THE VINDOLANDA CHAMFRONS AND MISCELLANEOUS ITEMS OF LEATHER HORSE GEAR

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The purpose of this paper is to collect together disparate and unpublished fragments of leather horse gear for the convenience of those concerned with the reconstruction and practical performance of individual items or with the analysis of the total appea rance of the caparisoned Roman cavalry horse through time. Both aspects have been tackled thoroughly in two recent contributions,[2] though the basic evidence of the surviving leatherwork could not, for a variety of reasons, be covered adequately in one of them. This also seemed to be a good opportunity to bring some spectacular new finds of horse trappings from Vindolanda (Chesterholm) to more general notice.[3]

As in more recent times, leather must have been widely employed for the purposes of horse harness. Curiously, apart from odd scraps lodged in metal loops and terminals, no leather straps survive to assist in the reconstruction of the metal elements of the harness or the arrangement of the various fittings.[4] Here, it is often the size and disposition of the attachment loops or rivets which must indicate the type, thickness and probable length of the necessary straps, while reliefs, figurines and practical considerations determine their arrangement and use. A possible reason for the scarcity of strapwork in archaeological contexts is that horse harness may have been made of oiled leathers, as was still mandatory in the Dutch cavalry in the 19th Century.[5] Such leather fails to survive in the waterlogged conditions which are the source of virtually all Roman military leatherwork in the north western provinces. Comparison with desiccated military sites in Egypt for example would be highly profitable here and might provide a useful source of additional information provided careful assessment of the socio-cultural context is undertaken.[6]

BARDINGS AND PEYTRALS

The complete scale armour horse barding from Dura Europos[7] has no counterpart in north western Europe, though it is open to question whether the isolated fragments of such armour which the archaeologist usually has at his disposal would ever be recognized as such anyway. That elaborate bardings - perhaps of cloth, if not of armour - were in use in the northern provinces at least from the late 1st century onwards is suggested by the evidence for leather and metal chamfrons, which can hardly have been used in isolation. In this respect, the illustrations of cavalry parades by both Embleton and Connolly are interesting, as the richly decorated metal chamfrons contrast with the curious 'nakedness' of the rest of the horse, giving a top-heavy appearance, quite at variance with the balanced finery of the Medieval barded horse.[8]

For the medieval charger, the normal complement to the chamfron is the peytral, to protect the vulnerable front of the chest. Other than some obviously decorative examples[9] there is little surviving evidence

that metal peytrals in the strict sence were in use at all in the Roman period. However, thickened bands or rolls on the breast of some terracottas and depictions,[10] point to the use of some sort of breast

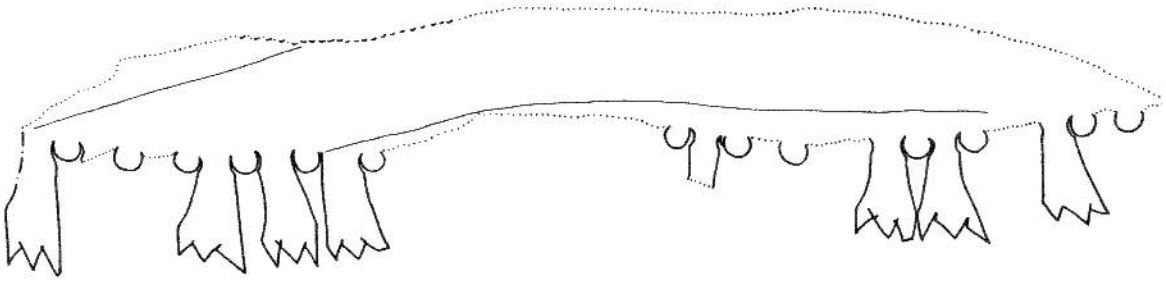

Fig.1: Breast band from Vindolanda (1:3)

covering, even if little more than a widened breast band. Both sources also depict fringed hangings under the breast strap and this may have been the position of a torn strip from Vindolanda with crudely cut trilobate pendants.[11] (Fig. 1) It is cut and ripped along a line of stitching at the top, so must have come from a broader band, or even barding. Despite its crudity, the leather would have looked rather jolly if used as a backing to set off pendants and melon beads.

Certain fragments of leather from Valkenburg (NL)[12] are suspected of belonging to horse trappings. The most convincing one is presumably symmetrical, a broad, inverted triangle, reinforced and decorated at the free-hanging point, but attached to other leather elements along the top where there is the usual joining seam (seam IIa). This would place it more in the category of housings than of peytrals. The two other pieces, though rather similar to some of the less regular tent sheets now known from Carlisle and Vindolanda, might belong to more capacious bardings, although in this case, the point would be expected to hang symmetrically below the throat, not to one side of it. There would, of course, be rather more scope for irregular shapes in a complete housing, though cloth might be a more suitable material.

The identification of several pieces of leather from Vindonissa has oscillated between human clothing and horse armour.[13] One bears an inscription, the reading of which was left to an open competition, resulting in 'POSTVMI LEPONT.IVS EQVES', which is certainly suggestive. However, the pieces are too small and irregular for the suggested half moon shapes to be fully justified and their function is perhaps best left open. Though two 'bibs' in the same collection are more likely to be reinforcements around the umbo opening of a shield cover than either clothing or horse gear, an identically shaped, but rather larger piece in the collection from Newstead might point to some relationship with horse trappings after all as it is made of stiff cowhide.[14] The possibility that the leather found together with the early 4th century helmet at Deurne (NL) is part of the horse trappings is under consideration and will be discussed in due course.[15]

A peytral is meant to be defensive: something rather stronger than thin and supple goatskin would surely be required (cf. the chamfrons

below), while leather bardings for purely decorative purposes seem unlikely on account of their weight and expense as well as the relatively restricted scope for decoration.

THE VINDOLANDA CHAMFRONS

In 1911 Curle published a leather object from Pit 78 at Newstead which he was unable to identify, but which was soon accepted as being a chamfron, the leather frontlet of a horse. The upper part of a second, less well preserved, example was subsequently found in Pit 102, too late for more than a mention in the report.[16] Both pits are Flavian. In addition to the chamfron lying on the bottom, Pit 78 also contained 5 silver plated harness mountings, forming a group highly suggestive of a deliberate grouping of horse gear and comparable to the remarkable deposition of parade armour and horse trappings in Pit 22.[17]

In their kind, the Newstead chamfrons remained unique until 1987, when another virtually complete specimen was excavated at Vindolanda (Fig. 5). This discovery led to the recognition of a decorated strip of thick leather, found in 1985, as a section of the brow band just above the eye sockets, cut away from a second example (Fig. 2). Shortly afterwards, the double backing leather of yet a third specimen came to light (Fig. 3). All three belong to Period III, dated to c. 95-105 AD, and thus contemporary to the Newstead examples.[18]

Apart from minor differences in decoration, the three chamfrons are of similar construction and are therefore treated together, using Chamfron I as the basic reference.

Both chamfrons I and II are of thick (4-5mm) stiff cow hide, very like good quality sole leather and without any visible blemishes or defects (cf. Newstead's 'fully one-eigth of an inch in thickness'). Chamfron I lacks its poll piece (though this can be reconstructed from Chamfron III) as well as its left ear and cheek flange. The shape of the object is somewhat distorted by soil pressure and the large hole left by the hacking out of one of the 4 metal attachments on the nose, and Fig. 5 is slightly idealized to give the original shape. Like the Newstead example, Chamfron I is still partially backed by a goatskin lining. Differential shrinkage of the two leather types means that they no longer match in size: the thinner goatskin seems to be less affected by shrinkage.[19] Lack of impressions on the back of II indicate that this too was lined originally. As for chamfron III, it is only the lining which remains (Fig. 3). This example is slightly smaller than the others, though the poll piece is thicker, and there are minor differences in the decoration. This chamfron had two linings, the outer of goatskin, the inner of thin sheep or deer skin, which may mean that the original outer mask was also of thinner material.

The chamfron fitted an adult horse skull from the same excavations exactly, though it was very much too small for modern ponies of c. 14 hands, the suggested height of the Roman horses. Any difference with modern animals must therefore be the result of changes in the facial proportions between horses and modern ponies. Roman cavalry horses are clearly a small, but gracile and well proportioned breed. The bottom edge falls just behind the nostrils, and the back flanges and the poll

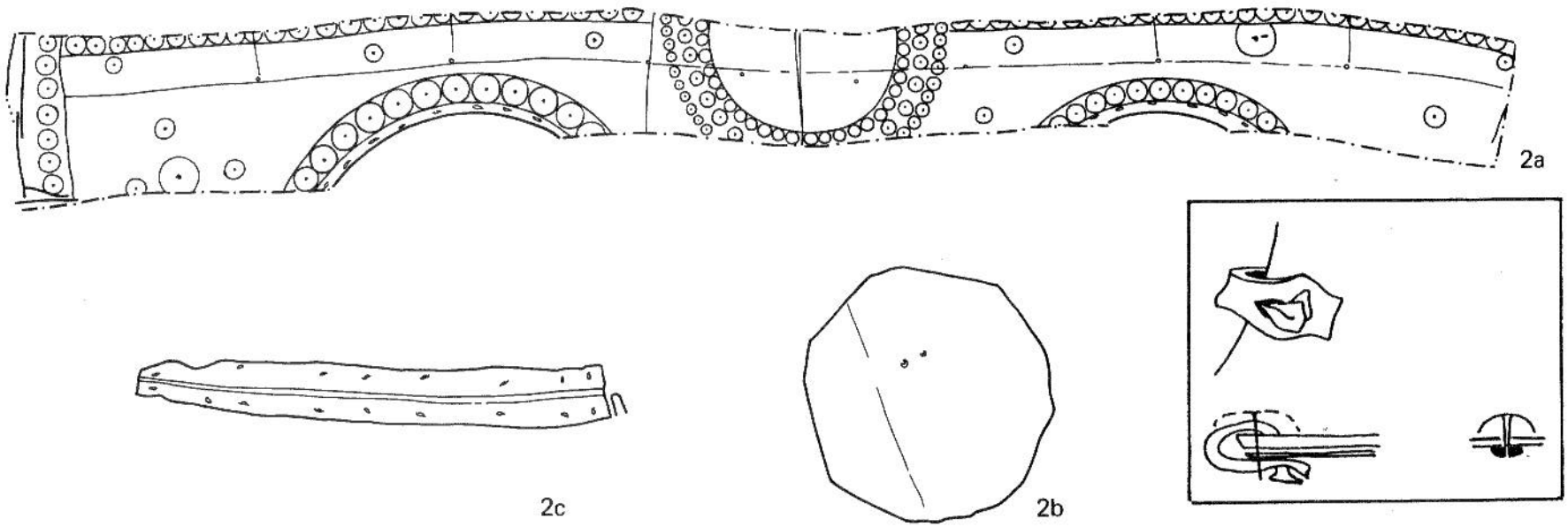

Fig.2a: Vindolanda Chamfron II; 2b socket cut out; 2c binding (all 1:2); inset 2d, details of stud and leather loop from Chamfron I

piece fit down neatly, though not touching, as can also be surmised from the stress lines at the fastening slits here. In this context it is perhaps worth quoting J.C. Ewart's comments on the horse bones from

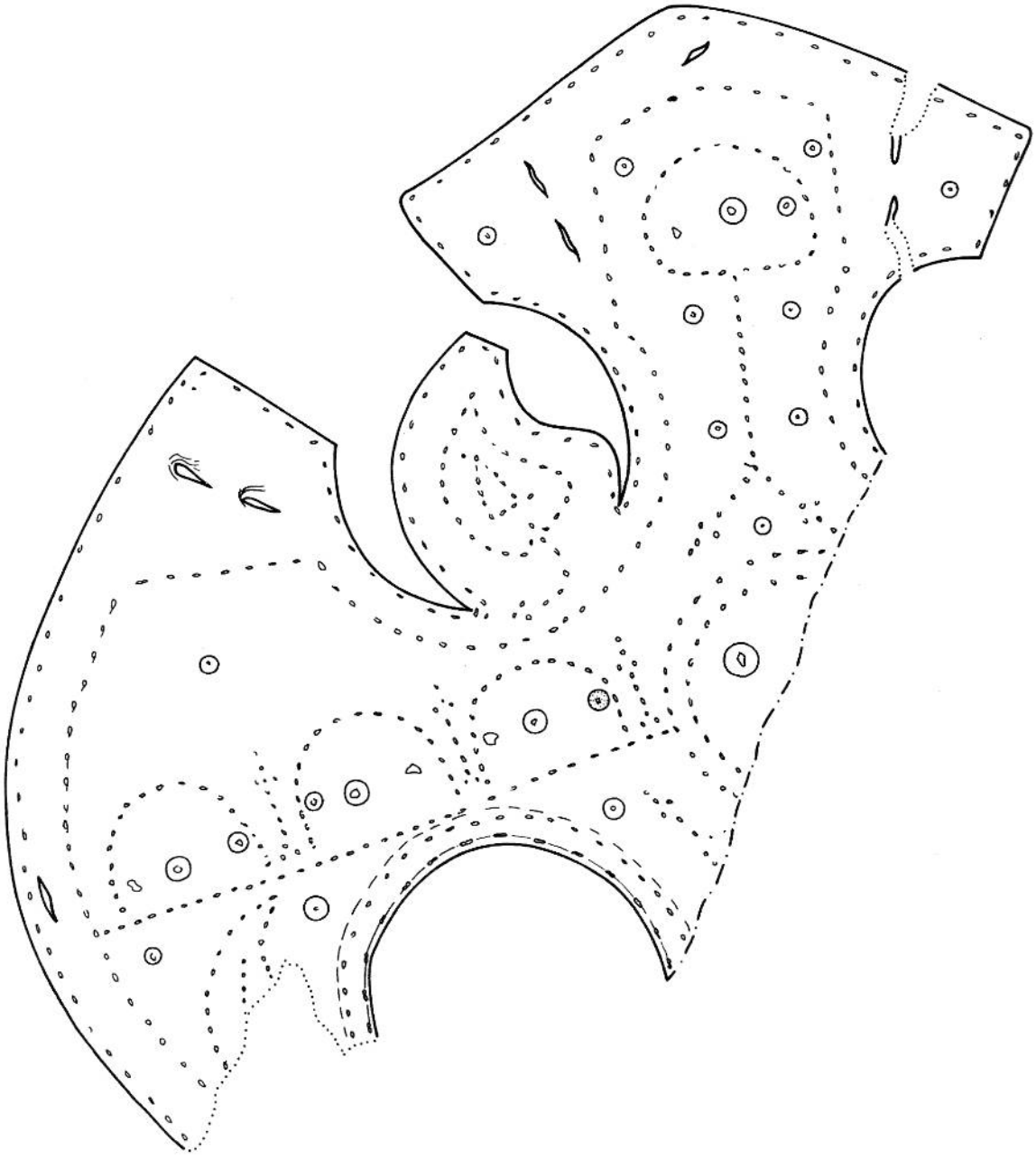

Fig.3: Vindolanda Chamfron III, outer lining (1:2)

