AN OFFICER OR A GENTLEMAN? A LATE-ROMAN WEAPON-GRAVE FROM A VILLA AT VOERENDAAL (NL)

Willem J.H. Willems

From November 1984 until December 1987, the Dutch State Archaeological Service (ROB) carried out large-scale excavations at the site of a Roman villa near Voerendaal, Province of Limburg (fig.1). Earlier excavations at the same site had revealed the presence of a large multi-phase villa here, which, according to the excavator dated from the end of the 1st until the middle of the 3rd century.¹

The new work at the site was primarily intended to investigate the area around the known central buildings as under the Dutch Monuments Act, only the actual area with foundations could be permanently protected.² The objectives of the excavation were threefold. Firstly, to determine the true extent of the site, to record all surrounding buildings and other features including (probable) wooden structures not found during earlier work, and to reexamine the dating as well as the periodization of the occupation. Secondly, to use the opportunity of large scale excavations for detailed palaeobotanical, zoological, and other studies to investigate the economy of the villa. And thirdly, to make use of the disparate data collected as a contributary element in a regional research program centering on the fertile Maas valley in the hinterland of the limes.

While work on the third objective has barely commenced, the results of the excavation have surpassed all expectations as regards the first two themes. Several preliminary reports have already been published,³ and the final analyses will follow in due course. In the present context, only a very brief outline of the results can be presented, and that mainly from a chronological perspective.

Occupation of the site started in the second half of the 1st century BC, perhaps soon after the end of the Gallic war, with a native settlement defended by a rectangular ditch. In the mid 1st century AD, a small stone villa was erected, with a number of wooden farm buildings nearby. Early in the 2nd century this was replaced by a very large corridor villa, nearly 190 m in length, with various associated buildings arranged around a central square and surrounded by a ditch and a hedge of 214 by (at least) 167 m.

Although the lack of recent excavations in the central buildings does not permit precise reconstruction, it is quite certain that the occupation of the settlement indeed survived the events of the late 3rd century and continued into the 4th century. Occupation of the villa as such must, however, have come to an end at the latest around 350. It was replaced by a small village of wooden houses and sunken huts centered around the only one of the former stone farm buildings of the villa that was evidently still standing. In addition to the evidence constituted by these native dwellings, the finds also clearly indicate that the inhabitants must have been Germanic immigrants. The sole stone building burnt down in the early 5th century, but the small Frankish village continued to be inhabited until c. AD 800.

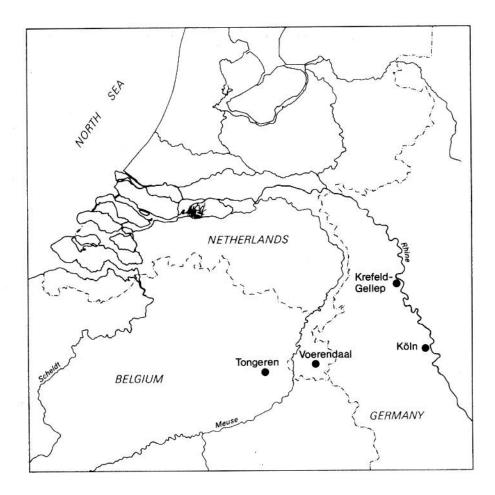


Fig.1: Location of Voerendaal and some other late-Roman sites mentioned in the text.

BURIALS

Although a total surface of c. 9 ha has been examined, $60,002 \text{ m}^2$ of which were totally stripped, not a single burial from the heyday of the villa has been found. In view of the scale of the excavation and the work outside the limits of the actual settlement, this in itself is surprising, but it may be mere coincidence. Graves from the early occupation are also lacking, but interments of a later date have indeed been found. A Merovingian cemetery has been discovered and partially excavated in and around the ruins of a farm building close to the main house of the former villa. In addition, several 4th century graves were found. One approximately mid 4th century burial was situated in the central courtyard, at the perimeter of the late-Roman, Germanic village. Two more, less precisely datable graves were located at a somewhat greater distance, but they may well be the burials of inhabitants of the 4th century village. The subject of the present paper is, however, the two associated graves which were located at a considerable distance from all occupation: nearly 200 m from the main house of the villa and at least 150 m from the later village.

