper and sole.

- 3rd and 4th century single pieces sewn shoes employ a plain seam, turned inwards and either tacked, or joined with an overstitch, occasionally with an edge/flesh overstitch (Fig. 16.6), but in all cases giving a scalloped appearance to the seam (Case Studies IX).
- Top edges are either plain cut or may be turned down, usually stitched through (using 2 threads, Fig. 14.4b), occasionally a whipped hem.
- Reinforcements are usually attached on the flesh side, with whip stitch (slip stitch or over sewing, Fig. 14.5b), and often whipped right over the edge, giving a scalloped finish. There is no separate top edging. Textile linings may also occur.

Fig. 16. Roman sole constructions



Soles (Fig. 16)

- Tunnel stitch (Fig. 13.6) is used to attach both the different layers of the sole and the outer sole to the upper.
- Lasting margins can be tunnel stitched or whipped to the under surface of the insole (Fig. 16.2 and 4). Sometimes this is only a preliminary securing before bracing.
- Overstitch or tunnel stitch, sometimes using thong, can be used to attach uppers to the insole in a butted seam arrangement (Fig. 16.5).
- Though there may be reinforcement wedges at the seat of the sole, there is no heel

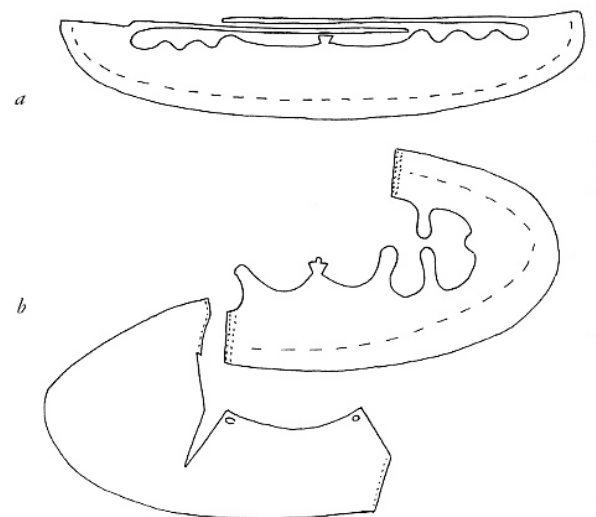
Complex constructions

Most types of Roman footwear possess a sole made of several layers (multi-layer construction) with the upper (or the straps) attached separately by means of stitching or bracing. The whole unit, with the outer sole, is sewn, thonged or nailed together.

The cutting pattern

The upper is generally made as a single piece, shaped by a seam at either the toe (pattern A) or, more rarely, at the inside waist (pattern B) (Fig. 17). It is rare to find both a vamp seam and a side seam, but at the Saalburg several high quality shoes were made in this fashion. In Egypt, there is a strong local tradition of single piece uppers with a back seam, which left the vamp entirely free for lavish decoration, but in western Europe, back seams are only used for *carbatinae* and *caligae* (see

Fig. 17. Cutting patterns A and B.



below). Consequently, the anachronistic term 'quarter' should be avoided in descriptions. Roman shoemakers avoided making shoe uppers out of separate pieces, and even laces are quite often included in the basic cutting pattern. Uppers made of a separate vamp and back piece (*i.e.* with two side seams) only seem to occur in complexes dating to the 1st century B.C. and the earliest years A.D.

The single piece upper places limitations on the height of the leg: boots tend to reach just above the ankle with 13/14 cm as the maximum height. Shoe backs are generally scooped under the ankle joint, rising to a peak at the back of the heel. A further consequence of the cutting pattern used is that Roman footwear almost invariably fastens at the front. Laces, integrally cut or loose, are the usual fastening method: buckles and buttons are extremely rare. Only in the later 3rd and 4th century do shoes fastened by means of a bone or metal stud appear. Within the basic pattern, the style of the upper differs greatly. All styles can be made with either a nailed or a sewn construction.

The sole

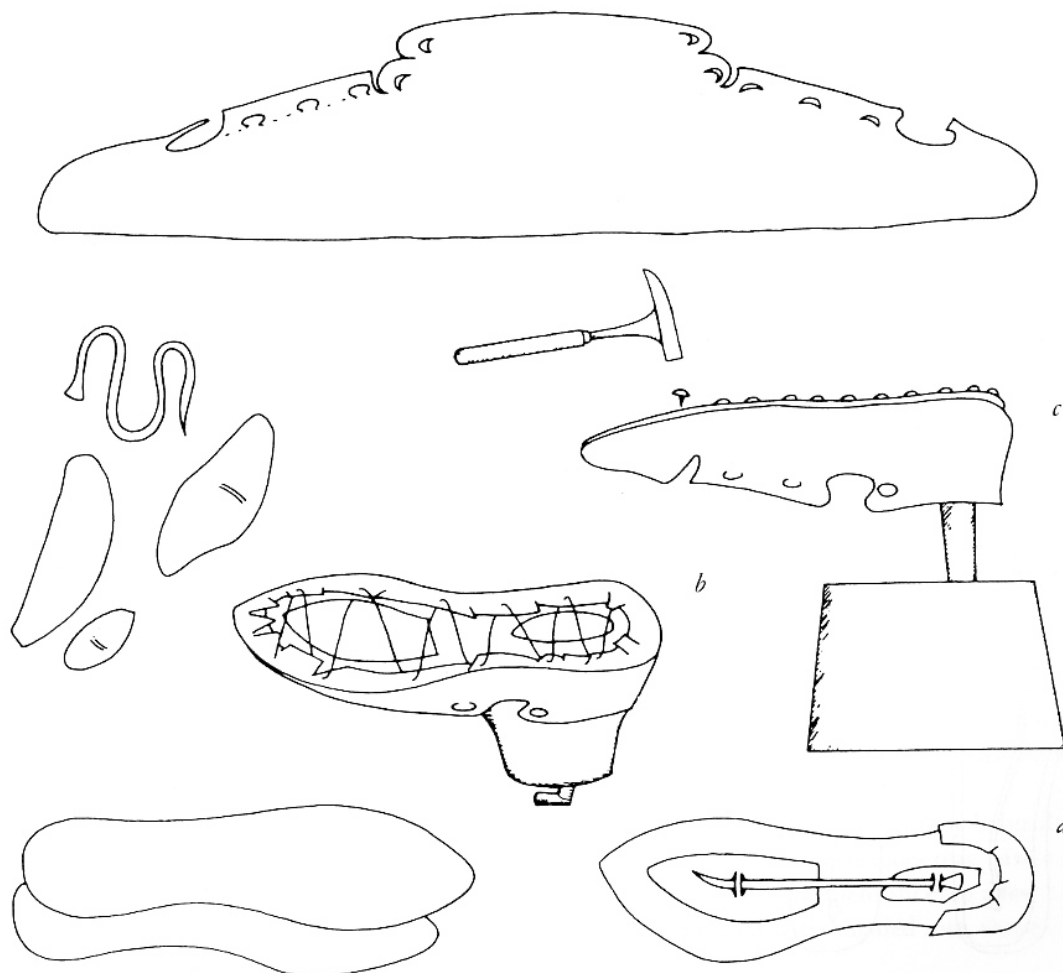
The soles of nailed and sewn shoes, as well as sandals, are usually made of cow hide, 3-5mm thick, which had been compressed by hammering or rolling the surface. Left and right are always clearly differentiated.

Dimensions. The dimensions of Roman soles are given in centimetres with incomplete dimensions in brackets. 4 points should be measured:

maximum length/widest point at the front/narrowest point at the waist/ widest point at the seat.

Though there is a slight correlation between the length and the width at the front, statistical manipulation of the various ratios does not seem to produce any meaningful information. To allow for the upper, the insole is usually about 10-20 mm smaller than the outer sole, and the width, especially at the seat, is also reduced.

Fig. 18. Construction of nailed shoes.



Nailed construction

Footwear with separately cut soles and uppers was constructed in several stages (Fig. 18). By folding the hide (as shown by off cuts from Bavay and Liberchies, Fig. 7), pairs of soles or uppers could be cut at the same time. The bottom unit is composed of an insole and an outer sole, with either one or more complete middle soles in-between or a packing of small pieces of leather (*laminae*) which makes for a more flexible sole layer. Sometimes there is only a small *lamina* at the seat, filling up the space left by the heel stiffener. The middles and the *laminae* are thonged to the insole with narrow leather or rawhide thong; there are slight indications that the patterns used may vary through time, so this feature should always be recorded (Fig. 19). Additional strips or wedges of leather might be inserted at points of especially heavy wear - the outside heel, or big toe for instance, but there is no raised heel. An internal heel stiffener, ca 2-5 cm high may be stitched to the insole, while boots or shoes of thinner leather may have additional linings sewn around the bottom of the upper (last-

ing margin reinforcement) and into the centre back. These are always mounted with the grain side to the foot. The edge of the upper might simply be whipped to the under side of the insole, or, more commonly, cross laced, a technique known as 'bracing' and which is also used in modern shoe construction (Fig. 18.b). At this stage, the shoe is removed from the wooden last, and is transferred to the iron 'anvil' where the outer sole is nailed on. The shafts of the iron nails bend back into the sole on impact with the anvil, clenching all the layers securely together. No glue is used in the construction.

Sole shapes

- The shape of the sole varies though time (Fig. 20):
- Swayed soles: earlier 1st century
- straight rather shapeless soles: later 1st/first decade 2nd century
- swayed and pointed: second half 2nd century
- wide, blunt soles 3-4th century

Although these shapes are characteristic for particular periods, they are not exclusive and relatively natural forms always predominate.

Nailing

It is the nailed construction which differentiates Roman footwear most clearly from all other periods. It is not merely structural in purpose, but at certain periods becomes a fashion accessory in its own right, just as much as the shoe's appearance. The acceptance of Roman-style nailed footwear involved a highly visible personal commitment to the new order: close fitting, rigid shoes alter the person's stance and gait, while hobnails leave individually recognisable patterns in the dust.²⁶ The nails around the edge are essential for the construction, but all the rest are optional, changing as fashions develop. Except for certain distinctive patterns, an individual sole cannot be dated closely, but in large complexes, such as those from Vindolanda and London, certain trends are noticeable

Fig.19. Different arrangements of the thong securing middles or laminae (insoles, from under side).

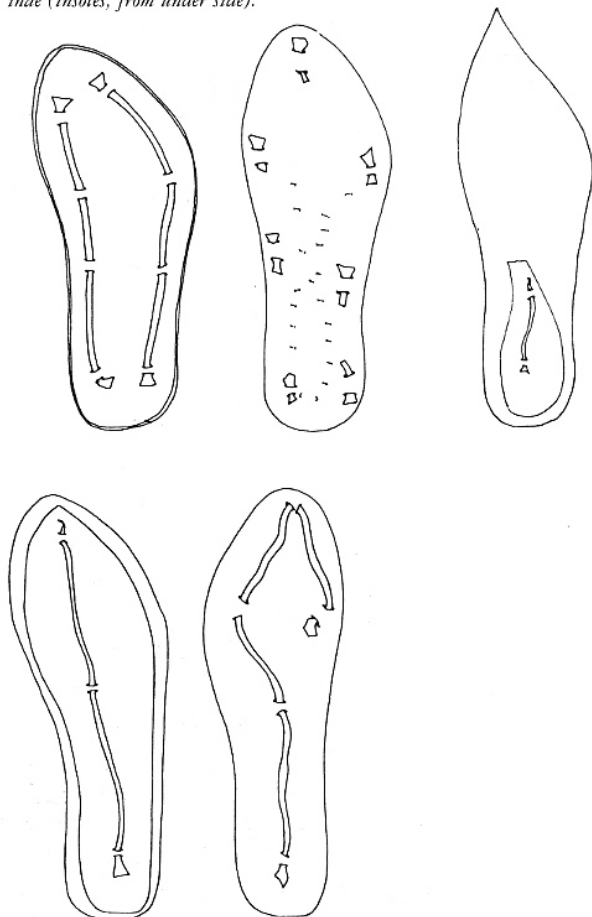
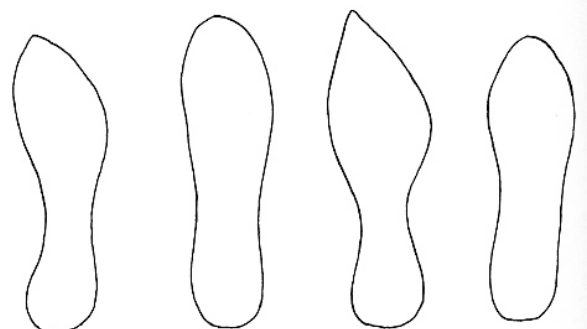


Fig. 20. Sole shapes, from left to right, 1st-4th century.



and the method of recording needs to reflect this. The great variety of patterns, many confined to a relatively short period of time, make a single comprehensive system too cumbersome for use. Any system should be kept to the basics, so that complexes are easily comparable, and flexible enough to allow for the needs of a particular site. For most of the Roman period, from the late 1st century onwards, a threefold division, with a number of variants, is adequate to register the majority of footwear, including incomplete fragments (Fig. 21).

Pattern 1: a single line of nails around the edge of the sole
 Pattern 2: a double line of nails around the edge of the sole

Pattern 3: a single line of nails around the edge of the sole, with a double line at the outside edge

Variants:

- a straight row of nails down the whole length of the sole
- b a gap left at the waist
- c one or two nails at the waist
- d widely spaced nails down the length of the sole

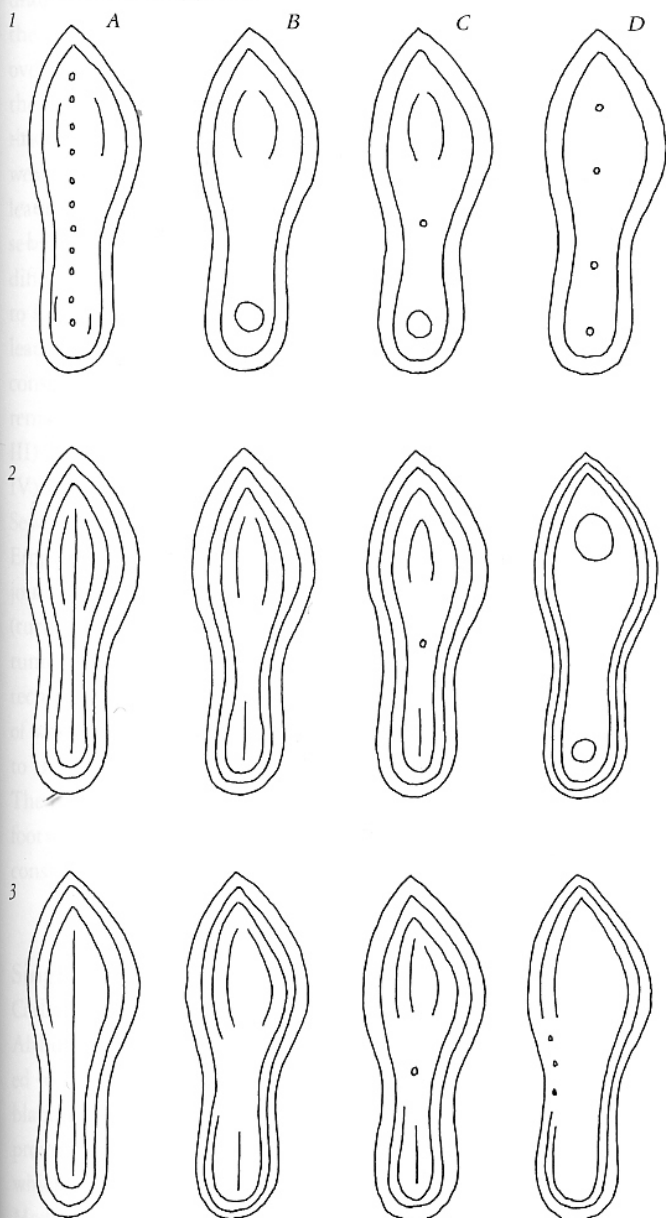
It is also useful to indicate

P = patterned (this can be further defined if necessary)

T = tendril

S = sparse (fewer than 15 nails used in total)

Fig. 21. Nailing patterns.