Newstead in full. 'From the size of the cranium, the dimensions of the narrow, tapering and only slightly deflected face, and from the slenderness of the limbs, it is evident that this pony was built on the lines of the smaller kinds of modern Arabs. Further, the relatively large cranium indicates that it was probably as intelligent and docile as Arabs are.'[20]

The chamfrons seem to have been designed with a compass and rule in a fixed system of guide lines which allow an interlocking series to be laid out over the best part of the hide (Fig. 4). A deep compass

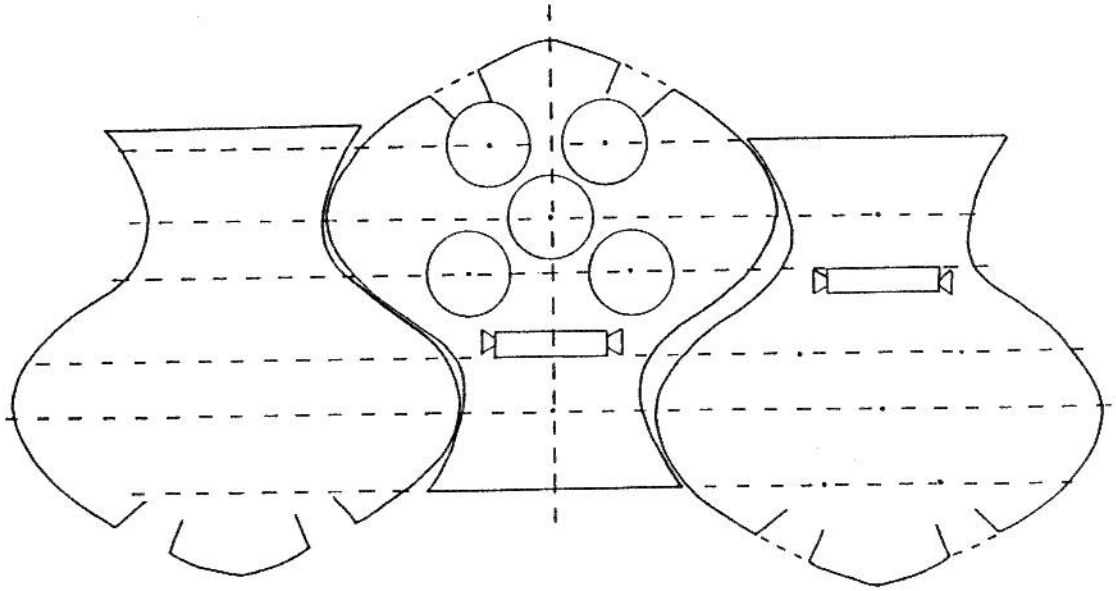

Fig.4: Guide line system for cutting chamfrons in series

point (repositioned twice) in the middle of the forehead marks the centre at which the axial guide lines cross and from which other circles and designs were layed out. Eye, ear and forhead circles are all the same size. If the visible compass points and guide lines are ignored, the chamfrons fit together even better (fig. 4 left), but the correspondence of lines seems too close for coincidence. Chamfron II shows the system of impressed guide lines and compass points across the eye sockets even more clearly. An irregular circle of thick cow hide with a central compass jab found together with Chamfron II (Fig. 2b) probably comes from the first cutting out of the eye socket, before the edges were neatened. All this points to a well developed routine and it is likely that the chamfrons were manufactured in series.

Stitch holes mark the presence of an edge binding, probably of cloth, though a small length of leather binding associated with Chamfron II (fig. 2c) would also be appropriate. The eye sockets of Chamfrons II and III were also bound. Slits for the fastenings occur around the edge. Stress lines on Chamfron III indicate that the cheek flanges were pulled slightly upwards towards one another, while the poll piece was pulled down towards them, though not touching. Chamfron I still retains two complete leather loops at the left throat (fig. 2d) and the lower right, with cut stumps of others at the right throat. It is unclear whether loops were also attached through the slits in the upper portions, or whether straps passed through these directly. Slight chaffing, as though from a metal ring, is visible in the complete loop, so these presumably held straps or chains, which, in this position, must have been attached directly to the bridle, since it is too low for a throatlatch. The straps at the widest point of the cheek may have been used for the throatlatch, though this strap is intended to hang

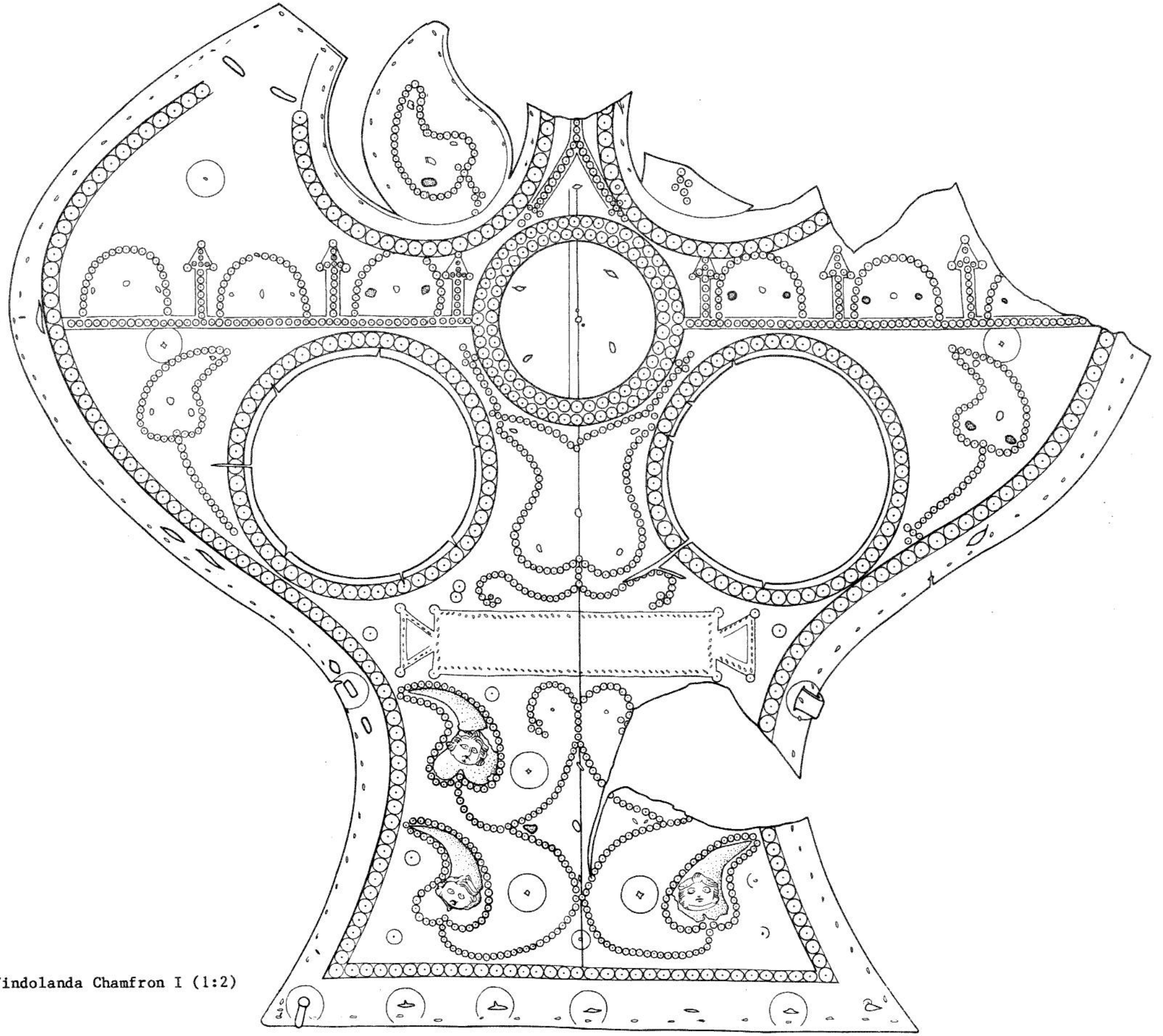

Fig.5: Vindolanda Chamfron I (1:2)

loosely around the animal's wind-pipe. Not only do stress lines around the holes seem to indicate that tension was exerted on these straps - which, in view of the thickness of the leather must have been quite severe - but the direction of the lines seems to indicate horizontal rather than downwards stress. The possibility therefore remains that these straps should be seen in conjunction with a crinet (neck armour or barding). Until now, however, the presence of a crinet has only been seriously considered for the cataphract troops of the Third century,[21] but neck covering for display purposes may have been used long before. The function of the row of slits along the bottom - all presumably holding a leather loop - is unclear. These also occur on the Newstead specimen and as they lie exactly behind the nostril they may have been used in conjunction with the bridle's nose band, although the construction does seem to be rather excessive for such a purpose. It is also questionable whether a chamfron should be so firmly attached to the bridle at so many points. All these bottom loops as well as those at the cheek were pierced and partially obscured by a large-headed metal rivet (fig. 2d). This arrangement is strongly reminiscent of that used on the Straubing metal chamfrons.[22]

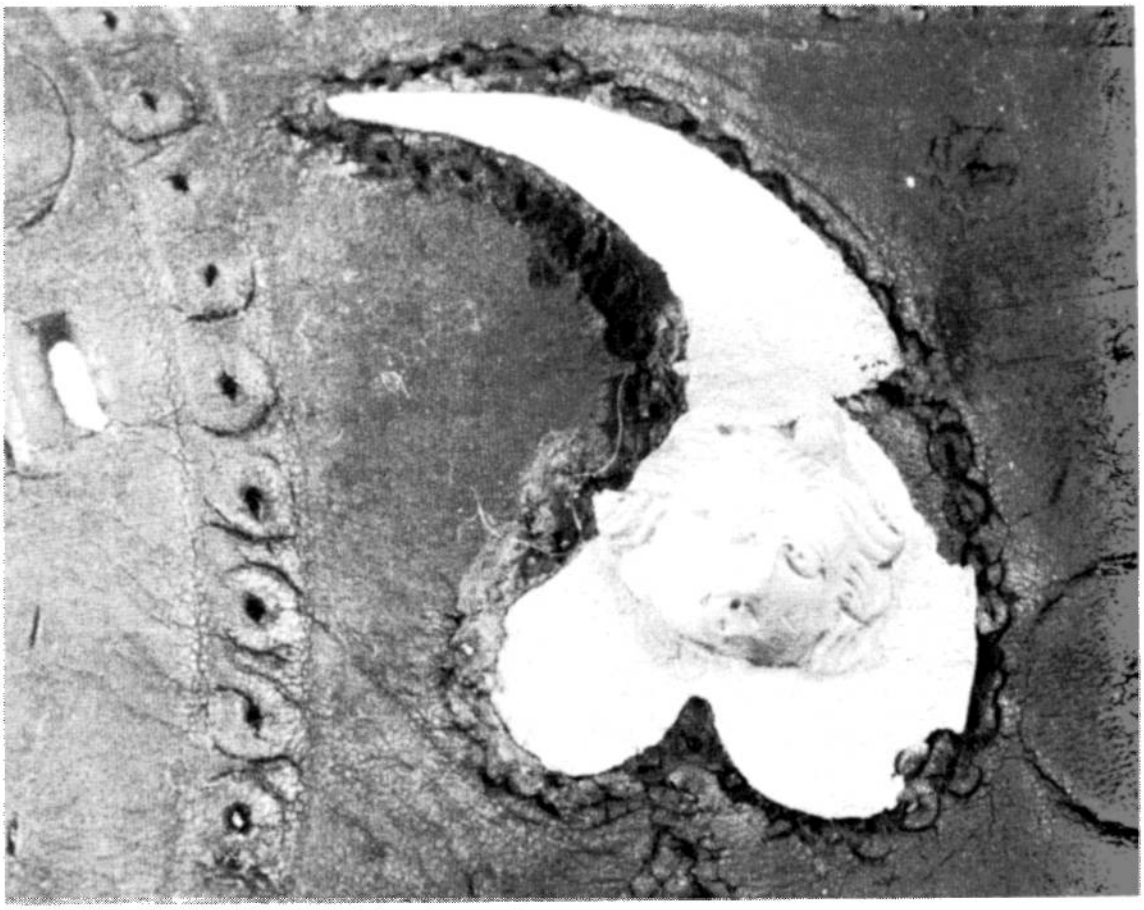

Fig.6: Detail of Bacchus heads. Courtesy R. Birley

The entire surface of all the chamfrons was originally covered by a decoration of metal studs, foil attachments and phalerae (all probably of brass), set within lightly tooled lines. None of the studs remain, only the shafts have here and there been left in the leather. The clear cuts left by the heads on the leather surface, however, show that, as at Newstead, three sizes of dome-headed studs were used

(diameters c. 3mm, 6mm and 170mm). The wiry shafts of the smaller sizes were carefully smoothed down over the back of the lining, leaving impressions remarkably like the passage of sewing thread (especially clear on III). The large studs and attachments were securly bell-capped at the back, presumably for the comfort of the horse. Several of these caps remain on Chamfrons I and III, in places still holding the layers of leather together (fig 2d). The metal of the bell-caps has caused extensive staining of the outer surface of III, and they were so firmly hammered on that the impressions are visible on the inner lining too. A large round phalera (or antler amulet?) was fixed to the forehead and a separate leather ansata, presumably with name of horse, rider and unit and inevitably lost, was attached over the nose with the smallest studs (no head impressions).