No other relevant features were observed around these two graves.

They can safely be considered as isolated burials, located in a prominent position on top of the plateau on the southern side of which the villa was situated. The centre of the later Frankish village was situated considerably further downslope, closer to one of the two brooks which bound the plateau. The location of the two graves does, in fact, conform rather well to expectations regarding the position of elite burials. Elsewhere, there are numerous examples of rich isolated burials or small cemeteries, evidently the graves of villa owners and their families, situated in a prominent position at some distance from the settlement and separated from the burial ground of the other inhabitants.

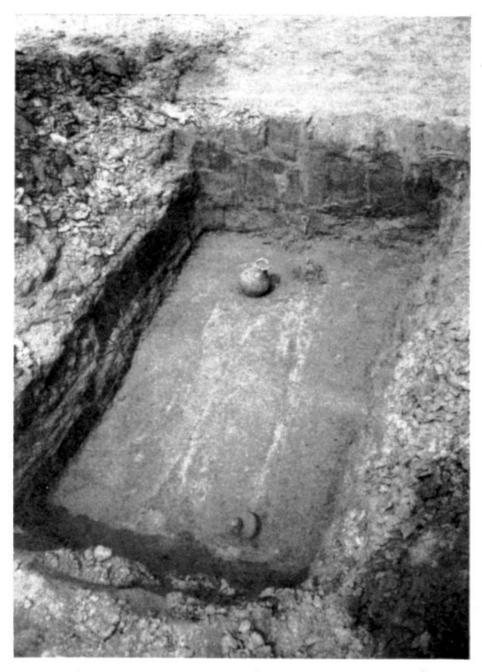


Fig.2: The southern inhumation grave (view from the west). Only the wooden coffin has left clear traces in the soil. Two vessels, a jug and a small flask, are situated in the corners.

The general orientation of both graves, which are some 3 m apart, is E-W. The southern grave measured 1.90 by 1.05 m and contained an inhumation in a wooden coffin (fig.2). The direction of the head was probably westward. Due to the acidic loess-soil, nothing remained of the skeleton although the coffin had left clear traces. The dimensions of the coffin are 1.70 m by 0.47 m at the eastern and 0.52 cm at the western end. This fact, and the presence of some faint traces inside the coffin, although these are not definitely the shadow of a skeleton, are the only indications for the orientation of the corpse.

A few iron nails indicate that the coffin was only partly nailed, and therefore must have been largely constructed by other means. A small terra sigillata flask had been placed inside the coffin at the western end, presumably next to the head (see also fig.4). At the eastern end stood a 20 cm high coarse ware jug (figs.2 and 4). Presumably, the burial is that of a woman. The clearly associated northern grave is, however, definitely a male burial (fig.3).

The dimensions of the grave pit, with no traces of a coffin, are 1.85 m by 0.90 m. It was not, however, an inhumation but a cremation-burial, the cremated remains of the deceased being deposited

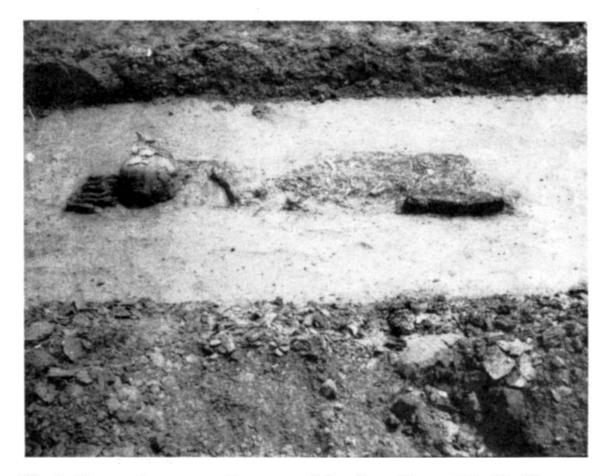


Fig.3: The northern cremation grave (view from the north). Visible are, from east to west, the 11 bolt-heads (see also fig.6), a jug, a knife, cremation scattered in the western part of the grave, and a large spearhead.

