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Four approaches to the analysis of (pre-)Roman Nijmegen

*Aspects of cultural evolution, acculturation,
contextual function and continuity*

J.H.F. Bloemers (ed.)

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Cover illustration: Overview from the east of the western half of the small early Roman fortification during the excavation in 1973 before the reconstruction of the Trajanusplein.

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Summary

This monograph presents a selection of conceptual and methodological framed issues relating to the excavations in 'Roman Nijmegen' which were carried out by the State Service for Archaeological Investigations in the Netherlands (ROB) from 1972 until the end of 1981. This investigation is characterized by its focus on the wider surroundings of the previously excavated fortress of the Tenth Legion on the Hunerberg dating from the late first century AD. This broadening of perspective resulted in substantial new insights into the organization and spatial development of an area 3 km² in size between the town centre of Nijmegen and the Kops Plateau from the late first century BC to the beginning of the fifth century AD, the various elements of settlement and the nature and role of the different groups of inhabitants and transients.

The high quality of the excavation results combined with a specific research question made it possible to search for a way to make use of the enormous database to achieve a meaningful analysis. Moreover, in addition to the accepted approaches current up to then, varying concepts and methods were also applied that came into vogue in European archaeology in the 1980s. The analyses and interpretations of this approach have been worked out in four chapters, each with a specific theme and a matching methodological-conceptual approach as is expressed in the title: 'Four approaches ...'. The concepts and methods chosen thus function as a starting point and a point of crystallization.

In the second chapter there is an analysis of a small Middle Iron Age cemetery with a grave containing a two-wheeled cart, spear- and arrowheads and the cremated remains of a woman. This grave is the northern exponent of a burial method with attributes known mainly from England, Northern France and the area between the rivers Moselle and Rhine, but which fit into a broader Central-European tradition. These burials are generally ascribed to men, but the inescapable attribution of the Nijmegen grave to a woman sheds new light on the status of possible female leaders. For the interpretation, the customary archaeological analysis was combined with a cultural-anthropological perspective on advanced tribal societies.

The third chapter covers the early Roman period from c. 15 BC to AD 70, the episode in which the invading Romans brought into use the 3 km² area on the Nijmegen push moraine and developed it as a location for a military force of over 12,000 soldiers plus smaller units and to build a capital for the Batavian *civitas* in the making. In this period, large military and civilian groups of 'immigrants' from far and wide settle in Nijmegen, whether or not permanently, and they are recognizable from their 'foreign' material culture and burial methods.

For the interpretation of this radical process that was to influence the character of Roman Nijmegen for centuries, use was made of concepts from developmental geography and anthropology such as acculturation and articulation.

The key question of the fourth chapter is how to arrive at a meaningful and selective approach to the analysis of the unusually large quantity of features and finds from the fortress of the Tenth Legion - consisting of c. 5,600 men - which was stationed in Nijmegen between AD 70 and 105. This location, 16 hectares in size, is characterized by a layout which, with regard to social structure, is the reflection of the organization of the Roman state at that time in the particular context of a military function. Starting from this assumption, three sub-areas with different status and function were selected: a crafts and storage area, a staff officer's house and the barracks of a *centuria*. All spatial structures, c. 500 pits and the pottery found in them (c. 3,000 pottery specimens) were described per group and in context and subjected to a quantitative analysis. This sociofunctional approach made it clear that for a meaningful analysis a larger spatial unit such as a barracks or an open space is essential in order to identify characteristic patterns. These patterns may be linked with differences in status or function, but also in depositional processes: most of the pits and the corresponding finds appear to be connected with the rebuilding of the timber fortress in stone, and the finds from the active phase of use were probably largely deposited outside the fortress!

In the final chapter the ditches of the late Roman fortress on the Valkhof and the finds collected in them are described. This fortification, 3-4 hectares in size, - built in the early fourth century

AD and abandoned by the Roman authorities in the early fifth century - is, together with the later Carolingian palace inside it, the ideal exponent of the traditional question of (dis) continuity between the late Roman and early medieval societies in the Rhine and Meuse area. The combination of concepts from the formation theory with an archaeological-historical approach to the analysis of the

settlement elements produces the building blocks for a hypothetical model that does justice to the role of a Frankish community as bearer of the historic continuity between AD c. 400 and 750. The relation with the Roman emperor and his successors in Gaul or even Constantinople provides their leaders with legitimacy, but the mode of existence is largely that of a self-sufficient farming society.

Samenvatting

In deze monografie wordt een bloemlezing gepresenteerd uit de opgravingen in 'Romeins Nijmegen' die de Rijksdienst voor het Oudheidkundig Bodemonderzoek (ROB) van 1972 tot eind 1981 heeft uitgevoerd.

Karakteristiek voor dit onderzoek is de aandacht voor de bredere omgeving van de al eerder onderzochte vesting van het Tiende Legioen uit de late eerste eeuw na Chr. op de Hunerberg. Deze verruiming van het blikveld heeft geleid tot wezenlijke nieuwe inzichten in de inrichting en ruimtelijke ontwikkeling van een 3 km² groot gebied tussen de Nijmeegse binnenstad en het Kops Plateau vanaf de late eerste eeuw voor tot in het begin van de vijfde eeuw na Chr., in de uiteenlopende bewoningselementen en in de aard en rol van verschillende groepen bewoners en passanten.

De hoge kwaliteit van de opgravingsresultaten heeft in combinatie met een gerichte vraagstelling een zoektocht mogelijk gemaakt hoe het zeer omvangrijke gegevensbestand voor een betekenisvolle analyse kan worden benut. Daarbij is ter aanvulling op tot dan toe gangbare benaderingen ook gebruik gemaakt van uiteenlopende concepten en methoden die in de jaren tachtig van de vorige eeuw in de Europese archeologie in zwang raakten. De analyses en interpretaties van deze aanpak zijn uitgewerkt in vier hoofdstukken met ieder een specifieke thematiek en een passende methodisch-conceptuele benadering zoals dat ook tot uitdrukking komt in de titel: 'Four approaches ...'. De gekozen concepten en methoden functioneren dus als vertrek- en kristallisatiepunt.

In het tweede hoofdstuk wordt een kleine begraafplaats uit de Midden-IJzertijd met een graf geanalyseerd waarin een tweewielige wagen, speer- en pijlpunten en de crematieresten van een vrouw zijn bijgezet. Dit graf is de noordelijke exponent van een begravingswijze met attributen die vooral bekend zijn uit Engeland, Noord-Frankrijk en het gebied tussen Moezel en Rijn, maar die passen in een bredere Centraal-Europese traditie. In de regel worden deze begravingen toegeschreven aan mannen, maar de onontkoombare toeschrijving van het Nijmeegse graf aan een vrouw werpt een nieuw licht op de status van mogelijke vrouwelijke leiders. Bij de interpretatie

wordt de gebruikelijke archeologische analyse gecombineerd met een cultureel-antropologisch perspectief op ontwikkelde tribale samenlevingen.

Het derde hoofdstuk bestrijkt de vroeg-Romeinse tijd van ca. 15 voor tot 70 na Chr., de episode waarin de binnenkomende Romeinen het areaal van 3 km² op de Nijmeegse stuwwal in gebruik nemen en inrichten als locatie voor een troepenmacht van meer dan 12.000 soldaten en kleinere eenheden en voor de ontwikkeling van een hoofdstad voor de Bataafse *civitas* in wording. In deze periode vestigen zich grote militaire en burgerlijke groepen 'immigranten' van heinde en verre al dan niet permanent in Nijmegen die te herkennen zijn aan hun gebiedsvreemde materiële cultuur en begravingswijzen. Voor de interpretatie van dit ingrijpende proces dat het gezicht van Romeins Nijmegen voor eeuwen zou bepalen is gebruik gemaakt van concepten uit de ontwikkelingsgeografie en -antropologie als acculturatie en articulatie.

De kernvraag van het vierde hoofdstuk is hoe te komen tot een betekenisvolle en selectieve aanpak van de buitengewoon omvangrijke hoeveelheid sporen en vondsten van de vesting van het Tiende Legioen - ca. 5600 man groot - dat tussen 70 en 105 na Chr. in Nijmegen gelegerd is geweest. Deze zestien hectare grote locatie kenmerkt zich door een aanleg die qua sociale structuur de afspiegeling is van de inrichting van de Romeinse staat uit die tijd in de speciale context van de militaire functie. Vanuit deze veronderstelling zijn drie deelgebieden met verschillende status en functie geselecteerd: een ambachts- en opslagareaal, een areaal voor de huisvesting van stafofficieren en voor de manschapsbarakken van een *centuria*. Alle ruimtelijke structuren, ca. vijfhonderd kuilen en het daarin gevonden aardewerk (ca. drieduizend individuen vaatwerk) zijn per groep en in samenhang beschreven en aan een kwantitatieve analyse onderworpen. Deze sociaal-functionele insteek heeft verduidelijkt dat voor een zinvolle analyse een grotere ruimtelijke eenheid zoals een manschappenbarak of een open ruimte noodzakelijk is om kenmerkende patronen te kunnen signaleren. Die patronen kunnen verband houden met verschillen in status of

functie, maar ook in depositieprocessen: de meeste kuilen en de bijbehorende vondsten blijken samen te hangen met de verbouwing van het fort van hout naar steen, de vondsten uit de actieve gebruiksfase zijn waarschijnlijk merendeels buiten de vesting gedeponeerd!

In het laatste hoofdstuk worden de grachten van de laat-Romeinse vesting op het Valkhof en de daarin verzamelde vondsten beschreven. Deze 3-4 hectare grote versterking – aangelegd in de vroege vierde eeuw na Chr. en door het Romeinse gezag opgegeven in de vroege vijfde eeuw – is met de later daarbinnen aangelegde Karolingische palts bij uitstek de

exponent van de traditionele vraag naar de (dis)continuïteit tussen de laat-Romeinse en vroeg-middeleeuwse samenlevingen in het Rijn- en Maasgebied. De combinatie van concepten uit de formatietheorie met een archeologisch-historische benadering van de analyse van de bewoningselementen levert bouwstenen voor een hypothetisch model dat recht doet aan de rol van een Frankische gemeenschap als drager van de historische continuïteit tussen ca. 400 en 750 na Chr. De relatie met de Romeinse keizer en zijn opvolgers in Gallië of zelfs Constantinopel verschaft legitimatie aan hun leiders, maar de bestaanswijze is in hoge mate die van een zelfverzorgende boerensamenleving.

Zusammenfassung

In dieser Monographie wird eine gezielte Auswahl der Ausgrabungen vorgelegt die die Staatliche Bodendenkmalpflege (Rijksdienst voor het Oudheidkundig Bodemonderzoek ROB) 1972 bis Ende 1981 im römischen Nimwegen durchgeführt hat. Schwerpunktmäßig wurde der weitere Umkreis des schon vorher ausgegrabenen Lagers der 10. Legion auf dem Hunerberg erforscht. Die damit verbundene Erweiterung des Forschungshorizonts hat zu einem wesentlich neuen Verständnis des 3 km² großen Gebiets zwischen der Nimwegener Innenstadt und dem Kops Plateau geführt, sowie die Gestaltung und räumliche Entwicklung vom späten 1. Jahrhundert vor bis Anfang des 5. Jahrhunderts nach Chr. Unterschiedliche großflächige Besiedlungselemente wurden erfasst, die Aussagen über Art und Rolle der verschiedenen Bewohner und Passanten ermöglichen.

Durch die Qualität der Ausgrabungsergebnisse und eine gezielte Fragestellung konnte der umfangreiche Datenbestand für die Suche nach einem sinnvollen Weg zur Analyse benutzt werden. Die in der provinzialrömischen Archäologie übliche Vorgehensweise wurde mit Konzepten und Methoden erweitert, die während der letzten Dezennien des 20. Jahrhunderts in der europäischen Archäologie aufkamen. Die Analysen und Interpretationen dieser Arbeitsweise wurden in vier Kapiteln mit jeweils einer spezifischen Thematik und einer dazugehörigen methodisch-konzeptuellen Vorgehensweise ausgearbeitet. Dies wird im ersten Kapitel beschrieben und kommt auch im Titel des Bandes ‚Four approaches ...‘ zum Ausdruck. Die gewählten Konzepte und Methoden dienen also als Ausgangspunkt und Fokus.

Im zweiten Kapitel wird ein kleines Gräberfeld aus der Mittleren Eisenzeit mit einem Grab analysiert, worin ein zweirädriger Wagen, drei Speer- und Pfeilspitzen und der Leichenbrand einer Frau niedergelegt sind. Das Grab ist der nördliche Exponent einer Bestattungsweise mit Beigaben, die vor allem bekannt sind aus England, Nordfrankreich und dem Gebiet zwischen Mosel und Rhein, jedoch zu einer breiteren mitteleuropäischen Tradition gehören. Meistens werden solche Gräber Männern zugeschrieben. Die Tatsache, daß sich der Leichenbrand der Nimwegener

Bestattung unumgänglich als die einer Frau erwies, wirft ein neues Licht auf den möglichen Status einer weiblichen Elite. Eine kulturanthropologische Perspektive auf entwickelte Stammesgesellschaften unterstützt diese Interpretation der Analyse.

Das dritte Kapitel behandelt die frühromische Periode, die Episode zwischen ca. 15 vor und 70 nach Chr., in der die einziehenden Römer das 3 km² große Areal auf der Nimwegener Moräne als Raum gestalten für die Lagerung von über 12.000 Soldaten mit zusätzlichen kleineren Einheiten und für die Gründung eines Zentralorts für die geplante *civitas* der Bataver. In dieser Periode lassen sich zahlreiche Gruppen von Soldaten und Zivilisten als Immigranten von nah und fern vorübergehend oder permanent nieder in Nimwegen, die sich kennzeichnen durch ihre gebietsfremde materielle Kultur und Bestattungssitten. Um diesen einschneidenden Prozess, der den Anblick vom römischen Nimwegen für Jahrhunderte bestimmen würde zu verstehen, sind Konzepte aus der Entwicklungsgeographie und kulturelle Anthropologie wie Akkulturation und Artikulation benutzt.

Kern des Problems im vierten Kapitel ist die Frage wie man in sinnvoller und effektiver Weise die außergewöhnlich umfangreiche Menge von Funden und Befunden der Festung der 10. Legion aus der Zeit zwischen 70 und 105 nach Chr. analysieren kann. In der Einrichtung dieses sechzehn Hektar großen Lagers für ca. 5600 Soldaten spiegelt sich - im speziellen Kontext der militärischen Funktion - die soziale Struktur des römischen Staats zu dieser Zeit. Ausgehend von dieser Annahme sind drei Teilgebiete mit Unterschied in Status und Funktion selektiert: ein Handwerks- und Speicherviertel, ein Areal für die Unterbringung von Staboffizieren sowie ein Areal für die Mannschaftsbaracke einer *centuria*. Alle räumlichen Strukturen und ca. fünfhundert Gruben mit den zugehörigen Keramikfunden (ca. dreitausend Gefäße) sind als einzelne Gruppe und in Zusammenhang miteinander beschrieben und quantitativ analysiert worden. Diese soziale und funktionelle Orientierung hat gezeigt, daß man für eine sinnvolle Analyse eine größere räumliche Einheit wie eine Mannschaftsbaracke oder einen offenen Platz braucht um signifikante Muster erfassen zu können. Diese Muster

können mit Status oder Funktion sowie mit Deponierungsprozessen zusammenhängen. Die meisten Gruben und deren Funde gehören zu der Umbauphase des Lagers von Holz in Stein. Die Funde aus der aktiven Benutzungsphase sind wahrscheinlich größtenteils außerhalb des Lagers deponiert worden.

Im letzten Kapitel wurden die Gräben der spätrömischen Festung auf dem Valkhof und die dazugehörigen Funde analysiert. Die drei bis vier Hektar große Anlage – im frühen 4. Jahrhundert gebaut und im frühen 5. Jahrhundert von den römischen Behörden aufgegeben – vertritt mit der später innerhalb der Festung gebauten karolingischen Pfalz überaus die klassische Frage nach der (Dis)

Kontinuität zwischen spätrömischen und frühmittelalterlichen Gesellschaften im Rhein- und Maasgebiet. Durch die Verbindung der Konzepte aus der Theorie zur Entstehung archäologischer Befunde (Englisch: formation processes) mit einer archäologisch-historischen Perspektive für die Analyse der Besiedlung ist ein hypothetisches Modell entwickelt worden. In diesem Modell wird die Rolle der fränkischen Gesellschaft als Träger der historischen Kontinuität zwischen ca. 400 und 750 nach Chr. anerkannt. Ihre Eliten legitimierten sich durch die Verbindung mit dem römischen Kaiser und seinen Nachfolgern in Gallien und Konstantinopel, ihre Existenz war jedoch weitgehend auf einer autarkischen Bauerngesellschaft gegründet.

The aim of this book must be seen against the background of the specific characteristics of the investigation of Roman Nijmegen in relation to the excavations and of the conceptual developments in Dutch archaeology during the 1980s and 1990s. These characteristics concern the large size of the site and the long duration of the archaeological investigation which covers three to four generations of researchers. This has yielded an exceptionally large quantity of relatively high quality data. Although opening up such a large area was problematic, the quantity and quality of the data provided an opportunity to address research questions that had remained unanswered up to now. This opportunity becomes even more attractive when purposeful use is made of conceptual and methodological developments, in this case from the 1980s and 1990s. To that end several representative sub-areas from the (ROB) excavations in Roman Nijmegen have been selected and appropriate characteristic questions formulated. The aim of this book is to open up and meaningfully analyse the data by making use of an effective conceptual or methodological approach. This combined approach should lead to new knowledge ranging from detailed archaeological information about Roman Nijmegen to insight into the usefulness of concepts, methods and techniques when dealing with 'big data'. The analysis of the selected excavations has been described in four thematic chapters framed in different conceptual approaches and was

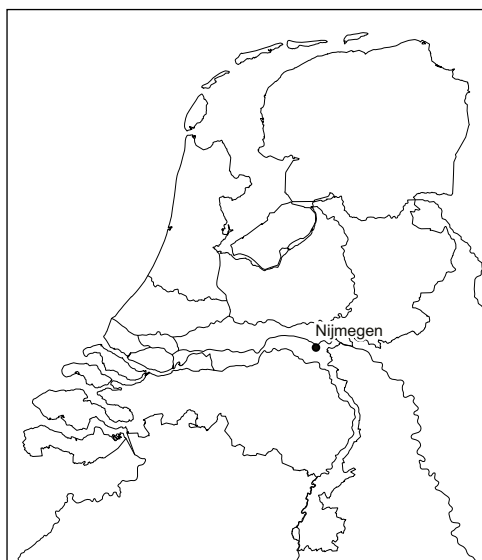


Figure 1.1 The Netherlands: location of Nijmegen.

carried out in the 1980s before 1995. It was also during this phase that the main part of the manuscript was prepared. However, in 2012 and 2015-2016 the manuscript was updated with additional texts and references where relevant or necessary. It must be stressed that the choice of a concept or method has not been determined by a (dogmatic) preference for a certain paradigm, but exclusively by its supposed suitability for meaningfully investigating the selected dataset and the research question belonging to it.