Earlier complexes and those with a high proportion of decorative patterns will require additional categories. There do not seem to be any regional differences in nailing patterns or their dating.

It has long been recognised that nails arranged in a D-shape at the waist of the sole are characteristic of earlier military sites (such as Velsen Fig. 43, Valkenburg, Xanten), but that by the Flavian period this had been replaced by different, rather shapeless soles with nails set very close around the edges (Fig. 54). These already appear in Valkenburg, but by the end of the 1st century are themselves replaced by the patterns, like 3c and 1a (Fig. 60), which dominate all complexes for the rest of the period.²⁷

Pattern 3 is particularly common in the late 1st and 2nd century, but increasingly replaced by the lighter nailing of pattern 1 towards the end of the 2nd century. Though there is a slight correlation between heavy nailing and foot size, the date of the complex is a more important factor. Exuberant tendril designs appear quite suddenly around 170, with variations lasting into the first quarter of the 3rd century (*eg.* Fig. 23). It is noticeable that these designs occur predominantly on the larger sized soles and often in combination with a markedly pointed shape, reminiscent of American cowboy boots. A peculiarity of the later Roman period (early 3-4th century) is the increasing popularity of figural nailing - S-shapes, lozenges, circles, swastikas, tridents (Fig. 22). An infrequent pattern like 2 will only show up in large complexes: but within this group, the rare variant 2c gains in popularity very rapidly towards the end of the 2nd century, disappearing more slowly during the early part of the 3rd (Fig. 83). Groups of 2-3 nails at the waist seem also to be a feature of the very late 2nd and early 3rd century, occurring in combination with all three edging forms.

It is not only heavy, closed shoes that employ hobnails: sandals are usually nailed, certain sewn shoes may have a few nails scattered over the sole and there are even a few cases of *carbatinae* being reinforced with a nailed sole, though it is not

always clear if this is original or whether an old nailed sole was being used to repair a worn *carbatina*. Even baby's shoes could be nailed. Whatever the exact function of nailing, it clearly played an important role in marking out "Roman style" footwear.

Excavating hobnails

Unless waterlogged, leather footwear will not survive in temperate Europe. But the iron nails of Roman shoes do provided an additional clue as they are more likely to survive in the soil. They are easily recognisable as clusters of small nails, with a head diameter between 0.5-1.5 cm, usually domed, but often deformed by corrosion, with square shanks no more than 1.5 cm long and bent round at the tip. There is not much

information to be gleaned from a little bag with some loose nails, but if the nails are cleaned in situ and either a photograph or a cast is taken, the size of the shoe and the pattern of the nailing can be recorded. At Velzeke and Maldegen-Vake (Belgium) and at Den Haag-Scheveningseweg the excavators made sure that concentrations of hobnails were first carefully cleaned and then a latex or plaster cast was taken from the surface.²⁸ Other concentrations were enclosed in plaster and lifted as a block so that cleaning could continue in the laboratory (Fig. 23). The effort was well worth while, as one of the soles from Velzeke could be dated to the 1st century, revealing that the occupants of this settlement had already adopted Roman styles of clothing, while a sole from the castellum of Maldechem-Vake dated to 172/4, provides the earliest securely dated specimen with tendril nailing. And at the Scheveningseweg, the individuality of the nailing patterns echoes the very varied nature of other clothing accessories, such as the *fibulae*, displayed at this relatively small and short-lived settlement. In the late Roman cemetery of Krefeld-Gellup, the exact position of hobnails indicates whether the corpse was actually clothed or whether the shoes were placed in the grave as a symbol of preparation for the afterlife.²⁹

Fig. 22. Some decorative nailing patterns. Specifically dated examples:
 a. Rainau-Busch (Germany) terminus post quem, 211/217 (also present at Aardenburg and Pommereul).
 c. Venray, 229/30.
 f. Aardenburg/Krefeld Gellep 3-4th century.
 g. Woerden, ca. 210 (also present, Vindolanda, London, Pommereul).
 b. Kaizeraugst (Switzerland)/Magor (Wales) early 4th century.

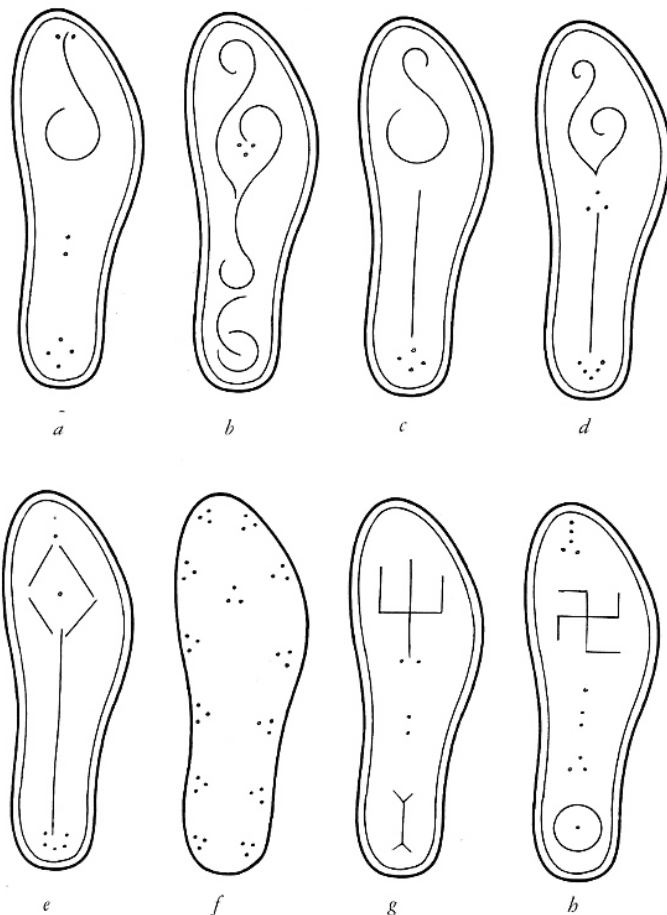
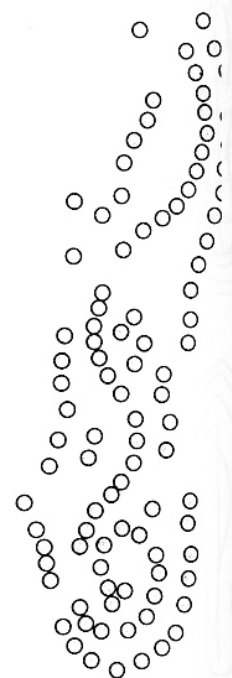


Fig. 23. Photo of in situ nails at Scheveningseweg (Courtesy of Archaeological Service Gemeente Den Haag).



Sewn bottom unit

Sewn soles form a disparate group, reflecting a variety of functions.

I) Though there is no actual proof, the possibility remains that some sewn outer soles reinforced a textile sock.

II) Composite footwear; an upper of leather or some other material is sewn to the sole. For examples from the early military sites see Case Studies II. Some rare survivals of complete sewn shoes are of exceptionally fine leather types. One, from Southfleet, Kent (Fig. 68), is purple dyed while another from Egypt is of thin, white, alum tawed leather, possibly gazelle skin. The delicacy of the leather is probably one explanation for the lack of surviving uppers. Where complete, the sole unit consists of an insole, an outer sole and laminae, just like the nailed bottom units. The uppers could be either braced over the insole, or sewn directly to it (whipped, Fig. 48), and the outer sole was attached with tunnel stitch. To start with, the stitching was hidden, but might become exposed through wear. In both Welzheim and Vindolanda, where thicker leather was employed for the uppers, it is clear that nailed and sewn constructions are interchangeable and do not represent different types or styles of footwear. Here the differences seem to lie in the purpose of the shoe. In the 4th century, thin leather thong or gut begins to replace twine in some sewn constructions, though the stitches (whip, tunnel stitch) remain the same.

III) Thick soled slippers; (Case Studies VIII)

IV) Alternative sewn constructions

Sewing and thonging was more widespread in the Eastern Empire and a wide variety of techniques were employed to join the upper to the insole: butted whipped seam, plain seam (turned to the flesh) through tacking in combination with tunnel stitch on the outer sole (Fig. 16.2-5). Some of these techniques are similar to Medieval constructions, but the lack of well dated complexes of Coptic footwear makes it difficult to trace the developments during the first four centuries A.D. The only certainty is that by the 7-8th century, Coptic footwear from Qasr Ibrim (Egypt) employs a true turnshoe construction.

Single piece constructions

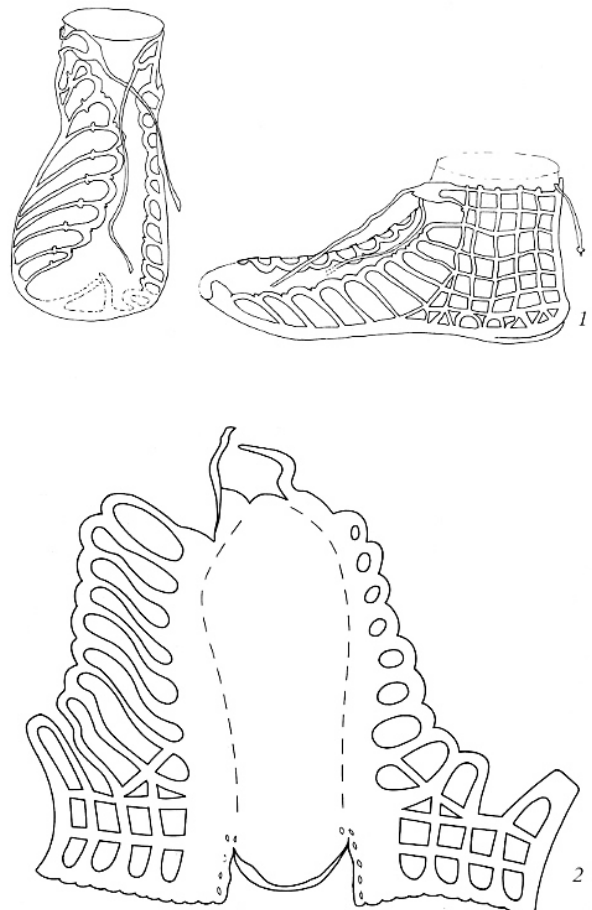
Carbatinae Fig 24.

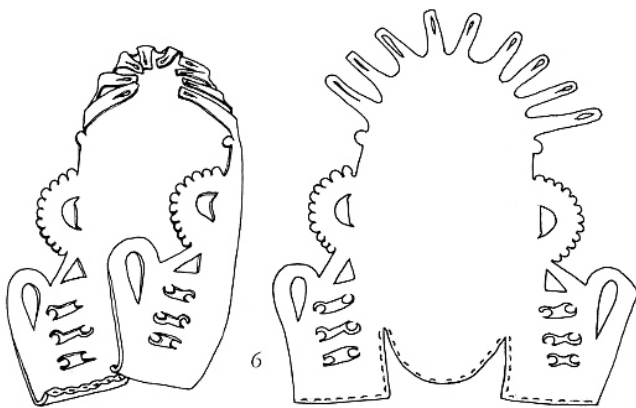
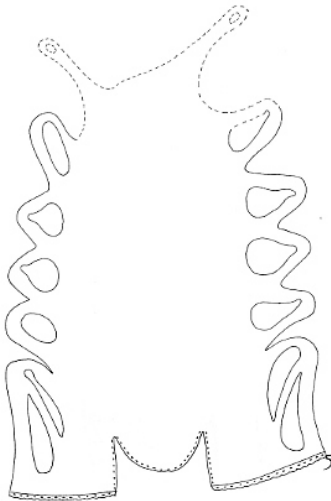
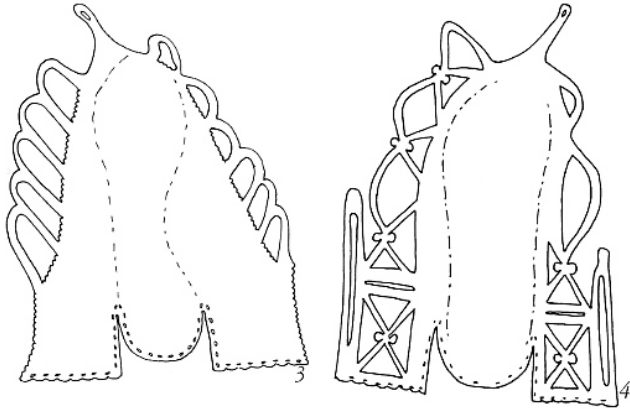
Although single piece shoes are technologically directly related to Prehistoric forms, stylistically there is little resemblance. Right from the start *carbatinae* in the northern provinces show strong similarities in form and decoration which seem to spring from common roots (Gaul and the Mediterranean?), thus linking the introduction of a new mate-

rial (vegetable tanned leather) firmly to the appearance of a new array of products. In manufacture and in wear, *carbatinae* form a transition between native soft footwear and the rigid, complex constructions of Roman footwear, but it would be incorrect to regard them as 'backward', for they are highly original with almost limitless variation on a basic pattern and are equally subject to fashion influences, sometimes copying other styles (compare Figs 24.1 and 53, Figs 78 and 60).

Carbatinae are made from thick cowhide with a smoothed, and in some cases obviously hammered, surface. The cutting pattern is - like that of the *caliga* middle - essentially oval, with a T or Y-shaped incision at the back, which forms the back seam. Even the simplest are shaped to fit the left and right foot, which may result in markedly asymmetrical patterns.