over an area of c. 0.80×0.40 m on the floor at the western end of the pit. Here too, a coarse ware jug (27 cm high) was placed at the eastern side of the grave. The other grave-gifts consisted entirely of weapons. Immediately east of the jug, at the end of the grave, 11 neatly arranged bolt-heads were uncovered (figs.3 and 6). In addition, an arrowhead was found south-west of the jug (not visible on fig.3), its point in a westernly direction.

The centre of the grave pit, between the cremation and the finds discussed so far, and thus the spot where in an inhumation burial the pelvis would have been, yielded a rather large iron knife placed nearly crosswise, its point facing south (figs.3 and 5). Finally, a very large spearhead was found at the western end, placed lengthwise in the grave and its point facing west (figs.3 and 5).

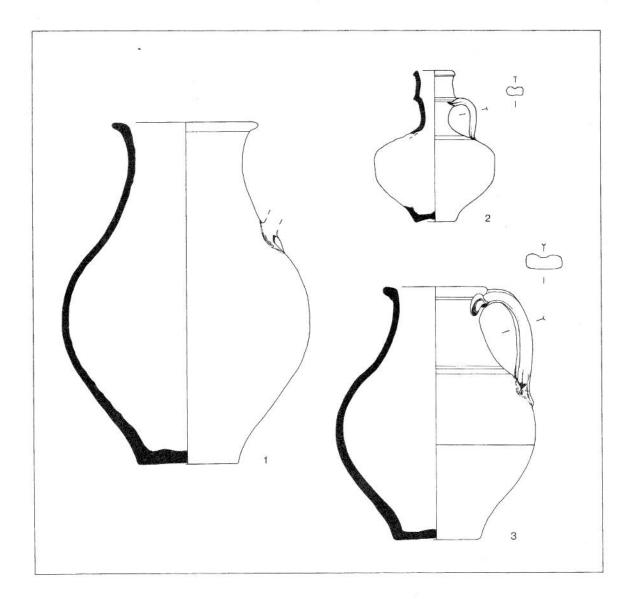


Fig.4: Pottery from the two burials: two coarse ware jugs (no. 1 is from the weapon-grave) and a terra sigillata flask. Scale 1:3.

THE POTTERY (fig.4)

Although not very impressive by itself, the pottery from both graves is rather important for its value in dating them. The small terra sigillata flask from the inhumation grave is of type Chenet 345 (figs.2 and 4.2). Although the surface has suffered from acidic soil conditions it is of good quality sigillata. Parallels can be found in several other cemeteries. In nearby Tongeren (graves 27, 50, 125, 140 and 240), these are all dated to the first half or even the beginning of the 4th century.⁴ Their absence in late 4th century cemeteries is interpreted as evidence for a general dating of this type to the first half of the 4th century.⁵ Even in a cemetery where most of the graves are of later date, such as Oudenburg, the two graves with a Chenet 345 flask are early.⁶

This dating is in accordance with that of the two coarse ware jugs, one of which was present in each grave. Both are of type Niederbieber 96. Oelmann has traced the origin of this type back to the early 2nd century,⁷ but it is a characteristic 3rd century form and not normally found in later contexts. Nevertheless, there is evidence that the type did at least survive into the 4th century, e.g., in Tongeren⁸ and Krefeld-Gellep.⁹ A late 4th century date for this wide-mouthed jug can be confidently excluded. The fabric of the Voerendaal specimens is, incidentally, identical to that of the normal 3rd century coarse ware used in the villa.