Elsewhere, foil attachments filled the larger areas and this must also have been the case on the Newstead examples, which bear similar traces. Much of the metal has been removed, leaving only fragments of yellow metal around the rivets, but three ivy leaves remain almost intact, still sporting remarkably ugly Bacchus (or Amor?) heads cast in high relief (fig. 6).[23] Similar faces presumably adorned the remaining ivy leaves, but the three rivet ends in the semi-circles of the brow band may have held spectacle-like arrangements of three joined discs. As it is, the brow band looks for all the world like a row of helmeted figures peeping over a wall, brandishing their spears. Differential wear on Chamfron II, the surface of which is particularly well preserved, is suggestive of the application of polish to the plain areas.

Unlike the Newstead chamfron, which was clearly deposited intact and intentionally in Pit 78, the Vindolanda examples have been roughly treated. Useful material had been salvaged and the presence of the eye cut-out (fig. 2b) suggest that these chamfrons were discarded in the process of making new equipment.[24]

The brow band of Chamfron II could have been used as a measure, but why the top of I should be so jaggedly cut is a mystery. The metal fittings of all three were removed. The large studs and foil decorations were wrenched from I with a claw inserted at the front, damaging the grain surface. Sometimes the rivets broke and the shaft, with bell-cap at the back, was simply left in. Stumps and jagged foil scars remain in the brow band and most of the ivy leaves (shaded in fig. 2). The two lower foil elements broke, or it was too difficult to get the claw in, so they were left intact and instead a complete fitting was slashed out, perhaps to serve as a pattern in the manufacture of the next chamfron. The three Bacchus heads each differ, with quality and finish decreasing in a clockwise direction, implying that the best face was used as the future pattern. The linings were ripped off the back, presumably flicking out the ends of the smaller studs which could then be easily pulled from the leather. The lining was evidently pulled sharply down from the poll piece, leaving bits trailing from the remaining bell-caps and at the bottom right and largely missing the upper left area. This was torn off separately, though was left dangling because of the complete loop at the side. It may well be that forgetting to cut this loop was the cause of the incomplete removal and hence the preservation of part of the lining in place.

THE PRESENCE OF EYE GUARDS

The use of metal eye guards is something of a problem, as loose guards have commonly been accepted as indirect evidence for the use of leather chamfrons. In fact, the best evidence for a decayed leather chamfron would be a concentration of yellow metal studs, hundreds of which were used (at least 230 of the middle size alone). The brow piece of a metal chamfron from Neuss was evidently used without eye guards,[25] while sets of guards from Mainz were attached directly to the straps of the bridle, presumably without any additional head protection, though textile drapes on medieval lines remain a possibility.[26] Half plates, such as those from Straubing[27] could well have been worn in conjunction with a leather or cloth head cover, as were medieval examples. In this context, it should be noted that the designs picked out by the metal studs on the leather chamfrons, would have served a practical purpose in quilted armour. The furthest development is seen in other chamfrons from Straubing where the eye guards form part of the hinged cheek pieces.[28] These are particularly solid affairs which must have been difficult to fit to the horse comfortably and textile padding may have been used as well.

Pace Robinson and Garbsch,[29] there is in fact no direct evidence for the use of metal eye guards on any of the known leather chamfrons. The eye sockets are all surrounded by metal studs of the middle size: though none of these survive, the impressions cut by the heads are distinct enough to preclude the attachment of anything else to the front. The regular placing of the thin metal shafts would not allow for the insertion of the occasional thick rivet to secure a guard, nor are there any signs of additional rivets elsewhere on the leather. Furthermore, the thin shafts of the studs are smoothed down over the back of the lining, thus excluding the possibility that the flanges of the eye guard were secured between the two layers of leather, quite apart from the fact that the spacing of the holes on the metal guards is quite different. A metal guard from Corbridge is surrounded by embossed relief which certainly imitates studs on leather, but is itself attached to a backing by means of 4-6 crudely punched holes.[30] The widely spaced large holes of other single eye guards could have been used for both rivets and for sewing. The inescapable conclusion is that eye guards were not meant to be attached directly to the chamfron. Indeed, the bound edges of Chamfrons II and III suggest that their use was not even considered. Interestingly, medieval, and later, chamfrons rarely use eye guards.[31]

However, damage to the eye sockets of Vindolanda Chamfron I, and this one alone, does suggest its use together with eye guards, if only temporarily. Cracks around the edge and quite a large cut in the left socket are suggestive of forcing the leather over a metal guard which was slightly too large for the hole. The flange at the back and the pressure of the leather may have been sufficient to hold it into place, or alternatively, the guards were attached to the bridle, like the Mainz examples.

The chamfron could never take the place of the bit and bridle, and must always have been placed over the normal harness used to control

the animal, however light. The eye guards attached to the bridle may then have been optional, used with or without a chamfron, just as the chamfron could be used with or without eye guards.

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Some minor differences apart, the designs on the three chamfrons from Vindolanda are so similar to those on the Newstead examples that it is tempting to see the same hand in all five. The presence of such distinctive equipment at these two forts does suggest some link between the garrisons of both, although factors such as the mere survival of leatherwork may distort the picture.[32] At Vindolanda the writing tablets now make clear that the occupation in Period II and III was the Cohors VIIII Batavorum, a cohors quingenaria equitata, and so it is presumably the Batavians who are responsible for the finery.[33] However, the presence of Veldedius, who was probably one of the Governor's Messengers, here may complicate matters by placing this equipment in a class apart.[34] Whether the use of chamfrons in this form is an element of display characteristic of mounted troops along Hadrian's Wall is a further point of contention. The bias introduced by the conditions required for the conservation of leatherwork has already been stressed. In addition, the metal fittings were easy to remove and reuse: such small metal objects are also easily overlooked in excavations or watching briefs so the absence of large numbers of studs, foil attachments or Bacchus heads in the available publications of small finds does not necessarily imply the absence of gorgeous leather trappings elsewhere.

Although I know of no exactly comparable leatherwork, two objects from Carlisle and one from Woerden do deserve notice. Despite differences in shape and, more essentially, in size, the objects from Carlisle, which are treated in more detail by S. Winterbottom (this volume), are so similar in proportion to the Vindolanda examples that they can certainly be classed as chamfrons. They are probably the linings, like Vindolanda III, but of undecorated chamfons, perhaps used in practice. Presumably, cavalry horses had to be trained from an early age to accept elaborate trappings, but whether such training would extend to foals is speculative.

The piece from Woerden (NL), is only tentatively included amongst the horse trappings[35] When complete, it consisted of four shaped pieces of calfskin joined by the standard heavy duty reinforced seam (seam III), the crossing strips of which remain at the back (fig. 7). On analogy with the Vindolanda linings, the smaller holes with impressions on the grain side represent flattened tails of small studs, not stitching as was first considered, and the impressions surrounding the larger holes are probably from bell caps, not of the studs themselves. The result is the shaped lining of an object decorated with widely spaced studs of two sizes, with sections of two cut out circles, also surrounded by studs. The piece is too incomplete for reconstruction and simple symmetry cannot be assumed. The reinforced seam suggests that a rather large object is concerned. The angular outline bears no comparison to the known chamfrons, but the barding of Sir Geoffrey Luttrell's horse is irresistible.36

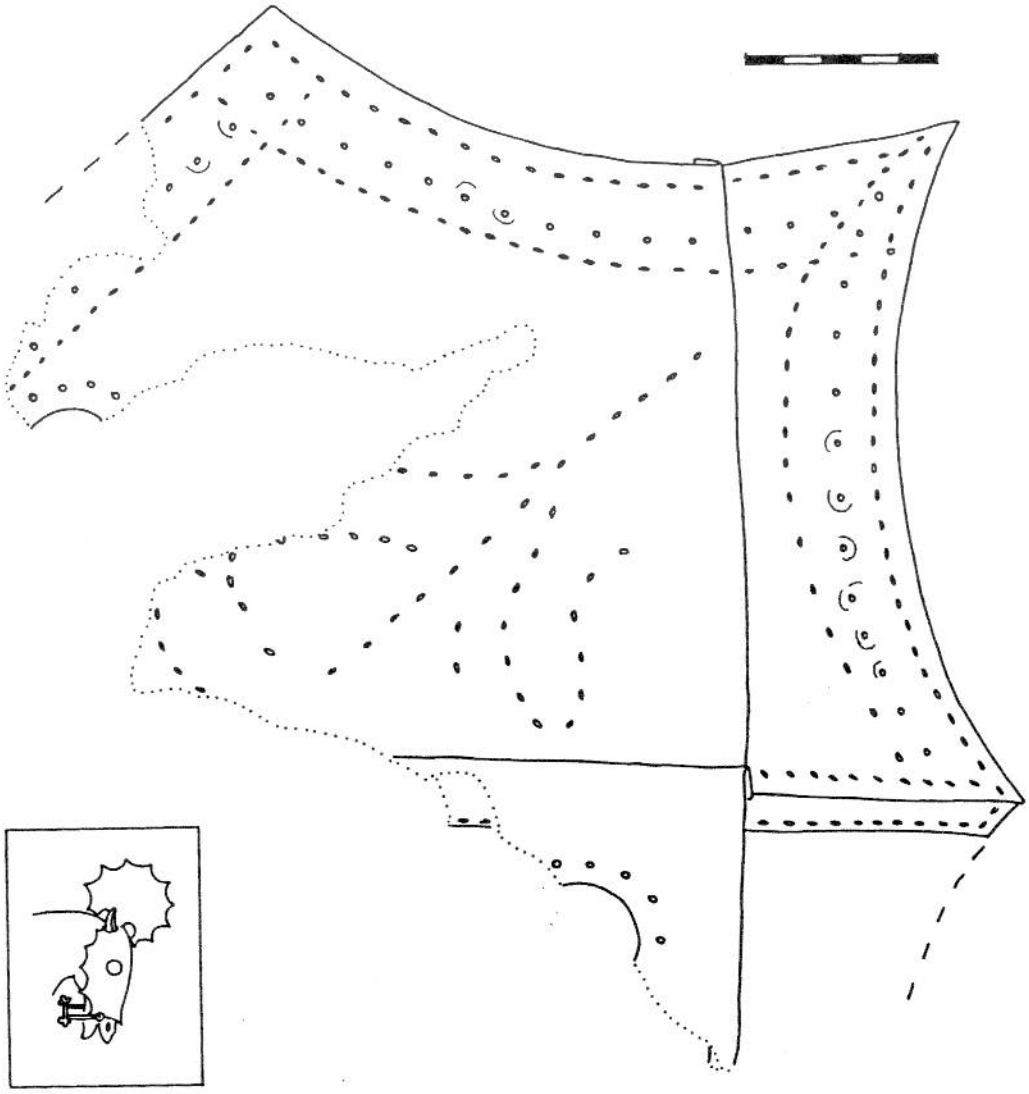


Fig.7: Decorated leather fron Woerden (1:2), with inset, Luttrell's chamfron

SADDLES[37]

Since the discovery and publication of an almost complete saddle cover from Valkenburg,[38] leather has come to play a central role in the reconstruction of the form and capabilities of the Roman cavalry saddle. The discussion centres on two issues, firstly whether it represents a saddle at all, or should not more correctly be called a shabrack, i.e a simple cover over the horse's back, as opposed to a firm seat moulded over a tree and secondly, if it is a proper saddle, how exactly it was formed to make a viable seat.

The purpose of a saddle is to provide the rider with a safe seat, but more essentially, to transfer the weight of the rider from the backbone of the horse to it's flanks. A shabrack would not meet these

requirements - surely essential for the mail-clad cavalryman - and neither would a simple padded cushion. A wooden structure is essential to relieve the horse's back. Though the presence of an internal structure can be inferred from the wear and stress marks on the leather coverings (Fig.8), the exact shape of the saddle is a matter of interpretation. The stitching has invariably decayed in the soil, leaving only the flattened shape of what was originally the outer covering of a stuffed object. Whether the edges were joined or hung free depends entirely on the interpretation of the various stitch holes and impressions, but even if the shape is agreed, the type of internal structure may differ.