Fig. 24. *Carbatinae*: 1. 1st century Vindolanda, Bavay, Vechten (shaped example from Vechten); 2. pattern from Vindolanda; 3. early 2nd cent. Roomburg; 4. mid/late 2nd century Nijmegen, Zwammerdam, Valkenburg, Oss /Ussen; 5. early 3rd century Valkenburg, Mainz, Vindolanda; 6. late 3rd/4th century London (Dowgate), child's *carbatina* with front tabs.





Stitching: the stitching around the heel is always a wide spaced edge/flesh: this would be sewn up first from the inside, then the back would be turned and sewn up from the outside with an edge/grain overstitch (Fig. 14.3b), using thick twine, rawhide thong (or gut) and more rarely leather thong. In contrast to more modern moccasin type shoes, this is usually the only shaping employed. When thinner leather, such as calf skin was used, a small flap may be left to reinforce the bottom of the seam. The back rarely reaches above the ankle. The shoe is laced over the foot through loops in the sides and tied at the ankle. The front can be treated in a variety of ways:

- a) open, with the big toe protruding
- b) tabs drawn closed around the toe.
- c) some children's *carbatinae* and the more elaborate versions also possess a front seam to improve the shaping of the shoe. An integrally cut toe-cap may protect the bottom of the seam. Sites in Germania Superior such as the Saalburg and Welzheim³⁰ show particular variety and ingenuity in these arrangements, elsewhere, simple tabs predominate. Though easily adjustable, considerable skill is still required in the arrangement of the loops to avoid unsightly creasing. Experiment has shown that shoes designed for size 41 are unsuitable for a size 39 foot: a shoemaker could not get away with a stock of just three sizes - small medium and large. The fastening loops are sometimes cut into shape, but they can also be made by simply pulling out a slit cut in the straight edge. This cut-and-expanded method allows the shoe to be made from a simple rectangle, leaving no distinctive off cuts at all. During the 3rd century new forms appear, which seem to be influenced by elaborate and highly sophisticated footwear from Germanic areas: far from being 'barbarian' these shoes show a level of skill and eye for design rarely achieved by Roman shoemakers, who were obviously more concerned with a mass market for their wares (Fig. 10.1.2 and 10.18-19, Fig. 25). Increasing use is made of seams to shape the rather flimsy single piece shoes of this period, which are so different in form and technology that they can no longer be regarded as *carbatinae* (Case Studies IX).

Late Roman single piece, sewn shoes

In the 4th century, sewn constructions become more common, but again there is considerable overlap in techniques. The same style of footwear may be made with a separately attached sole, either nailed or sewn, or as a single piece sewn construction. The upper is cut very low, exposing a large portion of the foot, and the shoes are fastened with an ankle strap and stud arrangement, or are tied through ankle latches (Fig. 10.27-28). Sole and upper are cut in one piece, often giving a markedly asymmetrical pattern, and are sewn into shape.

Seams vary considerably: top seams, plain seams, tacked, double stitched or over stitched with twine or thin thong (Fig. 16.6). In some cases the shoe must have been made inside out, so formally could be called a 'turnshoe' though the seam arrangement is quite different from the medieval types (Case Studies IX). Thin leather or rawhide thong increasingly replaces the use of twine in these shoes.

Sandals

Sandals are an obvious import from Mediterranean areas, but they are rare on early military sites, only becoming common in civilian settlements in the later 1st century, and worn mainly by women and children (girls?). The front of the early sandals is often shaped to show two or more toes and the inside surface may be decorated with stamps, rouletting, impressed or incised designs (Figs 6, 26). Rather abruptly in the later 2nd century, sandals also begin to find favour with men and at the same time, the shape of the soles undergoes a remarkable development (Figs 27, 28). While women's san-

dals become very narrow in shape, those worn by men show the opposite tendency, with a distinct widening at the front. This increases steadily, until the sole is almost triangular in shape, and must have been rather uncomfortable to walk on, especially when nailed. Experiments with 16th century Kuhmaul shoes, which resemble these sandals in shape, reveal that they produce a sliding, strutting gait, and a similar effect must have been achieved in Roman times.

Fig. 25. Pattern and reconstruction of a 3rd century asymmetrical carbatina with front tabs from northern Germany.

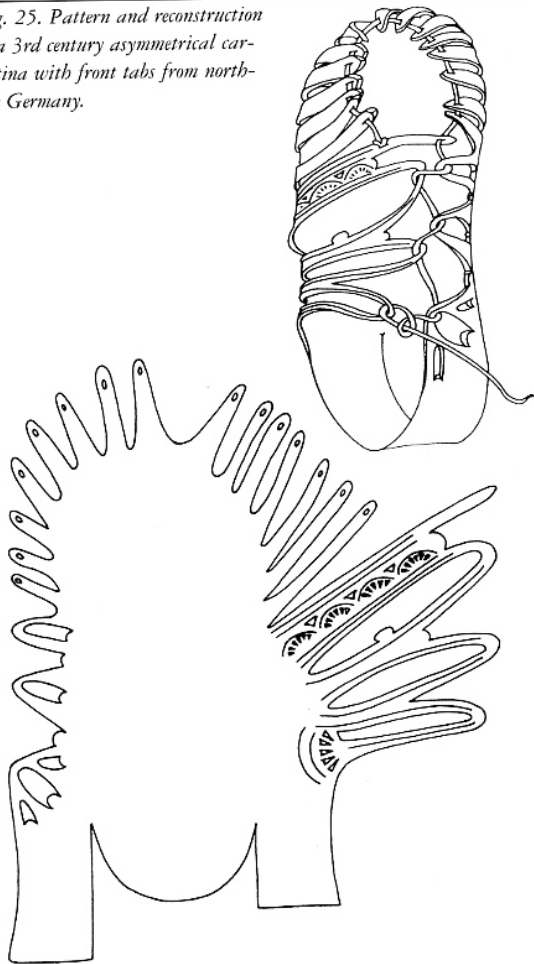
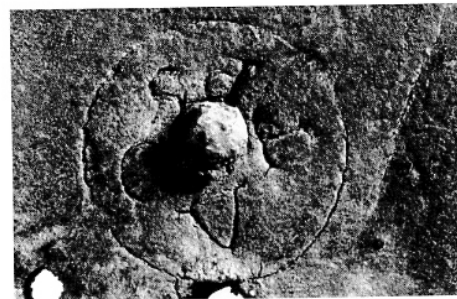
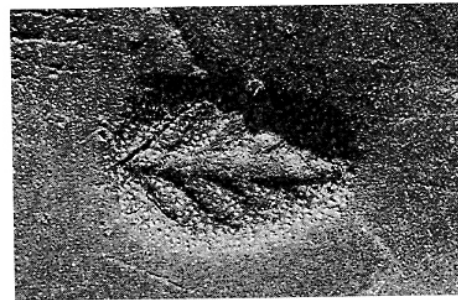


Fig. 26. Decorative stamps on soles. 1-3 Zwammerdam, 4 Vechten, (photo IPP).



Sandal soles are made of 2-6 layers of leather (n.b. thick cow hide may split with age, so that it looks as though double that number is present), usually joined by both thong and nails. The middle layer is sometimes cut-and-expanded to increase the flexibility of the sole (Fig. 29). During the 3rd century the number of layers decrease, and often the sole consists of just a single layer of cow hide, with the straps inserted into the thickness of the leather. Where soles consist of two or more layers, they are joined with rawhide thong, in the 1st

and early 2nd century through paired holes near the edge of the sole but later with an invisible form of thonging which leaves only hairline cracks on the outer surfaces of the insole and outer sole, and paired holes on the inner surfaces and on any middle layers (Figs 28.3 and 29). During the 3rd century, thonging disappears, being replaced by rouletted or incised

Fig. 27. The changing shape of sandal soles.

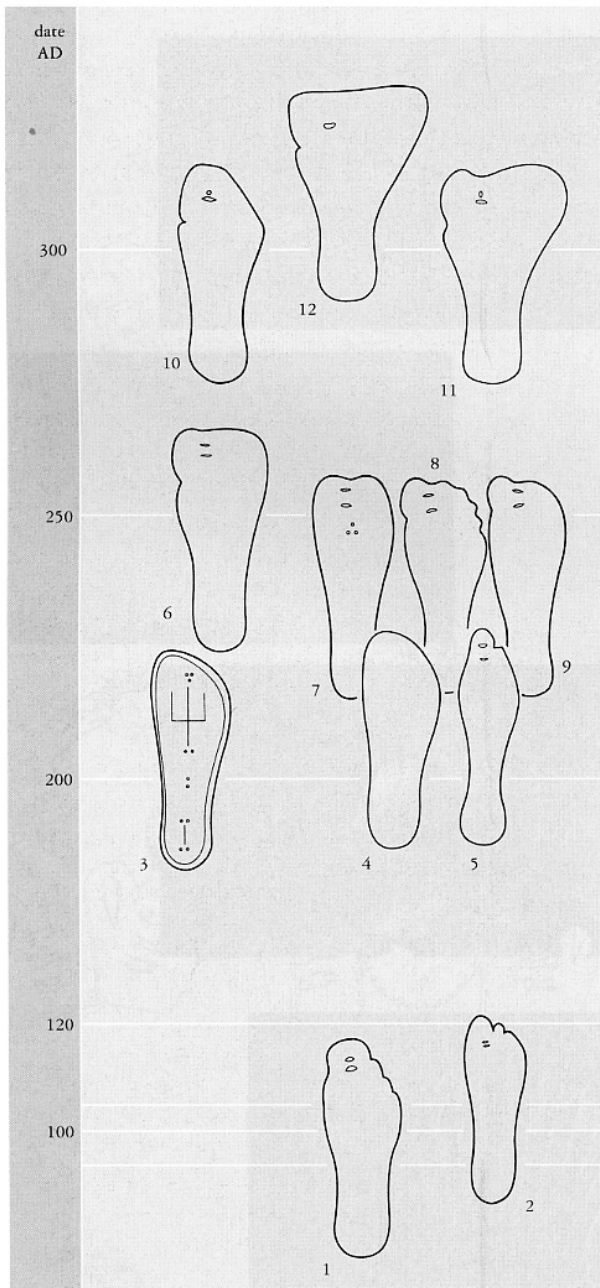


Fig. 28. Sandal soles from Woerden and Vechten (photo IPP).



herringbone motifs in imitation (Fig. 31).

The strapwork rarely survives, but what evidence there is suggests various forms :

a) heel enclosed by a light upper and tied to narrow straps passing between the toes. These might be cut in one with a middle sole, like the *caliga*. This type is depicted on a First Century pottery lamp from London,³¹ and examples occur in London and the earliest levels at Vindolanda (late first/first decade 2nd cent) and in Bonn (Fig. 34)

b) A strap between the big and the second toe inserted through slits in the insole and tied to ankle straps or a back piece. Impressions of strap ends, or a more continuous lasting

Fig. 29. Sandal from Zwammerdam, with toe indents and decayed outer sole, revealing the cut-and-expanded middle .

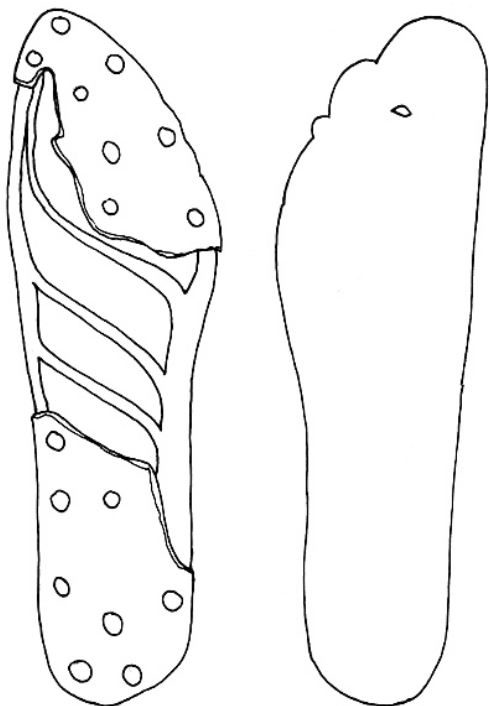


Fig. 30. Thonging method for sandal soles.

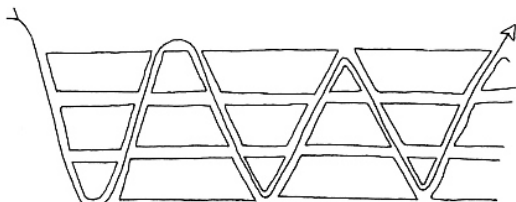


Fig. 31. Decorated, single layer sandal from Pomeroy.

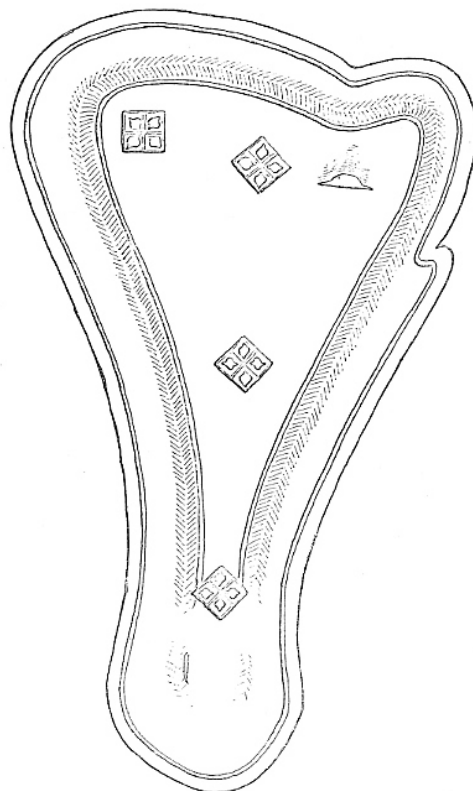


Fig. 32. Shoe lamp from London (Courtesy Museum of London).



margin around the seat, on the under surface of the insole may give a clue to the arrangement (Fig. 10.22).

c) Slits in the insole may also hold the end of a more elaborate, Y-shaped strap, similar to slipper tops, and sometimes, like them, decorated with gold or imitation precious stones.³²

d) Straps crossing from the waist over the foot, secured between the toes with a leather peg holding a rosette. This fashion is very popular in Egypt,³³ but both straps and pegged rosettes have also been found at Vindolanda, Vindonissa, Saalburg and Bonn, while soles with peg holes occur at Vechten and Zwammerdam,³⁴ thus revealing the full extent of these international fashion styles. (Fig. 33)

e) Straps across the foot, sometimes in combination with a toe strap. (Fig. 10.11)

There is no evidence of a loop for the big toe on sandals found in N. Europe.