1.1 THE EXCAVATIONS AT NIJMEGEN

The excavations at Nijmegen (Fig. 1.1) are characterized by the unusual size and density of the archaeological structures which make it an archaeological 'mega-site'.¹

Settlement extends over a length of more than four kilometres and a breadth of up to one kilometre over the edge of the outwash plain west of the push moraine from the Kops Plateau in the east as far as the Waterkwartier at its foot in the west (Fig. 1.2). The density of features is high because these were concentrated settlements with a non-agrarian subsistence in the form of fortifications, adjacent extra-mural settlements and urban settlement and the burials belonging to them. It is, therefore, not surprising that excavations have covered a period of more than 65 years, and that the end is not yet in sight. Excavations on such a scale are not, of course, the work of a single person, but of a series of persons and their different methods and ideas. The development of the excavations can be summarized in three episodes.

The first episode is 1950-1967, when the investigations, under the direction of H. Brunsting, curator of the National Museum of Antiquities (Rijksmuseum van Oudheden RMO) in Leiden and the new State Service for Archaeological Investigations (Rijksdienst voor het Oudheidkundig Bodemonderzoek ROB) in Amersfoort, were concentrated mainly on two elements: first the late Roman cemetery in the centre of Nijmegen and later the eastern part of the large first century AD fortress on the Hunerberg. These were in fact two very different archaeological elements separated from each

¹ Willems *et al.* 2005, in particular 43 afb. 15 and 53 afb. 20; Willems & Van Enckevort 2009, in particular 20 Fig. 4, 25 Fig. 7 and 28 Fig. 8.



Figure 1.2 Nijmegen. Modern topography with names of areas mentioned in the text. Scale 1:20,000.

Legend: 1. contour lines; 2. railway; 3. excavated areas; 4. topographical coordinates. Names of areas and sites: 1. Kops Plateau; 2. Hunerberg; 3. Trajanusplein; 4. Verpleeghuis Margriet; 5. Schildersbuurt; 6. Valkhof; 7. Kelfkensbos; 8. town centre; 9. Kronenburgerpark.

other in time and space and requiring a very different approach.²

The second episode lasts from the beginning of the 1970s to the early 1980s. On the one hand the existing lines of investigation from the preceding episode were continued and expanded, and on the other hand they were set in wider topographical contexts by extending the investigation to include intermediate settlement elements. As a result, it became possible for the first time to make functional and spatial connections of habitation per period and to trace developments through time. For the early first century and the fourth century the focus was mainly on the area in the town centre around the Valkhof and eastwards from it in the direction of the Hunerberg, where cemeteries as well as settlement structures unknown until then were excavated. For the late first and the beginning of the second century the emphasis lay on the fortress of the Tenth Legion and the surrounding *canabae legionis* on the Hunerberg.³ In the third episode which began in the course of the 1980s and continued until c. 1995, the investigation of the legionary fortress and the *canabae legionis* was continued. However, the excavations were increasingly concentrated

on two main settlement elements of which comparatively little was known up to then: the early Roman fortifications on the Kops Plateau and the territory of the Roman town of *Ulpia Noviomagus* in the extreme west. The first investigation fills a mysterious gap in the military presence at Nijmegen during the first century. The second provides insight in the nature of the town centre of the *Civitas Batavorum* which was the centre of regional organization in the second and third centuries.⁴ The size and variety of settlement elements at Roman Nijmegen justifies an analysis of the 'mega-site' which yields information about the nature of settlement and the processes which occurred throughout time. This is the subject of this study in so far as it is based on research by the former State Service for Archaeological Investigations (ROB; now Cultural Heritage Agency of the Netherlands) from the first two episodes. Settlement and the history of settlement receive an added dimension when they are set in a regional context.

² Mank & Loeb 1972, 144-145.

³ Bloemers, Greving & Zoetbrood 1979. See also Kloosterman, Polak & Zandstra 2014 for the investigations of the Katholieke Universiteit (now Radboud University Nijmegen).

⁴ Willems 1990; Willems & Van Enckevort 2009, 35-41 (Kops Plateau) and 72-79 (*Ulpia Noviomagus*).

1.2 THE RELATION WITH THE SURROUNDING BATAVIAN AREA

At the beginning of the 1970s, the State Service for Archaeological Investigations (ROB) reorganized an important part of its research into regional projects.⁵ One of these was the Eastern River Area Project, the region characterized by the existence of three main rivers, the Rhine, the Waal and the Meuse. The project focused on the investigation of the area as part of the territory of the famous tribe of the Batavi and consequently on the Roman period, with an extension into the Late Iron Age and Early Medieval Period. The main research goal of the project was to study the socio-economic development in this territory based on analysis of the historical, archaeological, geographical and ecological data.⁶ An important starting point for this project was of course to consider the relation between settlement in the rural area and settlement at Nijmegen. This relation reflects the position of the native community within the system of the Roman empire and the related developments which take place in the course of time. Willems' extensive Ph.D. study has provided us with a wealth of information and ideas on this subject.⁷ The main themes for the research presented in this book concern the beginning and end of the relation between Batavians and Romans in the first and fourth centuries. The themes are described by Willems in Chapters 10-12 of his book as follows: the characterization of the native community as a rather egalitarian tribal structure, the interaction between Batavians and Romans in the phase of annexation and incorporation in the Roman empire in the first century, and the 'frankization' of the Batavian region in the fourth and fifth centuries. The nature of the interaction and the degree of continuity in the developments take a prominent position in our research. The differences in settlement types at Nijmegen and in the rural area during the Roman period and the related variation in the socio-economic basis and the archaeological deposition patterns have been studied by Lauwerier on the basis of faunal bone material.⁸

In the 1980s, Roymans and Slofstra also made an intensive study of the integration of the native population in the Roman system.⁹ This study focused partly on the Batavians in the river area and partly on the Brabant coversand areas

further south. They attach much significance to the role of native elites in the contacts with the Roman state. These contacts lead to the so-called detribalization of the native society due to the admission of the elite into a more centralized *civitas* administration and to integration in the market system of the native peasants who were dependent on the elite ('peasantization').¹⁰ The problem of the frankization of the border zone in the late Roman period has received more attention as a result of Heidinga's excavation of the settlement at Gennep - barely 20 kilometres south of Nijmegen - in 1989 and 1990. This is the first time that a detailed study of a rural settlement in the immediate surroundings of Nijmegen from the period between AD 390 and 600 has been possible. There are distinctive similarities with contemporaneous settlements such as Bennekom and Wijster in Germania libera, 'free' Germania: the house-plans, sunken huts, clothing and pottery.¹¹

1.3 FOUR THEMES FOR THE ANALYSIS OF THE (ROB) EXCAVATIONS AT NIJMEGEN 1957-1981

The four chapters which follow are each distinguished by a specific conceptual theme: cultural evolution (Chapter 2), acculturation (Chapter 3), socio-economic function (Chapter 4) and continuity (Chapter 5). The analysis and interpretation of the data in these chapters are embedded in the specific conceptual and methodological theme applied in the chapter in question. The choice of a thematic approach to the analysis of the (ROB) excavations at Nijmegen between 1957 and 1981 in this book was determined on the one hand by the characteristics of settlement structures from the Roman period and the desire to formulate an adequate hypothesis. On the other hand it was also influenced by conceptual and methodical developments in Dutch archaeology during the 1970s and 80s. These were dominated by the ideas of New Archaeology and may be referred to as processual, i.e. focusing attention on the reconstruction of human communities from the past and how they functioned, the development of these communities and the explanation for the processes of change. The meticulousness of the archaeological

⁵ Bloemers 1999.

⁶ Bloemers, Hulst & Willems 1980.

⁷ Willems 1981; 1984a.

⁸ Lauwerier 1988.

⁹ Roymans 1990, 268-269; Slofstra 1991, 169-189.

¹⁰ This research theme was organized in 2004 in two research programmes funded by the Netherlands Organization for Scientific Research: 'The Batavians: ethnic identity in a frontier situation' and 'Rural communities in the *civitas Batavorum* and their integration into the Roman empire'.

¹¹ Heidinga 1993; Heidinga & Offenbergh 1992; Van der Velde 2011, 138-140.

observations and the transformation processes related are of importance to the development of archaeological method.¹²

When assessing the themes chosen, one should know that they were, in theory, decided on between 1982 and 1984, the period in which the above-mentioned research by Roymans, Slofstra and Willems was in an important formative phase as far as the concepts were concerned. It was in this period too that our joint volume on 'Roman and Native in the Low Countries. Spheres of Interaction' was published.¹³ The choice reflects the areas for attention which they and I were focusing on at that time and my attempt to link these up, wherever useful, with a regionally-oriented research approach. An account of the use of such concepts - from 1990 - can be found in Chapter 26 of 'Pre- & protohistorie van de Lage Landen' entitled 'Het acculturatieproces: romanisering en germanisering'.¹⁴ Here several central elements recur which throw light on the relation between native and Roman societies: the characteristics of the socio-cultural systems concerned, the differences in their nature and levels, their significance for the degree and method of integration and the role of local elites and intermediate groups. Chapters 3 and 5 which discuss respectively the integration phase in the fourth to fifth century and the disintegration phase in the fourth to fifth century are the result. Though Chapter 2 describes a cemetery from the Middle Iron Age without any link with the Roman period, it does form a basis for a socio-political analysis of a tribal society and is therefore connected with the issue just mentioned. Chapter 4 is of a completely different nature: it deals with an intra-site analysis from a socio-economic and functional perspective. It therefore belongs to the tradition of processual archaeology, but has no direct relation to the problem of native and Roman integration.¹⁵

1.4 SCALES AND LEGEND OF ILLUSTRATIONS

Scales of illustrations of finds and features and the indication of soil types are in a standardized form as shown in Figure 1.3.

1.5 ACKNOWLEDGEMENTS: TEAMWORK OVER GENERATIONS

As mentioned in Section 1.1, excavating a 'mega-site' and archaeological 'goody' like Roman Nijmegen is teamwork that extends over generations of archaeologists and their collaborators. Those like myself who have had the privilege to direct a phase in this long chain of research have to realise that they profit from the work of their predecessors and that they have to facilitate future research of their successors. And one becomes aware of the importance of teamwork on all levels of research activity and of one's dependency on time bound conditions favouring or frustrating opportunities to promote new knowledge and insights. From this background I wish to express my deep gratitude to a number of people from different institutions who have been involved in the research that is presented in this book. It is impossible to mention all of them and I will restrict myself to a select group of people I feel particularly obliged to because of my personal experience with Roman Nijmegen.

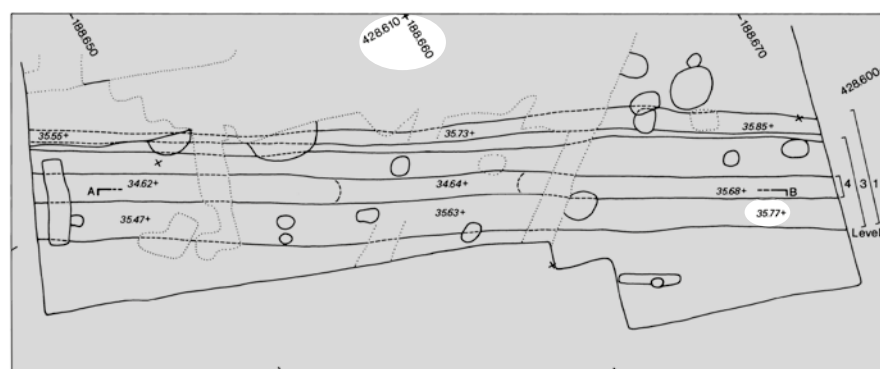
Post-war archaeology in the severely damaged town of Nijmegen is associated with H. Brunsting, curator of the National Museum of Antiquities (Rijksmuseum van Oudheden RMO) in Leiden and the new State Service for Archaeological Investigations (Rijksdienst voor het Oudheidkundig Bodemonderzoek ROB) in Amersfoort. This joint venture has been responsible for the large excavations of the late Roman cemetery in the town centre during the 1950s and the Roman legionary camp on the Hunerberg during the 1960s. Both activities have provided important building blocks for the topography of Roman Nijmegen. The legionary site is the subject of Chapter 4 and two of the three areas analysed have been excavated under the direction of Brunsting and field technician R. Woudstra. During my first archaeological field work as an unexperienced undergraduate in the summer of 1960, the latter enticed me into opting for Roman archaeology. It was also R. Woudstra who convinced W.A. van Es, the director of the State Service for Archaeological Investigations, of the urgency to resume the excavations in 1972 with a focus on the areas outside the legionary camp. Thanks to Van Es' policy and

¹² Bloemers & Van Dorp 1991, 66-67 and 144-145; Slofstra 1994.

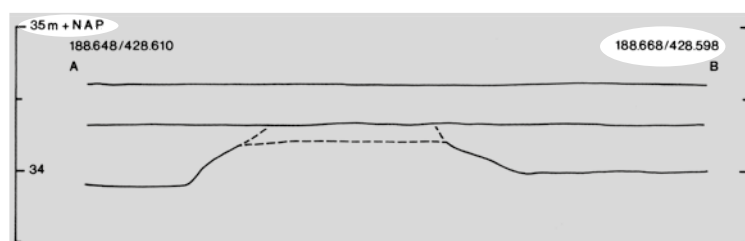
¹³ Brandt & Slofstra 1983.

¹⁴ Bloemers & Van Dorp 1991, 317-326.

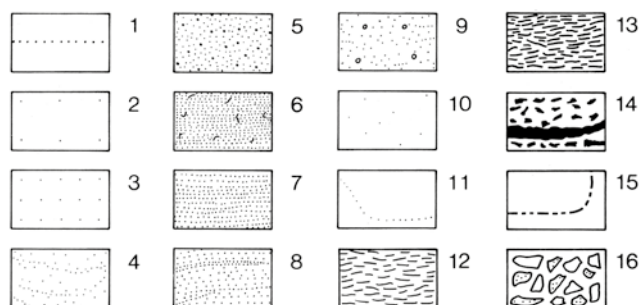
¹⁵ Starting from previous research on Roman Nijmegen and the Batavian area as described in Section 1.1-2, a research programme dealing with the relationship between these two themes was financed by the Netherlands Organization for Scientific Research between 2001-2005. The programme is entitled 'Roman Nijmegen: headquarters and capital in the region of the Batavians.'



a



b



c

Figure 1.3 Illustrations of objects and legend for the maps and sections.

All objects - in the text indicated with an asterisk * - are illustrated at scale 1:4 unless otherwise indicated.

Legend for maps and sections: a. 35.77+: Dutch Datum Level, 188.660/428.610: topographical coordinates; b. 35 m + NAP.: Dutch Datum Level, 188.668/428.598: topographical coordinates; c. symbols indicating soil types and objects: 1. modern top soil; 2. light layer (raised); 3. dark layer (raised); 4. light sand; 5. dark sand; 6. dirty dark sand; 7. brown sand; 8. layered sand (filling); 9. sand with small stones (gravel); 10. clean sand; 11. disturbed; 12. loam; 13. burnt loam; 14. char coal (fragments); 15. robber trench; 16. ceramic fragments (pottery, tiles).

support we - the team in the field - were able to counter by large-scale rescue excavations the intensive construction activities that threatened Roman remains in the 1970s. In this phase it was primarily K. Greving who played an important role and as field technician directed the work from day to day and from month to month; his observations in the field documented in hundreds of drawings are a crucial source for the analyses presented in this book. His work has been made possible by B. and A. de Wit,

the contractors who did the groundwork in cooperation with the over 20 workmen supplied by the Werkvoorzieningschap Nijmegen en omstreken. S.J.A. Kuppens and A.W.P.M. Penders, the photographers of the State Service took numerous photographs to document features and finds on a regular basis. The three successive student assistants, W.J.H. Willems, J.R.A.M. Thijssen and P.A.M. Zoetbrood, shared over the years the responsibility for the administration of the large number of



Figure 1.4 Nijmegen. Part of the ROB crew during the 1974 excavation of the eastern front of the legionary fort of the Tenth Legion in the Esdoornstraat (trench 47). From left to right in the centre (4-8th position) Klaas Greving (ROB), Tom Bloemers (ROB), Ben de Wit (contractor), Rob Lutter (ROB) and Nol de Wit (contractor); the student-assistant Willem Willems (ROB) is not present.

finds. Many important finds such as grave gifts were meticulously documented during the field work by fine drawings made by A.M. Nijs (Werkvoorzieningschap Nijmegen e.o.). I thank all the members of this team, named and unnamed, for their support, craftsmanship and loyalty. Finally the engagement of the Public Works Office of the city of Nijmegen must be mentioned for the proper coordination of the various activities and the planning of the excavations. The help of their surveyors and particularly of W.J.A. de Jong to establish an accurate topographical grid in the field has been of immense value to locate and link Roman features over a great distance in an urban environment.