Although the possibility of a firm structure had already been raised by several authors,[39] it was left to Peter Connolly to devise a working model by turning the flaps of the Valkenburg saddle in, and creating a leather pad, closely resembling those on depictions of cavalrymen. The principles of his reconstruction have already been published elsewhere,[40] and the actual saddle has been subjected to enough working tests for there to be no question but that the Romans knew and used a proper saddle, formed over a wooden tree and incorporating four metal horns in a construction which gave the rider as firm a seat as the future stirruped saddle was to do. For various reasons, however, the leatherwork which forms the basis of this reconstruction was not fully presented, and as much of it is either unpublished or too scattered to be readily accessible, it is the purpose here to present all the fragments of Roman leather saddle casings known to me to date. In particular, the fragments from Castleford, which are crucial to the reconstruction need to be treated in relation to other finds. It is also gratifying that Sue Winterbottom of the Carlisle Archaeological Trust was prepared to contribute the important material from Carlisle at a very late stage in the proceedings. We do not dispute the basic accuracy of Connolly's work, but wish to illustrate the range of shapes and sizes as well as differences in individual construction. Furthermore, for Connolly's reconstruction to be fully accepted, it must be shown that those impressions and features on the surviving leatherwork are consistent to the suggested use, as I believe they are.

The saddle-tree itself would have been of wood, with most of the shape and comfort being derived from the padding, as is the case with medieval and Rennaissance saddles, where the crude and splintery wooden frame is entirely masked by sumptuous padding and richly worked covering materials.[41] The metal sheathings[42] inserted in the leather pocket would have given additional shape and rigidity to the upstanding horns, which were subjected to severe wear - as the state of the leather clearly reveals. Besides holding the rider, these horns also provided the grips necessary for vaulting into the saddle, as the Castleford example shows clearly. A metal insert would also make it easier to secure the padding around the wooden core before the leather was drawn over, thus simplifying repairs, as well as keeping it in place if the leather wore through. If, as seems likely from the finds from Newstead (see below), the stuffing was of chaff, this was a very necessary precaution.

The chief drawback in the examination of the leatherwork is its condition. Only the Valkenburg example is anywhere near complete, and

unfortunately, far from ideal storage and lack of conservation treatment greatly limit its value for such detailed analysis. All other identifiable saddle leather is extensively worn and has often been roughly ripped apart. This in itself supports Connolly's assumption of a padded wooden tree which could be re-covered when necessary. What we have are the discarded bits from saddles which were being re-covered. This may explain the poor condition of the leather and the presence of all kinds of repair patches which further hamper interpretation.

Indeed, the condition of the surviving leather is consistent with that of covers ripped off a firm frame, with the preferred lines of tearing matching the areas most vulnerable on a firm saddle. The main body would be ripped off in a single operation (Vechten 1), leaving a strip with horns and the dart in place (cf. Vindolanda, Carlisle). Even with fairly complete removal, the tearing is likely to go diagonally (left hand holding the saddle, right hand pulling up and away) taking one or more of the horns off with the main piece (Vechten 7), but leaving one in place (Castleford, Vechten 2, 6). Wear and general stress account for the tearing away of the dart (Vechten 6, 7). Stress lines on the surviving leather are, indeed, only explicable if the leather was tightly stretched over a frame of the type envisaged, since a simple stuffing could never have been rigid enough to produce such pronounced stress at exactly these points (marked in Fig. 8). The Vindolanda fragment is particularly important in this respect, but similar lines and wrinkles occur on Vechten 6 while at Castleford it has resulted in the tearing out of the side angle and the dart. The significance of individual cases are described in the catalogue entries.

Several general points based on the leather described in detail below can be made with regard to the Roman cavalry saddle and its reconstruction.

Almost all the pieces described here are First or early Second Century in date. Valkenburg, at mid First, is the earliest, followed by Castleford at 70-80 and a cluster around the turn of the century from Newstead, Vindolanda and Carlisle. Both Mainz and Vindonissa fall in this range. Bonner Berg is Hadrianic. The finds from Vechten span a longer period, with 1-5 from the First Century and 6-7 from the late Second/early Third. The very much later date of these pieces may account for some of their idiocyncracies. Fragment no. 7 in particular (Fig. 13) may not belong to the rounded saddle pad of the First Century with its pronounced horns, but to the seemingly rectangular framed saddle as depicted on the Arch of Constantine.[43] This saddle seems to possess small, almost vestigial horns but does not, significantly, appear to require the crescentic tie holes, at least not in the position we have come to expect from the earlier saddle casings. This saddle also has a straight bottom edge, in contrast to the rounded earlier form.

Even within the earlier group, there is a remarkable diversity in overall size, size and proportions of the horns, angles at which the horns are set and length of side flaps. Though to some extent differential wear and post excavation shrinkage and distortion are responsible, these variations within the basic concept reflect the individuality of the saddle as a piece of equipment which was custom

made to fit a particular horse and its rider. The names on the Newstead horns are for the convenience of the saddler rather than a deterrent to thieves.

A standard feature throughout are the reinforcement patches sewn to the junction of the horns and the dart. This would be necessary to reinforce a particularly vulnerable point (on a saddle pad, but unnecessary on either a shabrack or a soft pad) where the leather is stretched in two opposing planes as the horns are turned up and the flap is turned down and under to be sewn to the free edge of the horn facing (Fig. 9 H-I). At this stage, the leather must already have been drawn over the padded tree as only then could such force be exerted. It is the closing of the leather cover over a rigid crest which has caused the stretch lines visible on the fragments from Vindolanda and Vechten 6 and the ripping of the leather on Vechten 6, 7, and Castleford. Furthermore, the reinforcements over the crest of the saddle (Valkenburg), or inserted inside (Carlisle 6) become explicable as a measure to counter this stress. The edges of the horns and their facings are also reinforced by a strip of leather, (none have survived, save a patch from Castleford) which may have been sewn together with the seam, or may actually have covered the whole seam to protect the stitching from wear. Such reinforcements were usually attached to the grain side for easy replacement.

Stretch lines along the crescentic slits on the Vindolanda, Valkenburg and Castleford examples mark the bottom edge of the saddle pad - again a firm structure below is indicated by the tight conformation of these lines.

The horns were the first pieces to be joined forming a pocket for the (metal?) horn (Fig. 10 H-A-B): not only is this the only seam which was stitched inside out, but it is also the only really neat and regular length of stitching. As Connolly found, it is considerably more difficult to stitch the leather once the pieces have been mounted on the padded structure. His practical experience disposes most elegantly of the baffling irregularity of stitching on pieces such as those from Castleford and Vindolanda. Changes in direction, angle and shape of the stitch holes (as on Fig. 10 C, D and E) mark changes in the saddler's position and the increasing awkwardness of sewing a completely closed cover.

This same irregularity allowed the exact matching of the Castleford fragments (Fig. 10), despite their poor condition and the damage which means that the exact depth of the side angle can no longer be established. Even here, however, the problem remains as to what kind of seam was used to join the sides. Until now, the edges of the side flap and the dart (Fig. 10 B-G, H-I) were assumed to have been finished off with a bound hem on account of the lack of thread impressions and the faint impressions parallel to the edge which were interpreted as marks of the binding. However, recent discoveries of complete seam associations at Carlisle and Castleford not only greatly increase the repertoire of seams, but also indicate just how easy it is to confuse a bound hem with beaded or reinforced seams. The edges may even have been reinforced with a binding before sewing, thus accounting for the lack of stitch holes. A trial by Connolly showed that if the edges are first bound, a much greater force can be exerted on the leather in drawing

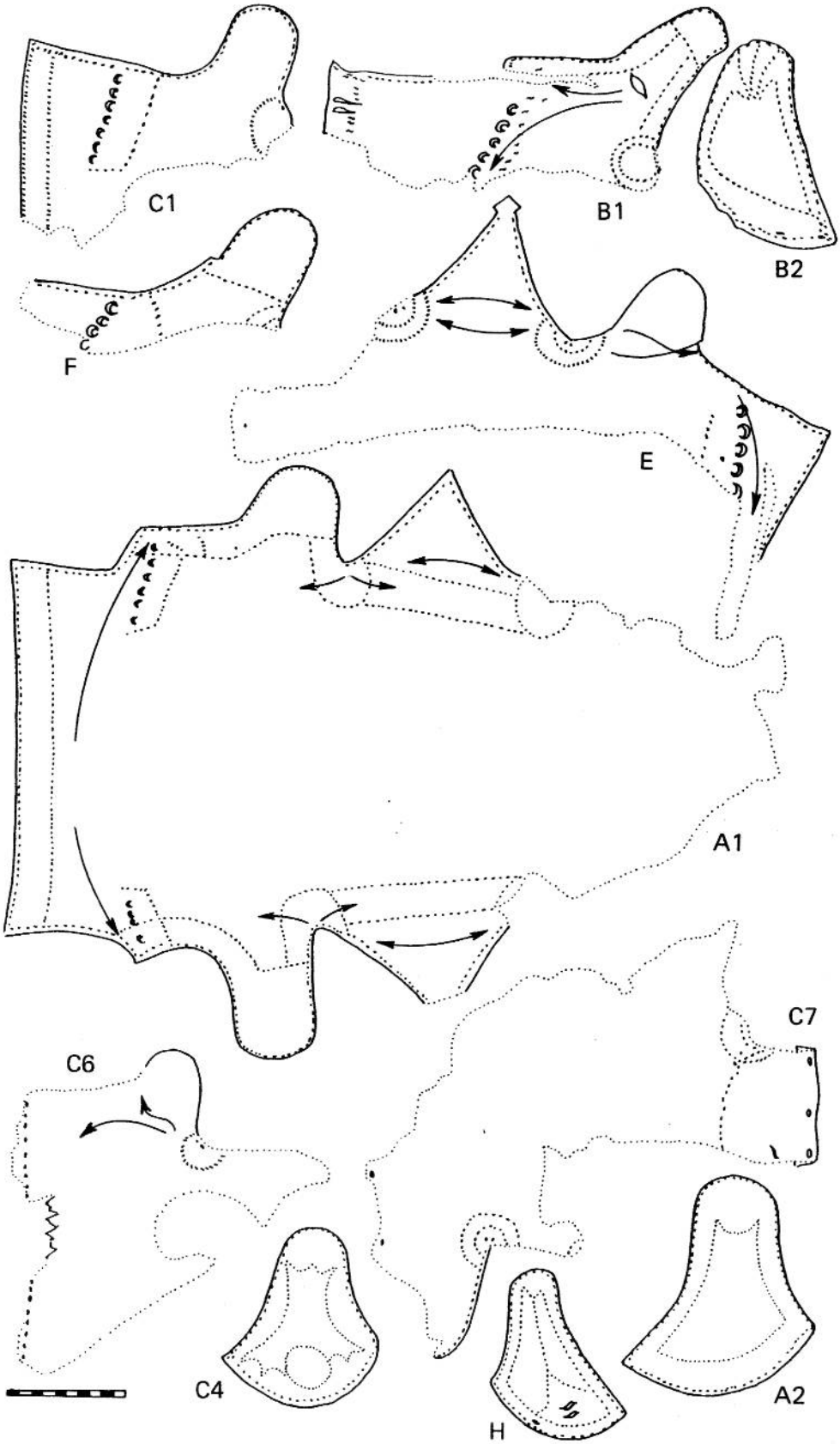
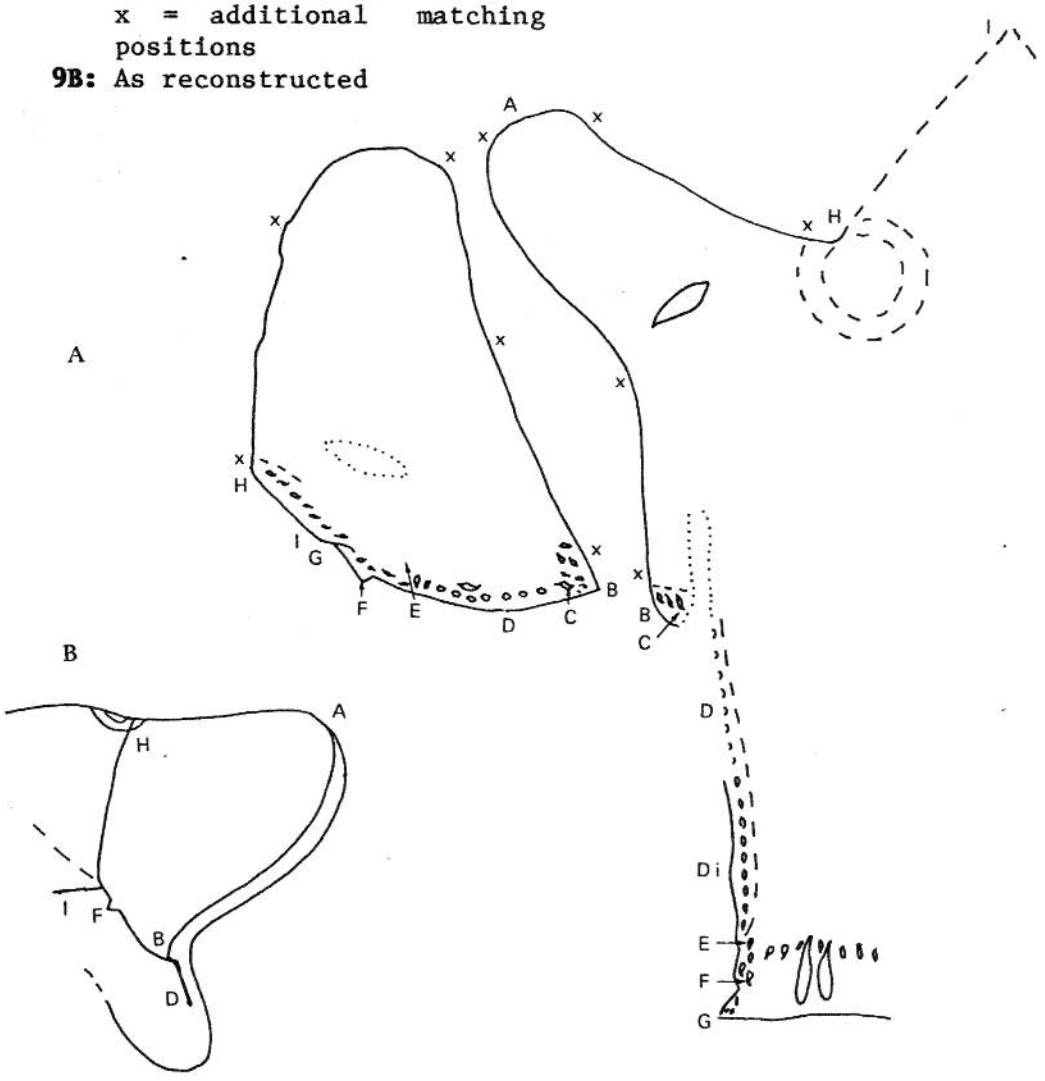


Fig.8: Sketch outlines of saddle casings and horn facings; identification according to the catalogue

the edges together (on the principle of a butted seam) without distorting the stitch holes. Though no appropriate bindings seem to have survived, the resulting impressions on the leather do accord with those on the archaeological material. However, in the absence of definite survivals it is impossible to suggest the exact method used. The stitch holes therefore need to be carefully registered, and for important pieces, with possibilities for matching, a publication scale of 1:4 is too small to register such fine but important detail.