THE WEAPONS (fig.5)

The largest of the iron weapons deposited in the cremation grave is a remarkably broad, leaf-shaped and seemingly midribbed spearhead with a closed socket (fig.5.1). The total length is 34 cm, the length of the blade 23.5 cm and its breadth 7.8 cm. The pronounced 'midrib' is rather asymmetrical - to such a degree that in cross-section this could well be described as a corrugated blade. The socket still contained identifiable wood that proved to be ash (Fraxinus excelsior).¹⁰ In view of its position in the grave, the shaft of the spearhead may have been up to 1.40 m long.

Spearheads of such broad, leaf-shaped form are not very common in late-Roman contexts.¹¹ Parallels are known from, e.g., Vert-la-Gravelle grave 6,¹² Vireux-Molhain grave 22,¹³ Abbeville-Homblières grave 18,¹⁴ and Furfooz.¹⁵ All these parallels are, however, split-socketed and somewhat smaller, and they are dated to the second half of the 4th century.

The leaf-shaped arrowhead with closed socket (fig.5.2) is 11.5 cm long. Because the socket is damaged at the end it could originally have been slightly longer. Arrowheads of this general shape are frequently found in weapon-graves. Because of their sometimes rather large size it is often doubtful whether the points should be classified as arrowheads or spearheads. An example is the bundle of 11 'arrowheads' found in Krefeld-Gellep, grave 1088, which are up to 17 cm long.¹⁶

Knives with wooden or bone handles are also a common feature in late-Roman burials. Our specimen (fig.5.4), with a strongly curved

back, has a lancet-shaped blade that is only slightly longer than the tang. The total length is 27.2 cm. An overview of the distribution of this type of knife, from Hungary to Britain, has been provided by Clarke.¹⁷ Knives with broad blades are a 4th century type.¹⁸ The wood from the handle, which is terminated by a lozenge-shaped plate, could be identified as ash (Fraxinus excelsior).

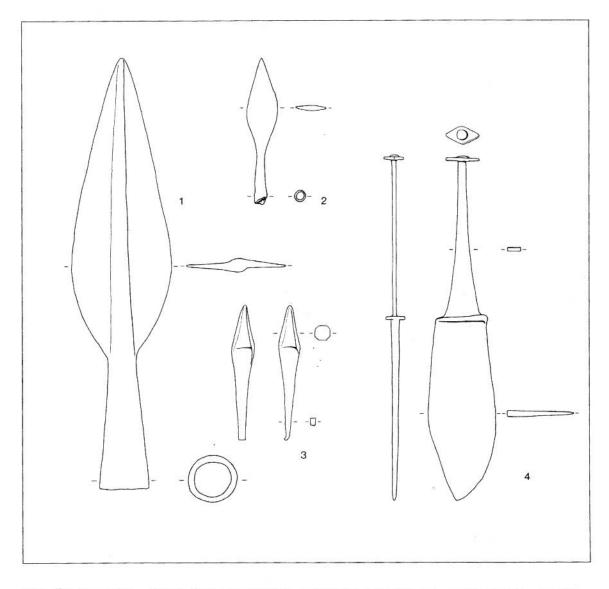


Fig.5: Weapons from the cremation burial: spearhead, arrowhead, knife, and one of the 11 bolt-heads. Scale 1:3.

The most intriguing weapons from the Voerendaal cremation burial are definitely the eleven bolt-heads from the eastern end of the grave. They were not deposited in a bundle as sometimes occurs with the arrowor javelin-heads,¹⁹ but placed 5-6 in an alternating opposed direction, lengthwise in the grave (see figs.3 and 6).