The analysis of the selected excavations is the result of the cooperation between the Cultural Heritage Agency of the Netherlands (former State Service for Archaeological Investigations) and the Amsterdam Centre for Ancient Studies and Archaeology (ACASA; former Amsterdam Archaeological Centre) of the University of Amsterdam. The State Service facilitated the drawing and photographing of maps and figures by H. de Kort and F. Hoedemaker, the English translation of the text by C. Jefferis and the operation of the first digital data base by P.A.M. Zoetbrood. I have highly appreciated their professional engagement and in particular the long-term commitment of C. Jefferis. Apart from my own work, three students

prepared their master theses analysing pottery finds from various sites by investing their considerable talents: R.M. van Dierendonck, M. Erdrich and A. Vanderhoeven. And S.Y. Comis, L. Smits, E. Schouten and G.F. IJzereef provided the analysis of the organic material found in the Iron Age cart burial. R.C.G.M. Lauwerier analysed the huge number of animal bones found in the fourth-century single ditch on the Valkhof. J.S. Boersma and J. Raap studied the coins and D. Teunissen analysed the palynological samples collected from this ditch. Most of the work on the manuscript was done during the 1980s, but its completion by myself has been seriously delayed because of

other priorities, obligations and opportunities during the past twenty years. Conditions for publication of 'old excavations' by the present Rijksdienst voor het Cultureel Erfgoed (Cultural Heritage Agency of the Netherlands RCE) have since then changed immensely. Thanks to the dedication of L. Theunissen especially, but also J. Deeben, J. Pors and M. Haars, the production of this book was successfully completed. R. Polak (Radboud University Nijmegen) has read the pre-final version of the manuscript, checked the relation between text, tables and figures in a meticulous way and invested his expertise of Roman Nijmegen and archaeology in a very constructive manner.



Figure 2.1 Nijmegen: location of the Iron Age cemetery. Scale 1:10,000. Legend: 1. altitude; 2. railway; 3. excavated area (situation 1982); 4. topographical coordinates; 5. location of the Iron Age cemetery.

2 A small Middle Iron Age cemetery with a cart burial in Nijmegen: an aspect of cultural evolution

Even in systematic research designs, coincidence and finder's luck continue to play a role which is not to be underestimated in archaeological field work. Thus it was in Nijmegen, where in the wake of the long term excavations of the Roman occupation by the former State Service for Archaeological Investigations in the Netherlands a small, yet interesting cemetery of the Middle Iron Age was unexpectedly revealed in passing. Small because there were only five graves, interesting because one of these graves contained the remains of a cart and horse gear.¹⁶

2.1 THE CEMETERY

The cemetery was laid out on the ridge of the outwash plain west of the push moraine at Nijmegen, and is only about 50 m from the steep northern edge, from which there is a wonderful view over the Gelderse Poort, the place where the rivers Waal and Rhine break through the moraine (Fig. 2.1).¹⁷ It belongs to a series of settlements and cemeteries dated in the Bronze and Iron Age, stretching over the edge of the outwash plain from the Kops Plateau in the east as far as the modern railroad in the west.¹⁸

The five burials are scattered over an area of no more than 30 x 10 m. Three graves lie close to one another in the south, two others - including the cart burial - lie to the north, more widely spaced (Fig. 2.2). Immediately to the north of the vehicle burial was an extensive, deep disturbance and a very large area outside trench no. 60 to the east of the three burials was also badly disturbed.

The possibility that there were originally more burials here cannot therefore be entirely excluded. On the other hand, no other burials were located in the undisturbed areas which extended 10 m to the east and 25 m to the west.

The cremated remains were interred in small, more or less circular pits (30-80 cm in diameter). The pits extended no more than 10-20 cm below the excavated surface (38.49-38.69 m NAP) and 50-70 cm under the supposed Roman surface as indicated by a small Roman road: they may therefore have been 50-70 cm deep. Only relatively small quantities of rather finely burnt bone fragments were found, with scarcely any charcoal. Taken in conjunction

with the clean fill of the grave pit, this could indicate that for the burial itself only the bone fragments were collected - with extreme care - from the burnt-out pyre. There were no traces whatsoever of any structures around the graves. The southern three burials lie so close to one another (c. 2 m) that they could never have been covered by individual mounds, though a collective tumulus is a possibility. The distance between the two northern graves is about 10 m, sufficient for the construction of a mound over each of them separately. Visible traces of any possible mound will have fallen victim to levelling during the intensive Roman occupation of the site. Indeed, four of the five graves must have been saved only because they lie exactly under a Roman road!

2.2 THE CART BURIAL NO. 60/9

2.2.1 The grave and the retrieval method

The largest grave pit (70 x 80 cm) was situated to the north, about 10 m from its nearest neighbour (Fig. 2.2 no. 9).¹⁹ When, during clearance, it became obvious that the grave contained a large quantity of ironwork, the entire grave was lifted in a metal container and transported to the conservation laboratory of the State Service for Archaeological Investigations at Amersfoort. Here, where the grave could be cleaned up at leisure and with due attention, it became increasingly evident just how important the find was. In places, the ironwork had corroded to an impenetrable mass with the gravelly sand of the outwash plain. During the process of restoration it was decided to conserve this part - which contained both the horse-bits as well as the nave-hoops - without attempting to separate the lumps. The tyres lay somewhat apart; it was not possible to preserve them in their entirety. During treatment, a full-size location sketch was made and a photographic record made (Fig. 2.3). The position of the cluster of horse-bits and nave-hoops after cleaning may differ from its original positioning. Though cremated bone was recovered, there was almost no trace of any charcoal.

¹⁶ This chapter was first published as Bloemers 1986b. The present version contains essential additional information like the sex determination of grave no. 60/9.

¹⁷ The discovery of the cemetery was first mentioned in Bloemers 1975a, 162. It was then provisionally and incorrectly dated to the first century BC. See also Fontijn 1996a, 43-44.

¹⁸ Fontijn 1996a, 31; Van den Broeke 2005, 25-34 and afb. 7.

¹⁹ Part of the cart burial was first illustrated and summarily described in Bloemers, Louwe Kooijmans & Sarfatij 1981, 73.

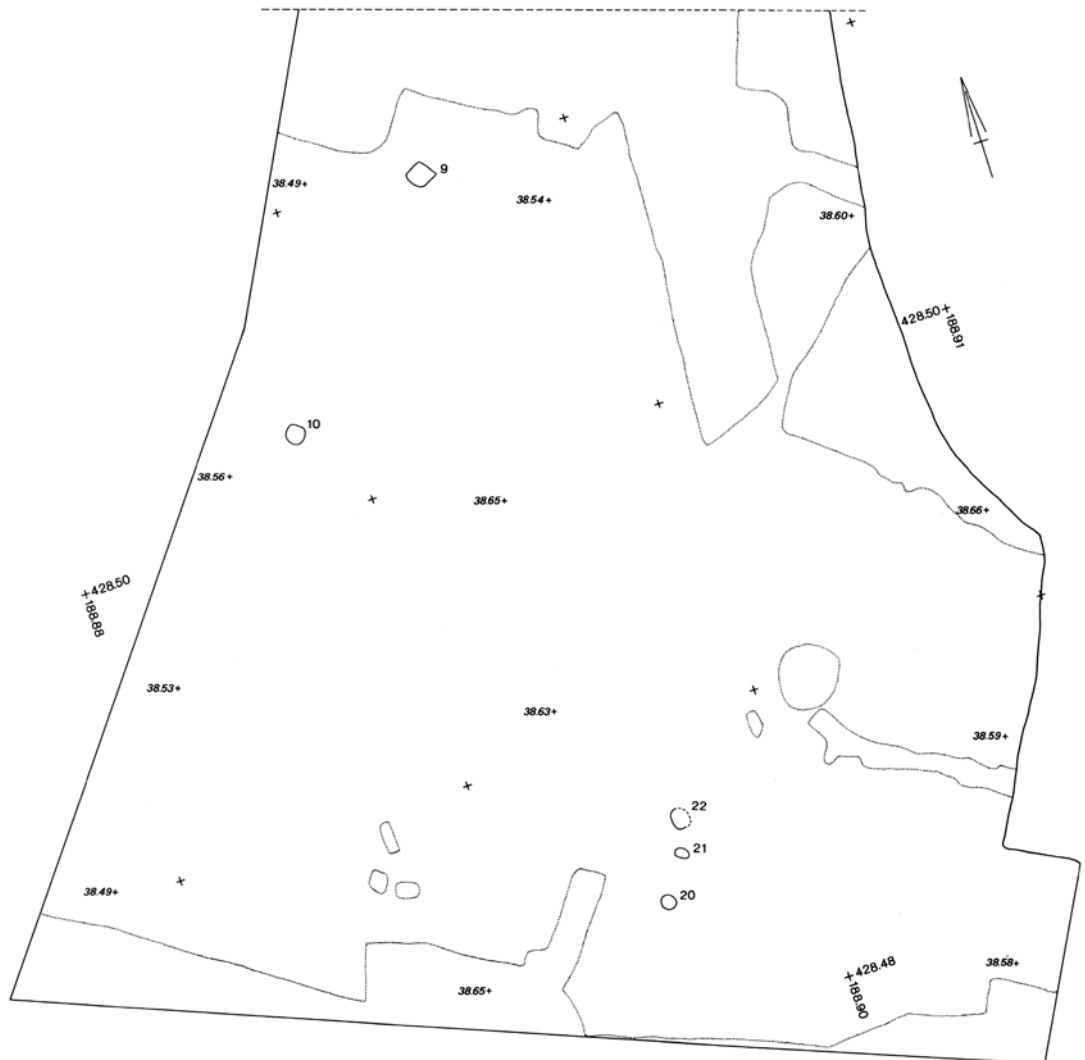


Figure 2.2 Nijmegen. Trench no. 60 (partially) with the Iron Age burials nos. 9, 10 and 20-22. Scale 1:250.

2.2.2 Description of the grave goods

Weapons

The remnants of two or three weapons were recovered from amongst the corroded iron: a spear, an arrow or small spearhead and a shaft which possibly belongs to another small spearhead (Fig 2.4 nos. 1-3).

The spear is broken into three fragments, which lay in correct alignment in the grave and which fit together (Fig. 2.3 no. 15 and 2.4 no. 1). The weapon was not deliberately bent, so it is unnecessary to suppose that the breakage occurred deliberately prior to deposition in the grave. The total length of the spear, including the shaft is 62 cm. The hollow part of the socket is not perfectly round (length at least 5.3 cm,

greatest diameter 2 cm). The shaft was possibly longer originally since a rivet (0.15 cm thick) is driven through the metal about 2.5 cm from the bottom. The maximum width of the blade is 5.5 cm, the tip is forged to a narrow point with a pronounced midrib.

The small spear or arrowhead (Fig. 2.3 no. 20 and 2.4 no. 2) is incomplete: the point and part of the tang or socket are broken off (present length c. 4.5 cm, originally possibly c. 6 cm). The base of the tang is massive and oval in shape and it is not entirely clear whether the blade had a midrib.

A socket, hollow except for the last 0.5 cm (7.5 cm long; 0.6-1.5 cm diameter), must have belonged to a small spear point, the blade of

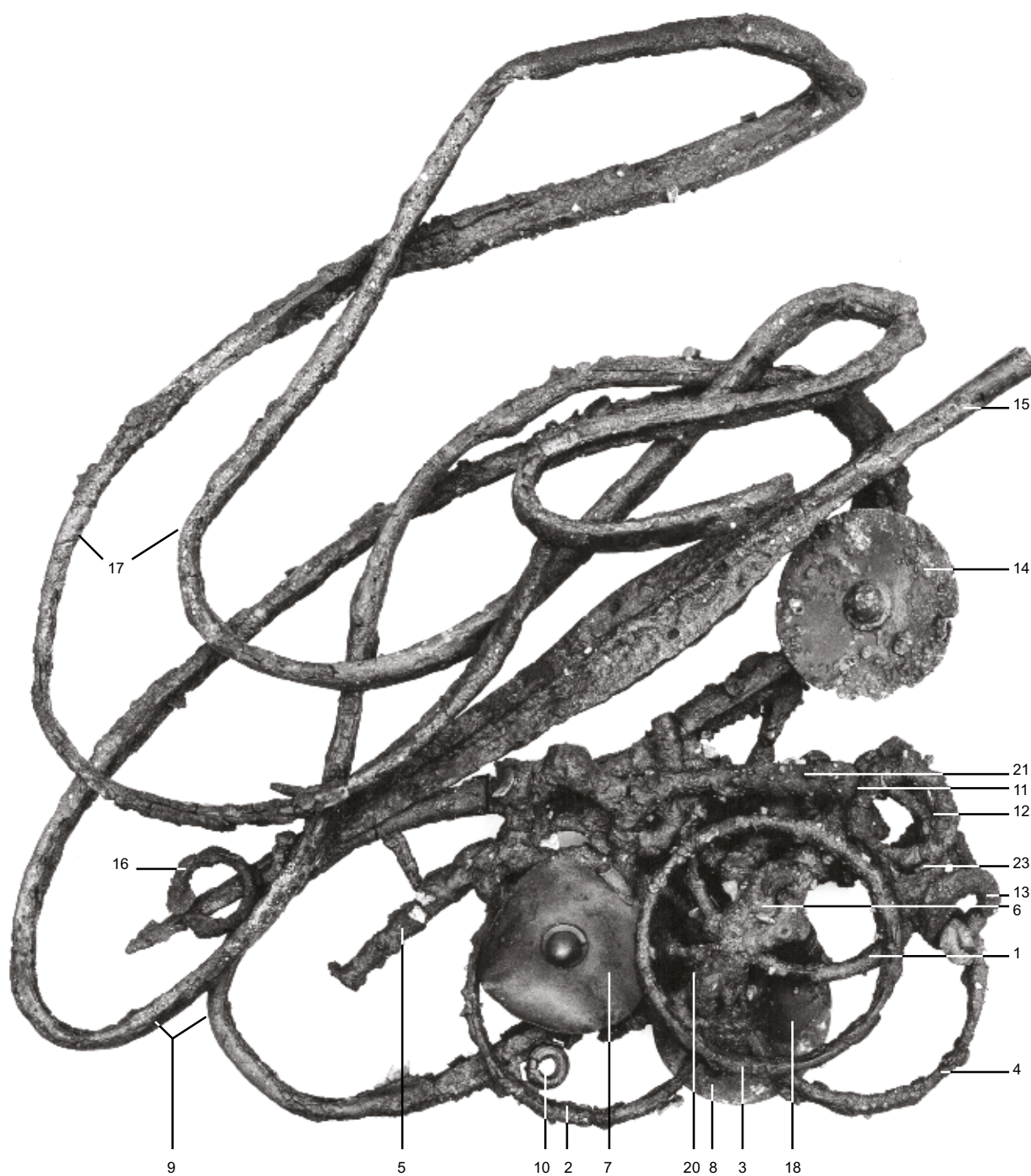


Figure 2.3 Nijmegen. Grave no. 60/9: iron and bronze work after laboratory cleaning. The lump with the nave-hoops to the lower right lies now probably in the right place.

Legend: nos. 1-4. iron nave-hoops; 5-6. iron horse-bits; 7-8, 14, 18. bronze phalerae; 9 and 17. iron wheel tyres; 10. bronze ring without split-pin; 11. bronze ring with split-pin; 12-13, 16, 19. iron rings; 15. iron spear; 20. iron arrow or spearhead; 21. iron shaft; 22. iron nail from wheel tyre; 23-25. iron U-shaped felloe-joins. The numbers 19, 22, 24 and 25 are not visible on the photo.

which has not been found: perhaps it is still concealed in the iron corrosion (Fig. 2.3 no. 21 and 2.4 no. 3).

The weapons make it likely at first glance that a man was buried in this grave.

Horse trappings

Two iron horse-bits, four bronze discs and a bronze boss may be regarded as forming part of the horse trappings (Fig. 2.3 and 2.5 nos. 5-6, 7-8, 14, 18 and 27; Section 2.4). The iron and bronze rings which are described below may also possibly be associated with horse fittings.

One bit is quite easily recognizable amongst the corroded ironwork (Fig. 2.3 and 2.5 no. 5). It is a three-link bit with sharply recurved cheek pieces (centre link c. 7-9 cm, side links c. 5 cm, cheek pieces 28 cm long). Although an eye occurs on the inside of the cheek pieces, the exact method of attachment to the bit is unclear. The bit was made from round, forged bars of iron (1.3-1.5 cm in diameter). The two cheek pieces and the mouthpiece of a second three-link bit can be distinguished with difficulty (Fig. 2.3 and 2.5 no. 6).