Fig.9A: Construction diagram of Castleford casing
x = additional matching positions
9B: As reconstructed



The considerable variation in the stitching along the dart and the treatment of the edge (e.g. folded or bound) must reflect variation in the methods used to attach it to the horn facing. As this must have been a fairly complicated seam, different solutions may have been attempted, but in the present absence of matching sets of darts and horn facings, further speculation as to the nature of the seams is pointless.

A common feature on the saddle is a large slit or a pair of slits in the leather of the horn facing (Bonn, Carlisle 10, 11, Vechten 4).

At Castleford this has been torn out but, uniquely, a corresponding slit occurs in the saddle, implying that a hole was pierced right through the horn, perhaps to act as a attachment point for shoulder or haunch straps. Several of the metal horn stiffeners are also pierced, but at a lower point than in the leather facings. This is not surprising as the leather is folded much further round the bulge of the saddle than is the metal. Both front and back stiffeners are pierced, so the slit is no distinguishing criterion.[44] Whether a particular leather fragment comes from the front or back is often difficult to establish with certainty and frequently a scale model reconstruction is the only solution as the angle of the horn then becomes apparent. The front horns are flatter, the back ones stand upright.

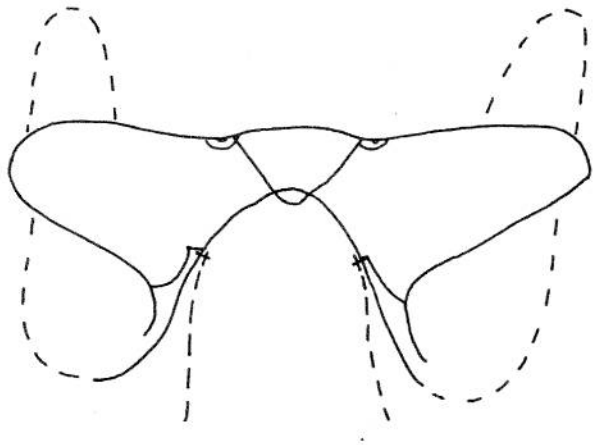


Fig.10: Front view of saddle with hypothetical placing of side flaps

A further point at issue is the place and function of the additional side flaps of the Valkenburg saddle. No equivalents have been recognised elsewhere, but the finish of saddles from Vechten, Vindolanda and possibly Castleford do suggest their presence, while the joining seam on Carlisle no. 1 definitely indicates the addition of an extra panel. There is no place in the present saddle reconstruction for such flaps, nor is there pictorial evidence, at this date, for saddles with long, straight-edged sides. Depictions on Trajan's Column which have been taken as evidence of saddles with long side flaps in fact seem to show drapes covering the horned saddle itself. Scenes such as XXXVI show quite clearly that shields were slung from the horns of the saddle underneath the drapes. Also on tombstones such as those of Gaius Julius Primus (Rheinisches Landesmuseum, Bonn) and Titus Aurelius Probo (a Batavian) (Lateran Museum Rome), the long sides of the 'saddle' are tassled textiles, hence a cover thrown over the firm saddle which is often even visible underneath (not shabracks, which would occur instead of the saddle). The presence of the Valkenburg flaps has, indeed, always tended to favour the shabrack option. The explanation may, however, be quite simple: thread impressions on the Vindolanda example seem to indicate that the extra panel would have been sewn to the grain side, and if mounted not as a lengthening of the saddle, but as a flap lying up against it, this would allow the flap to fall over the horse's flanks (Fig. 9). On the other hand, the seam along the edge of Carlisle no. 1 directly contadicts the Vindolanda evidence, as this seam type is characteristic of flat joins (eg. as on tents), and brings us once more to the Valkenburg reconstruction drawing mentioned at the beginning. At

present the problem seems to be insoluble: the evidence is contradictory and the solution is more likely to emerge from practical reconstruction work offering acceptable hypotheses than from the surviving leatherwork. The very nature of the material means that the leather is in poor condition so hopes of better or more complete finds are unlikely to be fulfilled.

CONCLUSION

If the number of mounted troops is considered, it is remarkable how infrequently leather from saddles is found. Few sites have more than two or three fragments, a single piece is more usual. In this, Vechten and Carlisle form important exceptions. Vechten, it is known had a mounted unit,[45] so did Valkenburg,[46] Vindolanda[47] and, presumably, Newstead. Whether there is at present sufficient evidence to state categorically that the horned saddle is a cavalry saddle as opposed to a general riding saddle is doubtful. Mounted detachments in infantry units will always tend to cloud the picture (e.g. Bonn, Mainz); it would be interesting to know whether infantry officers with their own horses also used these saddles. The evidence from the leatherwork is too restricted for the distribution of finds to be at all meaningful. Leather from civilian sites consists almost exclusively of footwear so the absence of saddle leather there is not significant. The frequency of four horned saddles on the pipe-clay figurines presupposes its familiarity to the makers in Central Gaul, but it may be significant that when mounted, these horses are accompanied by warriors.[48] However, the un-Roman aspect of these figures and the combination of horseman with warrior-groom suggests that the roots of such groups rests in native tradition, thus providing better evidence for the horned saddle as a Celtic feature than for contemporary civilian riders in Central Gaul using them in their daily travels.

This survey of the surviving saddlery supports the reconstruction of the Roman saddle as a firm pad in the form presented by Connolly. His work was based on the Valkenburg specimen, but all other finds to date are consistent with it. The Castleford fragments came into my posession after the basic reconstruction had been presented and served to confirm and further refine the hypothesis, which must now be regarded as being substantially correct. The piece from Vindolanda appeared even later. Some features do remain to be clarified, in particular, the function of the Valkenburg side flaps, the exact form of the edge seams and the function of the crescentic tie holes, but in essence the reconstruction provides a practical and simple solution for too many otherwise inexplicable features for the basic premiss not to be correct.

What with chamfrons, bardings, the possiblity of a crinet, and a holding saddle, we are approaching a remarkably medieval caparison, something quite unsuspected from the contemporary tombstones, nor, indeed, from accounts of warfare. Experiment shows that the saddle provided an excellent seat as the horns keep the rider firmly in place by gripping the thighs and buttocks. Connolly's experiments prove that the use of the lance and the slashing sword are feasible using the saddle, with the horns fullfilling much the same function as stirrups. The satisfactory reconstruction of the cavalry saddle therefore, has

implications extending into the field of military tactics and into our assessment of the capability of mounted forces. If the Romans failed to exploit the effect of shock tactics to the full, this was obviously a matter of choice, not a constraint imposed by inadequate technology.[49] We can, at any rate now accept the tombstones where a barbarian grovels under the spear thrust of the rampant horseman as a reflection of reality, even if not for the individual commemorated.

DESCRIPTION OF FINDS

The most characteristic feature of the leather saddle covers are the four projecting horns and the rows of crescentic tie holes. In the absence of either, it is likely that much saddle leather will go unnoticed. Recognisable leather comes from 10 sites in the Netherlands, Britain, Germany and Switzerland and no doubt much remains to be identified.

Dimensions can be taken from the diagrams but little signifcance should be read into differences on account of shrinkage which is inconsistant, differing from site to site (e.g. the horn facing from Valkenburg as compared to that from Bonn). All identifiable examples are goatskin. The pieces are drawn from the grain side unless otherwise stated.

A. Valkenburg (Z.H.) Netherlands (Fig. 8)

The almost complete cover from Valkenburg must be one of the best known pieces of leatherwork and features in numerous more general studies of military equipment.[50] The importance of the Valkenburg piece cannot be overstated: it was the first recognisable casing and it also finally solved the problem of the sets of metal horns from sites such as Rottweil and Newstead. However, the illustration of the saddle provided was not intended to tackle the problem of how the cover acutally fitted onto a frame, nor what type of frame was used, though its wide reproduction has perhaps led to the shabrack option being maintained longer than necessary. In fact, at the time, Groenman-van Waateringe had already suggested that the leather would have been stretched over a wooden frame (p.114). This find has already been extensively discussed by Groenman-van Waateringe[51] and Connolly[52] and will not be treated any further here, though it is interesting to note the similarity of stress lines still visible on the lower side flap - until now considered to be secondary shrinkage - with the stress lines on the Vindolanda fragment.

B. Castleford England (Figs. 10 & 11)

Despite its unprepossessing appearance, a tattered, severely scuffed section of a saddle cover from Castleford[53] is possibly the next most important piece of Roman saddlery, due to a combination of factors which came to a head in 1985.

Firstly, Peter Connolly was working on a reconstruction, based primarily on the Valkenburg example, at the same time as these pieces were under study: the mutual interaction proved to be essential for the final result. Hypotheses could be generated, tested practically and checked against the surviving leatherwork, while practical considerations stimulated renewed interpretation of the technical

evidence of seams, folds and wear on the leather. The kindness of West Yorkshire Archaeological Service and Mr. J.D. Hedges in particular in allowing me to study the Castleford leather in Holland, contributed greatly to the progress of the reconstruction since it enabled me to compare the Castleford and Valkenburg finds closely and repeatedly, as Connolly's work progressed. Without such very close cooperation, it would never have been possible to solve the practical problems of how the leather could be moulded to make a workable saddle, nor would Connolly's experiment have been so clearly vindicated by the surviving evidence.

Secondly, although the fragments were fragile and badly worn and torn by heavy usage, the careful conservation at the Doncaster Laboratories left the leather soft and pliable, with clear colour contrast emphasising such features as differential wear or protected surfaces, in stark contrast to the old, dry leather from Valkenburg, which is hard, brittle and blackened.

Thirdly, and most importantly, the front and back of the same pommel cover were preserved: this is only rarely the case, and at Valkenburg, where a complete association exists, differential shrinkage and creasing make certain matching impossible. The Castleford finds were therefore ideally suited for the very detailed matching of stitch holes which was essential to test out Connolly's hypothesis.

In his first attempt at reconstruction, Connolly sought to reconcile the evidence of the Valkenburg saddle with the practical requirements for both rider and horse, taking into account the pictorial evidence for saddles from the Rhineland tombstones. This reconstruction was presented at the Roman Military Equipment Conference at Nottingham, 1985, where the firmness of the seat was amply demonstrated, when the lab stool used for demonstration tumbled over and Connolly almost broke his neck, being unable to free himself from the close grip of the four saddle horns. The reconstruction also provided an immediate and logical explanation for a number of irregularities in the stitching, as well as wear patterns on surviving leatherwork. However, a number of theoretical objections were raised, which could only be met, or repudiated, by renewed examination of the leather. Here, the importance of the Castleford fragments became apparent, and much of the evidence supplied by them was incorporated in Connolly's subsequent published account.

The Castleford fragment preserves a portion of the front left side of the saddle (1), along with the matching outside pommel facing (2) and a reinforcement patch (3). Since it is this area which is critical to the shaping of the saddle, it displays most evidence of manufacturing techniques.