Clogs

Functionally related to cork slippers, but probably more common, are wooden bath-house slippers intended to protect the feet from hot floors. Well made examples have been found at the early 1st century fort of Velsen (Fig. 34). There are also much coarser wooden soles, sometimes even reinforced with nails,³⁵ and these would have been used by people working in dirty conditions - stable hands, water carriers, washer men/women. The raised part under the tread may be either straight, or cut in a diamond shape, like the example from Bonn (Fig. 34.2). The straps are often of old, re-used leather simply nailed on, but there are also carefully made, decorative

Fig. 33. Sandal strap arrangements.

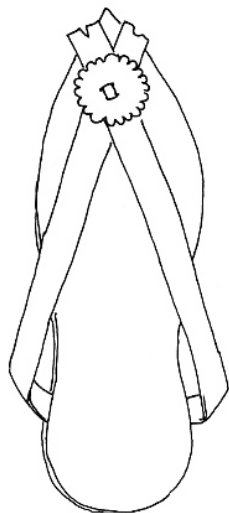


Fig. 34. Wooden pattens. 1. Velsen; 2. Bonn.

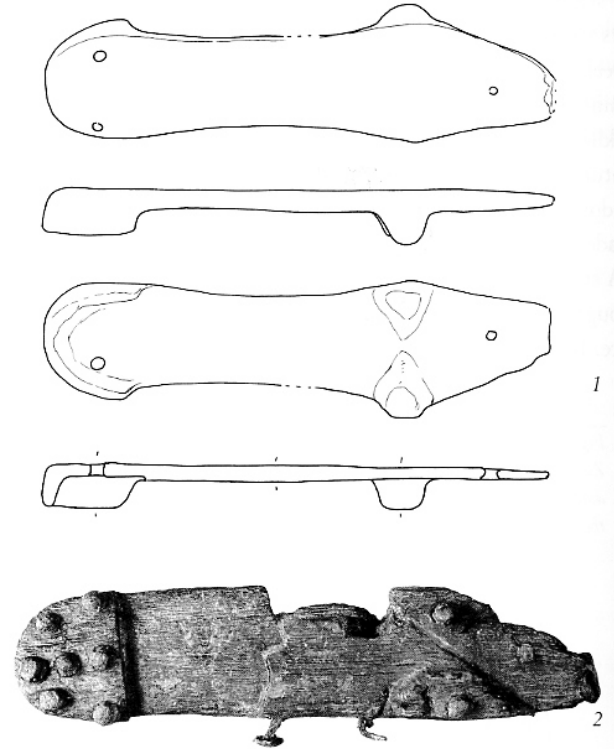


Fig. 35. Top from Vindolanda with toe strap.

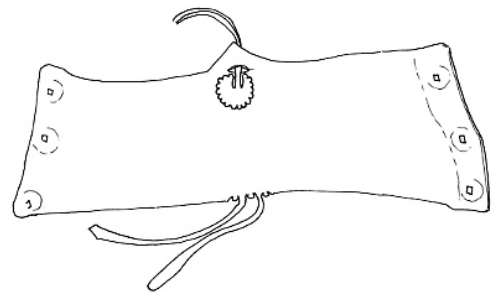
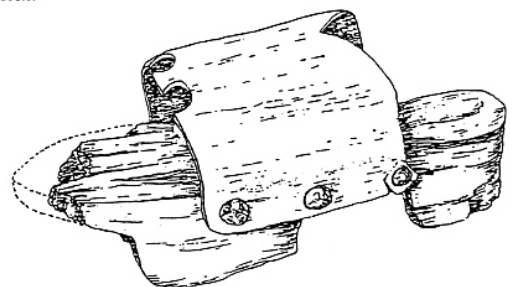


Fig. 36. Complete patten from Vechten.



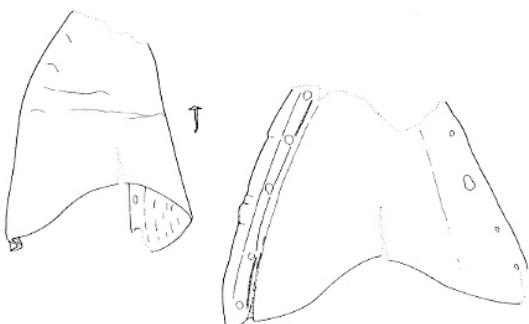
versions (Fig. 35). Those with a central hole for the toe strap must have been worn with bare feet, but others, with a simple cross strap could also have been used as over-shoes (Fig. 36). Although wooden soles tend to be referred to as *sculponaea*, a text from Vindolanda mentions *balnearia* (shoes for bathing) which might apply to the bath house slippers, especially as numerous examples of the leather tops were found in the same level at the text.³⁶ So once more, depending on secondary characteristics, footwear grouped under a single heading on the basis of technological characteristics actually fulfilled different purposes.

Roman clogs are usually easy to distinguish from Medieval ones, but occasionally doubts arise when finds come from undated collections or were found in disturbed conditions. This leather mule top from Pommeroeul (Fig. 37), with its nails for attachment to a wooden sole, looks remarkably like 17th century examples illustrated by Goubitz (Goubitz, Mules, Type 105, Fig. 2) and quite unlike the normal Roman patterns. But then a wooden sole which would match this mule turned up in a Roman well in N. France...³⁷ So another variety can be added to the Roman repertoire

Fibre sandals

Fibre sandals have not been positively identified in NW Europe, but the very widespread use of palm fibre, grass and plaited straw sandals in Egypt should alert us to the possibility. Extremely fine, brightly coloured examples are known from Coptic cemeteries and they could well have been used indoors in Europe as well. Certainly in Rome, there was a guild of 300 rush-sandal makers (CIL VI, 9404, *fabrum solarium baxiarium*). Microscopic analysis of metal corrosion from a Roman burial in France has recently detected the presence of fibre objects near the feet and this may be one way of identifying such sandals in future.

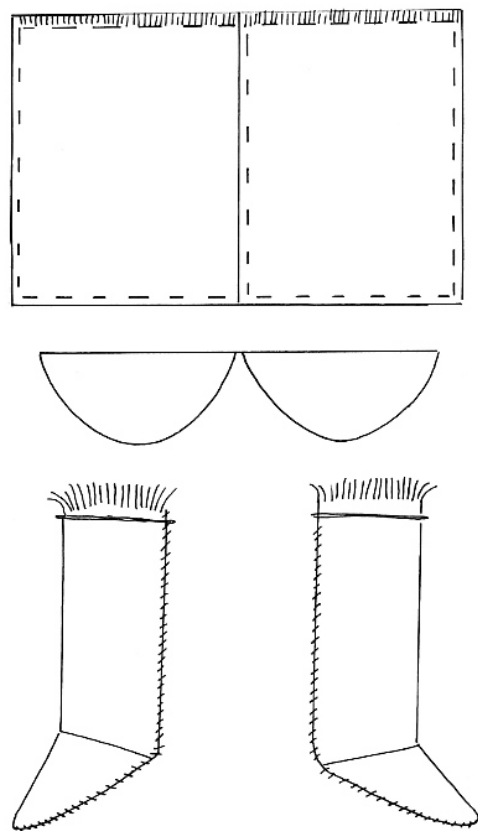
Fig. 37. Mule with reinforcement strip and nails for attachment to a wooden sole (Pomeroeul).



Socks

Did the Romans wear socks? There are texts mentioning socks (*udones*): when old and infirm, the Emperor Augustus wore them and there is the famous present of 'socks, underpants and sandals' sent to a soldier stationed at Vindolanda (incidentally, he must have come from either Tongeren or the Betuwe).³⁸ There is also a crudely made textile sock from the site, as well as textile inlay soles.³⁹ In Roman Egypt there were colourful, striped socks with a gap between the toes so they could be worn with sandals. These were not knitted, but were made with a netting technique (naelbinding). Depictions of soldiers wearing *caligae* show not socks, but textile foot bindings which left the toes and the heel bare (Fig. 47). But to judge from the clear imprint of bare feet on some insoles, socks were not invariably worn. A pair of short socks and a pair of knee length stockings were found with burials of women at Les Martres-de-Veyre

Fig. 38. Textile stockings from Martres-de-Veyre.



(France).⁴⁰ Like the Vindolanda sock, these were made of woollen cloth with a seam running under the foot and up the back of the leg (Fig. 38). Men wore the low cut shoes of the later Empire with hose, *i.e.* trousers with an attached foot, often of coloured cloth (Fig. 76). Although depictions of men of this period show a smooth line of leg, actual surviving examples of hose, such as those from Thorsberg⁴¹ would have been baggy around the knees and ankles. A curious little loop at the side of the shoes on the statue of the Tetrarchs in Venice may have been a drawstring used to tighten the hose around the instep and give it a neater shape (Fig. 77).

Foot sizes

Foot sizes should only be calculated from the insole. To allow for comparison between complexes, continental sizes are used (length in cm x 1.5) Some specifically Roman features should be noted:

- 1) In graphs of foot sizes, the different sorts of footwear should be indicated to allow for the fact that nailed shoes with closed uppers are roomier than sewn shoes or sandals, so that they appear to be made for a larger foot (as in Fig. 39). In fact, someone wearing size 39 closed shoes will use size 37/8 sandals or close fitting sewn shoes.
- 2) *Carbatinae* can only be presented as size groups (large, medium and small), as they are so easy to adjust to different sizes and the leather is also distended by use.
- 3) In Roman complexes, the differentiation between men's and women's sizes lies around continental size 35 with most adult men between 37-40, but with large shoes upto size 43 by no means uncommon.
- 4) Large numbers of children's' shoes are a feature of Roman complexes. *Carbatinae* are the most favoured form of footwear for children, but otherwise there is no difference between adult's and children's' shoes.

Contrary to what is commonly assumed, the use of footwear is conditioned culturally: wearing shoes is a symbol of status and prosperity rather than a basic necessity. Travellers to Ireland and the Scottish highlands in the 19th century, for instance, frequently commented on the fact that women and children went barefoot, even in winter, while men were shod. If women had shoes, they were only used on special days, being put on just before entering town or going into church! The lack of footwear reflects to the low status accorded to women and children in these societies, and a similar attitude is reflected by the low number of women's and children's shoes in Early Medieval settlements, such as Haithabu.⁴² In contrast, Roman size graphs show more balanced proportions between the ages

and sexes, very similar to the graphs from late Medieval cities such as Amsterdam and Lübeck. This seems to indicate not only a greater degree of material wealth spread throughout the population, but also a more equal attitude to the sexes and a greater concern for the well-being of children. In the Roman period even very small children wore nailed shoes, though *carbatinae* tend to be preferred. The smallest nailed soles would fit a child of 12-15 months, so even before they could walk, mothers presented their babies in fashionable and even elaborate shoes. This perhaps shows how essential hobnailed shoes were in defining a 'Roman' identity

Shoe sizes reveal the presence of women and children in early military settlements such as Velsen, where they tend to follow Mediterranean fashion of wearing sewn, rather than nailed footwear (Fig. 39). A century later, the family of the camp commander can be recognised in Vindolanda Period III (ca. 100 AD, Fig. 40, individuals 1-6). The shoes from Period IV (ca 115) also reveal the presence of families, living inside a normal barrack block.⁴³ A similar picture is obtained for the legionary fortress at Bonn. By the mid-late 2nd century, the shoes from the military *vici* (such as the Saalburg, Vindolanda Period VI and Zwammerdam)⁴⁴ show the presence of a balanced population, but on the evidence of the footwear it is obvious that forts were never a male-only preserve.

Fig. 39. Graphs of shoe sizes : military sites: Velsen (IA), Valkenburg (Ic), Bonner Berg (IIA), Zwammerdam (Id-II), Saalburg (II-IIIa). On account of shrinkage, in cm or without absolute scale.

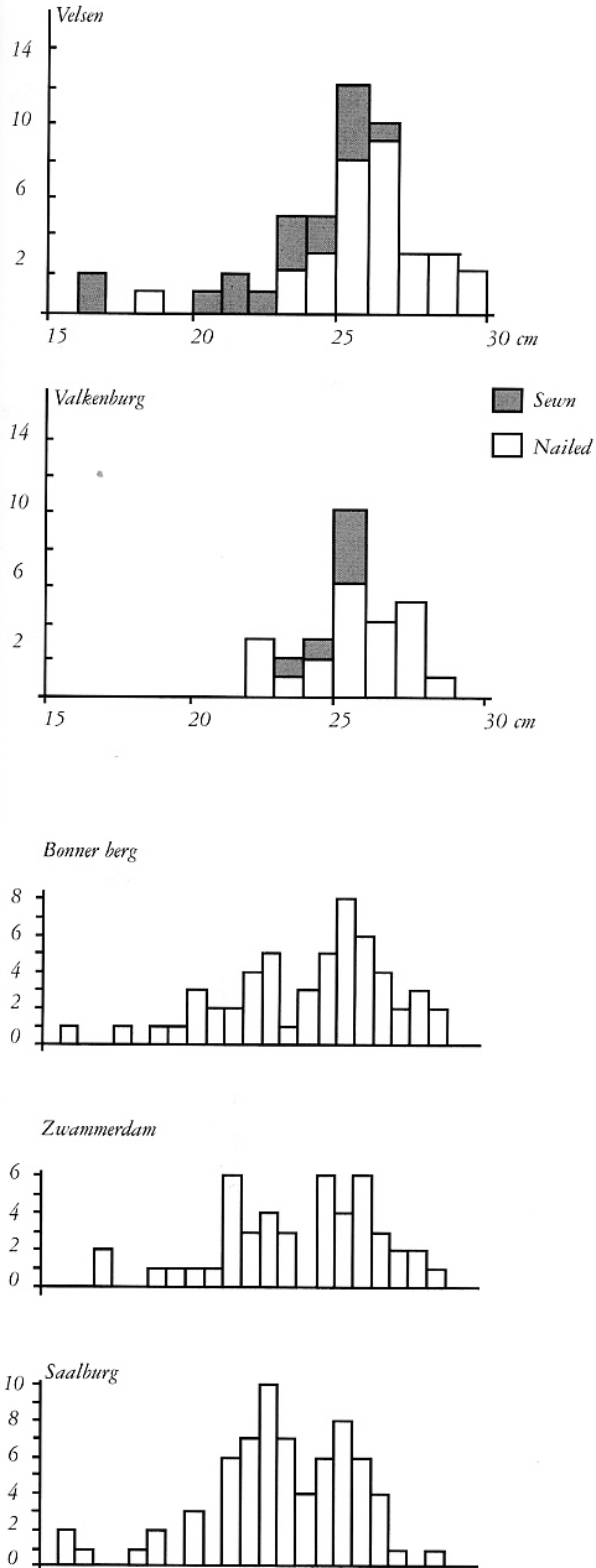
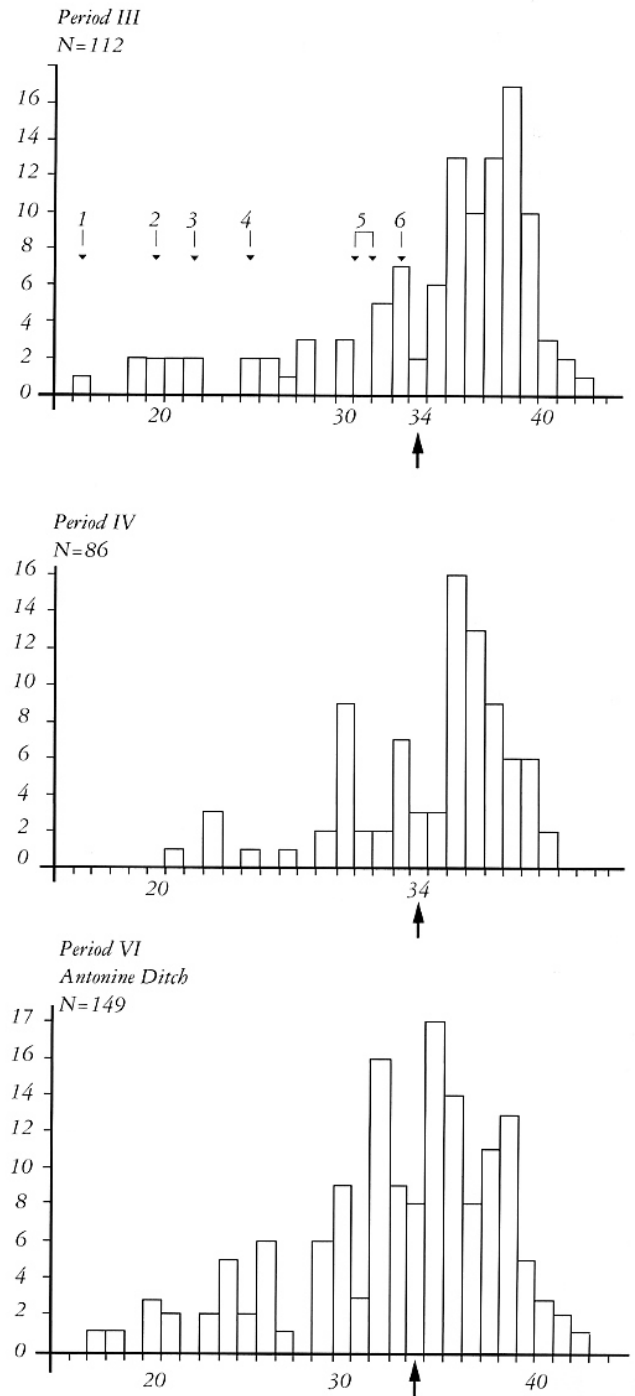