Iron points of this type, with a short pyramidal head and somewhat longer tang (figs.5.4 and 6), are characteristic for military sites. An overview, to which many new finds can be added, was composed by Von Petrikovits.²⁰ Discussion on this and other types of bolt-heads is

inevitably concerned with their precise function: could they have been regular arrowheads and, if not, should they be interpreted as bolt-heads, and thus as artillery ammunition, or as javelin-heads. In his discussion of the problem, Baatz indicated that an interpretation as bolt-heads is feasible for specimens of 25-75 g, but stressed the ambiguous nature of the evidence.²¹ Partly, this is the result of the



Fig.6: The ll bolt-heads in their original position as found in the grave (top = west).

frequency of alleged bolt-heads in auxiliary camps and the lack of evidence for auxiliary artillery.²² As indicated by Baatz and Campbell, static field artillery was normally used only by legions; but there is also evidence for no less than three types of lighter, hand-held mechanical weapons, perhaps in addition to the small non-torsion crossbow known from two Gallo-Roman reliefs.²³

Iron points such as those from Voerendaal are frequently found on late-Roman fortified sites.²⁴ In contrast to the socketed points sometimes interpreted as bolt-heads, their average weight of 42g makes a use as javelin-point rather unlikely, while they are still too heavy for arrowheads.²⁵ The 11 specimens from our grave range in weight from 32 to 57g, which in view of the extensive corrosion must be considered a minimum indication. They are also important because, in contrast to the stray finds from forts, their position in the grave may provide an additional argument for an interpretation as bolt-heads.

Although the wood could unfortunately no longer be identified, all the points were clearly shafted when buried. While javelins could be quite short, 1-1.33 m, 26 and the 5 points facing west could easily have been mounted on shafts of such length, that is impossible for the remaining 6 points facing east. These are positioned no more than 10 cm from the side of the grave. Unless one assumes that the shafts were broken, for which there might be evidence, these can only have been very short indeed. As the very few preserved artillery-arrows prove, 27 these had extremely short shafts.

While it is, therefore, very likely that in Voerendaal we are dealing with bolt-heads, the evidence is unfortunately not entirely unambiguous. That is because the tangs of some of them are bent, 28 which necessarily implies the shaft of these specimens was damaged and broken. Whatever the reason for this may have been, the presence of these points with bent tangs is curious. The angle, at the lower end of the tang, is precisely the spot where the shaft of an arrow or javelin would break if it was moved sideways with the point in a fixed position. Without further evidence, deliberate breaking of the shaft cannot be assumed because most of the bolt-heads have straight tangs (fig.6). Moreover, the 'ritual' breaking of grave gifts is quite exceptional in a late-Roman context, while placing personal equipment (which was sometimes worn and damaged) in a grave was not at all special. The careful and deliberate way in which the bolts were arranged in the grave is, of course, another argument for their interpretation as complete objects.

INTERPRETATION

The reason for discussing two graves from the site of the Roman villa at Voerendaal in this volume is, obviously, the presence of possibly military equipment of a unique kind in one of them.²⁹ A problem even more difficult than the true nature of this equipment, is the interpretation of the burials. Who were the deceased and in which settlement did they live? The date of the two graves is very important in this respect. Unfortunately, the weapons are of little help with this problem. They indicate without any doubt a 4th century dating, but the fact that the spearhead and the knife have parallels in late 4th century graves elsewhere is not decisive. After all, datable weapons are normally those regularly found in Germanic weapon graves and these are the result of a tradition that started in the mid 4th century and became popular only from the end of that century onwards.³⁰ By contrast, the pottery from both graves presents no chronological problems and indicates a date in the first half of the 4th century, or even around AD 300.

The fact that the weapon-burial is a cremation cannot be used for direct chronological inferences. Nevertheless, it would be quite exceptional for a late 4th century 'Germanic' weapon-burial and fits more readily in ordinary 3rd century and earlier practices of the disposal of the dead. The structure of the grave and its association with an inhumation nevertheless point to a rather late date. There is some difference in the orientation of both burials so that the most likely interpretation would be that they are the remains of a couple buried together but not at the same time.