Saddle horn and facing are joined by a top seam (Groenman-van Waateringe seam I) along H-A-B sewn inside out (Fig. 10). Stitching just in from the edges marks the presence of reinforcement strips (thread impressions on the flesh side, grain side better preserved): only the patch (3) which reinforces the base of the horn remains with the stump of such a covering. The edge C-G of the main piece is lined by stitching with impressions of a binding (see above p.000) which ends at E. The shape of stitch holes along the edge B-G changes at E from

rounded to less regular slits, matching a similar change in stitching on the bottom of the facing. Part of this edge stitching is torn out, destroying evidence for the depth of the angle (at C), but suggestive of considerable stress on these seams here. Lack of thread impressions suggests that these seams were beaded and/or covered. Individual stitch holes can be counted out and matched at points marked x in Fig. 10, but the crucial matching occurs along the bottom edge of the facing (H-B), where distinctive stitch holes at B, C, and G correspond, as does the

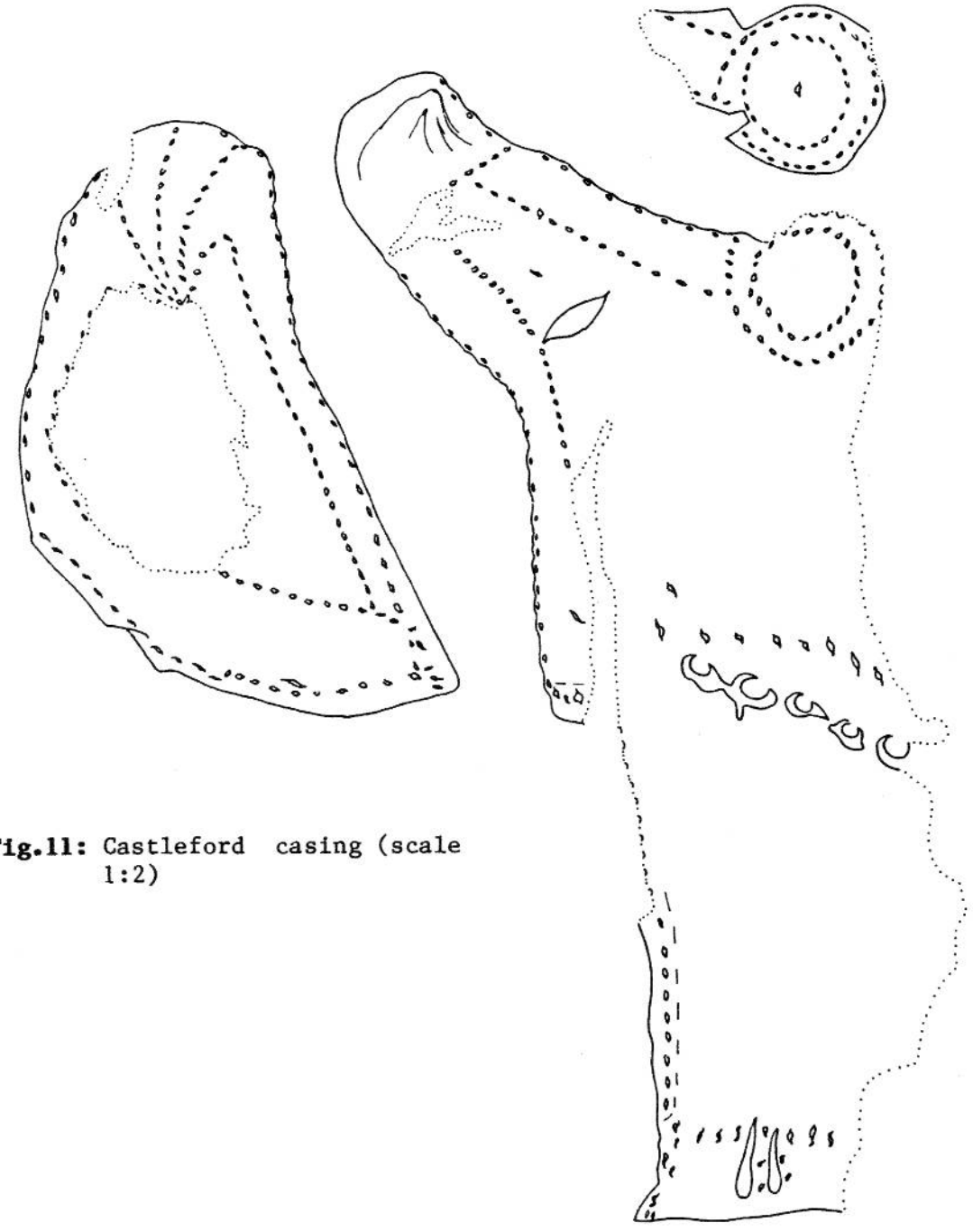


Fig.11: Castleford casing (scale 1:2)

change from rounded holes to slits at E with the knick F evidently forming the starting point of the joining process, in much the same way as modern dress making patterns use such marks in matching differently

shaped sides of a garment. Whatever the exact nature of the seams involved, the correspondence is such that it is certain that the two edges were joined, proving beyond doubt that the bottom of the main piece was sewn to the free edge of the horn facing, with D-D1 being doubled to form a stuffable casing (Figs 9, 10).

Rather crude and irregular stitching remains at the bottom edge of the saddle cover, where two long tears may either be deliberate slits associated with the attachment of the girth, or merely fleshing cuts which have been opened out by the very severe wear which is evident on the entire cover. The grain surface is scuffed, the top of the horn is deformed by weight, and the entire centre of the facing is torn out, but probably contained a slit to correspond with the slit in the main piece. On the level of the angle at C, and falling exactly on the edge of the saddle pad, is a line of at least 5 crescentic holes, originally covered by a flap. These were probably used to mount the breeching or decorations hanging from the saddle to the underlying tree.

Interestingly, a scale model of the piece made in cloth to test the fit revealed, on taking it apart, lines of stress across the base of the dart and around the base of the horn, with particularly severe creasing and stress at the point B/C, thus explaining the tears in this area. This corroborates the evidence supplied by the Vindolanda piece.

C. Vechten Netherlands

This site has produced several pieces of saddles. Five fragments (Vechten 1-5) come from the 1893-4 excavations. These are probably to be dated to the mid/late First Century to judge from the footwear in the same find. Two additional fragments (Vechten 6-7) in private possession were collected from the bank cast up for the construction of the motorway in 1977.[54] The dating of these is uncertain, but most of the associated footwear is late Second/early Third Century: residuality is less of a problem with leather, and it may be assumed that all the preserved leather comes from the same horizon. If this is correct, these pieces would be the latest datable saddle fragments. Leather from the 1970 ROB excavations is still under study but has already yielded one saddle fragment (Vechten 8). No information on the date is available and the footwear associated in find no. 46 has no datable features.

Vechten 1-5

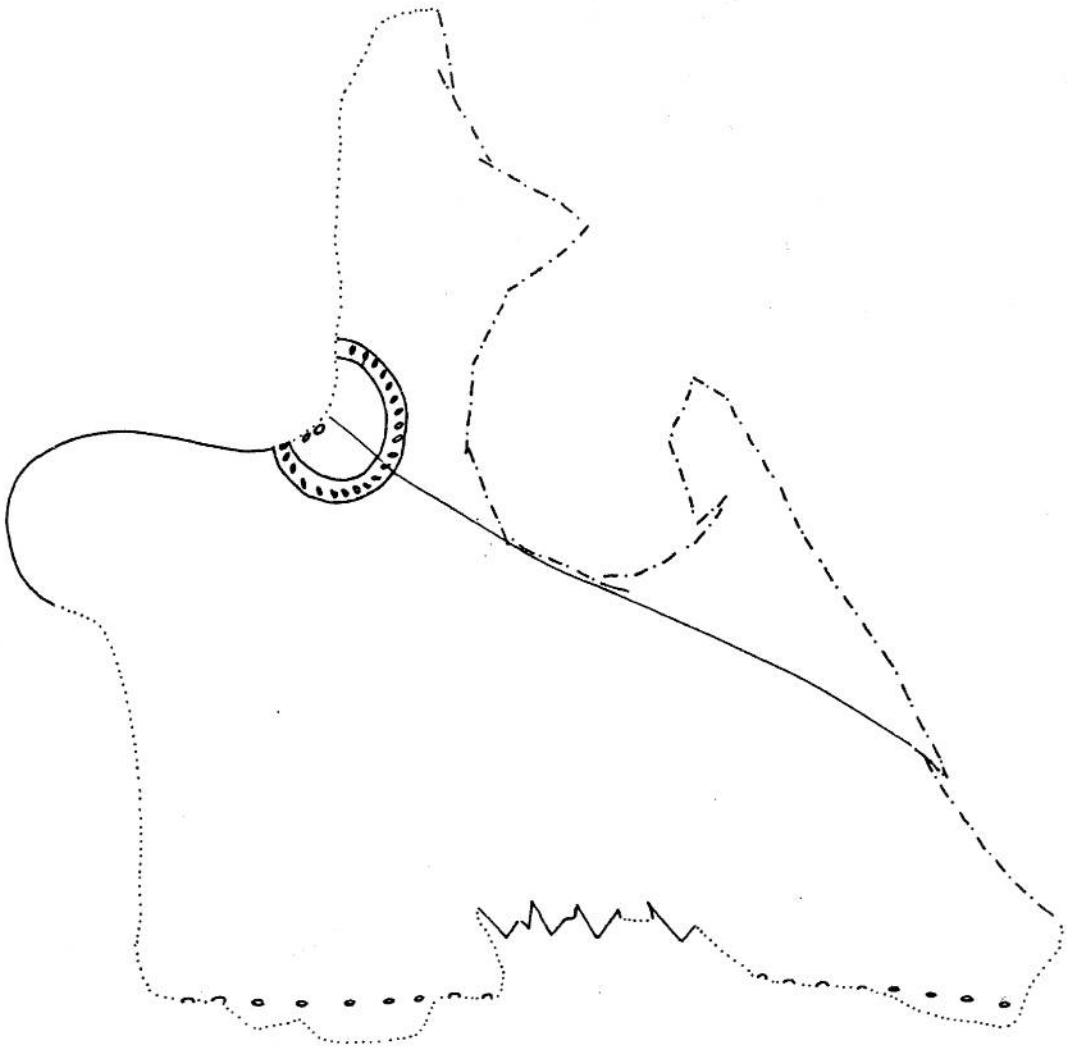
Groenman van Waateringe published five fragments from the old excavations: three from the covers (cat. nos 8-10) and two horn facings (cat. nos 11, 12):[55] it is of course possible that all come from the same cover. Notable here are a) the slight differences in shape and proportion when compared to Valkenburg; b) the absence of an angle at the edge near the line of crescentic tie holes; c) the decorative stitching, and especially the circle at the bottom of the facing no. 4, which may have attached a patch with slits like the Bonn example.

Vechten no. 6 (Fig. 12)

Fragment preserving one short, stumpy horn seamed with the usual top-seam and with stitching at its base of a reinforcemnt patch which must have been applied to the flesh side as the impressions of the rather thick twine are visible on the grain surface, between two concentric, impressed circles. The dart is torn off, the front of the

side flap is probably ripped off along the stitching and the leather is jaggedly cut for secondary purposes. There is no indication of the expected line of crescentic tie holes, but a line of stitching perhaps takes its place as a marker of the end of the saddle pad, in which case the bottom is rectangular, not curved. The piece lacks the sharply angled edge of the Valkenburg example and its short, wide projection is matched at Newstead. A lightly impressed line over the grain surface is perhaps a guide line for the setting out of the dart angle in relation to the corner of the saddle flap. If so, the fragment can be reconstructed as symmetrical with about 44 cm between the two side edges.

Fig.12: Vechten 6 (scale 1:2)



Vechten no. 7 (Fig.13)

This large fragment is considerably more difficult to interpret. It is extensively cut and torn, with only a single, fragmentary horn edged with a top-seam remaining to suggest its function. It is presumably the back left horn with a stumpy shape like Vechten no. 6

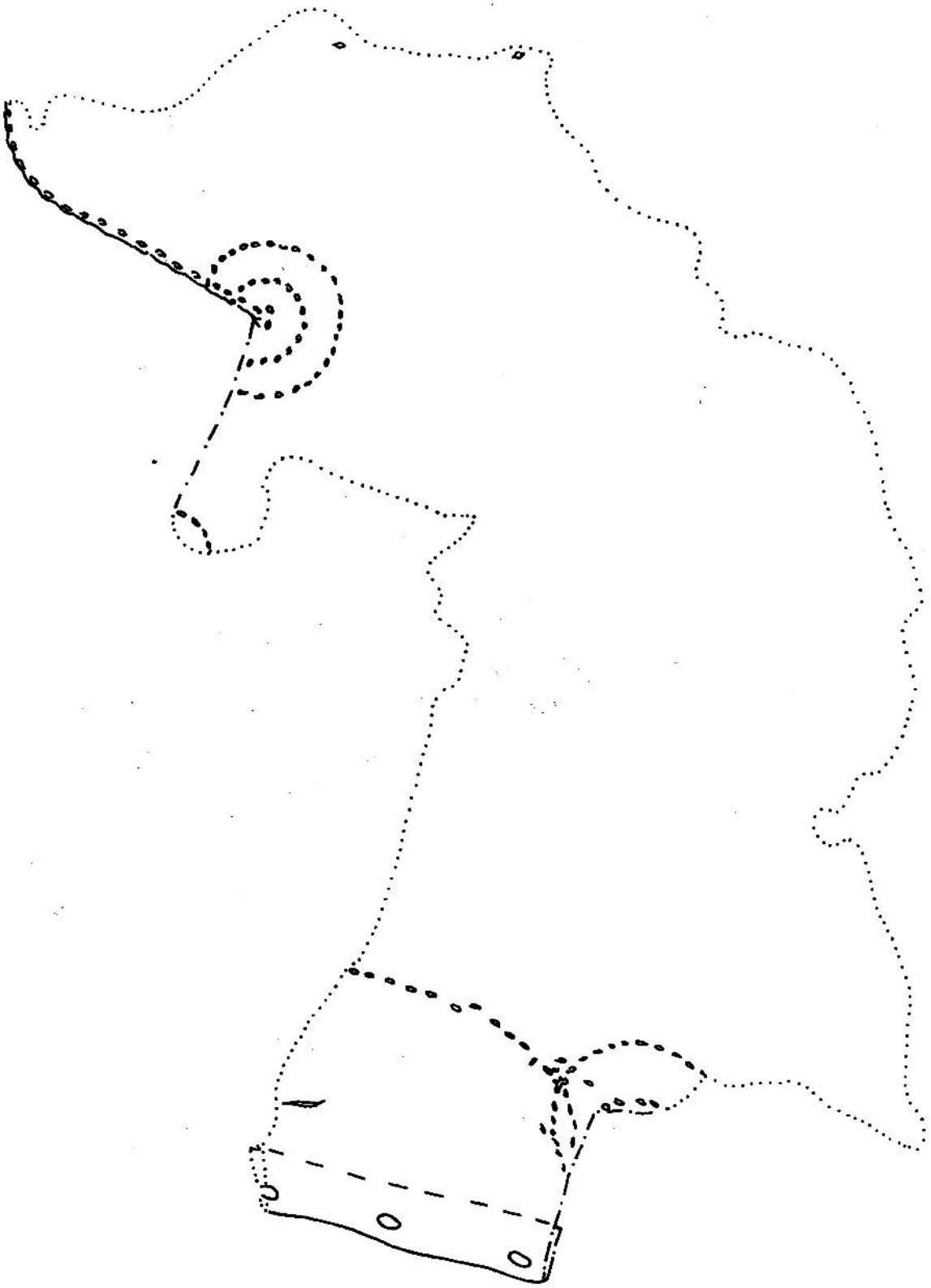


Fig.13: Vechten 7 (scale 1:2)

and a straight, unangled side flap like Carlisle 1 (see below), since there is too much leather in the surviving width of the horn for it to fit the Valkenburg shape. As elsewhere, the junction of horn and dart is reinforced by a patch sewn to the flesh side. The dart itself has apparently been cut away: whether this cut is original or secondary is impossible to tell. It is tempting to regard the segment of a circular stitching 4cm below as the edge of the patch belonging to the second horn but it would leave a mere 9.5 cm for the base of the dart, as compared to about 16 cm for Valkenburg and Vindolanda and a huge 18 cm for Carlisle no. 2. However, if Valkenburg is taken as the model, matching their back left horns leaves an impossibly short side flap for the Vechten example: its length is acceptable if the remnant of stitching is taken as the base of the second horn and it would then also match the size of Vechten no. 6. Furthermore, it is only thus that the piece could fit within the Valkenburg pattern at all, as the surviving leather should overlap the position of the front horn, yet there is no sign of this. It does seem, therefore, that the small dart must be accepted.