Fig. 40. Graphs of shoe sizes (continental) for Vindolanda Period III with commanders household marked (1-6); Period IV from the barrack block, Period VI from the fort ditch.



Case studies

Due to the great variety in Roman footwear styles over the entire period of 400 years, and the extremely fragmentary state of much of the material from the Netherlands, it is not possible to offer a complete catalogue of finds. Instead, a selection of the most characteristic styles has been made, in part based on the requests for information which I have received over the years from re-enactment societies in search of authentic footwear appropriate to their chosen period. For each style, the approximate date of use is given together with information on its distribution within the Empire and a list of sites in the Rhineland and Belgium where the style is certainly present: this evidence is frequently unpublished and in any case represents only the state of knowledge at the present time. If a particular style is present on Hadrian's Wall and in southern Germany, it is pretty certain that it will turn up sooner or later in the regions inbetween.

I *Caligae*

Date: First century B.C. to ca. 90 A.D.

Distribution: all over the empire

Examples present at: Velsen, Valkenburg, Xanten, Bonn (Fig. 10.4).⁴⁵

In archaeological publications the term *caliga* is used specifically for the military boot worn by soldiers during the great expansion of the Roman Empire in the 1st centuries B.C. and A.D. It consists of three layers, the insole, the outer sole and the middle which is cut in one with the strapwork. The outer sole is first secured to the middle with tunnel stitch and then all the layers are firmly joined by the hobnails, forming a sole 1.5-2 cm thick. The back seam is double stitched with an extremely fine edge/grain on the outside, raising a ridge along the join, and a more widely spaced edge/flesh overstretch on

the inside. To prevent blistering, this is covered on the inside with a narrow strip of leather, lightly tacked on. Other reinforcement strips might be sewn to the outside. Four narrow straps at the front pass between the toes, two or three long loops enclose the foot with between one and three loops fastening above the ankle joint. A long lace is threaded through the perforated ends of the toe straps (the gathered ends are sometimes covered by a decorative rosette) and is then wound through the loops, leaving the loop ends as an upstanding comb.

The boot is ideally suited to its purpose: it can be mass produced (each legion would need 36,000 shoes per year!), and its construction is perfectly adapted to the needs of a marching army. The strapwork can be adjusted to the individual foot, allowing adequate ventilation and so reducing the chance of blistering and foot disease (such as the dreaded trench foot

Fig. 42. Reconstructed cutting pattern of the middle and upper based on examples from Valkenburg and Castleford.

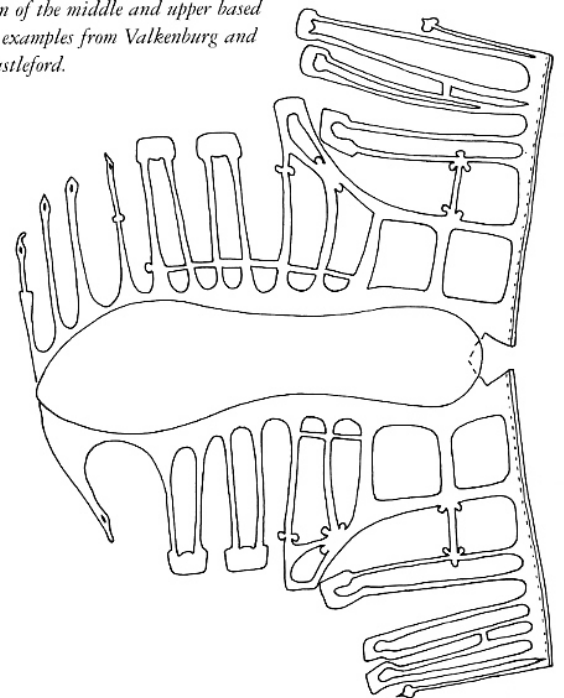


Fig. 43. D-nailed caliga outer sole from Velsen.

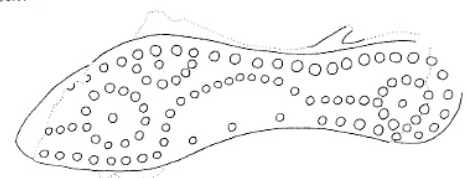


Fig. 41. *Caliga* from Valkenburg.

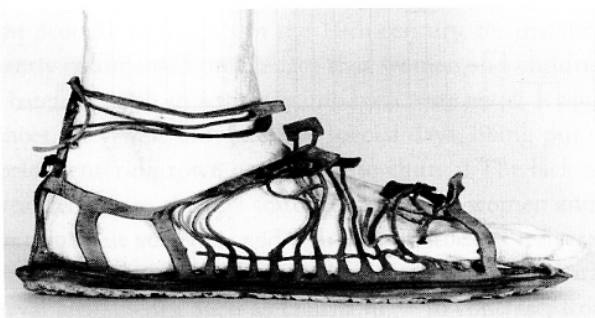


Fig. 44. back seam construction.

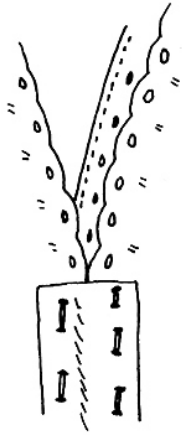


Fig. 45. tunnel stitching joining sole to upper.

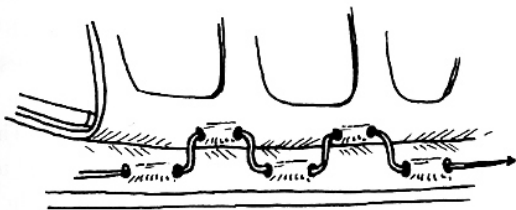


Fig. 46. Rosettes from Mainz (From Göprich, 1986, Abb.35).

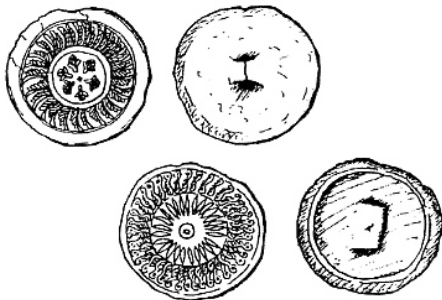
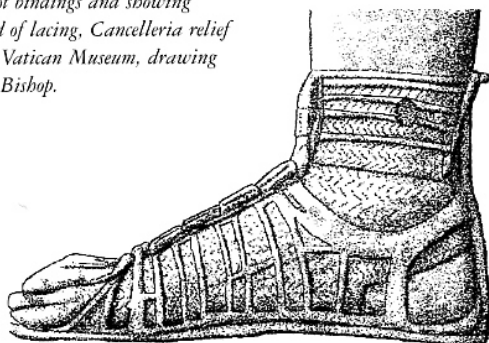


Fig. 47. Caliga worn with heel-less foot bindings and showing method of lacing, Cancelleria relief in the Vatican Museum, drawing M.C. Bishop.



of the First World War). Pressure on vulnerable points - ankle, instep toe joints, big toe - is avoided, and there is room for the foot to expand in hot weather or for the insertion of socks or foot bindings, though re-enactment societies find that the thick sole is insulation enough. Although the straps look fragile, it is noticeable that the shoes are usually discarded because the bumps of the nails become uncomfortable as the insole is trodden down, not because the straps had broken. Stress is evenly distributed and because the straps are arranged in two different planes, the foot and leg are given support while the entire problem of the fit around the ankle and instep is neatly avoided - something Medieval shoemakers never managed to solve. In addition, the nailing stimulates correct foot movement - the similarity of the Roman nailing patterns to the sole designs of modern athletic competition footwear is no coincidence. And we must not forget the awesome effect of the sound of thousands of hobnailed feet marching over paved roads. The Romans never crept anywhere. They strode out making a lot of noise.

There is great variety in the design of the strapwork, which may include decorative elements such as roundels, shaped danglers at the back seam and rosettes. *Caligae* are still present at some sites dating to the 80's (such as Castleford),⁴⁶ but by the 90's they no longer appear in archaeological complexes, though sculpture in Italy especially continues to depict soldiers in what was evidently regarded as their 'traditional' dress.

II Sewn boots: style Mainz

Date : First century B.C. to 70's A.D.

Distribution: All over the Empire

Examples present at: Velsen, Valkenburg, Xanten, Mainz (Fig. 10.3).⁴⁷

In pre-Flavian military complexes, sewn soles form about 5-10% of the total, but the associated uppers have only survived at Mainz and Qasr Ibrim (Egypt). In detail, the construction varies greatly, but in general the upper is sewn or tongued to the insole and the outer is attached by tunnel stitch directly to the upper. Sculptural depictions of such shoes indicate that they were very close fitting, often of such thin leather that the contours of the foot are clearly distinguishable. Although in Mainz there is only one kind of high-closing boot (which may also possess a nailed sole), at Qasr Ibrim (also a military site, but dated to the final decades B.C.) at least three different types of uppers - including women's and children's shoes - are associated with this construction. In Velsen too, smaller sizes favour sewn constructions so the sewn soles are not invariably to be associated with style Mainz (Graph, Fig. 39).

Fig. 48. Sewn sole construction: insole with stitching of attachment of the lasting margins, outer sole with tunnel stitch (Velsen, soles drawn from flesh side).

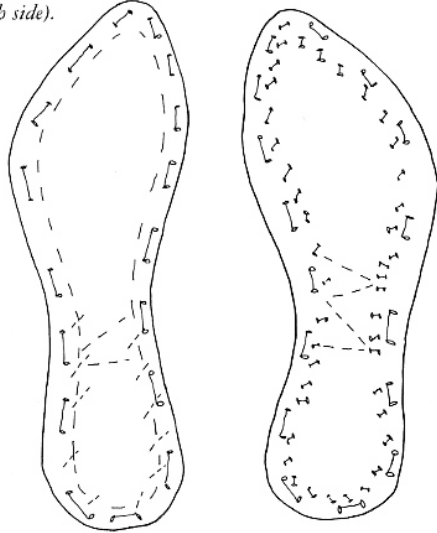


Fig. 49. Sewn boot from Qasr Ibrim (Egypt), with repairs to toe and seat.

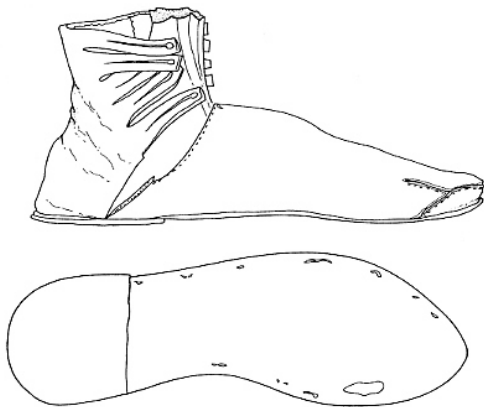


Fig. 50. boot from Mainz, Göpfrich 1986, fig. 42.



The uppers are cut in one piece, sewn together at the side, and with 4-6 pairs of lachets. Unusually for Roman footwear, there is always a tongue, making this a fully closed boot. The boots have a heel stiffener and are also often lined inside. The bottom of the lace passes through two holes on the vamp - as with the extra vamp button on the medieval button boot (Goubitz, this vol.) this is necessary to draw the vamp and leg together and to prevent the boot losing its shape. The lacing is vertical, leading to the projecting tabs that are also such a distinctive feature of the *caliga*.

III Soldier's boots: the Fell and Allendale

Date : late First century A.D. to ca. 120.

Distribution: so far, evidence only from the northern provinces
Examples present at: possibly Bavay (Fig. 10.5, 9).⁴⁸

By 90 A.D. the *caliga* had been replaced by a sturdy, front-closing boot with sole and upper cut separately and which remains in use till about 120. The thick sole layer includes one, and very often two, complete middle soles, which are thonged to the insole with thin leather thong (Fig. 19). The cow or calfskin upper is either braced over, or is whipped to the unit before the outer sole is nailed on. There are slight variations in the treatment of the lace holes, and more decora-

Fig. 51. Cutting pattern, Fell (from Vindolanda).