Four round bronze phalerae were found in the grave (Fig. 2.3 and 2.5 nos. 7-8, 14 and 18). They consist of three elements: a bronze disc with a separate tanged boss attached to the centre by an iron T-shaped sleeve. The disc is dished, 1 mm thick, 10.7-11.2 cm in diameter, and with a central hole 0.5-0.6 cm across. Neither surface of the disc is decorated. Thickness, regularity of shape and finish of the surface all indicate that the discs must have been cast bronze work. The undecorated tanged boss is solid bronze, cast in a single piece with a somewhat pointed domed head with a slightly bevelled edge (diameter of head 2.7-3.1 cm; height 1.8 cm; total length 3.2 cm). The tang (1.4 cm long) passes through the central hole of the disc and the boss is secured to the disc by means of an iron T-shaped sleeve which fits over the end of the tang. The end of the tang was struck to flatten it and to prevent movement of the sleeve, while leaving a space of about 1 cm between the sleeve and the disc. The sleeve head is oval (2 cm long). The T-shaped sleeves would have enabled the discs to be mounted on leather straps (or strap junctions), on either side of the bridles, for example.²⁰

A single unattached knob of identical construction to those on the four discs, but

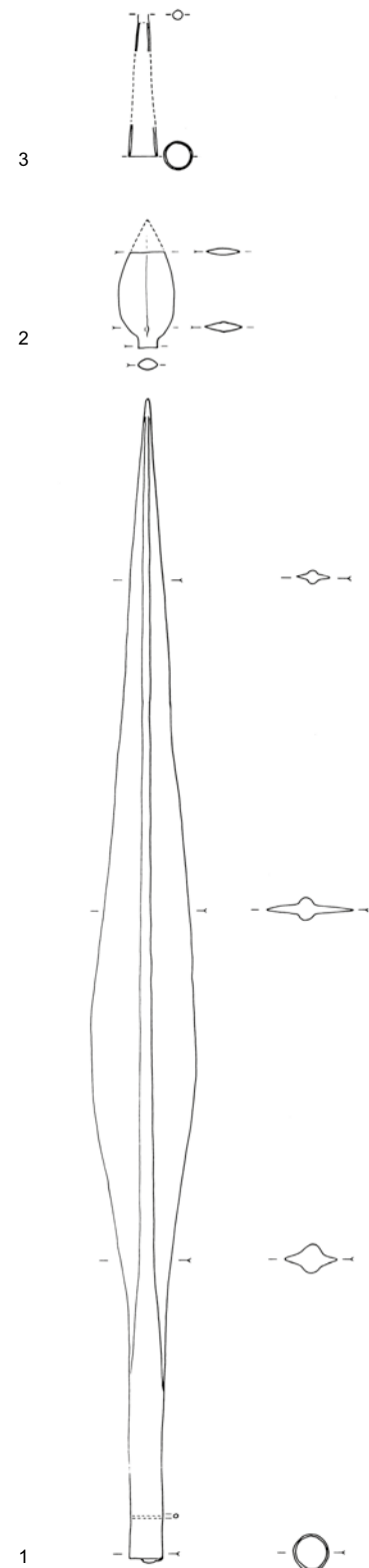


Figure 2.4 Nijmegen. Grave no. 60/9. 1. iron spear no. 15; 2. arrow or spearhead no. 20; 3. shaft no. 21.

²⁰ See for example Mariën 1958, 237 fig. 46 nos. 117, 146 and 152.

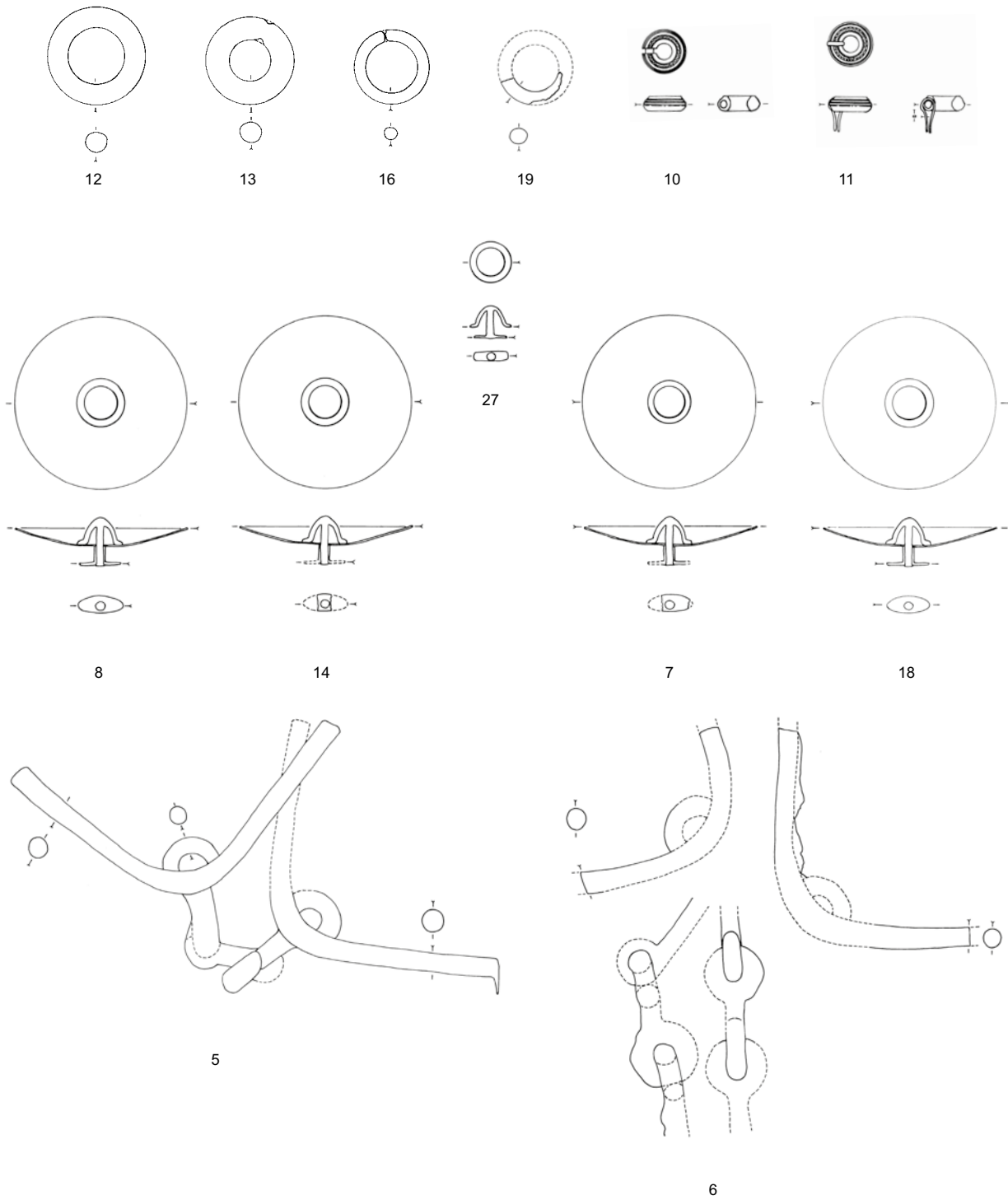


Figure 2.5 Nijmegen. Grave no. 60/9. Iron and bronze horse trappings.

Legend: nos. 5-6. iron horse-bits; 7-8, 14, 18. bronze phalerae; 10. bronze ring without split-pin; 11. bronze ring with split-pin; 12-13, 16, 19. iron rings; 27. single bronze boss.

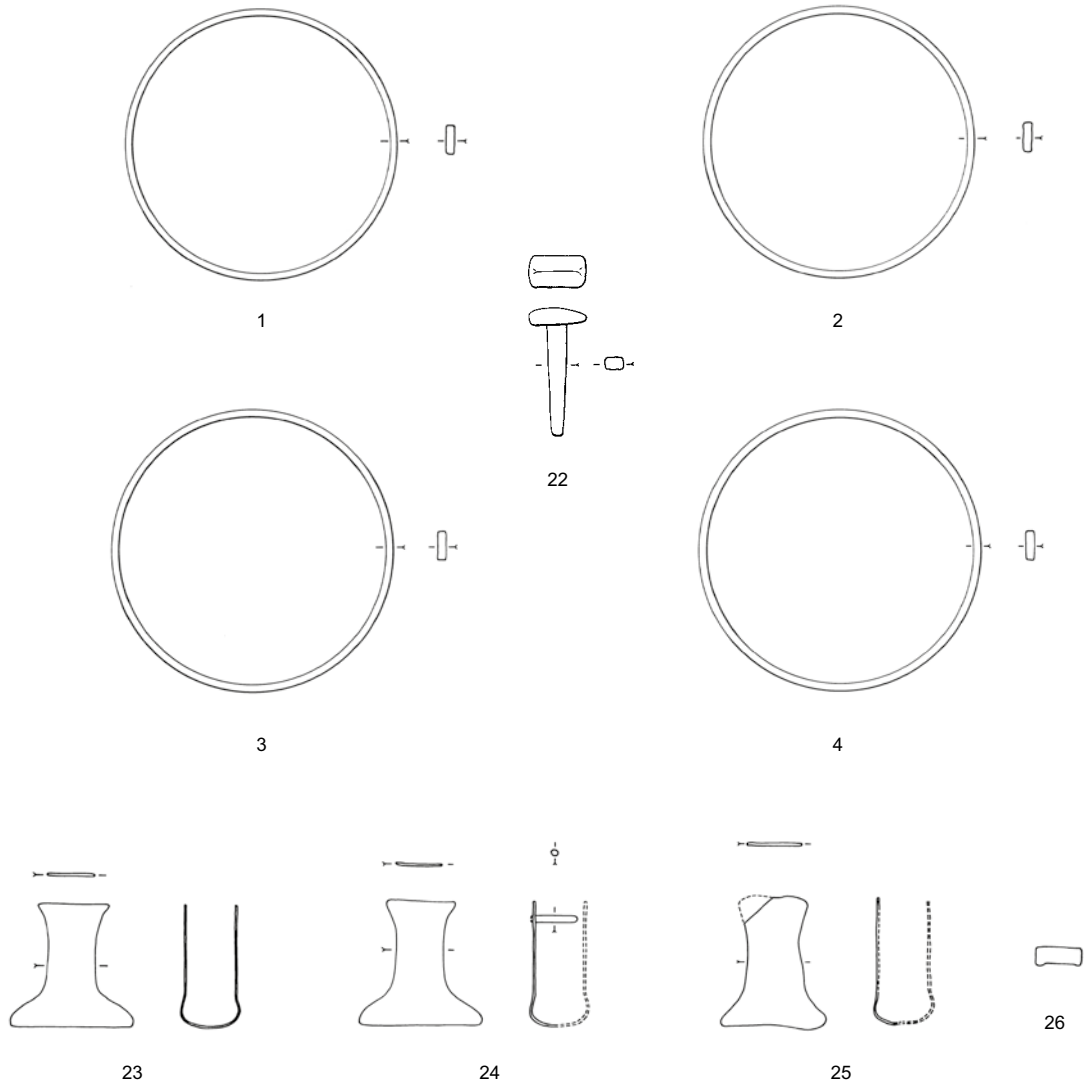


Figure 2.6 Nijmegen. Grave no. 60/9. Iron vehicle fittings.

Legend: nos. 1-4. iron nave-hoops; 22. iron nail from wheel tyre; 23-25. iron U-shaped felloe-joints; 26. cross-section from a wheel tyre. Scale 1:4.

lacking the iron sleeve was also found (Fig. 2.5 no. 27). Since all four phalerae still retain their central boss, this knob must have served some other purpose, unless it is the only remaining component of a fifth disc. Based on the uniform dimensions of all the bosses, they could well have been cast in the same mould. Neither the iron horse-bits nor the bronze phalerae and single knob display the slightest trace of any effect of fire, heat or of deliberate damage. A single disc is slightly bent, but this need not have been deliberate (Fig. 2.5 no. 7). The presence of the two horse-bits clearly indicates that paired traction is concerned. This is supported by the phalerae, four in number,

which could have been mounted in pairs on the two bridles.²¹ The same is true of the two rings with sunk bronze split-pins (Section 2.4). Only the bronze knob lacks a companion, though in theory, this might still remain hidden in the lumps of iron corrosion. In all events, the principal elements of the bridles seem to have been deposited more or less complete in the grave: perhaps the leather bridles were deposited intact.

²¹ For the paired occurrence of bridle fittings see Kossack 1954, 116-118.

Vehicle fittings (Fig. 2.6)

Recognizable vehicle fittings remaining are: four nave-hoops, the tyres, and three (fragmentary) U-shaped felloe-joints.²² All are made of iron.

There are four complete, circular bands of iron which can be identified as nave-hoops (Fig. 2.3 and 2.6 nos.1-4) with the following dimensions (Table 2.1).

Significantly, the four nave-hoops probably belonging to two naves lay very close together. Possibly the naves were intact when put in the grave. After the wooden nave had rotted away, the upper hoops slipped away over the lower ones, suggesting the following arrangement based on either dimensions or position (Table 2.2).

Since hoops nos. 1 and 2 lie relatively far apart and without any overlap, the second alternative (nos. 1 + 4 and 2 + 3) is the more plausible, in which case each nave would have been fitted with a smaller and a larger hoop. If however the naves were taken apart after the fire, which seems to have happened (see Section 2.2), the hoops may have been collected and deposited in a random composition. In that case, the second alternative for the combinations of the hoops (nos. 1 + 4 and 2 + 3) remains possible and still the more plausible one for symmetry's sake. The wheel tyres are rather more difficult to describe and interpret (Fig. 2.3 nos. 9, 17, 22-26, and 2.6 nos. 22-26). In contrast to the other equipment, these were certainly deliberately deformed and perhaps even broken since neither of the tyre hoops is still closed. The poor condition of the tyres constitutes an additional difficulty in estimating the size or number of the tyres. The total remaining length of the iron tyre strips is about 502 cm, the width c. 2.4 cm, the thickness of metal 0.9-1.0 cm, thus appreciably thicker than the nave-hoops. Using the formula ' $2 \pi r = \pi \cdot \text{diameter}$ ' for the calculation of the circumference of the tyres, in association with the wheel diameter of 80-95 cm usual for Middle Iron Age vehicles in the Hunsrück-Eifel²³ we obtain the following lengths (Table 2.3).

In view of our total length of 502 cm, we presumably have the tyres of two wheels 80-90 cm in diameter. The rims of the tyres are slightly

Table 2.1 Nijmegen. Grave no. 60/9. Dimensions of nave-hoops in cm.

No.	Diameter	Width	Thickness
1	14.6	-	-
2	14.6	1.7	0.4-0.5
3	14.9	1.5	0.5-0.6
4	15.2	1.7	-

Table 2.2 Nijmegen. Grave no. 60/9. Possible arrangements of nave-hoops.

	No.	Size in cm	Position
Dimensions	1 + 2	14.6 + 14.6	upper + lower
(option 1)	3 + 4	14.9 + 15.2	upper + lower
Positions	3 + 2	14.9 + 14.6	upper + lower
(option 2)	1 + 4	14.6 + 15.2	upper + lower

Option 1 based on (similar) dimensions, option 2 on (attested) positions.

Table 2.3 Nijmegen. Grave no. 60/9. Circumference of the tyres.

Pi	x Diameter in cm	= Circumference in cm
3.14159	80	251.3
3.14159	85	267.0
3.14159	90	282.7
3.14159	95	298.5

thickened on the inside, probably to counter lateral sliding (Fig. 2.6 no. 26). Serving the same purpose and in one instance distinguishable are nails with rectangular shafts (length 6.4 cm; thickness 0.4 x 0.9 cm) and flat, rectangular heads (2.3 x 1 cm) which were struck through the tyres into the wooden felloe (Fig. 2.6 no. 22). Only one of the three U-shaped felloe-joints is complete (Fig. 2.3 and 2.6 no. 23). It is 6.6 cm long and measures 2.5 cm between the arms and 3.0 cm at the closed end. Seen from the side, the felloe-join widens from 3.7 to 6.5 cm at the closed end. The iron plate is 0.1 cm thick. The fragments of the two other examples are both arms which have broken off (Fig. 2.6 nos. 24-25). One is 6.6 cm long and retains

²² A synopsis of construction and use of wheeled vehicles is given in Piggott 1983, 138-238.

²³ Haffner 1983, 246; Piggott 1983, 159-160 and 211-213.

**Table 2.4 Nijmegen. Grave no. 60/9.
The measurements of felloe-joins in cm.**

No.	Length	Width (closed end)	Width (open end)
1	6.6	6.5	3.7
2	6.6	6.5	3.7
3	7.0	5.6	3.5?

an iron nail (at least 2.4 x 0.3 cm long) near to the open end, the other measures 7.0 cm, but is narrower. The measurements may be summarized (Table 2.4).

The felloe-joins are intended to secure the individual segments of wooden spoked wheels. The number of such joins may vary per wheel from one (e.g. Djebjerg and Kärlich) to sixteen (Salamis), and in part depends on the method of construction used for the spoked wheels and the number of felloe segments. In some cases like the wheels from Hradenín and Grosseibstadt it is clear that the joins held an inner and an outer felloe together.²⁴ In the case of the Nijmegen cart it may be assumed that there was a minimum of two per wheel: one is therefore lost.

The dimensions of the felloe-joins indicate that the felloes were about 3.5 cm wide and at least 7 cm thick. Thus the tyres, which were only 2.4 cm wide, did cover almost the entire outside edge of the wheel.

Miscellaneous metal objects; textiles; cremations

Finally, mention must be made of some rings and nails (Fig. 2.5 nos. 10-13, 16 and 19). There are two relatively small (diameter 2.8 cm external; 1.0 cm internal) and thick (1.0 cm) bronze rings (Fig. 2.5 nos. 10-11). A channel 0.4-0.5 cm wide is provided to take a narrow bronze

split-pin and save it from lateral movement. The bronze wire still remains around one of the rings (length 2.7 cm; from ring to end c. 1.4 cm; thickness 0.1-0.2 cm; width 0.3 cm; Fig. 2.5 no. 11). On each ring, one face is convex and undecorated while the other is faceted with grooves occurring on the outer side. The rings show no effect of either heat or fire. There are five iron rings circular in section and varying in size (Fig. 2.3 nos. 12, 13, 16 and 2.5 nos. 12, 13, 16, 19). One is extremely poorly preserved, another was possibly grooved for a split-pin or a narrow thong, comparable to the construction of the bronze rings. The rings may have been used as belt-fittings, either for men or women.²⁵ The dimensions may be summarized (Table 2.5).

A few other fragments of iron may come from nails. On the iron fragments six pieces of textiles are found (see Appendix I.1).

Human cremated bone has been analysed in two independent studies (E. Schouten and L. Smits; see Appendix I.2) and in both cases ascribed to an adult woman (age 20-40 years). The animal bones belong to three pigs (see Appendix I.2) probably deposited as ritual food for the dead.