The chronological evidence indicates that these people can hardly have been inhabitants of the Germanic village, who were presumably Frankish <u>laeti</u> or <u>foederati</u>. In addition, the contents of the graves are unusual for Frankish burials. We may disregard the inclusion of bolts, but the absence of an axe in the male grave is surprising if it were Frankish, and so to some extent is the absence of brooches in the presumed female burial. The conclusion is, therefore, that we are probably dealing with graves of the inhabitants of the latest phase of the villa.

This conclusion has some interesting implications. It means, firstly, that it is not very likely that the weapon-grave is that of a Germanic officer heading a small group occupying the estate.³¹ This does not preclude the possibility that the burial is in some way military. It is conceivable that a villa owner in the early 4th century was at the same time a soldier, e.g., an artillery officer. It is even quite likely that he was in some way connected with military affairs, if only for the defence of his estate.³² Moreover, we may expect a considerable degree of Germanization in this period, a process which may indeed be illustrated by the two Voerendaal burials.

Nevertheless, the most likely interpretation remains that the graves are of the owners of the villa, and that should lead us to a less speculative conclusion. After all, it is a well-known fact that Roman soldiers or veterans were not buried with their weapons. But it is also known that civilians sometimes were. In his thorough study on the cemeteries from northern Gaul, Van Doorselaer devoted considerable attention to the weapon-graves of the first three centuries AD.³³ The 2nd and 3rd century examples concentrate in the fertile loess-zone and coincide with the densest distribution of villae to which in most cases (e.g., the tumulus-graves) there is a direct relation. Voerendaal is situated in this region.

The weapon-graves are, without any doubt, a native tradition of elite burial. As Van Doorselaer was able to show,³⁴ this is, in a provincial-Roman context, primarily related to the fact that the grave gifts were hunting weapons. The overall scarcity of weapons in graves and their strong association with very luxuriously furnished graves is conclusive proof of their function as high status grave goods. They were used primarily in burials of wealthy Gallo-Roman villa owners of native descent. Hunting may well have been a favourite pastime of these gentlemen.

The burial from Voerendaal is most likely an example of this type of burial and thereby the latest one known to date. The weapons can all be interpreted as hunting equipment and an axe, sword or shield are lacking. Even the bolt-heads can be placed in a non-military context, as is shown by the crossbows on the hunting scenes from Salignac and Saint-Marcel (cf. note 23). The troubled times in which the deceased lived could suggest a military function for his grave goods and thus that he was an officer and a gentleman. The evidence, however, proves only that he was a gentleman.³⁵ NOTES

- 1. BRAAT, 1953.
- 2. KLOK, 1981 gives an account of the legal procedures.
- WILLEMS, 1986; WILLEMS & KOOISTRA, 1987; WILLEMS, 1987; WILLEMS & KOOISTRA, 1988 (in press).
- 4. VANVINCKENROYE, 1984, catalogue.
- VANVINCKENROYE, 1984, 152. This is confirmed by a specimen in Tournai, grave 92, dated by an unworn coin from AD 307-310: BRULET & COULON, 1977, 25-28 and 93-94.
- 6. For grave 141 in particular, independent evidence is provided by a small Constantinian coin hoard, dating the burial to shortly after AD 335: see LALLEMAND, 1966, 10 and MERTENS & VAN IMPE, 1971, 171-174.
- 7. OELMANN, 1914, 75.
- 8. VANVINCKENROYE, 1984, 168 (fig.11, 10).
- 9. PIRLING, 1966, 72-73 (type 66).
- Identification of this and other wood by Dr. L.I. Kooistra (ROB), who is studying all botanical data from the excavation.
- 11. I am grateful to Dr. H.W. Böhme, Römisch Germanisches Zentralmuseum, Mainz, for his comments on the find.
- 12. BÖHME, 1974, 101 and plate 143, 12.
- 13. LEMANT, 1986, fig.29, 3a.
- 14. PILLOY, 1886, 232.
- 15. NENQUIN, 1953, fig.18, J12.
- 16. PIRLING, 1966 (1), 123 and (2), 127-8 and plate 89,3. See also BÖHME 1974, 110-111, who regards points over 12 cm as spearheads (javelins).
- 17. CLARKE, 1979, 250-251.
- 18. BÖHME, 1974, 128; CLARKE, 1979, 250
- 19. Cf. BÖHME, 1974, 111 and note 460; see also CZYSZ, 1986.
- 20. VON PETRIKOVITS, 1951, 206-208. see also note 24.
- 21. BAATZ, 1966, 203-207.
- 22. See also the recent discussion by CAMPBELL, 1986.