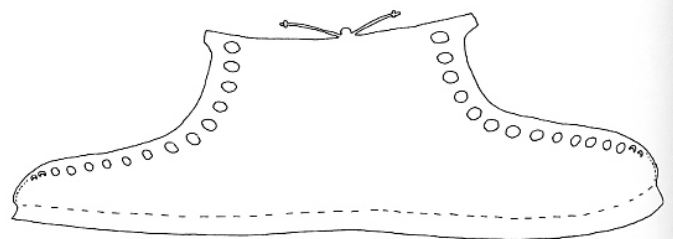
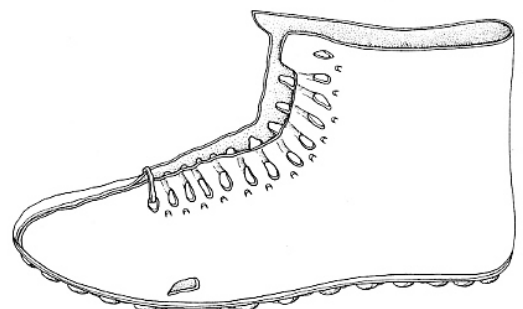


Fig. 52. Reconstruction, drawing B. Brouwenstein.



tive versions also occur in women's and children's sizes. In the period 80-110, this must have been the most common shoe style in the northern provinces, and by varying features such as surface decoration or the treatment of the lace holes, a simple pattern could be adapted to meet the needs of men, women and children, soldiers and civilians (Fig. 10.5-7, 9). That comfort in northern climates is not the chief consideration in the abandonment of the *caligae* is shown by the elaborate, lacy boot which occurs in large, male sizes in the earliest levels of the fort at Vindolanda, together with the sturdy boots of the ordinary soldiers. Notable is the markedly asymmetrical cutting pattern, which means that the fastening runs up the highest part of the foot, from big toe to ankle. The elaborate openwork is deceptively fragile: like the *caligae*, repairs to the soles and re-nailing are far more common than repaired straps. Such open patterns presuppose the use of socks. The upper is cut separately from the sole, and this is the main difference with the *caligae*, since the strapwork can sometimes be quite similar. The Allendale has only a rudi-

Fig. 53. Cutting pattern, Allendale (from Vindolanda).

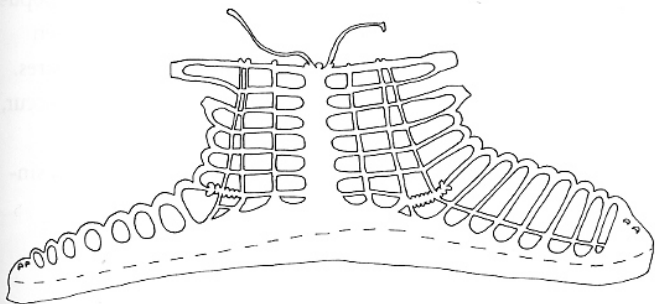
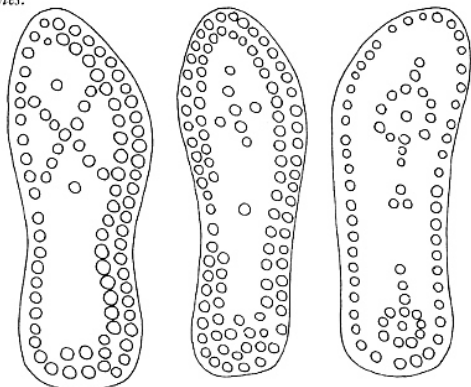


Fig. 54. Typical soles belonging to the Batavian garrison of Vindolanda and used with these two styles.



mentary vamp seam and in some cases the front is not closed at all, though small lace holes indicate that the toe was cross laced.

With these shoes, the characteristic 'comb' of 1st century military footwear had been abandoned, and the boots were cross laced. With the Allendale, the two top loops might sometimes still laced vertically in the old fashion, but the Fell was either knotted (though the topmost hole is often unused) or the lace was wound round the top of the boot leg a few times and tied at the back.

IV Style Zwammerdam

Date: 140-170 A.D.

Distribution: Northern provinces, Antonine Wall sites⁴⁹

Present at: Zwammerdam.

This is a typical neat, well made, comfortable shoe of the mid 2nd century. The sole may be nailed or sewn, it is especially favoured for women and children, but also occurs in large, male sizes. The usual style is a shoe, but short ankle boots also occur. There is considerable variation in the number of lace holes and the extent of the radiate openwork. Additional decoration is provided by rouletting, stamping and cusping. The vamp seam of the illustrated example has a double top seam, stitched through the fold so as to leave a ridge up the vamp.

Fig. 55. Cutting pattern (Newstead).

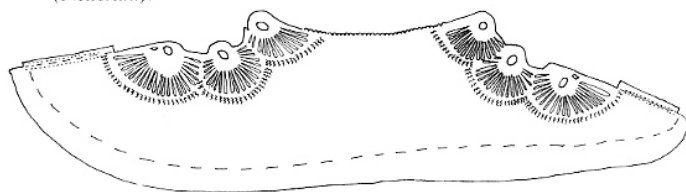
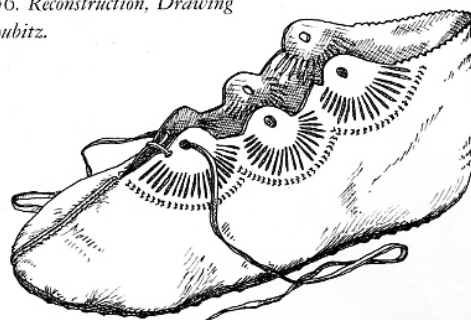


Fig. 56. Reconstruction, Drawing O. Goubitz.



V Style Welzheim

Date: late second century, disappearing early third.

Distribution: all over the western empire.

Examples present at: Valkenburg, Vechten (Fig. 10.15).⁵⁰

Shoe upper cut as a strip, with a front seam, from which springs a perforated tongue, there is a deep instep opening

Fig. 57. Cutting pattern. Shaded areas are the only off cuts which would be left.



Fig. 58. Diagram of the lacing.

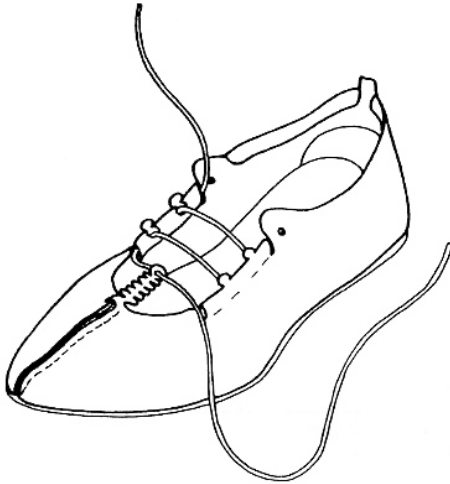
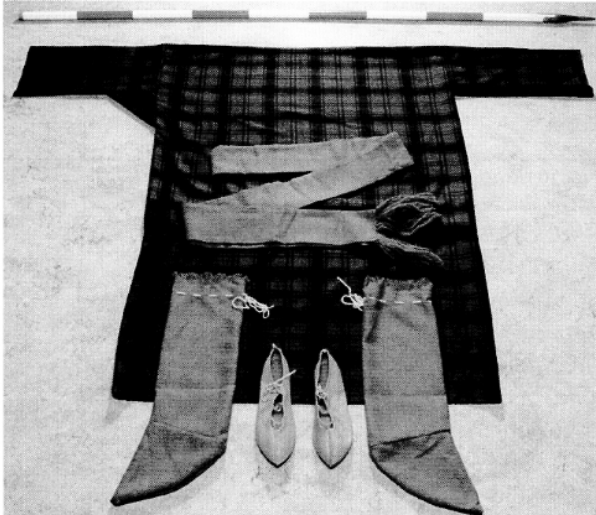


Fig. 59. Additional Replica of the complete set of woman's clothing from Martres-de-Veyre.



and generally one pair of lace holes at the ankle. The shoe reaches to just under the ankle, but a variant with 2 pairs of lace holes, reaching just over the ankle is particularly favoured in children's sizes. The edges of the instep opening are folded down, leaving 2-3 upstanding roundels, and a lace, held by the tongue is passed through the small holes. The stitching is very obvious and may have been highlighted in coloured twine. Additional decorative features are impressed lines and scored swags, all rather crudely done, but possibly rubbed with colour. The shoes can have either nailed or sewn soles. The shoes come in all sizes and are popular at both military and civilian sites. At Martres-de-Veyre (Fr) a young woman was buried in her woollen tunic, wearing these shoes with long stockings.

VI Eyelet boot: style Ramshaw

Date: from ca 200 A.D.

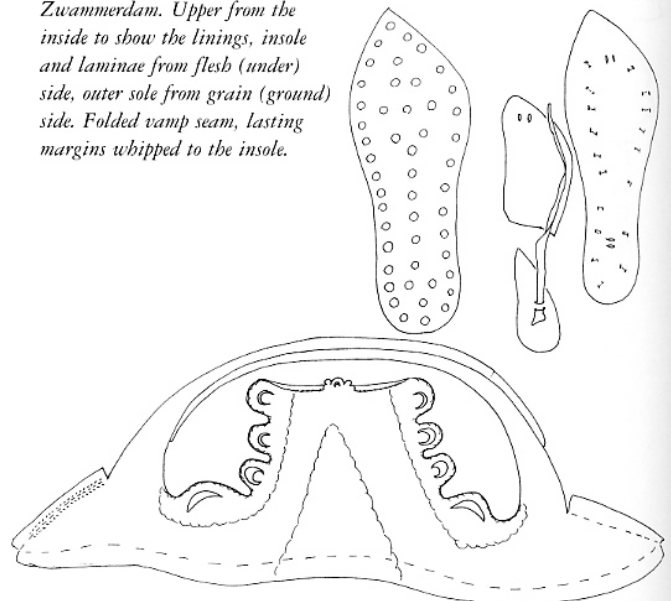
Distribution: The entire Empire, from Egypt and Syria to Northern Britain.

Examples present at: Valkenburg, Zwammerdam, Vechten, Xanten (Fig. 10.23).⁵¹

This style develops after about 200 and variants remain popular for over 150 years. As usual, it is worn by men, women and children, and appears on both military and civilian sites. Though usually nailed, versions with sewn soles do also occur, particularly in the later variants.

The boot reaches to, or above the ankle and is cut from a sin-

Fig. 60. Complete shoe from Zwammerdam. Upper from the inside to show the linings, insole and laminae from flesh (under) side, outer sole from grain (ground) side. Folded vamp seam, lasting margins whipped to the insole.



gle piece of leather together with the laces which spring from the side of the foot. For such a high form, it is curious that the front of the foot and leg is so exposed, only by the wide laces offer some protection. A tongue is never included. The lace holes and sometimes also the back of the boot are reinforced with linings of thin leather (often sheepskin) and there is often also an additional lasting margin reinforcement sewn right round the bottom part of the upper. The toe may also be reinforced by a small cap sewn to the outside. A front seam is usual, but later examples may have a side seam (lap seam) leaving the vamp free for decoration: metal studs, open work and slashing occur, as well as sewn imitations of the old vamp seam using saddle stitch. Small fragments of a slashed vamp

with metal studs were found at Valkenburg.⁵² The high, boot version seem to disappear after the mid 3rd century, being replaced by lower cut styles which still retain the characteristic integral lace. In common with other later 3rd and 4th century styles, these shoes expose more and more of the foot, while the latches become very prominent (Fig. 10.27). Curiously, bronze and pottery oil flasks (*balsamaria*) are frequently made in the shape of this boot. One of these, originally from the Eastern Empire, has hobnails which spell out 'follow me' in Greek (Fig. 64).

Fig. 61. Reconstruction, drawing O. Goubitz.

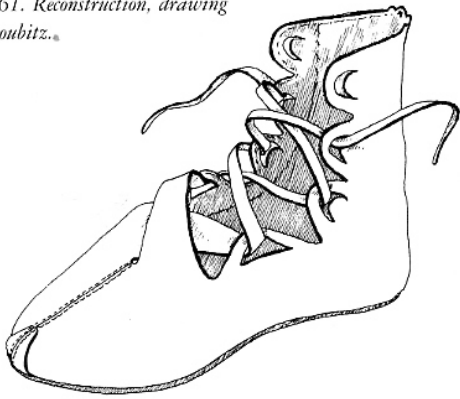


Fig. 62. 3rd century variant from Vindolanda, with side seam, decorated with openwork, small metal studs and impressed lines. Side seam, and a shaping tuck at the toe. drawing B. Brouwenstein.



Fig. 63. Cutting pattern of later 3rd cent variant from Vindolanda, upper from the inside to show linings (including lasting margin reinforcement), soles from grain side (laminae in place underneath). Note metal studs on the vamp.

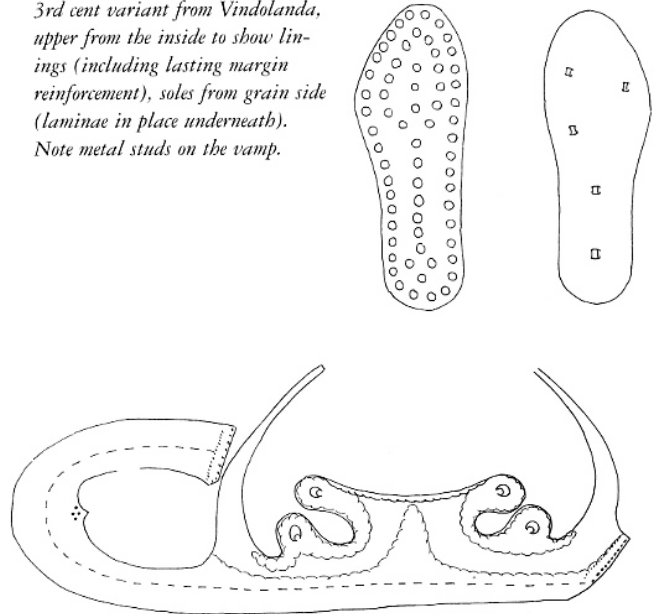


Fig. 64. Pottery lamp in the form of a nailed boot.



VII Style Southfleet

Date: from ca 200 A.D.

Distribution: All over the Empire, Hadrian's Wall to Egypt (Fig. 10.21).⁵³

For the most part, Roman footwear, though varied is predictable, but every so often something very unusual turns up. All too often, however, the first example of a "unique" shoe leads to the discovery of other fragments of the style, lurking unrecognised in other find groups and the "unique" shoe turns out to be not so special after all! This underlines the importance of publishing even small, unidentifiable fragments.