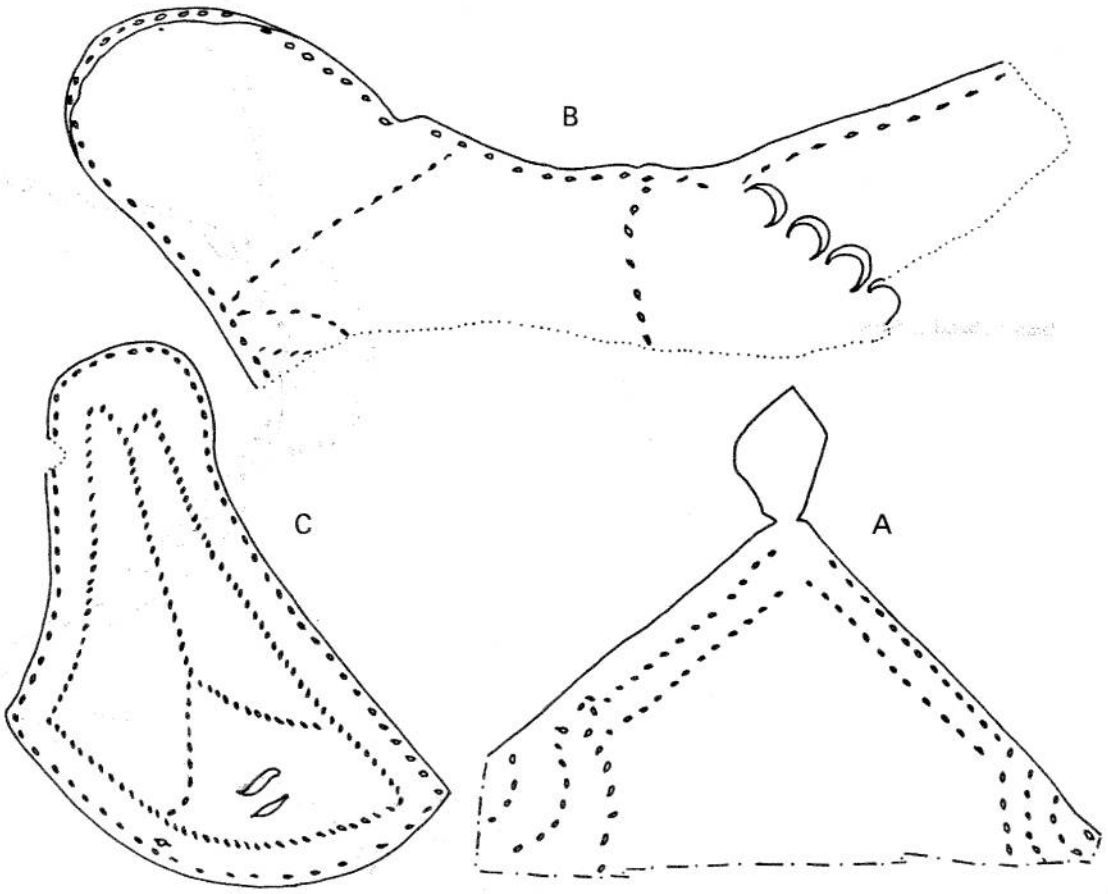


Fig.14: A Vechten 8, B Newstead, C Bonner Berg casings (scale 1:2)

Further problems are caused by the bottom edge, where secondary(?) cuts as well as repairs(?) hamper interpretation. The edge is unique in that it is folded, not stitched and it is partially covered by a large patch, presumably circular, which may have been folded round both sides, as there are no thread impressions of the attachment visible. This patch was evidently sewn on while the leather was still new and may be associated with a narrow slit which could have served to attach

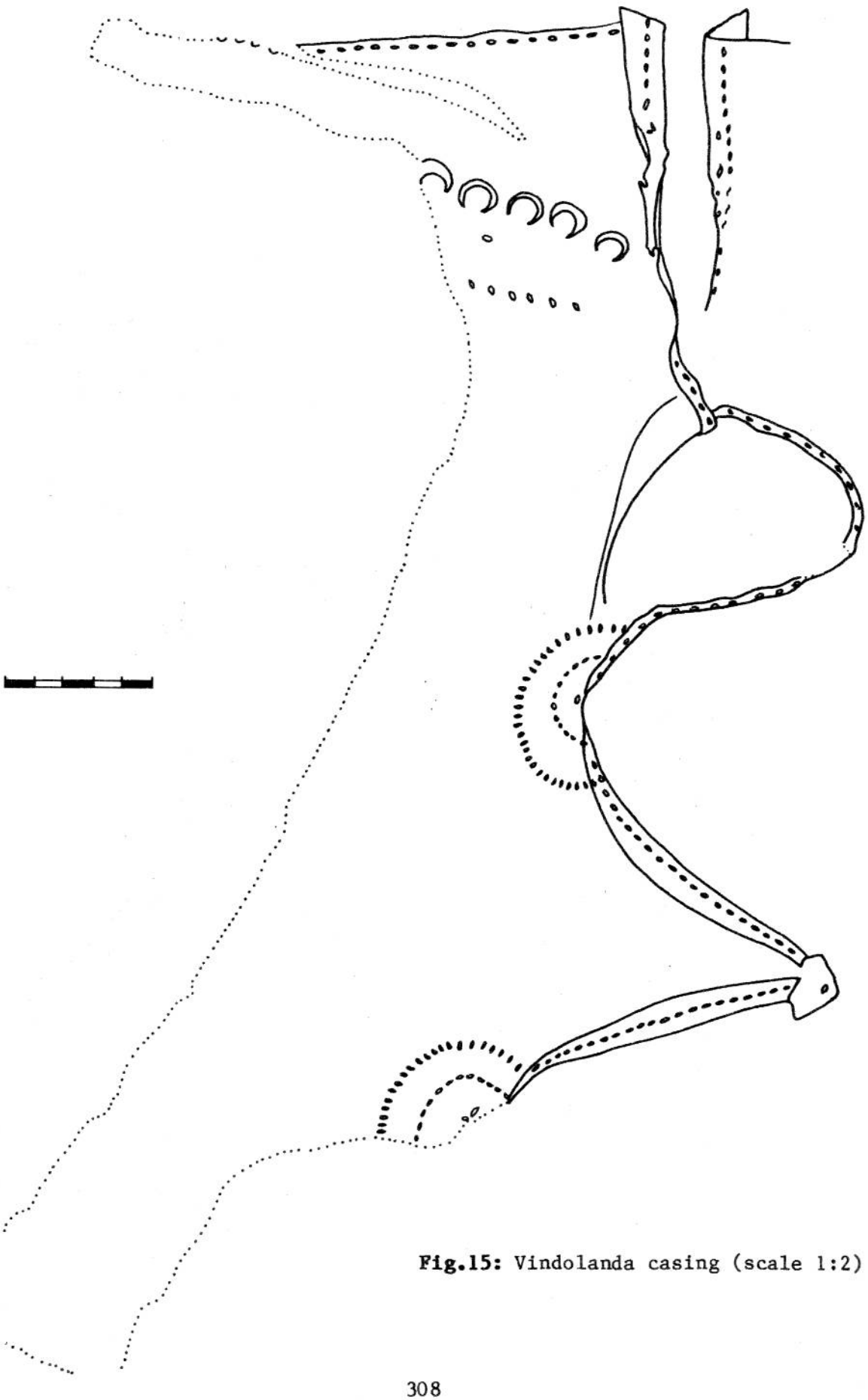


Fig.15: Vindolanda casing (scale 1:2)

thongs to the underlying tree in the absence of crescentic tie holes. A smaller, round patch has also left no impressions: its edge appears to have been secondarily cut through, but in shape and position it is somewhat reminiscent of the reinforcements at the base of the horns. Three large round holes, one of which still contained a wooden peg indicate that the leather was pegged to a wooden frame. There are in fact too many imponderables here for a definite reconstruction to be proposed, but this piece does provide definite evidence for the use of a wooden structure underneath the saddle.

Vechten 8 (Fig. 14)

A cut away dart, remarkably like Carlisle no. 6 and Vindolanda, with tripple stitching of reinforcement patches at each side (no thread impressions, so patches attached to both sides of the leather). Folded edges, double stitched, no thread impressions visible, though the surface is in poor condition. The folded flaps are so wide they almost double the thickness of the dart at the back.

D. Carlisle Britain

See separate contribution by S. Winterbottom, this volume for the 13 fragments which form large portions of two separate saddle casings along with 6 other saddle fragments from various locations in Carlisle. These form one of the largest and best dated complexes.

E. Vindolanda Britain (Fig. 15)

This is an important recent addition to the corpus of saddle leather as it preserves a considerable part of the front and it has also been professionally conserved, thus enabling accurate examination.[56] The dart, horn, complete side flap remain with at least 5 crescentic tie holes and the stitching of three patches at each side of the dart, the smallest sewn to the flesh side, with a larger patch attached to both sides of the leather. Sufficient remains for the entire front half of the saddle to be reconstructed.

The side flap is unangled, as at Newstead and Vechten no. 6. The top seam extends right round the horn to the level of the crescentic holes (a), where the folded edge widens and the whole nature of the seam and stitching changes. The stitch holes pass awkwardly through two or more thicknesses of rather crumpled edge for about 5 stitches, still apparently a top seam, but as though the workman was having difficulty in sewing it. Below this (b), and to the end, it becomes a folded hem, with thread impressions on both sides of the fold and a large, pulled out hole which looks as though it is either the starting or finishing hole. This hem was evidently sewn at a different stage in the proceedings to the seam above it. A lap seam along the bottom edge (thread impressions flesh side) may indicate that a flap, like that at Valkenburg, was attached to the grain side (grain to grain), hanging down the flanks of the horse. The treatment of the edges of the dart is identical to that of Carlisle no. 6 and Vechten 8. The edges are folded and stitched so as to leave clear continuous thread impressions on the front, while on the back they are also visible, though much fainter. The fold at the back curves out in a fashion reminiscent of the form the leather takes on either side of a beaded seam, and there is a strong possibility that these edges are not folded hems at might seem at first glance, but are seams sewn to a relatively thin beading or outer piece. The force exerted on the sewing twine might be sufficient

to leave 'ghost' impressions on the underlying piece, a phenomenon noted elsewhere. That considerable force was exerted on this particular cover is clear from the very marked stess lines on the leather, running along the base of the dart, and curving up round the bottom of the horn in exactly the areas that Connolly's reconstruction would lead us to expect. The wrinkle at the edge of the horn is also highly characteristic of the difficulties encountered in smoothing the leather simultaneously around the upstanding horn and the opposing curve of the saddle pad. Other pronounced lines of stress curve down from the seam change at a), passing below the tie holes and leaving a clear, well preserved area in the corner. Again, this is what we would expect from leather stretched over a padded frame. An exceptionally interesting feature is the nail hole at the tip of the dart. In Connolly's experiment, a permanent problem was how to keep the dart in place while it was being worked on: the Romans had the same problem and tacked the flap to the wooden frame first.

This fragment came to my notice in summer 1988: that it corroberates Connolly's previous work so neatly must be more than coincidence.

F. Newstead Scotland (Fig. 14)

A small fragment of a saddle was recognised amongst the boxes briefly examined in the Museum of Antiquities, Edinburgh during a visit in 1980:[57] the possibility remains that other, less obvious pieces were also present. A stubby horn, edged with the standard top-seam projects obliquely, at much the same angle as Castleford and it may therfore also be a front horn. It has the unangled, straight side of Vechten and Vindolanda, which it resembles closely in size and proportion. It illustrates clearly the change from the top seam with regular round holes to irregular, slit-like stitch holes on the level of the crescentic tie holes. The top seam seems to flatten out after the knick in the horn edge, which may indicate that this part was sewn up after insertion of the horn stiffeners. A beading would seem to have been included: it is quite possible that a beading strip was included in the top seam as well.