- 23. ESPÉRANDIEU, 1908, 442-444, nos. 1679 and 1683. Cf. CAMPBELL, 1986, 128: the reliefs prove the existence of these weapons and their use for hunting, but there are also reasons (op. cit., 131-132) to assume military use of similar arms.
- 24. A few recent finds in addition to Von Petrikovits' overview are those from Froitzheim (BARFIELD, 1968, fig.46, 8-11 and 13-14) Furfooz (BRULET, 1978, fig.77, 13-14), or Vireux-Molhain (LEMANT, 1985, fig.67, 63-69).
- 25. Cf. also BARFIELD, 1968, 112.
- 26. Cf. BAATZ, 1966, notes 68-69.
- Specimens from Haltern, Vindonissa, and Dura-Europos. See BAATZ, 1966, fig.1, 5-7.
- 28. Cf. LEMANT, 1985, fig.67, 68.
- 29. Another grave with one (socketed) bolt-head that is definitely a grave gift is known from Krefeld-Gellep (PIRLING, 1974, 176: grave 1911). Several socketed points were found in Westendorf, grave 4 (CZYSZ, 1986) which has some remarkable parallels in general context and dating to the Voerendaal grave.
- 30. Cf. PIRLING, 1966, 230-237 or BÖHME, 1974, 158-165, both with further references.
- 31. Such as, e.g., Abbeville-Homblières (BÖHME, 1974, 178), Vert-la-Gravelle, Contrat, and other (BÖHME, op. cit., 180-181); compare also the conclusions of CZYSZ, 1986 for Westendorf. The interpretation of grave 4 as a Germanic burial is supported by positive evidence from the grave-goods as well as the context, which indicates that the deceased in this case was not a wealthy villa owner.
- 32. The central buildings of the villa include a massive square tower which presumably belongs to a late phase. Similar towers, sometimes interpreted as <u>burgi</u> and sometimes as granaries and perhaps being both, are known from various villa sites in the Rhineland (BECHERT, 1978).
- 33. VAN DOORSELAER, 1967, 185-199 and Map I.
- 34. VAN DOORSELAER, 1967, 194-5. The types of weapons in the graves and the absence of shield-bosses lead to this conclusion.
- 35. I am grateful to F. Horbach (drawings) and to the ROB technicians H.J.M. Meijers (restoration) and A.W.P.M. Penders (photography) whose work allowed the quick publication of the find and to Dr. C. van Driel-Murray for correcting the English text.