A good example of a "new" style, which later turned out to have been first illustrated in 1803, is a bootee which I have called the 'Southfleet'. That such an infrequent style should be one of the first published examples of a Roman shoe found in an archaeological excavation is remarkable enough, but is not the only reason for examining this style in more detail. The complex fastening of this ankle boot anticipates an equally uncommon Medieval shoe style by some 1200 years! Indeed,

Fig. 65. Cutting pattern of the shoe from Welzheim. Note lasting margin reinforcements.

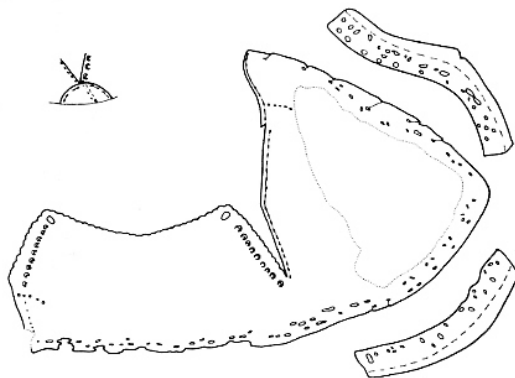
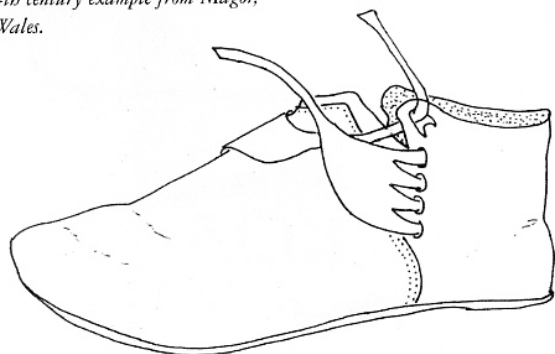


Fig. 66. Reconstruction based on a 4th century example from Magor, Wales.



it was only because I had previously come across the draw-string fastening in Leiden (Goubitz, type 30, Fig. 5), that I could so readily reconstruct the principle of the Welzheim examples: the Vindolanda backs were found some years later. The upper of the Southfleet is cut as a single piece, joined at the side and with tongue, which is either integral, or is sewn to the vamp throat with a visible lap seam (Fig. 15). The boot reaches to or just above the ankle and is fastened by means of split laces, sewn into the boot leg at both sides, crossing over to the larger holes at the top of the upper where the ends are tied together. This construction allows the boot to be fastened neatly around the ankle with a single tug, avoiding stress on individual lace holes and preventing unsightly creasing. Two exceptionally fine examples of this type were found in the burial of a child in 1802 and can still be seen in the British Museum. These shoes were coloured purple, with stitching in gold thread around the elaborate openwork. Undecorated examples also occur, such as an almost complete example from Welzheim (in a man's size) and two boot legs with the laces still in position, from Vindolanda. Small fragments are easily recognised at other sites such as the Saalburg. It is clear that this strange method of fastening was widely employed throughout the Roman Empire, with 4th and 5th century examples known from Britain and from Egypt. All these boots were sewn: where vis-

Fig. 67. Fragment of the back and fastening laces from Vindolanda (from the inside).

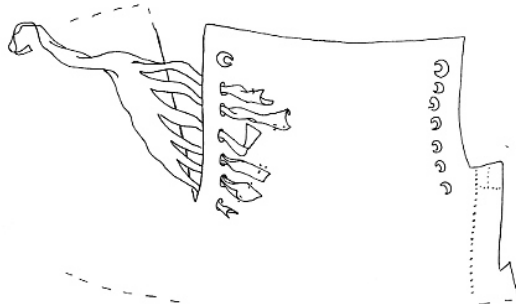


Fig. 68. Decorated shoe from the Southfleet burial (reproduced with the kind permission of the Trustees of the British Museum).



ible, the lasting margins are whipped to the insole and the outer sole is attached with tunnel stitch. It is, however, possible that the large example from Welzheim possessed a lightly nailed sole.

VIII Cork slippers

Date: late second century onwards

Distribution: all over the Empire, from Egypt to N. Britain.

Examples present at: Pommeroeul, Vechten, Valkenburg, Xanten (colonia), Esch.⁵⁴

These slippers left the heel and toes bare while raising the foot ca. 10-15 mm from the ground. The butterfly shaped top is usually made of fine leather such as doeskin, lined with felt. Such luxury leathers were probably oiled or tawed rather than vegetable tanned, they consequently survive less frequently than the thick outer sole. Where doeskin is preserved, it is noticeable that this usually occurs in close proximity to oak structures or concentrations of tannin-rich organic matter, suggesting that secondary tanning has taken place.⁵⁵ The more elaborate examples are decorated and even gilded, and this may provide an explanation for the stamps which regularly occur on the outer soles in the Lower Rhine region (above Fig. 3).⁵⁶

Cork slippers begin to come into general fashion towards the end of the second century and are particularly popular in the 3rd century, though later examples are also known, particularly from Egypt. Although the majority of these slippers possess a distinctive straight shape with a sharply pointed toe, more rounded shapes also occur and there are even a few wide fronted examples. The fine leathers and gold foil suggest luxurious living and several have indeed been found in wealthy female

graves. But they also appear regularly in more ordinary settlements and must have been very widely used. The frequent association of these slippers with sponges and unguent flasks on reliefs suggests that plainer versions were especially popular as bath-slippers, and indeed, the felt lining is well suited for slipping onto damp feet.

Few intact examples have been found, but impressions on the

Fig. 70. Outer soles from London (with envelope edging) and Vechten.

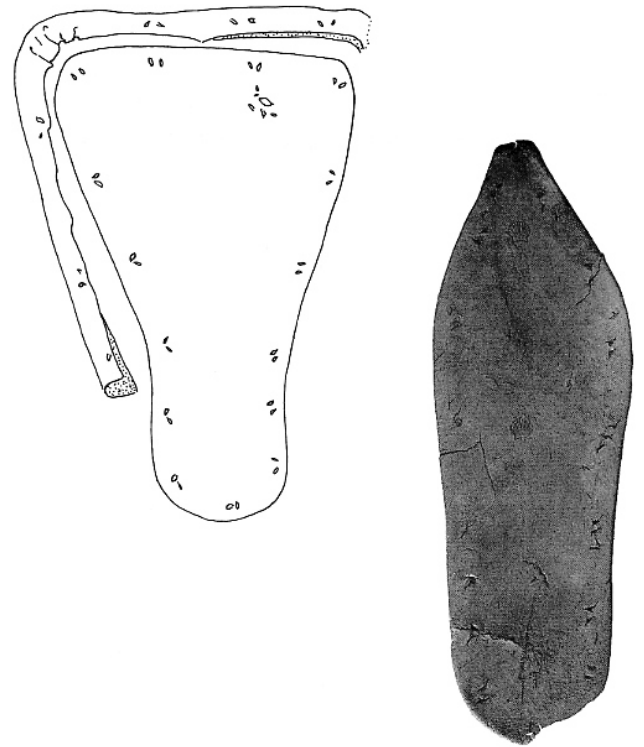


Fig. 69. Construction of cork slippers.

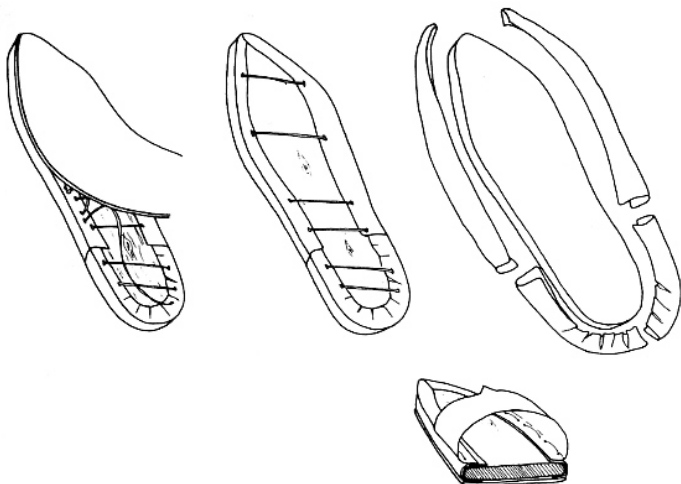
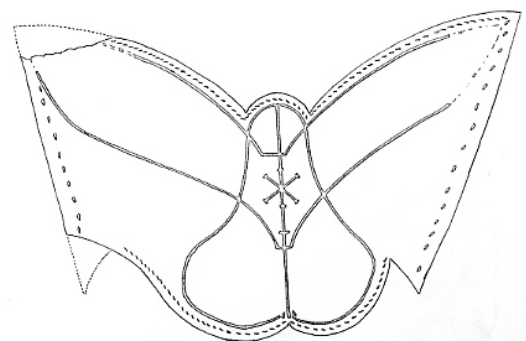


Fig. 71. Slipper top from Pommeroeul with impressed designs. Stitching around edge marks attachment of felt lining.

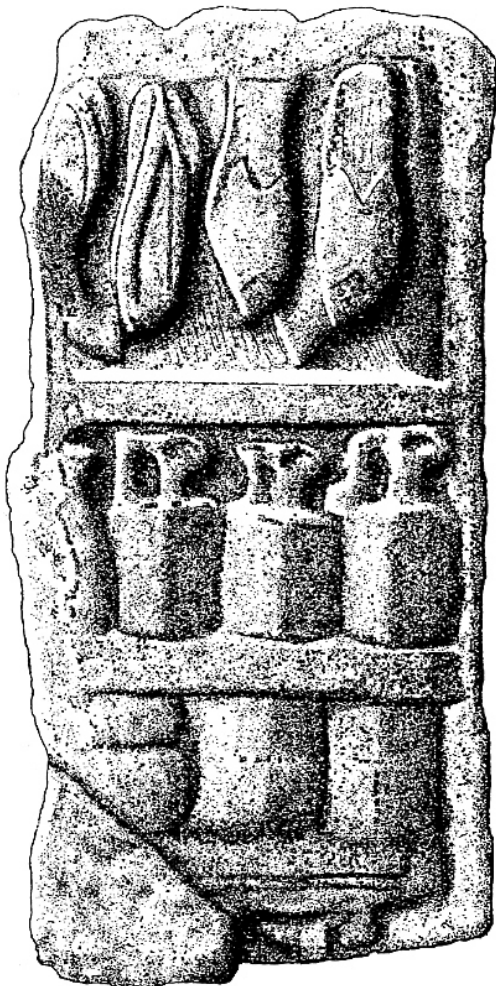


surviving fragments reveal the construction methods. The sole filling is made of a piece of cork (or sometimes, wood) about 10-14 mm thick, enclosed in a leather envelope, much like the Medieval counterpart (Goubitz Type 110). The casing was braced over the cork, the twine passing right through the sole. In some cases the outer sole was sewn at the same time

Fig. 72. Replica made by Peter de Haas.



Fig. 73. Relief from Langres showing bath slippers (drawing M.C. Bishop).



(resulting in close, paired stitches), otherwise it was attached later with tunnel stitch. As the soles with tunnel stitch differ little from other sewn constructions, it may be difficult to distinguish the slipper soles unless clear impressions of bracing, the envelope edges or (as is the case on some examples from Vechten) impressions of the wood grain are visible. No insoles have been found to match this construction (in contrast to shoes with sewn soles) and it is likely that these were made with felt or woolly lambskin, sometimes with an elaborate, cut-out leather reinforcement sole stitched on. The reproduction made by Peter de Haas shows how decorative this would be. Felt was also used to line the foot covering, making a comfortable indoor slipper for use on heated floors.

IX Style Deurne

Date: 4th - 5th century

Distribution: such footwear occurs on depictions all over the Empire, surviving examples from Switzerland, Luxembourg, France, Netherlands and Britain.

Examples present at: Deurne (Fig. 10. 27-8).⁵⁷

Three different styles of sewn, single piece footwear were found in the peat near Deurne together with a late Roman gilded helmet and coins which date the find to around 320. The finds are on display at the Museum of Antiquities at Leiden. Originally there were 3 pairs of shoes, all are damaged, but similar shoes from other locations allow reconstructions to be made. The shoes are all made of quite thick cow hide and are sewn with a plain seam turned to the inside and tacked, thus leaving a distinct corrugation at the edges. In all three shoes, the leather of the sole area curls around the foot so that the seams are not in contact with the ground.

I: A single piece shoe, cut symmetrically and with T-seams at the front and back, but differing from earlier carbatinae in the more carefully shaped front and the type of seam employed. The shoe covers most of the foot, and is tied on the instep. One side of the ankle fastening has been lost and though it may have been symmetrical with the opposite side, comparative finds suggest rather that there would have been a strap fastening with a metal or bone mushroom-headed stud. The upper is richly, but rather crudely, decorated with slashing, stamped roundels and impressed lines. The shoes were heavily worn and both had been repaired with a piece of leather roughly thonged over the holes in the sole part.

II: The other shoes are also single piece but cut to a more complex pattern, and requiring more seams to achieve the shape. The cutting pattern is markedly asymmetrical and the shoes are cut out so low that much of the foot is exposed: such shoes would presumably be worn with hose. Both shoes were fastened by means of an integrally cut lace which passes

Fig. 74. Cutting pattern of the shoes from Deurne (no. 1 is a composite of the two remaining fragments).

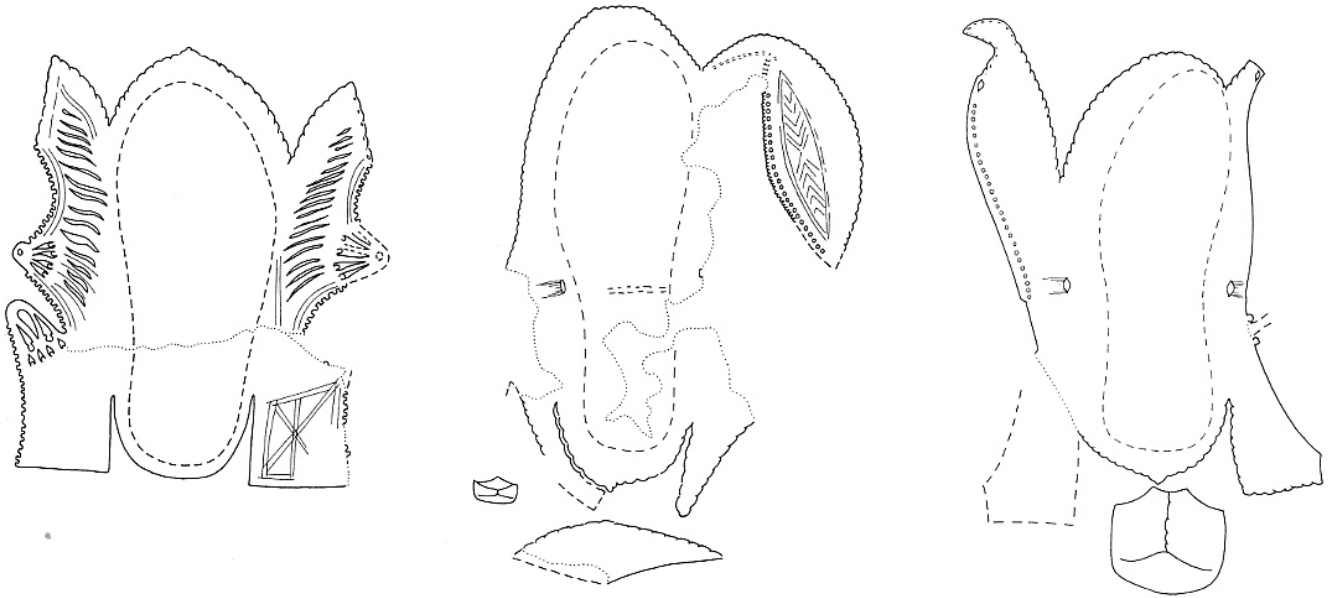


Fig. 75. Reconstruction of the shoes.