2.2.3 The burial ritual and the deposition of the grave goods

From the description given of the finds and the find circumstances, it will be apparent that the treatment of the corpse differed from that of the accompanying gifts of personal weapons, the horse harness and the cart. The corpse was cremated and only a small quantity of charred bone fragment was selected for burial: no part of the pyre, in whatever form, was incorporated in the grave. The cremated human remains must therefore have been carefully picked out of the remains of the pyre together with parts of the ritual food for the dead for burial purposes

Table 2.5 Nijmegen. Grave no. 60/9. Diameters of rings

No.	Figure	Diameter in cm (external)	Diameter in cm (internal)	Thickness (in cm)
1		c. 4	-	1.2 or more
2	2.5 no.16	4.8	3.4	-
3	2.5 no.19	4.8	3.0	-
4	2.5 no.13	5.6	2.8	-
5	2.5 no.12	6.4	3.6	-

²⁴ Kossack 1971, 145 Fig. 28, 150 Fig. 31, 154 Fig. 33 and 156 Fig. 34; Egg 1987, 82-84 Abb. 5. For a typology and the (re-)construction of spoked wheels see Hayen 1973, 149-155 and 170-173; 1980-1981, 140 and 144-146; Hayen *et al.* 1981, 24-25.

²⁵ Waldhauser 1978, 119-122. I am obliged to K. Pieta, Nitra (Slovakia) for this information.

and possibly deposited in a textile bag. Two horse harnesses were evidently not placed on the pyre since none of these items show any signs of fire or heat. Furthermore, their principal components appear to have been retained and deposited as a virtually complete set. The wooden shafts of the weapons might be burned on the pyre or removed before burning. The vehicle itself must have been placed on the pyre but only a selection of its parts has been deposited in the grave. The wooden sections of the cart such as axle, chassis and yoke pole were not placed in the grave. This might explain the scarcity of nails and the absence of lynch pins, terrets and pole end.²⁶ Surprisingly no indications for the treatment of the two horses belonging to the cart were observed. There is no clear association with the burnt horse bones in grave no. 60/20.

Of all the equipment, only the tyres were deliberately bent and broken. This rather suggests that the wooden wheel was dismantled during the removal of the iron tyre, possibly leaving only the nave with its metal fittings intact. The tyres could then have been flattened to fit into a relatively small grave pit. The procedure of deposition can be deduced from the position of the objects in the grave (Table 2.6). The sequence is:

1. felloe no. 9;
2. bit no. 6 and discs nos. 8 + 18;
3. nave-hoops nos. 2 + 4;
4. nave-hoop no. 1;
5. felloe-join 23;
6. belt rings nos. 12, 13 and 16;
7. bit no. 5 and discs nos. 7 + 14;
8. felloe no. 17 and nave-hoop no. 3;
9. spear and arrow;
- ? for the other felloe-joins, cremation and ring no. 19 no sequence can be established.

This sequence suggests the deposition of two sets each consisting of a horse trapping and parts of one wheel (steps 1-3 and 4-6) in such a way that the two felloes mark the beginning and the end of the deposition process.

Most of the tyre fragments occur in the south-western half of the grave. In the north-eastern corner, the nave-hoops lie in a heap with the horse harness: only a single phalera lies elsewhere, at the end of the spear butt. Since the nave-hoops nos. 1 and 3 are separated by the horse trapping nos. 4 and 7 it is not probable

that they were still in position on the wooden hub when put in the grave.

2.2.4 Man or woman?

The two independent anthropological analyses clearly indicate that in grave no. 60/9 an adult woman (age 20-40 years) was buried. Weapons, however, are generally associated with men. Carts are found in graves of men and women.²⁷ Is it possible that women also used weapons? Weapons need not be associated exclusively with combat, but can also be linked to hunting or status symbolism. The absence of a sword, which is generally interpreted as indicating a man, might support the interpretation as a female grave.²⁸

2.3 THE REMAINING BURIALS

2.3.1 Grave no. 60/21

Grave no. 60/21 is one of the group of three to the east and appeared as a modest round pit of 30-45 cm diameter. It contained a small quantity of cremated bone (130 g) and a small intact pot (7 cm high; maximum diameter 10.3 cm) (Fig. 2.7).

The vessel is burnished with a matt gloss of dark grey to black ware, tempered with sand, grog and organic material. The shape is characterized by the carinated form of the transitions from the low foot to the body, body to shoulder, shoulder to low, everted rim.

The cremation belongs to a child aged 13 years at the most (infans II; Appendix I.2).

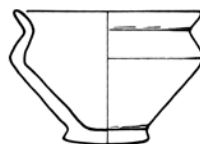


Figure 2.7 Nijmegen. Grave no. 60/21. Handmade vessel.

²⁶ For a reconstruction of the cart with the two horse harnesses see Fontijn 1996a, 44; 1996b, 24.

²⁷ Van Endert 1984, 55; 1986.

²⁸ Van Endert 1984, 48.

Table 2.6 Nijmegen. Grave no. 60/9. Matrix illustrating the (probable) sequence of deposition of vehicle fittings, horse trappings and weapons.

Action	Elements	Dead				Food	Vehicle			
		body	spear + arrow	textile	belt		cart	yoke pole	axle	wheel no.1
Burning		x	x	x	x	x	x	x	x	x
Collecting		textile bag?	x	x	iron rings nos. 12, 13, 16, 19	x	nails?			felloe no. 9
										flattening
Deposition step 1							nails?			x
Step 2										
Step 3										
Step 4										
Step 5										
Step 6					nos. 12, 13, 16					
Step 7										
Step 8										
Step 9			x							
Step ?					no. 19					
Step ?		textile bag?				textile bag?				

2.3.2 The other graves

The three remaining burials (nos. 60/10, 60/20 and 60/22) are all circular pits varying in diameter between 50-70 cm, and containing only meagre remains of cremations. There is not the slightest trace of any grave gifts.

Cremation burial no. 60/22 (247 g) belongs to an adult person but sex characteristics are lacking. The cremation burial in grave no. 60/20 belongs to a 2-3.5 year old horse and could be considered as a horse grave. The cremation in grave no. 60/10 has not been analysed.

2.4 DATING AND PARALLELS

The most obvious items available for the dating of grave no. 60/9 are the bridles. The bits are of a distinctive type, several variants of which occur in Bohemia, but which we also know from South and Central Germany and the Champagne region.²⁹ They appear in the latest phase of the Hallstatt and the first phase of the La Tène period. A variant with recurved cheek-pieces is especially characteristic of the latter period.³⁰ Large phalerae mounted on the bridles are also a

familiar feature of the period and occur in many different shapes.³¹ Exact parallels are difficult to locate, all the more so since illustrations are frequently insufficiently detailed. The phalerae from the early La Tène burial at Chassemy are perhaps nearest to the Nijmegen specimens.³² A two-wheeled vehicle burial in itself is also of significance for dating purposes. In the Hunsrück-Eifel, the first cart burials appear at the transition from the Hallstatt to the La Tène period, and subsequently this form of burial occurs with considerable frequency during the La Tène A phase (450-350 BC). The earlier vehicle burials of the late Hallstatt period in the Middle Rhine area are all of four-wheeled Chassemy-type wagons.³³ Cart burials are also well represented in the Ardennes and there they are mostly dated to between 450 and 400 BC.³⁴ This type of cart also occurs regularly in the La Tène graves of the Champagne region in the later part of La Tène A and in La Tène B.³⁵ In general terms, the extremely large spear supports the evidence of the cart. This type of spear with its pronounced midrib is familiar from the Hunsrück-Eifel and the Champagne region where it is common in graves from the end of the Hallstatt to well into the middle of the

²⁹ Joffroy & Bretz-Mahler 1959, 17-18 Fig. 12; Pauli 1983, 460-461; Soudská 1976, 631 nos. 2-3, 640 no. 2, and 645 no. 5. The Anloo hoard contains two bronze specimens of this type of bit as well as two bronze, openwork phalerae (De Laet & Glasbergen 1959, 172 and Pl. 44; Beuker, Van der Sanden & Van Vilsteren 1991, 40-42 and Fig. 48-49).

³⁰ Dehn 1975; 1980, 329.

³¹ Mariën 1958, 72 Fig 9 no. 123 and 124; Joffroy & Bretz-Mahler 1959, 17 and 19 Fig. 14; Dehn 1966; Kimmig 1970-1971, 166-167; Soudská 1976, 628 nos. 4-5 and 7-9, 631 nos. 5-7, 639 nos. 7-11, and 645 nos. 1-4, 6 and 8-11; Cahen-Delhaye 1981, 28-29 Fig. 13 nos. 17-21.

³² Joffroy & Bretz-Mahler 1959, 19 Fig. 14.4.

³³ Haffner 1983, 241. See also Piggott 1983, 158-159 and 199-207.

³⁴ Cahen-Delhaye 1975; 1976; 1983, 254; Cahen-Delhaye & Hurt 2013, 12-113.

³⁵ Joffroy & Bretz-Mahler 1959, 10-11 Fig. 2, and 25 Fig. 21; Van Endernt 1986, 244-247 and 275.

Action	Vehicle							Two horses		
				wheel no. 2				bodies	bit 6/discs nos. 8+18	bit 5/discs nos. 7+14
Burning				x				?		
Collecting	nave-hoop no. 2	nave-hoop no. 4	2 felloe joins	felloe no. 17	nave-hoop no. 1	nave-hoop no. 3	felloe join no. 23		x	x
				flattening						
Deposition step 1										
Step 2									x	
Step 3	x	x								
Step 4					x					
Step 5							x			
Step 6										
Step 7										x
Step 8				x		x				
Step 9										
Step ?			x							
Step ?										

La Tène period, i.e. from the sixth to the fourth century BC.³⁶

Altogether, it would appear reasonably certain that the cart burial no. 60/9 may be placed broadly in the Middle Iron Age, and more specifically dated from the second half of the fifth to the first half of the fourth century BC. A similar date for the vessel from grave no. 60/21 is quite acceptable. The carinated profile is one of the characteristic features of pottery in this period.³⁷ In 2003 a radiocarbon dating of the cremated human bones from grave no. 60/9 has become available giving a date of 2490 ± 50 BP (GrA-22969), which is about 100 years earlier than suggested above.³⁸

The burial ritual in which the deceased is given a cart, horse gear and weapons is closely related to the contemporary burial practices of the Ardennes, the Hunsrück-Eifel and northern France.³⁹ These 'West European' connections are confirmed by the cast bronze discs which seem to concentrate here, whereas the hammered discs all are found in Central Europe.⁴⁰ A major dissimilarity, however, lies in the fact that whereas elsewhere the corpse is generally inhumed, at Nijmegen it was cremated. The ritual of cremation is obviously

directly comparable to the mode of burial in the urnfields in the Netherlands.

Carts in burials need not specifically be associated with the burial ritual but can also be used for ceremonial purposes in the world of the living.⁴¹

2.5 THE FEASIBILITY OF A SOCIO-CULTURAL INTERPRETATION

2.5.1 Theory and method

Some comment of a theoretical and methodological nature is unavoidable prior to any attempt to discuss the opportunities and limitations of a socio-cultural interpretation. In view of the region - north-west Europe - and the period - the first millennium BC - the complexity of the socio-political structure must be sought primarily in the 'tribal' or 'chiefdom' level in the sense of Service, comparable to Fried's distinction in 'ranked' and 'hierarchical' societies.⁴² Despite the fact that anthropologists are concerned with still (in the recent past) living societies, the debate as to which criteria serve to place a particular society into one or other of

³⁶ Haffner 1976, 25-26, and Beil. 1-8; Hatt & Roualet 1977, Pl. II, III, XIV, and 1981, Pl. XXXV.

³⁷ Verwers 1972, 124 and 134-136.

³⁸ I thank J. Lanting (Groningen Institute of Archaeology) for this information.

³⁹ Cahen-Delhaye 1976; 1983; Cahen-Delhaye & Hurt 2013; Van Endert 1984; Flouest 1984; Haffner 1983; Haffner & Joachim 1984.

⁴⁰ Kimmig 1970-1971, 166-167 and Abb. 6.

⁴¹ Pare 1987, 212; 1989, 81 and 96.

⁴² Service 1971, 99-169; 1975, 44-46.

the categories, what the characteristics of such societies are and how clear cut or blurred the transition may be is not yet closed.⁴³ Pre- and protohistoric archaeologists are concerned with no longer living cultures and consequently have to make do with much more defective evidence, a drawback which is to some slight extent compensated for by the much greater depth in time which is covered by their research. The translation of anthropological characteristics into pre- or protohistory therefore requires considerable caution.⁴⁴

A comparable, if not identical problem concerns the possibilities of relating the primary pre- or protohistoric evidence and its archaeological context to the context of the system: this problem is the object of behavioural archaeology (Schiffer), middle-range theory (Binford) and interpretative theory (Clarke).⁴⁵ For Schiffer, the 'archaeological remains are a distorted reflection of a past behavioural system' and the object is to retrieve the cultural and noncultural formation processes which determine the archaeological record.⁴⁶ Binford's middle-range theory is directed to the 'accurate means of identification and good instruments for measuring properties of past cultural systems'.⁴⁷ The application of research which has considered the formulation of correlates which could link anthropological and archaeological criteria and which takes account of the (trans-)formation process is often superficial.⁴⁸ Here, it must be queried in how far it is justified in the case of burial analysis 'to define or classify *societies* (as ranked, stratified, etc.) on the basis of the differential *status* of *individuals* within those societies'; in the first place, burial analysis provides information on the position of the individual.⁴⁹ Finally, we need to be aware that 'each material trait is produced in relation to a set of symbolic schemes and has a meaning dependent on its place within those schemes. So the same material thing may have different meanings in different contexts'. Thus Hodder warns against 'any restriction of analyses to one class of data, such as mortuary remains, because the relationship between patterns in life and patterns in death depends on the cultural context'.⁵⁰

The foregoing is directly relevant to the question of in how far and in which context - be it archaeological or social - cemeteries may provide evidence for the socio-political organization of the society which made use of

that cemetery. Ranking of the individual burial or cemetery may be justified within the context of the Nijmegen cemetery, but to transpose the resulting conclusions onto the entire society of a much larger region demands greater caution, if only because it is precisely the Middle Iron Age which is so sparsely represented in cemeteries in the Netherlands.

2.5.2 The analysis of the Nijmegen cemetery

On the basis of the assumption that the Middle Iron Age cemetery excavated in Nijmegen is pretty well complete in so far as the number of burials is concerned, it is possible to formulate the following observations and assumptions. The cemetery is remarkably small, comprising only five graves. Grave no. 60/9 is conspicuous on account of the accompanying gifts of cart fittings, horse bridles and weapons, by its isolated position and by the larger grave pit; there is sufficient space for a tumulus of 10 m diameter or more, although definite evidence for such a mound is lacking. On the basis of the determination of the cremated bones the grave is proclaimed to be female. If the distance between the graves is accepted as evidence of status or social distance from grave no. 60/9, then grave no. 60/10 takes the first place (distance 9.75 m). Here there would be room for a tumulus, the exact dimensions of which would be dependent on those of the hypothetical tumulus over no. 60/9, but which could reach 5-8 m in diameter. The group of three graves (nos. 60/20-22) follows in second place (at a distance of 22-25 m). Within the group of three graves, no. 60/21 stands out due to the presence of the small vessel. There is no room for individual tumuli, though a communal mound with a minimum diameter of 4 m is a possibility. No. 60/22 belongs to an adult of unknown sex, no. 60/20 is a horse burial. It is clear that within this small group, perhaps a nuclear family, grave no. 60/9 occupies a dominant position. But which position could that be?

2.5.3 *Pater familias*, 'big man' or chief? Or big woman?

Seen against the background of the comments on theory and method, the question of the position held in life by the deceased in grave

⁴³ See Kloos 1976, 28 and 92-94 for distinguishing characteristics; Claessen 1974, 113-118; 1978.

⁴⁴ Claessen 1983, 9-10; Willems 1978, 82-84.

⁴⁵ Binford 1983b, 411-422 and n. 2; Clarke 1973, 17; Schiffer 1976; 1988. See also Raab & Goodyear 1984.

⁴⁶ Schiffer 1976, 11 and 13.

⁴⁷ Binford 1983a, 49.

⁴⁸ Peebles & Kus 1977; O'Shea 1981; 1984, especially 1-49; Frankenstein & Rowlands 1978 without particular attention to the (trans-)formation processes. See also Chapman & Randsborg 1981, 6-19 and Bloemers & Van Dorp 1991, 144-147.

⁴⁹ Renfrew 1983, 3-5 (Renfrew's italics).

⁵⁰ Hodder 1982, 152-153 ('contextual approach'); also Hodder 1986, 118-146.

no. 60/9 is by no means simple to answer. Head of the suggested small family seems possible, but could she have been more? If the other comparable burials from the region between Maas and Rhine are marshalled (Fig. 2.8), the limits of the evidence specifically relevant to this burial are soon exceeded, for the comparison is intended to establish the position of this particular individual, not the structure of the socio-political organization of the entire region.