REFERENCES

- BAATZ, D., 1966: Zur Geschützbewaffnung römischer Auxiliartruppen in der frühen und mittleren Kaiserzeit, Bonner Jahrbücher 166, 194-207
- BARFIELD, L.H., 1968: Ein Burgus in Froitzheim, Kreis Düren, <u>Beiträge</u> <u>zur Archäologie des römischen</u> <u>Rheinlands</u> 1, (Rheinische Ausgrabungen 3), 9-119
- BECHERT, T., 1978: Wachtturm oder Kornspeicher? Zur Bauweise spätrömischer Burgi, Archäologisches Korrespondenzblatt 8, 127-132
- BÖHME, H.W., 1974: Germanische Grabfunde des 4. bis 5. Jahrhunderts zwischen unterer Elbe und Loire (München 1974)
- BRAAT, W.C., 1953: De grote Romeinse villa van Voerendaal, Oudheidkundige Mededelingen uit het Rijksmuseum van Oudheden 34, 48-76
- BRULET, R., 1978: La fortification de <u>Hauterecenne</u> à Furfooz (Louvain-la-Neuve 1978)
- BRULET, R. & G. COULON 1977: La <u>nécropole</u> <u>Gallo-Romaine</u> <u>de la Rue</u> Perdue à Tournai (Louvain 1977)
- CAMPBELL, D.B., 1986: Auxiliary Artillery Revisited, Bonner Jahrbücher 186, 117-132.
- CLARKE, G., 1979: Pre-Roman and Roman Winchester, II: the Roman Cemetery at Lankhills (Oxford 1979)
- CZYSZ, W., 1986: Ein spätrömisches Waffengrab aus Westendorf, Lkr. Augsburg, Bayerische Vorgeschichtsblatter 51, 261-271
- ESPÉRANDIEU, E., 1908: <u>Recueil</u> <u>général</u> <u>des</u> <u>bas-reliefs</u> <u>de</u> <u>la</u> <u>Gaule</u> romaine, 2: Aquitaine (Paris 1908)
- KLOK, R.H.J., 1981: De Romeinse villa te Voerendaal, <u>Tijdschrift</u> Kon. Ned. Heidemij 92, 25-36
- LALLEMAND, J., 1966: Monnaies Romaines découvertes à Oudenburg, Helinium 6, 117-138
- LEMANT, J.-P., 1985: Le cimetière et la fortification du Bas-Empire de Vireux-Molhain, dép. Ardennes (Mainz 1985)
- MERTENS, J. & L. VAN IMPE 1971: Het laat-Romeins grafveld van Oudenburg (Archaeologia Belgica, 135) (Brussel 1971)
- NENQUIN, J.A.E., 1953: La nécropole de Furfooz (Brugge 1953)
- OELMANN, F., 1914: <u>Die Keramik des Kastells Niederbieber</u> (Frankfurt a.M. 1914)
- PILLOY, J., 1886: <u>Etudes sur d'anciens lieux de sépultures dans</u> <u>l'Aisne, I</u> (Saint Quentin 1886)

- PIRLING, R., 1966: Das römisch-fränkische Grberfeld von Krefeld-Gellep, (Germanische Denkmäler der Völkerwanderungszeit, serie B, Bd. 2) (Berlin 1966)
- PIRLING, R., 1974: Das römisch-fränkische Gräberfeld von <u>Krefeld-Gellep</u>, (Germanische Denkmäler der Völkerwanderungszeit, Serie B, Bd. 8) (Berlin 1974)
- VAN DOORSELAER, A., 1967: Les nécropoles d'époque Romaine en Gaule septentrionale (Brugge 1967)
- VANVINCKENROYE, W., 1984: De <u>Romeinse</u> zuidwest-begraafplaats van Tongeren (Tongeren 1984)
- VON PETRIKOVITS, H., 1951: Eine Pilumspitze von der Grotenburg bei Detmold, Germania 29, 198-210
- WILLEMS, W.J.H., 1986: de Romeinse villa te Voerendaal: Opgraving 1985, Archeologie in Limburg 28, 143-150
- WILLEMS, W.J.H., 1987: De grote villa van Voerendaal, in: P. Stuart & M.E.T. de Grooth (eds.), <u>Langs</u> <u>de</u> <u>weg</u>, 46-50, 78-79 (Heerlen/Maastricht 1987)
- WILLEMS, W.J.H. & L.I. KOOISTRA 1987: De Romeinse villa te Voerendaal: Opgraving 1986, Archeologie in Limburg 32, 29-38
- WILLEMS, W.J.H. & L.I. KOOISTRA 1988 (in press); De Romeinse villa te Voerendaal: Opgraving 1987, Archeologie in Limburg 37