Because of its context the piece is of more than incidental interest. Not only is Newstead the find spot of two chamfrons, but it has also yielded a notable amount of horse gear - bridle bits, pendents, rectangular saddle plates and, above all, two sets of four metal saddle horns. Many of these items come from pits, the contents of which are of considerable interest in the reconstruction of associated sets of equipment. One of the sets of saddle horns, the pieces of which were marked with the name Senecio, came from Pit XXII, the other from Pit XXVII.[58] It is unfortunately unknown whether FRA 10 came from one of these pits, but a tantalizing reference to 'some shaped pieces of leather' (p.122) from this pit suggest that it may have done so. Curle would certainly have referred to one of the plates if these pieces had been illustrated, so we may accept that the shaped leather is not one of the items on Pl. XIX: virtually all the leather I saw in Edinburgh was geometric so by 'shaped' Curle presumably meant something with a curved outline. No loose leather is mentioned in Pit XXVII, so if FRA 10 is the shaped leather, it must belong to the set of horns Pl.XXXII 1-4. The implication is then, that the horns were not simply included as loose items of metal, but that this pit in fact contained a complete

wood, metal and leather saddle. Viewed in this light, Curle's comment 'towards the bottom a considerable quantity of chaff' takes on a new significance: the chaff is probably the stuffing of the saddle. The plywood frame would have disintigrated to unrecognisable scraps of wood (Curle does mention quantities of twigs in the pit) and the very fact that no large pieces of worked wood remained may count as additional evidence in favour of Connolly's suggestion of a plywood frame.[59] The skulls of a horse and a dog a little above probably mean that these animals accompanied their trappings. The pit would, therefore, seem to be not merely the receptacle for assorted unwanted scrap metal, but a deliberate deposit of equipment looking suspiciously like an offering of all of a man's most treasured personal possessions.[60] Here we see perhaps what was personal equipment and what was issue to be returned to camp store on death, dismissal or desertion: there is significantly no body armour or weaponry in this pit.

In Pit XXVII, the association of a set of four horns with 'over a hundred' studs (evidently like those used on the chamfrons) and several rectangular bronze mountings suggest that here too a complete saddle, together with its decorative plates (not ornamental belt mountings for a human) was buried.[61] The two dogs skulls are also suggestive. Here, fragments of leather preserved on the horns indicated that (p. 178) they had been entirely covered over with leather on the front. The edges were turned over to the back and the leather was sewn with twine through the holes on the metal plates. These fragments apart, there is no identifiable saddle leather with holes of this type round the edge which might have been used in accociation with metal horns.

G. Mainz Germany

The early volumes of the catalogue of the Mittelrheinisches Landesmuseum Mainz incorporate detailed drawings of registered objects, many of which were lost during the last war. The meticulous drawings - probably by L. Lindenschmit himself - permit the identification of at least one saddle fragment.[62] This is probably a back horn, with reinforcement stitching like the Valkenburg example, top seam extending from the missing dart right round to the crescentic tie holes, three of which are visible and along which the piece is torn. More recent excavations[63] at the Emmeransgasse also yielded a horn cover, a double thickness top piece, similar to those from Carlisle (nos 8 and 12), but in size probably for the back horns.

H. Bonner Berg Germany (Fig. 14)

From the fabrica on this site (where repairs migh be expected to have been carried out), there is only a single facing for a front horn with slits similar to Castleford.[64]

J. Vindonissa Switzerland

Gansser-Burckhardt[65] considered that certain stitched pieces of leather came from saddles, clearly visualizing a quilted structure with solid front and back bows on the medieval model. However, the tongued shape is clearly secondary and the solution chosen in the Vindonissa museum - the backing for sewn on scale armour - looks just as satisfactory. On the other hand, a tongue shaped fragment, described as an infantry man's breast covering[66] is probably the horn and side flap of a saddle similar to the Vindolanda example in size and shape. However, the drawing is sketchy and probably inaccurate: the absence of

cresentic tie holes would also be unusual.

K. Other sites

Fragments of saddle covers from London will be examined by M. Rhodes, Museum of London, in a future publication. Despite quite extensive excavations and careful attention to the leather, no convincing saddle fragments have yet appeared at Zwammerdam, despite the presence of a mounted unit,[66] nor at Velsen I or II, Woerden, Xanten (Colonia), the Saalburg, Zugmantel or Welzheim. Neither has anything appeared at Bar Hill, which is perhaps curious in view of the presence of Syrian archers - though these need not, of course have been mounted.

NOTES

1. I am grateful to B. Berensteijn (IPP) for drawing figs 1-4 and for his assistance with the other figures. Contigencies of page size means that a single scale could not be maintained. Where possible, drawings are 1:2. 1:4 is in fact too small for the details of stitching, so essential in the interpretation of leatherwork to be properly visible and a scale of 1:3 is therefore resorted to occasionally.

2. CONNOLLY, 1987; BISHOP, 1988

3. I must express my thanks to Mr. R. Birley and the Vindolanda Trust for suggesting rapid publication of these finds, for the considerable practical support in enabling me to do so and for providing the photograph fig. 6.

4. BISHOP, 1988; PALÁGYI, this vol.

5. TEUPKEN, 1823, V.73-76

6. E.g.EMERY, 1938, 251ff.

7. ROSTOVTZEFF ET. AL. 1936, 439-449. For the construction of housings of padded cloth, stiffened by withies and containing a small metal peytral laced to the inside see Le Livre des Tournois in the series 'Ici est pourtraite l'histoir du hourt', the heraldic bardings are draped over this construction: not much of this elaborate and costly housing would remain for the archaeologist.

8. CONNOLLY, 1975, figs pp. 64-65; ROBINSON & EMBLETON, 1976, fig. p.17 as compared to Le Livre des Tournois or YOUNG, 1987, fig. 11

9. Mentioned by ROBINSON, 1975, 191, Pl. 521

10. Tombstones such as that of Oclatius (Rheinisches Landesmuseum, Bonn), the horses on one of the Straubing chamfrons, GARBSCH, 1978, Taf. 4.B16, figurines such as VAN BOEKEL, this vol. figs.3 and 5 and a particularly wide breast band with pendants on a statue from Jünkerath, ESPERANDIEU XIV, Pl. C, no. 5251.2

11. Find no. L86/418, Period III

12. GROENMAN-VAN WAATERINGE, 1967,108-111, figs 36, 37

13. GANSSER-BURCKHARDT, 1946, 34-37; GROENMAN-VAN WAATERINGE, 1974

14. Cat. no. FRA 14. In store at the Royal Museum of Scotland, Edinburgh, where I examined it in 1980. I am most grateful to Dr Clarke and Mr T.G. Cowie of the Department of Archaeology, Royal Museum of Scotland for permission to refer to them here.

15. VAN DRIEL-MURRAY, forthcoming

16. CURLE, 1911, 153-5, Pl. XXI, ROBINSON, 1975, 190-1, PLs 514-515

17. CURLE, 1911, 121; see below, p. 24

18. Find nos: Chamfron I, 187/1345, Per. III, floor, together with a leather off cut inscribed VELDEDII SUPONDU(S). R. Birley kindly informs me that this man was previously known from a letter, where he is described as EQUISIO CONSULARIS, 'the Governor's equery', presumably connected to the Governor's messenger service cf. Vindolanda Friends Report, 1987, 6; Chamfron II, L85/97, Per. III; Chamfron III, L87/1628, Per. III/IV

19. It is impossible to estimate the original size of the chamfron. The chamfrons have all been professionally conserved, and the now well established 7-10% shrinkage during treatment seems to restore the leather to approximately its original size (cf. TACONIS, 1987; NEWSLETTER, 1987). The thickness of the leather is a distorting factor here, but as the chamfron fitted comfortably on a contemporary skull, one or two cms on either side would seem a reasonable allowance. Dimensions of Chamfron I after conservation, with missing portions reconstructed ht. 53.8 cm, w. 44.8 cm. which compares with 57 x 51.4 cm for Newstead

20. EWART in CURLE, 1911, 365

21. ROSTOVTZEFF ET AL., 1936, 446

22. GARBSCH, 1978, in particular Taf. 6, B21 and B22

23. These heads, characterised by swept back locks and a top knot, and known variously as Bacchus or Amor heads, seem to have been rather popular for decorating all kinds of leatherwork. Examples occur in various collections, few of them datable, though one from Neuss may be late 1st/early 2nd century (LEHNER, 1904, Taf. 30B, nos 29, 30; MENZEL, 1986, no. 339). In view of the presence of Batavian troops at Vindolanda, it is curious that the closest likeness is provided by a stud from Vechten (NL). BROUWER, forthcoming.

24. Details of the production process must await further analysis of the associated leatherwork

25. LEHNER, 1904, 372, Taf. 29; GARBSCH, 1978, Taf. 44

26. GARBSCH, 1978, Taf. 45

27. GARBSCH, 1978, Taf. 6

28. GARBSCH, 1978, Taf. 4-5, ROBINSON, 1975, Pls 522-26

29. ROBINSON 1975, 192; GARBSCH, 1978, 13

30. ROBINSON, 1975, 191 Pl. 518; GARBSCH, 1978, Taf. 48.2. Medieval fittings were laced, not rivetted, together, with the two laces frequently knotted through a single hole: a similar system might explain why so few rivets survive.

31. See Le Livre des Tournois; YOUNG, 1987, 64-5; examples in the Tower Armouries, London

32. Chamfrons are not the only link: both also posses a curious fringed hair-moss 'cap'. CURLE, 1911, 108, Pl. XV. A closer examination of other equipment from these sites might be profitable

33. BOWMAN & THOMAS, 1983, 47-8, 77. I am indebted to R. Birley for information on the unit from the most recent tablet finds

34. In the opinion of R. Birley, Veldedius was probably a messenger attached to the Governor's postal service (see note 18): whether such people would sport such lavish equipment is unknown.

35. WRD 371, Flavian in date and from river side rubbish deposits

36. Luttrell Psalter, British Library, MS Add. 42130, fo. 202 v.

37. My debt to Peter Connolly will be apparent throughout this section. I am grateful not only for his criticism, comments and suggestions, but also for help with some of the illustrations. I am also grateful to Sue Winterbottom, of the Carlisle Archaeological Unit, for bringing the Carlisle finds to my attention some time before we decided to include a fuller report on them here.

38. GROENMAN-VAN WAATERINGE, 1967, 106, fig. 35. Though usually referred to as a 'saddle cover', 'saddle casing' would be more accurate as the leather is certainly not a cover draped over the saddle, as the first term wrongly implies

39. GROENMAN-VAN WAATERINGE, 1967, 120; VAN DRIEL-MURRAY & GECHTER, 1983, 25-8, Taf. 5.

40. CONNOLLY, 1987

41. Such elaborately padded examples may be seen at the Wallace Collection, London, where a conservation display in 1987 also revealed to the visitor just how rough and unfinished the actual saddle-tree was.

42. The function of these pieces was only established with certainty by GROENMAN-VAN WAATERINGE, (1967, 114-118) in direct consequence of the leather saddle casing from Valkenburg

43. Illustrated in LAWSON, 1978, Taf. 54.2

44. See KESSLER, 1940, Abb. 7; BISHOP, 1988, figs 22B, 35. The tombstone of Vonatorix in Bonn (BISHOP, 1988, fig. 14) appears to show the haunch strap passing directly to the appropriate position on the rear horn.

45. BOGAERS & RÜGER, 1974, 62.

46. GLASBERGEN & GROENMAN-VAN WAATERINGE, 1974, 5, 13ff

47. BOWMAN & THOMAS, 1983, 46-49

48. VAN BOEKEL, this vol.

49. WHITE, 1962, 7ff.

50. ROBINSON, 1975, 194-196; CONNOLLY, 1975, 60-61

51. GROENMAN-VAN WAATERINGE, 1967, 106-121

52. CONNOLLY, 1987

53. I indebted to Mr. J.D. Hedges, and Mr. P. Abramson of the West Yorkshire Archaeology Service for allowing publication prior to the full report which is due for completion in 1989.

54. I am grateful to Mr. G.W. Wttewaal for placing these pieces at my disposal

55. GROENMAN-VAN WAATERINGE, 1967, 112, fig. 38, cat. nos 8-10, 11-12 resp, here referred to as Vechten 1-5 resp.

56. Find no. L84/641

57. FRA 10, cf. note 14,above

58. CURLE, 1911, 121-123, 117-118, Pl. XXXII, 1-4, 5-8

59. Unless the pad was only a stuffed cushion without an internal frame (as I originally envisaged: VAN DRIEL MURRAY & GECHTER, 1983, p. 27). In this case the horns would loose much of their holding power and hence their practical purpose. Furthermore, the horns were anchored firmly enough for shields to be slung from them, eg. tombstone of Romanus Dardanus, Köln (BISHOP, 1988, fig. 6). Plywood is unikely to be recognised under normal circumstances. An analogous application of hind-sight can be quoted concerning the thin pieces of wood at Valkenburg which, it is now suggested, belonged to shield boards, cf GROENMAN-VAN WAATERINGE, 1967, 67, note 1

60. ROSS & FEACHEM, 1976

61. CURLE, 1911, 123, 178, Pl. XXXII 5-8, saddle plates, 162-163, Pl. XXV. cf. BISHOP, 1988, fig. 28; 131, Table 3, saddle plates type 1a

62. No. 5096, Emmeransgasse

63. GÖPFRICH, 1986, Abb. 52, no. 159

64. VAN DRIEL-MURRAY & GECHTER, 1983, cat. no 118

65. GANSSER-BURCKHARDT, 1942, 110-111, Abb. 84

66. GANSSER-BURCKHARDT, 1946, 34-37, Abb. 10; GROENMAN-VAN WAATERINGE, 1974, 72-76

67. BOGAERS & RÜGER, 1974, 50

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