Comparable conspicuous burials are those graves containing weaponry, horse harnesses or bronze vessels and dating to between the seventh and fifth centuries BC.⁵¹ These graves may be distinguished not only by their grave gifts, but also by the size of the mound over them, as in Oss (Vorstengraf: 52 m)⁵² and Hegelsom (19 m)⁵³. Where sufficient evidence is available, as in Haps⁵⁴, Hegelsom, Lommel-Kattenbosch⁵⁵, Meerlo⁵⁶, Rhenen⁵⁷, Venlo⁵⁸ and Wijshagen⁵⁹, these graves are all fully integrated into the surrounding cemetery, or, to put it differently, they are not set apart from the other graves. It is, furthermore, remarkable that, with the exception of the cemetery at Wijshagen, only one of these conspicuous graves is known from each cemetery. This fact might be explained by the supposition that there was no continuity from one generation to the other of the leading position concerned and that this position could be maintained for only a single generation. The suggested instability of the leading position would go some way to explaining why throughout the seventh to fifth centuries such important graves are scattered over the region, in a different place each time, suggesting a centre shifting from generation to generation. The Nijmegen cemetery differs from the other complexes in so far as it is very much smaller. In this respect, it is perhaps comparable to the Late Iron Age cemetery at Valkenburg-Vroenhof, which comprised 18 graves.⁶⁰ The question is whether this difference with the earlier graves must be interpreted as a symptom of a more separate and elite position, or of the smaller size of the group buried, or of a more segmentary society. It is possible that the exposed position of the Nijmegen cemetery near the edge of the outwash plain could emphasize such separation in both geographical and spatial terms.⁶¹ Evidence in the sense of the 'archaeological correlates of superordinate dimension of

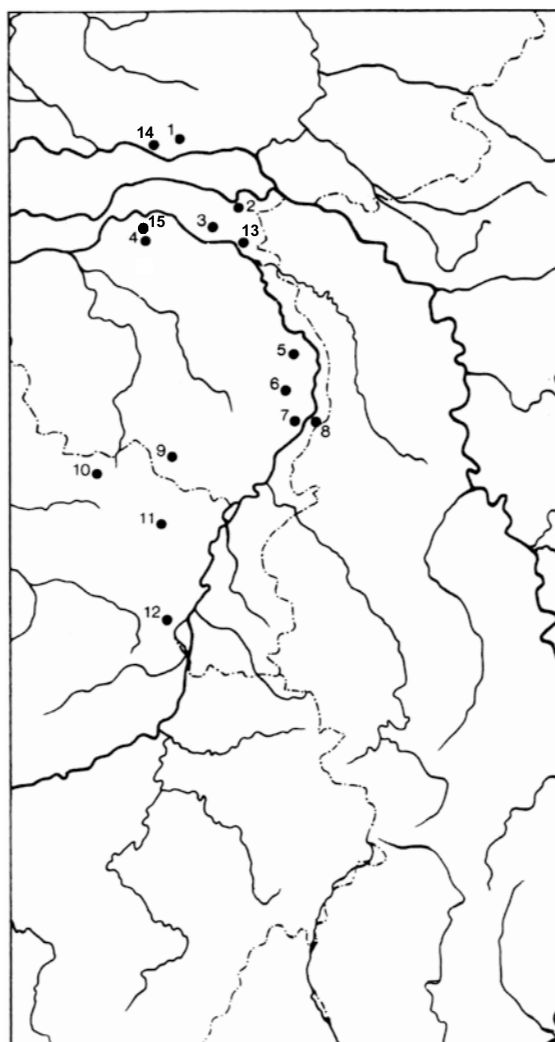


Figure 2.8 Lower Meuse basin: conspicuous burials with large mounds and/or grave goods like weaponry, horse harnesses and bronze vessels dating to between the seventh and fifth century BC. Scale 1: 2,000,000.

Legend: 1 Ede; 2 Nijmegen; 3 Wychen; 4 Oss-Vorstengraf; 5 Meerlo; 6 Hegelsom; 7 Baarlo; 8 Venlo-Jammerdaalse Heide; 9 Weert-Boshoever Heide; 10 Lommel-Kattenbosch; 11 Wijshagen; 12 Eigenbilzen; 13 Mook; 14 Rhenen; 15 Oss-Zevenbergen.

chiefdoms' as formulated by Peebles and Kus for mortuary practices is lacking from all the important burials which have been mentioned previously: 'A partial ordering which is based on symbols, energy expenditure and other variables of mortuary ritual, and which is not simultaneously ordered on the basis of age and sex'. The available evidence does fit the 'subordinate dimension' where the variables

⁵¹ See also De Laet 1979, 494-500; Fokkens & Jansen 2004, 80; Verwers 1976, 10-15.

⁵² Oss-Vorstengraf. Modderman 1964; Fokkens et al. 2011-2012. Oss-Zevenbergen: Fontijn, Van der Vaart & Jansen 2013.

⁵³ Bloemers & Willems 1980-1981, 37-39; Willems 1985, 158; Willems & Groenman-van Waateringe 1988.

⁵⁴ Verwers 1972, 55-62 and Beilage 4 no. 190.

⁵⁵ De Laet & Mariën 1950, a.o. 324 Tombelle 22 (Fig. 8) and 348 (Fig. 38). Verwers 1976.

⁵⁷ Van Heeringen 1998-1999.

⁵⁸ Possibly also Venlo-Jammerdaalse Heide: Willems 1983, 227-229.

⁵⁹ Maes & Van Impe 1986, 47-49; Van Impe & Creemers 1987.

⁶⁰ Bloemers 1975b, 40-41.

⁶¹ In a similar way Fontijn 1996c, 84.

listed are ordered on the basis of age and sex.⁶² The conclusion must then be that these individuals did not possess the rank of 'chief'. The absence of a recognizable hierarchy within a settlement such as that of Haps⁶³, and between the settlements mutually, might support this conclusion. If, on the other hand, the criteria are applied which Frankenstein and Rowlands have used to differentiate between paramount chief, vassal chief, sub-chief and minor chief, then these graves could, with due allowances, be placed on the level of the sub-chief or minor chief, depending on the composition of the grave goods.⁶⁴ If, however, we move to a lower level, that of the tribe, then the position of 'big man' could be brought into discussion. But what about an egalitarian society which is in

its development some way advanced towards a ranked society? Are the criteria, and especially the archaeological ones, used to identify the tribal 'big man' perhaps to a great extent identical to those for a sub- or minor chief at the bottom of a chiefdom hierarchy? This possibility must remain open, all the more if we follow Claessen: 'the big man is a very specific type of political leader. He is - as a type - an extreme on a continuum. His opposite is the *chief*, the head man.'⁶⁵ That the Nijmegen grave has been ascribed to a woman does not make much difference. She could be referred to as a 'big woman', 'big mother' or 'big wife' and the patronage concept might be replaced by 'matronage'.⁶⁶

⁶² Peebles & Kus 1977, 431

⁶³ Verwers 1972.

⁶⁴ Frankenstein & Rowlands 1978, 84-85.

⁶⁵ Claessen 1974, 102.

⁶⁶ Schrijvers 1986, 24-31.

3 The pre-Flavian occupation: an aspect of acculturation

The pre-Flavian occupation in Nijmegen extending from 19 BC to AD 70 is characterized by the variety and size of military and civilian activities related to the expansion of the Roman empire in northwest Europe. The emergence and disappearance of forts, settlements and a cemetery as shown in Figures 3.1 and 3.12 reflect the dynamics of this important and formative historic episode. The local inhabitants of the region were confronted with an immense number of foreigners in a way never seen before. For this reason the concept of acculturation has been adopted to interpret the results of the excavations described below (see Section 3.6).

3.1 THE LARGE EARLY ROMAN FORTIFICATION AS A TOPOGRAPHICAL ELEMENT

3.1.1 Introduction

In 1960, during the excavations in the northeast of the military camp area on the Hunerberg, two ditches and an impressive gate were discovered which could be dated back to the time of the Emperor Augustus. On the basis of their similarity of construction and shape, these features were linked with the two ditches and the gate which had already been discovered approximately 640 m further west by Holwerda and Vermeulen some decades before.⁶⁷ Together they formed the northwest and southeast limits of a fortification, the exact size of which could not yet then be determined (Fig. 3.1 no. 5). It was correctly assumed that the steep slope in the northeast formed the most obvious demarcation on that side. Between 1974 and 1978 the course of the ditches in the southwest was gradually retraced, despite the fact that the site in question had been completely built over. In particular, the plans of the city of Nijmegen for the reconstruction of the streets in this district and the possibility of carrying out a systematic excavation prior to this led to important new insights regarding size and topographical function.⁶⁸

The aspects of the large fortification on the Hunerberg which are to be discussed here are restricted to the fortress as an element in the topography of Nijmegen in the early Roman period. Matters such as the nature of the building of the Augustan fortress, the garrison,

the chronology and so on, have been dealt with in another publication.⁶⁹

3.1.2 The ditches

The area of the large fortification on the Hunerberg can be precisely determined by the course of the system of two wide ditches (Fig. 3.1 no. 5 and 3.2-3). Both ditches have a relatively wide, sharply-pointed V-shaped cross-section: no indications of a drain were found in the point of the ditches (Fig. 3.2-3). The inner ditch has an observed width of 4.40-5.00 m and an observed depth of 1.90-2.00 m; in the case of the outer ditch, 4.20-5.00 m wide and 1.70-2.00 m deep. The outer ditch would, therefore, appear to have been of about the same width as the inner one, but rather less deep. The distance between both ditches, measured from the bottoms, varies from 8.50 to 9.10 m; these measurements correspond to a prescribed distance of thirty Roman feet. The fill of the ditches is characterized by the unusually clean sand in the lowest 1-1.50 m. Above this, a 0.10-0.20 m thick layer stands out in one part of the profiles, which could mark a temporary standstill in the filling process.

The course of the two ditches coincides with the relief of the Hunerberg. In the northwest and northeast the two ditches link up with two erosional valleys in the steep slope of the outwash plain ridge. The southwest side of the military camp follows the northwest slope of the Hengstdal and bends outwards slightly. The northeast side curves inwards, influenced by the shape of the Beekmansdal. Only the northwest side runs more or less in a straight line. The total surface area within the ditches amounts to approximately 42 hectares. The Hunerberg is the only place on the outwash plain where such a large camp could be built in a comparatively strong defensive position.

It is generally accepted that the site of this early fortification was not used for any purpose other than a military one after the garrison left. Arguments in favour of this are that there are no settlement traces worth mentioning from the period between c. AD 20 and 70, that the Flavian military camps were constructed on the same site, and that the pre-Flavian burials southwest of the camp do not extend as far as the ditches and the area inside them.⁷⁰ The first two arguments will not be discussed further

⁶⁷ Holwerda 1920, 18 and Taf.VII.19.a-m; Vermeulen 1931.

⁶⁸ Bloemers, Greving & Zoetbrood 1979, 25-27.

⁶⁹ Driessen 2007, 43-52 and Fig. 10 (plan of fortification); Willems & Van Enckevort 2009, 29-35 and Fig. 9 (plan idem). For a recent analysis of the western defence constructions Niemeijer 2013.

⁷⁰ Vermeulen 1932, 217-218; Haalebos *et al.* 1998, 23 and Bijlage I.

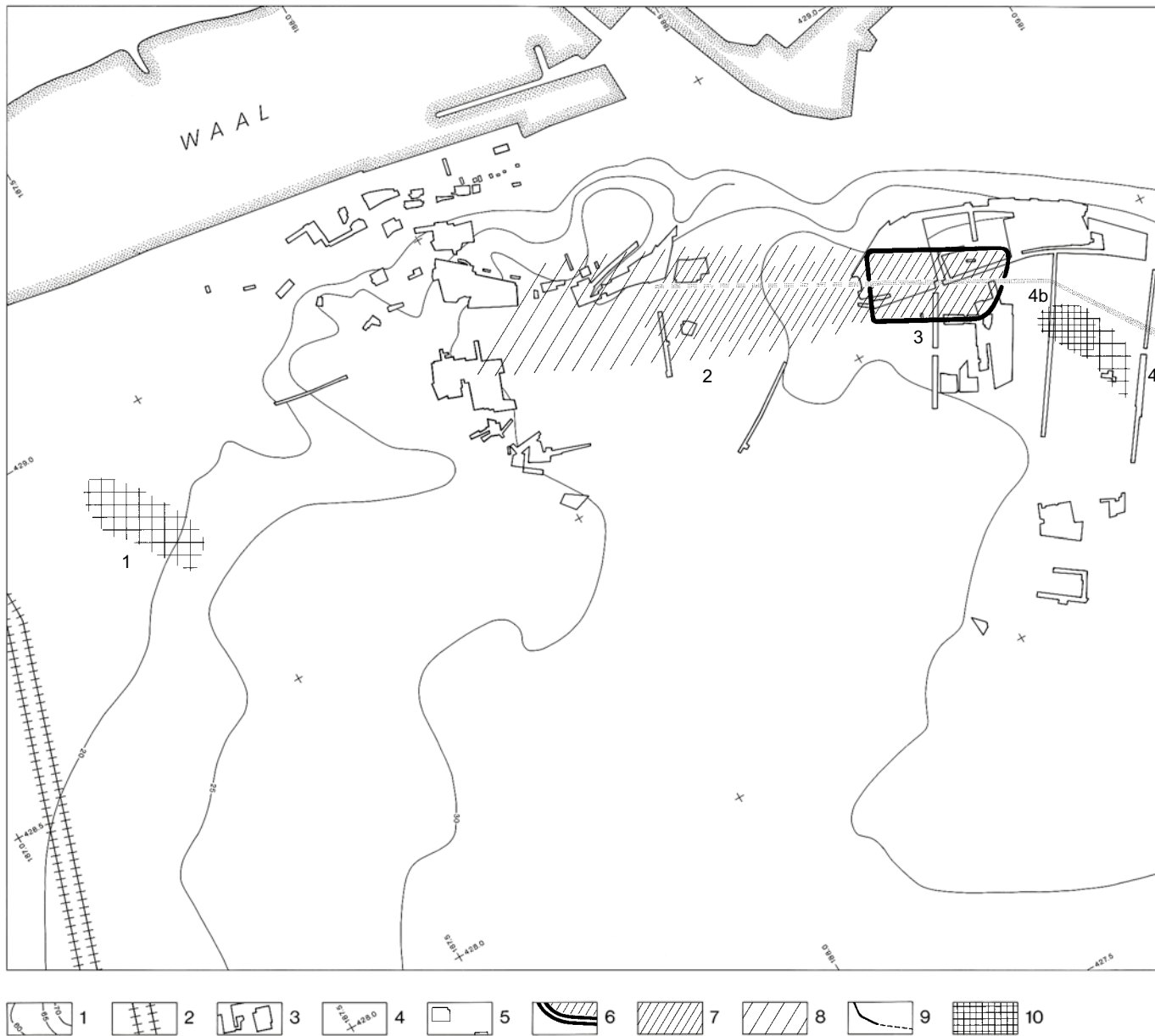


Figure 3.1 Nijmegen. Topography during the period 19 BC - AD 30 (situation 1982).⁷¹ Scale 1:10,000.

Legend: 1. contour lines; 2. railway; 3. excavated areas; 4. topographical coordinates; 5. contours of Roman buildings; 6. Roman ditches enclosing (occupied = hatched) military areas; 7. during this period inhabited area (investigated and/or many finds); 8. during this period inhabited area (not investigated by ROB and/or few finds); 9. during this period enclosed but not inhabited area (investigated); 10. cemetery during this period in use (investigated and/or many finds); 11. cemetery during this period in use (not investigated and/or few finds); 12. (hypothetical) Roman road.

Site numbers: 1. cemetery in Kronenburgerpark (Willems 1981 no. 400); 2. settlement around the Valkhof (Willems 1981 no. 403); 3. small fortification near Trajanusplein; 4. cemetery on the Hunerberg (Willems 1981 no. 409): a. Museum Kamstraat; b. Hugo de Grootstraat; 5. large fortification on the Hunerberg (Willems 1981 no. 412); 6. fortifications on the Kops Plateau (Willems 1981 no. 417).

⁷¹ For a more recent overview see Willems & Van Enckevort 2009, 20 Fig. 4.



here, only the third. The question arises as to how the users of the cemetery in about the middle of the first century AD were able to see how far the cemetery could be extended there. It could be assumed, of course, that the earth and timber wall with its towers and gate was still visible, whatever state they might have been in, although concrete evidence of this is lacking.⁷² Moreover, it is quite possible that, once there was no longer any need for such a large military camp, the wall was levelled in order to prevent a possible enemy taking cover there. The ditches, although partially filled, may have been visible

as depressions in the landscape for a long time afterwards. The fact that this may indeed have been the case is well illustrated by the discovery of a *dupondius* of Vespasian, minted between AD 77-78, in the outer ditch on the southwest side of the fortress (Fig. 3.2 no. 56/4).⁷³ The coin was found while shaving off the profile, and lay 1.35 m above the point of the ditch in the clean part of the ditch fill, but under the dark-brown upper fill. This means that in about AD 80 the outer ditch at this spot could be seen as a depression of at least 0.40-0.60 m deep. Other profiles along the southwest and southeast

⁷² Niemeijer 2013, 71-72.

⁷³ No. 56/4 Vespasianus; *dupondius*; Lugdunum; 77-78 AD; RIC 777b; obv. Titus.

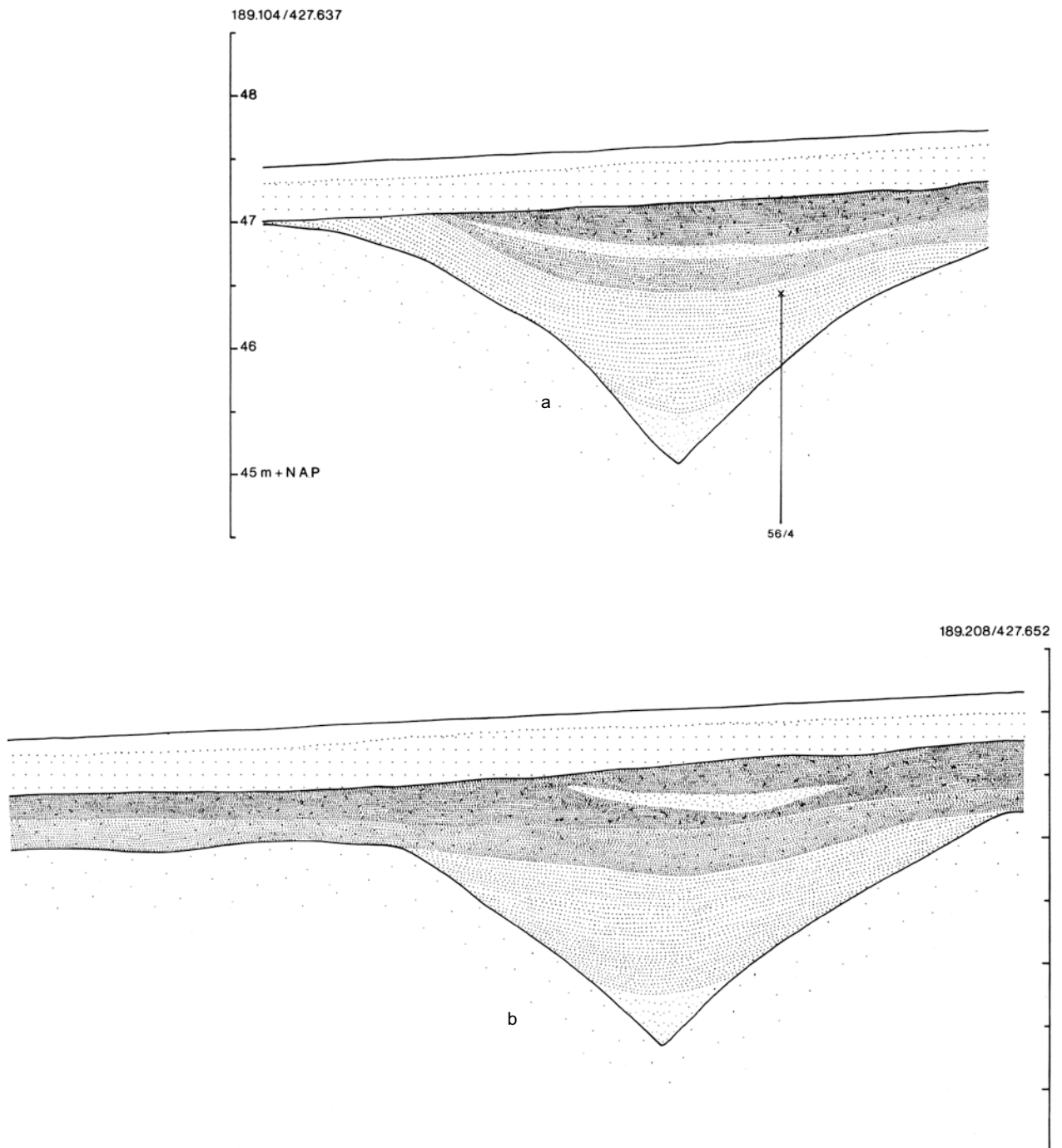


Figure 3.2 Nijmegen. The large fortification on the Hunerberg; section of the system of two wide ditches in Dommer van Poldersveldtweg (trench 56). Scale 1:50.