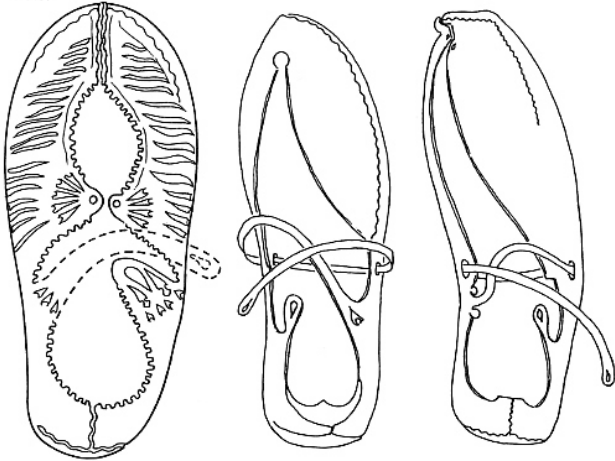


Fig. 77. Statue of the Tetrarchs in Venice: detail of shoes with separate soles. Note the loop of a drawstring at the ankle of the hose (drawing M.C. Bishop).

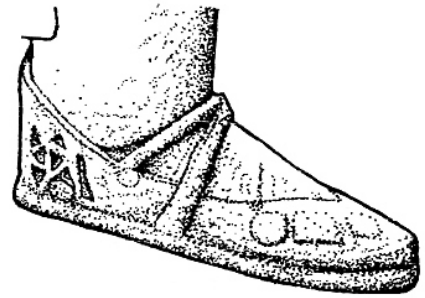


Fig. 76. Servant carrying shoes and hose from the 4th century tomb at Silistra (drawing M.C. Bishop).

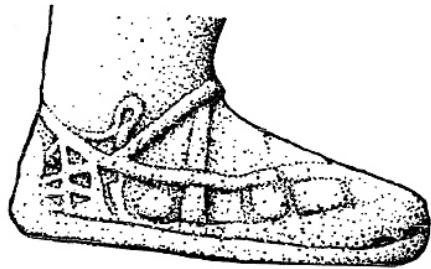


Fig. 78. A *carbatina* from Valkenburg imitating the eyelet boot. The shoe is worn and a repair sole has been roughly rhonged on to the outside of the sole area (Hoevenberg 1993, 319).

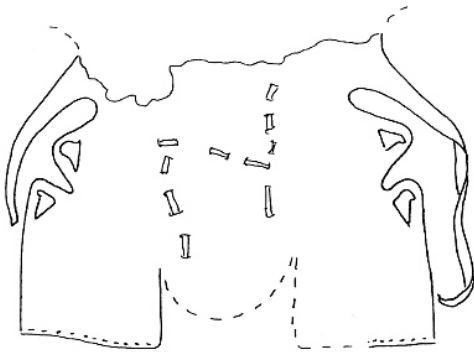
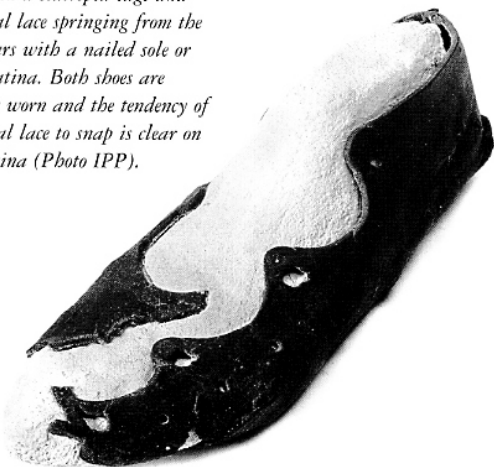


Fig. 79. At Welzheim, the same style of shoe (Fig. 10, 16), with lace holes in a scalloped edge and an integral lace springing from the front, occurs with a nailed sole or as a *carbatina*. Both shoes are excessively worn and the tendency of the integral lace to snap is clear on the *carbatina* (Photo IPP).



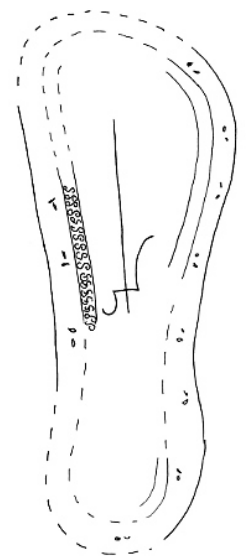
through slits at the waist of the shoe, under the foot and then crossing over the instep to the ankle strap. This seemingly awkward arrangement can be recognised on Late Roman depictions, as well as on several surviving examples of footwear. On discovery, one of the shoes still had a metal spur attached, so this particular shoe was certainly worn by a cavalryman.

Shoes of a similar appearance also occur with nailed soles, for example, Vindolanda, York⁵⁸ and on the statues of the Tetrarchs in Venice

Cross-overs

Evidence for the versatility of Roman shoemakers can be found in the interchangeability of stylistic and technological features. This is particularly noticeable at the site of Welzheim (Baden Wurttemberg), but is not uncommon elsewhere⁵⁹. Outwardly, the shoes look similar, but details of manufacture differ: *carbatinae* copy the uppers of nailed shoes or sandals, the same kind of upper can be attached to either a nailed or a sewn bottom unit, similar foot straps can be used on sewn slippers, wooden soles or on sandals, decorative motifs such as fine openwork, roundels and cut-outs are shared between all shoe styles.

Fig. 80. A sandal with astrological symbols from Aardenburg, dating to the mid 3rd cent. The sign for the planet Jupiter: besides the general protective properties, this may symbolise the victory over winter, since Jupiter rules over winter zodiac signs such as Aquarius, Pisces and Sagittarius, all of which appear regularly on sandal soles (Van Driel-Murray, C. 1999b).



Special soles from the Netherlands (Figs 80-84)

Even though they are mass produced articles, unusual find locations or particular decorative impart a special significance to certain soles. These shoes were being used to convey cultural messages in their own right: here are a few examples from the Netherlands. Excavators need to be aware that footwear possesses a social function besides that of protecting the feet from cold and damp.

Fig. 81. Deliberate placing of a pair of shoes in the build-up of a house terp in Midden Delfland. The arrangement is similar to that found in many burials and implies that the shoes were bound together by their laces with the nailed soles together. All the upper leather has decayed, leaving only the insole of the right shoe facing up. The left shoe had been laid downwards.

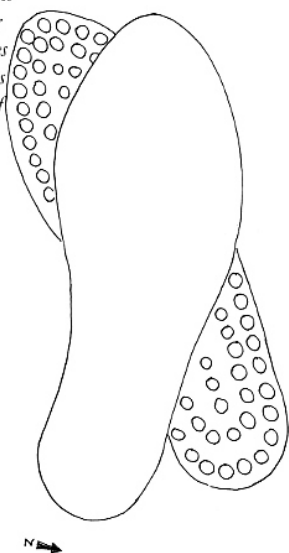


Fig. 82. This sole from Venray with decorative nailing (pattern 1a) was deliberately inserted behind the wooden well construction and could therefore be exactly dated by dendrochronology to 230 A.D. (van Driel-Murray, 2000b).

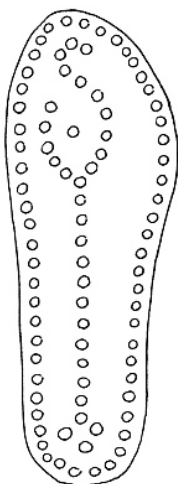


Fig. 83. Late 2nd century fashionable footwear from rural sites
A) ladies sandal from Rotterdam.
B) swayed and pointed sole from Hoogeloon (pattern 2c).

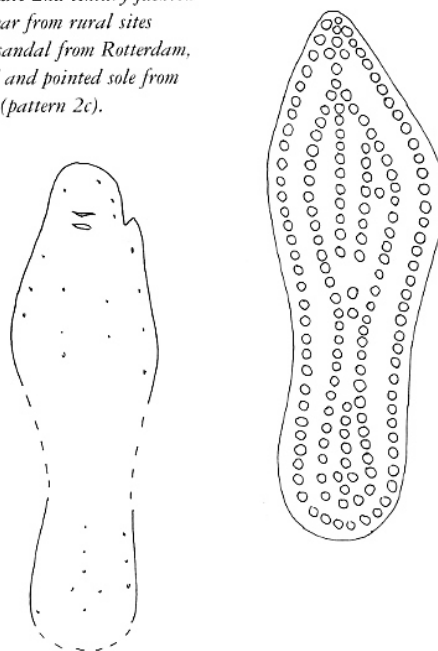
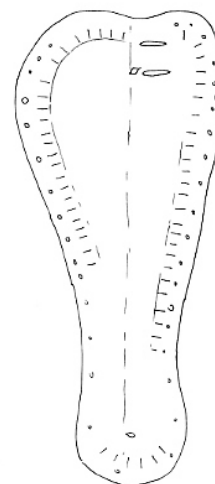


Fig. 84. A sandal from the bottom of a well at Katwijk; the shape shows it cannot have been deposited earlier than 230, showing that occupation here continued into the mid 3rd century.



Notes

1. Van Driel-Murray 1993 and unpublished material.
2. Van Driel-Murray 1999a.
3. Groenman-van Waateringe *et al.* 1999; Van Driel-Murray 2000a and forthcoming a.
4. Goldman 1994.
5. Van Driel-Murray 1999b.
6. Polyethylene glycol 600. For methodology see Spriggs 1987 and Goubitz, this vol. For reasons of safety, fungicides should be avoided. Freezing can adversely affect Roman leather, which should never be refrozen once thawed.
7. Göpfrich 1986; Schleiermacher 1982; Van Driel-Murray 1999c; Rhodes 1980, MacConnoran 1986 and unpublished material; van Driel-Murray 1977a, 1977b and unpublished material; Van Driel-Murray 1980, Verweij 1993 and unpublished material from private collections; Van Driel-Murray 1998c; Hoevenberg 1993; De Boe & Hubert 1977 and unpublished material from private collections.
8. Robertson *et al.* 1975; Van Driel-Murray 1993 and unpublished material.
9. Groenman-van Waateringe 1967.
10. Busch 1965; Van Driel-Murray 1999a, Curle 1911.
11. Gansser-Burckhardt 1942; Van Driel-Murray & Gechter 1983.
12. Van Driel-Murray 1999b.
13. De Boe 1982, fig. 19.
14. Lentacker *et al.*, 1992, fig. 7.
15. De Boe & Hubert 1977.
16. SAL(aluci)/RVSTICVS/SVTORIBVS/NOVIOM(agensibus)>ESSER-AVI/D(ono).D(edit).D(edit).D(edicavitque). To the goddess Salus, Rusticus has pledged and given this ring on behalf of the shoemakers of Noviomagus in the guild of Essaravus.
17. Van Driel-Murray 1977b.
18. For gold leaf on slippers in London, MacConnoran 1986, 225 and from Egypt, Montebault 2000, 112.
19. *cf.* Gansser Burckhardt 1942, 16-22 for a selection of iron tools from Vindonissa.
20. Van Driel-Murray 1987b.
21. Van Driel-Murray 1992.
22. Van Driel-Murray forthcoming d.
23. Montebault 2000.
24. Van Driel-Murray 1987a, forthcoming b.
25. Hald 1972, 68ff.
26. Van Driel-Murray 1999b.
27. Van Driel-Murray 1999c.
28. Van Driel-Murray 1999d, Waasdorp 1999, 89.
29. Pirling 1997, Taf. 158, nos 4349 and 4411.
30. Busch 1965, Van Driel-Murray 1999a.
31. An identical shoe lamp has been found in Vindonissa.
32. Busch 1965, Taf. 6 for a complete example.
33. Montebault 2000, p. 110-115.
34. Gansser-Burckhardt 1942, Abb. 40; Busch 1965, Taf. 26; Van Driel-Murray & Gechter 1983, Taf 13,6.
35. For example, van Driel-Murray & Gechter 1983, Taf. 4.3.
36. Bowman & Thomas 1994, 170. Since there are no cork slippers from the levels with the texts, the term can only refer to the wooden soles, of which large numbers survive.
37. Coulthard & Montemault 1998.
38. Bowman & Thomas 1983, 133.
39. Wild, 1993, 83, pl.XIII.
40. Wild 1968, 171; Van Driel-Murray 1999e.
41. Schlabow 1976, 76-79.
42. Groenman-van Waateringe 1984, Abb 38.
43. Van Driel-Murray 1998b.

44. See also Valkenburg vicus, Hoevenberg 1993, 255.
45. Junkelmann, 1986, 158-161, Bishop & Coulston 1993, 100-102, figs 2, 61; Groenman-van Waateringe 1967; Göpfrich 1986, 17-19, Van Driel-Murray 1999c.
46. Van Driel-Murray 1998a 289-91.
47. Göpfrich 1986, 22-24; Van Driel-Murray 1999c.
48. Van Driel-Murray, 1992, 1993, fig. 18, pl. VI.
49. Curle 1911; Robertson *et al.* 1975 figs 23-4, Van Driel-Murray 1977a, 256, fig. 31.
50. Busch 1965, no. 213; Hoevenberg 1993, 289; Van Driel-Murray 1999a, 68-74.
51. Busch 1965, no. 199, 209, 739, 749; Van Driel-Murray 1986, 1987a, 1993, fig. 17.
52. Hoevenberg 1993, p. 277.
53. Van Driel-Murray 1999a, 77-8, Busch 1965, no. 222a.
54. Van Driel-Murray 1999a, 80-95 for refs.; van den Hurk 1977, fig. 53, 1980, fig 8; Hoevenberg 1993, 319.
55. Van Driel-Murray 2000a.
56. MacConnoran 1986, 8.27.
57. Van Driel-Murray 1987a, forthcoming c; Braat 1975.
58. MacGregor, A. 1978, 28; van Driel-Murray forthcoming d
59. Van Driel-Murray, C. 1999a.

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