Legend: x. located find with number of inventory; a. outer ditch; b. inner ditch.

sides of the fortress show a similar picture of a transition from a lighter to a darker fill between 0.90 and 1.50 m above the point of the ditch. In the light of these arguments it is possible that, in the southwest and southeast, the limits of the former large Augustan military camp were recognizable up to the Flavian period due to the remains of the ditches which were visible as shallow depressions in the terrain. The ditches there run through relatively flat land. The situation was probably different in places where the ditches were dug along or on a steep slope, as, for example, in the northeast, along the Beekmansdal. The two graves from the middle of the first century AD which were discovered in the inner ditch clearly indicate that, at the time of burial, this ditch had already become completely filled.⁷⁴

On the basis of the above, it is probable that the Augustan military camp area as a whole was a recognizable topographical feature until about AD 70, although it may only have played a comparatively passive part.

3.1.3 The road

The road which ran through the large camp from northwest to southeast may have played a much more active part in the Hunerberg topography than the ditches. The continuation of this road beyond the military camp determined the location and expansion of the large cemetery in the west and the small cemetery in the east in the period following the abandonment of the fortress (Fig. 3.12 nos. 4 and 7). It formed the connection between the settlement on the Kops Plateau and the settlement around the Valkhof on the hill near the river Waal. Therefore, there is every reason to assume that it was actively used during the whole pre-Flavian period, as it was in the years following AD 70. The *via principalis* of the Flavian fortress of the Tenth Legion had practically the same course. The gates and the dams in the ditches of the large Augustan fortification give a close indication of the position of the road which corresponds to observations of the road section outside the fortress. Judging from the measurements of the gateways, the width of the road cannot have been more than c. 9.00 m.⁷⁵ As the course of the road corresponds to that of the present Ubbergseveldweg in the east, no detailed observations are available. Outside the fortress,



Figure 3.3 Nijmegen. The large fortification on the Hunerberg; section of the system of two wide ditches in Dommer van Poldersveldweg, seen from the south with the outer ditch in front and the inner ditch at rear.

ditches have been observed along the verges of the road and a layer of gravel for road hardening. Inside the fortress the construction will have been the same.⁷⁶

3.1.4 Conclusion

Because of its dating in the Augustan period and its size, the fortification on the Hunerberg is an element which has, to a large extent, determined the further development of the

⁷⁴ Brunsting 1961, 61-62.

⁷⁵ Brunsting 1961, 52-56. See also Haalebos et al. 1995, Beil. I nos. 34-35, 41 and 67-68 (drainage along the road in the western part of the large camp).

⁷⁶ Niemeijer 2015.

topography on the outwash plain. The dating of the ditches and the gates and towers belonging to them is based on some Augustan finds from these features, on the intersection of graves from the middle of the first century, and on the morphology in general. Only a very small part of the site inside the ditches was excavated.⁷⁷ Building traces and pits were observed and finds were collected which can certainly be dated to about 19 BC or shortly after.⁷⁸ The fundamental problem remains whether the features with these earliest finds and the two ditches with gates and towers belong together. The size of the area between the two ditches and the indications that this site was not used for any other purpose after the abandonment of the fortress, but that it was still recognizably marked, mean that it must have been an important topographical element in the post-Augustan period. The road, in particular, which continued from the military camp to the southeast and northwest, determined the location of other, and therefore predominantly younger elements of occupation. The pattern of settlement which had thus developed in the first half of the first century AD was to remain roughly the same, certainly until the middle of the second century and, in some places, until into the fourth century.

3.2 THE SMALL EARLY ROMAN FORTIFICATION

3.2.1 Introduction

The reconstruction of Trajanusplein led to the excavations in 1973. Isolated finds in particular had been discovered in the vicinity during work on the so-called Hunerpark in 1923-1925 and during the construction of the access to the Waal bridge in 1935-1936.⁷⁹ To everyone's surprise, the west front of an early Roman fortification was discovered which later proved to be of limited size (Fig. 3.1 no. 3 and 3.4). Despite the fact that the anticipated archaeological structures were totally unfamiliar and that the period of time available for investigation was so short, an area of more than 6,500 m² was thoroughly excavated within 8 weeks.⁸⁰ The adjoining eastern site of more than 6,000 m² was excavated in 1975 and 1976. The ideas formulated since as to the position and shape of

the east front of the camp had to be completely revised in 1981 when the southeast corner of the fortification was revealed.

The northwest section of the excavation area had been rather disturbed by wide deep ditches possibly connected with 18th century fortifications, the construction of the Belvoir villa and Terwindtstraat at about the turn of the century which had apparently been flanked by a double row of trees in large square holes. The site had been completely and deeply disturbed, among other things as a result of demolishing houses which had been destroyed by acts of war in 1940-1945.

3.2.2 The fortification

The shape and size of the fortification

The fortification is in the shape of an irregular square. The northwest corner is more or less regular although it is not an absolute right angle. The southeast corner forms an elongated curve producing a completely different picture. There is no reason why the cause of this should be sought in the morphology of the site. The width of the camp between the bottom of the ditches measures 110.5 m. The greatest length cannot be given precisely because the most easterly position of the east front was not observed. At the point where the 1981 excavation trench in Barbarossastraat should approximately have cut it, there was a large and deep disturbance of the soil for more than 40 m (188.742/428.522-188.782/428.516). The greatest length must have been between 182 and 222 m and, on the basis of the northward projection of the southeast side, was probably between 200 and 215 m. The surface area was therefore approximately two hectares. The position of the east side of the fortification, as published before 1981, appears to have been incorrect.⁸¹ The 1981 excavation proved beyond doubt that the southeast corner of the fortification lay over 40 m more to the east than had been assumed until then. The possibility that there might have been two stages in the construction of the east side was considered and investigated by means of a trench at the northeast corner originally projected (188.72/428.57). The lower part of the continuation of the ditch on the north side was in fact found, and it appeared unmistakably to run eastward in a straight line and not to curve

⁷⁷ For a complete and recent overview of the excavated areas Niemeijer 2015, 9 Abb. 2.

⁷⁸ Bogaers & Haalebos 1977, 97-111 and 1980, 54-81; Haalebos 1991, 102-107; Haalebos *et al.* 1995, 19 and 24; Kemmers 2005, 44-49; Willems & Van Enckevort 2009, 29-31; Niemeijer 2014, 35. See also Section 3.6.1.

⁷⁹ For the situation around the Trajanusplein in about 1925 and 1935-1936 and the finds from this area: Daniëls 1955, 47-101 (with the map on p. 72-73) and Holwerda 1946.

⁸⁰ 1973: Bloemers 1974, 181; 1975-1976: Bloemers 1975a, 161 and 1978b, 250-251; 1981: Bloemers 1985, 32-33; summarizing up to and including 1978: Bloemers, Greving & Zoetbrood 1979, 28-29; Willems & Van Enckevort 2009, 41.

⁸¹ Bloemers 1975a, 161-162; Bloemers, Greving & Zoetbrood 1979, 24-25 and 28-29.



Figure 3.4 Nijmegen. The small fortification near Trajanusplein. Overview from the east of the western half of the fortification during excavation in 1973. The western front runs in the longitudinal axis of the two trenches between the two draglines. In the rear lies Trajanusplein before its reconstruction.

south. Moreover no indication of this was found on the south side either.

The ditch

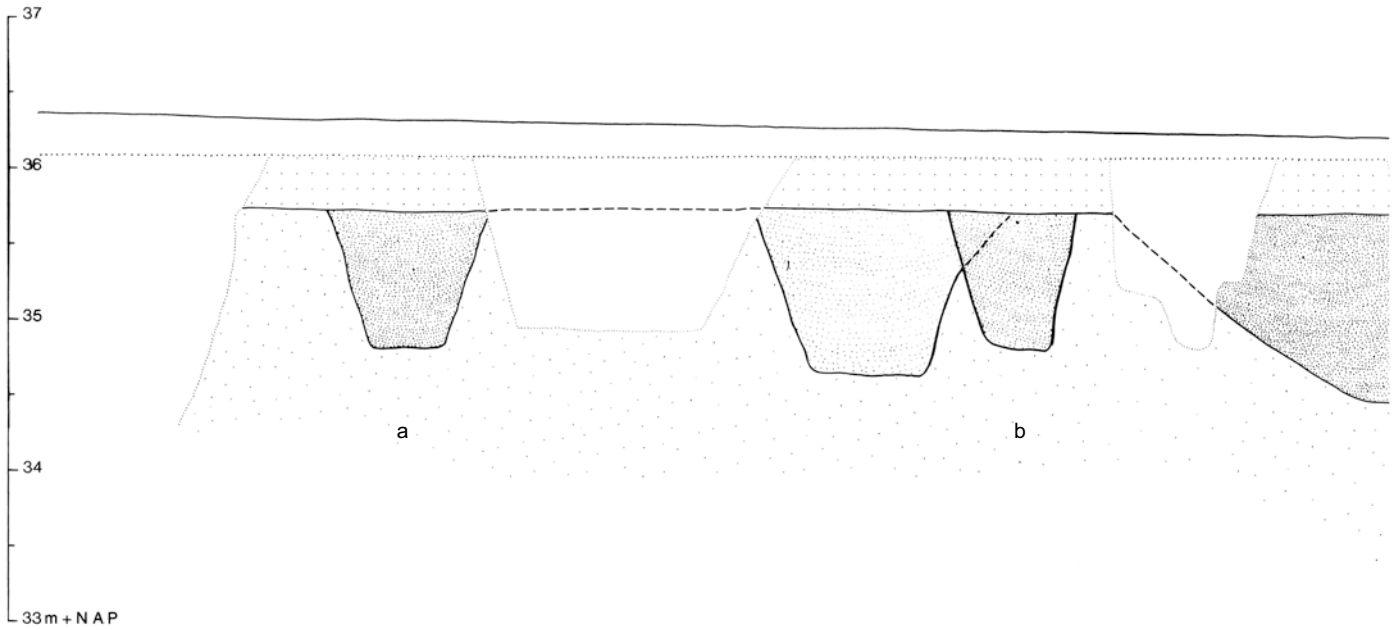
The fortification is surrounded by a single ditch with a V-shaped profile (Fig. 3.5). The bottom of the ditch does not generally form a sharp angle but is usually flattened along a width of 0.20-0.30 m. The width at the top as far as can be reliably observed measures 5-6 m, and the depth is as much as 2.50 to 2.70 m or even 3 m below the supposed Roman period surface (Fig. 3.5 upper section = c. 36.40 m NAP). The bottom of the ditch in the west, the north and at the southeast corner varies from 34.00 - 34.60 m NAP; only in the middle of the south side is the ditch more than a metre deeper.

Generally speaking, the ditch fill in the bottom 0.40 m consists of very clean washed-in sand. An approximately 2 cm thick humus strip on

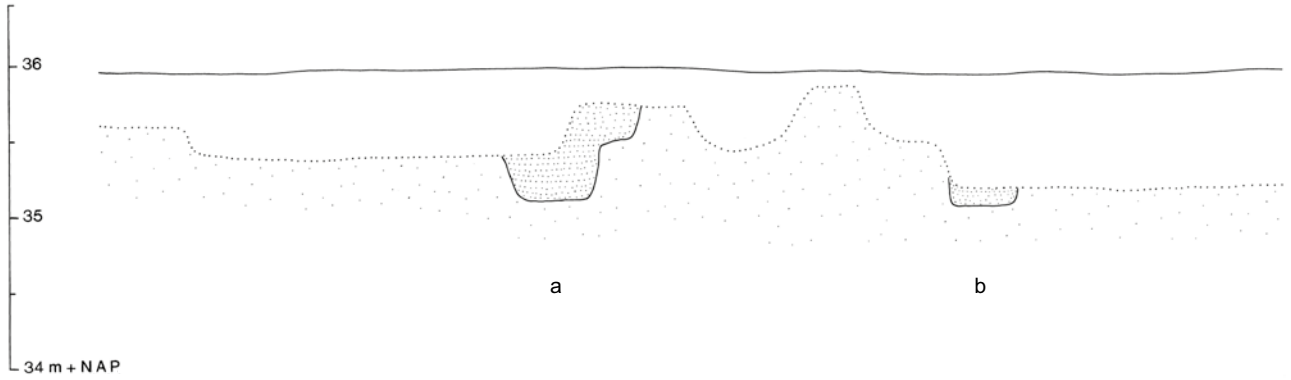
top of this which was observed to continue for quite some distance on the west side indicates that, at this level, the ditch lay open for a long time. The 0.61-1.00 m above this had clearly become filled at various stages with somewhat heavier soil which may partly have come from the sides of the ditch. In some places there were sections which were so even in structure and free from washed-in layers that it is assumed that the ditch had been filled in by man. Above this level the fill was much darker in colour and often contained later settlement refuse. No indications of two stages in the construction of the ditch were found anywhere except at the spot where the dam was thought to have been dug through on the north side (infra and Fig. 3.6-8).

Approximately in the middle of the west side there is an interruption in the ditch which, at surface level must originally have been about 5

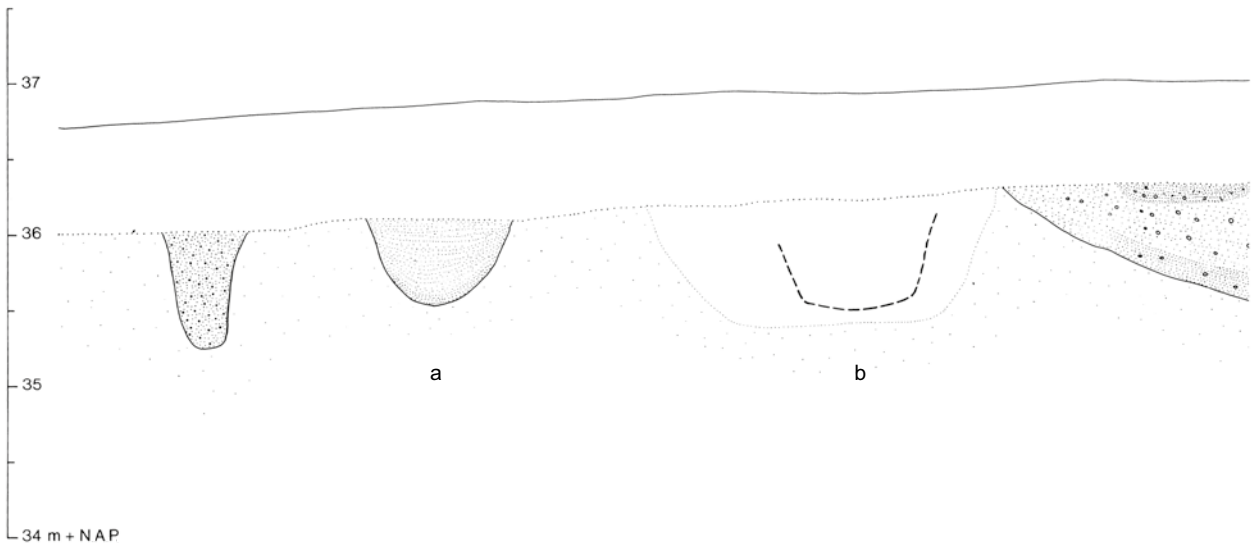
188.634 / 428.505



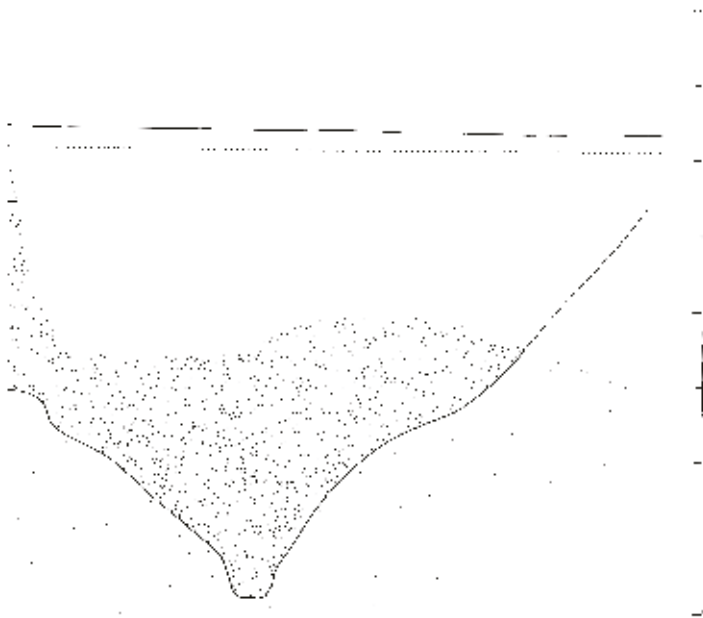
188.563 / 428.569



188.586 / 428.601

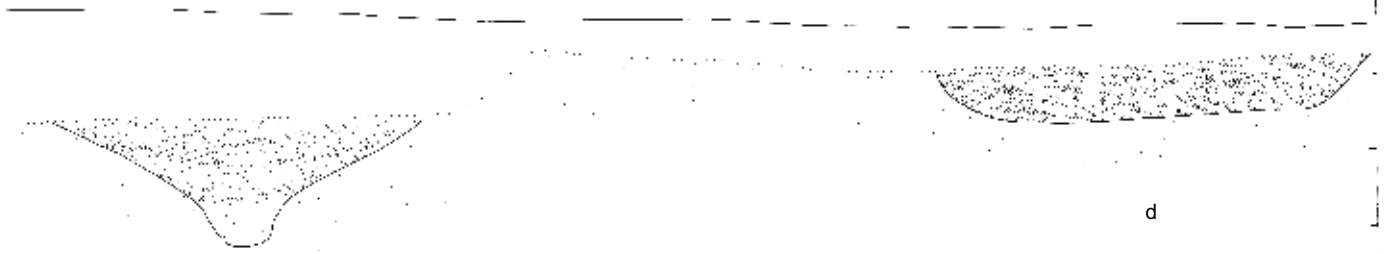


180.627/428.496



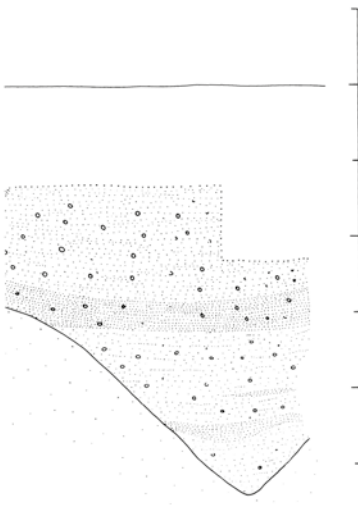
c

188.557/428.574



d

188.578/428.602



c

Figure 3.5 Nijmegen. The small fortification near Trajanusplein; three sections over the system of the two trenches for the rampart and the single ditch.
 Legend: a. inner trench for the rampart; b. outer trench of the rampart; c. single ditch; d. pit. Scale 1:50.

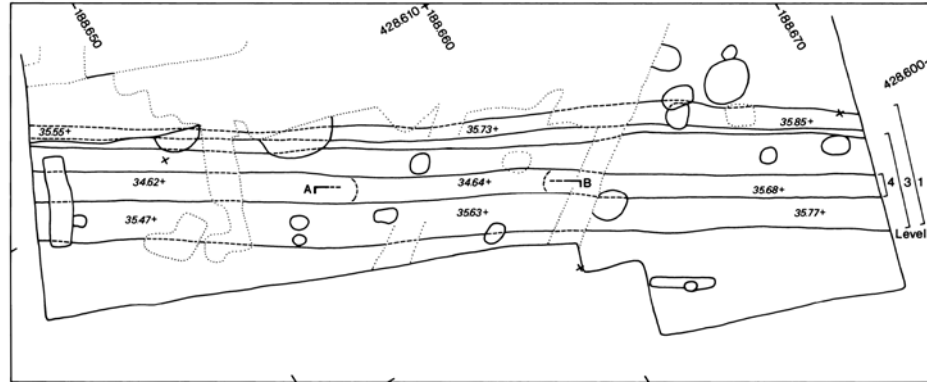


Figure 3.6 Nijmegen. The small fortification near Trajanusplein; the single ditch on the north side of the fort showing a slight bend, where the dam was thought to have been dug through. Longitudinal section A-B: see Fig. 3.7. Scale 1:250.

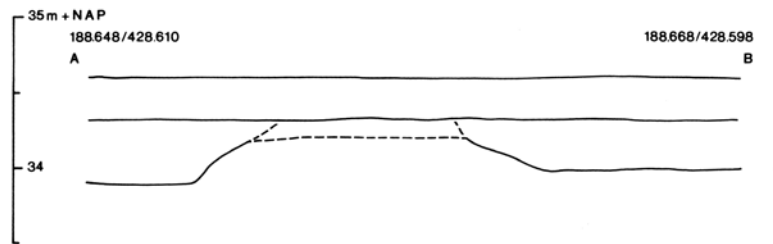


Figure 3.7 Nijmegen. The small fortification near Trajanusplein; longitudinal section A-B (see Fig. 3.6) over the lower part of the single ditch on the north side of the fort where the ditch shows a slight bend and where the dam was thought to have been dug through. Scale horizontally 1:100, vertically 1:50.

m wide (Fig. 3.9). This can be deduced from the projection of the banks in the longitudinal axis of the ditch on both sides of the interruption. There also appears to have been an interruption in the ditch on the north side, approximately 70 m from the northeast corner, which was dug away at a later stage (188.657/428.606) (Fig. 3.6-8). This assumption is based on the fact that the bottom 0.60 m of the ditch showed a slight irregularity, a bend, at excavation level 34.60 m NAP.

A section through the longitudinal axis subsequently showed that, precisely at this spot, the bottom of the ditch lay about 0.25 m higher than elsewhere. The fill in the part which lay higher connected horizontally with a similar fill in the adjoining parts of the ditch; because of this the lower fill of the latter was covered over and was a different colour.

The greatest length of the shallower part measured 12 m, the projection of the banks in the longitudinal axis of the ditch on both sides of the interruption in the lower ditch fill resulted in a 6 m wide interruption at the Roman surface level. These measurements correspond fairly closely with similar points at the west opening:

12 m between the ends of the banks at the bottom of the ditch, and approximately 5 m between the ends of the banks at surface level.

The ramparts and the gate

The construction of the ramparts and gate was best examined on the west side of the fortification, and indications of two periods were visible especially in the southeast part (Fig. 3.9-10).

The ramparts could be seen in the form of two parallel trenches or rows of posts. The trenches were 0.60-1.00, sometimes even 1.50 m wide, and up to 1.00 m deep. At the bottom of the trenches regular round or rectangular postholes were observed (0.50-1.00 x 0.40-0.50 m) which, in some cases, appeared to contain the core of a post. The intervals in the longitudinal axis of the trenches were generally 0.50-0.90 m, but were often more. The distance between the two trenches was in general 2.80-3.00 m; however on the southeast side, where two stages of construction could be distinguished, the distance was anything up to 4 m, if there were in fact two simultaneous trenches.

All this makes it clear that the ramparts

consisted of a wall of wood and earth, a nucleus of earth between two wooden walls. How the space between the posts in the two walls was filled can no longer be established. The excavated soil of a ditch 6 m wide and 2.50 m deep is sufficient to fill up this wall of earth and wood to a height of at least 2.50 m. With the addition of a parapet 1.25-1.75 m high, the overall height of the ramparts could have reached 3.75-4.25 m. At a few places it was established with a fair degree of certainty that the ditch had come up to 0.20-0.60 m from the foot of the outer wall (e.g. 188.635/428.495). Only at the northwest corner does the wall sharply cut off the bend made by the ditch creating a space of max. 7.50 m between the wall and the ditch (188.600/428.630). All along the south and southeast side of the fortification there are distinct indications that there were two periods in the construction of the outer side of the wall. Two trenches, each 0.90-1.00 m wide, are so close together here that at the highest levels they appear to be one single trench 1.50-2.00 m wide. From cross-sections it is clear that the outer trench is more recent than the inner one. It is not apparent whether the inner wall of the wood and earth rampart is contemporaneous with the two construction periods of the outer wall or whether during one of these periods there was only one outer wall and no inner wall. In this case the earliest outer wall cannot be combined with an inner wall.⁸²

The only gate observed for certain is situated on the west front of the camp (Fig. 3.9-10). The gate has only one passage with a free space of 3 m. It is possible that the gate had two towers with internal flanking gate towers on the inner side. The towers could have been 4.25 and 3.00-3.50 m wide respectively. Identification of the towers is not completely certain because the posts appear only on one side of the wall to have been deeper than those adjoining. The position of the internal flanking gate towers is not very convincing either, since the innermost posts are surprisingly deep and, moreover, are placed rather irregularly. It is likely that there was also a gate at the spot where the dam in the ditch on the northeast side was dug away; however, no traces were found. Towers were not found anywhere else, not even at the corners of the fortification, since they cannot easily be distinguished from the rampart construction.



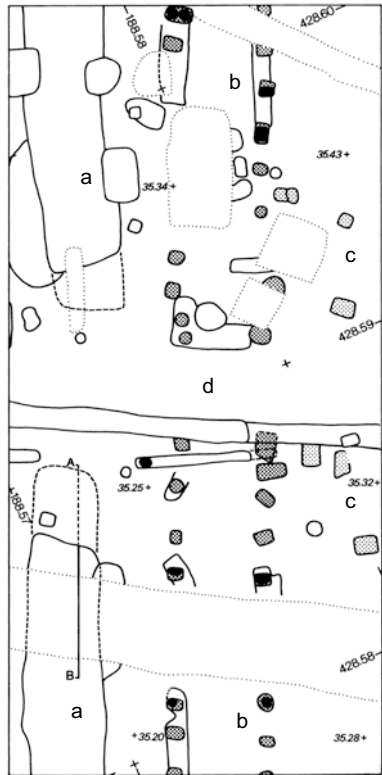
Figure 3.8 Nijmegen. The small fortification near Trajanusplein; the lower part of the single ditch on the north side of the fort showing a slight bend where the dam was thought to have been dug through.

However, a two-metre-wide interruption flanked by two somewhat heavier posts and with two short transverse ditches in the most recent outer wall of the south rampart might perhaps have been a small entrance with a tower (188.654/428.486).

Inner structures

There are, in fact, no traces at all to indicate any inner buildings or an internal division of the fortification. The trench running in an east-west

⁸² Van Enckevort 2011, 66-68.



direction through the west gate probably dates from after the time when the fortification was in use: it cuts through one of the postholes of the gate and is completely filled with finds from a somewhat later period: South Gaulish terra sigillata, mortars of Stuart 1977b, type 149 and jugs Stuart 1977b, type 106-109. The few pits exclusively containing earlier finds (Arretine sigillata, mortars Stuart 1977b, type 148 and jugs Stuart 1977b, type 101-104) do not, as far as their position and orientation are concerned, give any further indication of the layout of the fortification. Despite this, several assumptions can be made. Since the gate was situated west and the road ran from the large fortification on the Hunerberg to and probably through the smaller camp it must have divided the camp into

Figure 3.9 Nijmegen. The small fortification near Trajanusplein; the entrance in the west front with the single ditch and rampart (trenches and posts). Scale 1:250.
Legend: a. single ditch with interruption; b. rampart with two trenches and posts; c. posts possibly indicating towers; d. gateway; A-B longitudinal section of the ditch over the bank in front of the gate (not illustrated).



Figure 3.10 Nijmegen. The small fortification near Trajanusplein; the gate in the west front with (the interruption of) the single ditch and rampart (posts marked with rods) seen from the south.

two parts and must be seen as the *via principalis*. The dam in the ditch on the northeast side which was dug away and the therefore presupposed gate indicate the existence of a road giving access to the Rhine side c.q. the 'enemy', the *via praetoria*. In this case the *principia* must be sought to the south of the *via principalis*. The division of the fortification as far as proportions are concerned is reminiscent of the one at Haltern which has a *principia* at about one-third of the *via principalis*, running lengthwise through the camp.

3.2.3 The datable finds

The finds

The finds used here to date the fortification came from the ditch fill; except for no. 210/60 which came from a posthole in the wall. Only those finds which were able to assist relatively precisely in dating were selected from the ditch and wall; they were, in this case, *terra sigillata*, stamps on Gallo-Belgic ware, flagons and coins. The other finds will not be discussed here, because they can only support the specific date by means of dates with a wider margin. None of the other excavated finds have been taken into consideration because they originate from a complex of finds which has no direct connection with the fortification.

The datable finds from the ditch fill are (Fig. 3.11):

a. From the bottom of the ditch, i.e. 0.00-0.25 m above the lowest point

No. 29/60

a. Two wall-fragments of undefinable shape of 'Italic' *terra sigillata* with a matt orange-brown surface.

No. 28+29/97

a*. Wall-fragment and probably base-fragment belonging to it with stamp ALBAN from a cup, service 2 type Haltern 8 of 'Italic' *terra sigillata* with orange-brown surface. Diameter c. 13.5 cm. Stamp: Oxé & Comfort 1968, 8-9 Albanus no. 36 a2: ('legionary (?) potter contemporary with the stamps from Haltern, and presumably with Germanicus' campaigns'); Stuart 1977a, 17 in Fig. 3.1; Von Schnurbein 1982, 90; Bechert & Vanderhoeven 1984, 169 No.4: '... in spätaugustisch-frühtiberischer Zeit ...'; Oxé, Comfort & Kenrick 2000, 86 Albanus no. 63.3 ('Lyon, 10-1 BC'). On the outer wall a graffito

LVC(·)II or LVC(·)IF.; the preferred reading is that of Lucius: Galsterer 1983, 51 No. 153 and Taf. 10.153 '... unklar, ob Praenomen, Gentile ... oder Cognomen ...'.

No. 28+29/85

a.* Base-fragment with stamp ATTISSV on a plate, probably Holwerda 1941, 140 no. 19 and Pl. XIX.19; Filtzinger 1972, 35 no. 3/ohne Fdnr.

b. From the lower fill above the lowest point of the ditch, i.e. 0.30-0.60 m above the V-shaped point

No. 29/59

a.* Wall and neck-fragments, fitting fragments sub c no. 29/61 a, from an almost complete flagon of orange-beige clay. Filtzinger 1972, 10 Form 12 (,stilistisch zwischen Haltern 45 und Hofheim 50A.B ...'). Diameter rim 9.8 cm; length of neck c. 9.0 cm.

No. 29/92

a.* Rim-fragment from a plate service 2 Haltern type 2 of 'Italic' *sigillata* with orange-brown surface. Von Schnurbein 1982, 44 sub 1.

No. 32/34

a.* Rim-fragment of a cup of orange-brown *terra sigillata* with surface. Diameter c. 13 cm. The overall shape is that of service 2 Haltern type 8 and 9, but the rim is unusually straight and therefore somewhat resembles Haltern type 9 and 15 (Von Schnurbein 1982, 49 and 63 with respectively Taf. 55. 1233 and Taf. 69.1620 and 1625); Ettliger 1983, 34 and Taf. 46. 10, 12, 14 and 15 : '... Es existiert... eine späte Gruppe ..., die ... den steifen Rand hat, der mit Brillenappliken verziert wird'

b.* Base-fragment, probably from a plate, with stamp ([N]AMANTO) on reddish-orange ware in the technique Holwerda 1941, 117 IV.1. Stamp: Holwerda 1941, 144 no. 105.

c. From the middle fill of the ditch, i.e. 0.60-1.20 m above the V-shaped point

No. 28+29/73

a.* Base with stamp ATEL, probably from a cup service 2 Haltern type 8 of 'Italic' *terra sigillata* with orange-brown surface. Diameter 3.8 cm. Stamp: Oxé & Comfort 1968, 51 no. 144 sub 103, 159, 232 (or 233?) ...; Oxé, Comfort and Kenrick 2000 type 268 (144), 119 sub 64 and 125 sub 112.

No. 28+29/81

a. Wall fragment from a cup of 'Italic' terra sigillata with orange-brown surface.

No. 28+29/87

a.* Rim-fragment from a plate service 2 Haltern type 2 of 'Italic' terra sigillata with orange-brown surface. Von Schnurbein 1982, 44 sub 1.

b.* Rim-fragment from a plate service 2 Haltern type 2 of 'Italic' terra sigillata with orange-brown surface. Von Schnurbein 1982, 44 sub 1.

c.* Rim-fragment from a cup service 2 Haltern type 8 of 'Italic' terra sigillata with orange-brown surface. Diameter c. 5.5 cm.

d.* Rim-fragment from a cup service 2 Haltern type 8 of 'Italic' terra sigillata with orange-brown surface. Von Schnurbein 1982, 61: '... in augusteischer Zeit noch eine untergeordnete Rolle ... in tiberischer Zeit sehr Häufig ...'.

No. 28+29/88

a. Wall-fragment from unknown form of 'Italic' terra sigillata with orange-brown surface.

No. 28+29/92

a. Wall-fragment from a plate service 2 Haltern type 2 of 'Italic' terra sigillata with orange-brown surface.

b. Wall-fragment from a cup of 'Italic' terra sigillata with orange-brown surface.

c. Wall-fragment from a plate of 'Italic' terra sigillata with orange-brown surface.

No. 29/61

a.* Fragments from a flagon; see this Section sub b. no. 29/59a.

No. 28+29/92

a.* Rim-fragment from a flagon of smooth ware with two grooves on the outer side of the lip. Filtzinger 1972, 11 Form 13; Vegas 1975, 59 and Taf. 12, e.g. nos. 9 and 16; Bruckner 1975, 82 Typ 1 and Taf. 37 e.g. no. 3 (p. 96 '... knapp 20 Jahren, von gegen 15 v. Chr. bis kurz nach der Zeitwende.'; Zandstra & Polak 2012, 153-154 Group B ('10 v. Chr.-25 na Chr.').

No. 28+29/94

a.* Rim-fragment from a flagon of smooth ware with four grooves on the outer side of the lip. Filtzinger 1972, 11 Form 13; Vegas 1975, 59 and Taf. 12, e.g. nos. 2; Zandstra & Polak 2012, 151-153 Group A ('ca. 20 v. Chr. tot 20 na Chr.').

d. From the upper fill of the ditch, i.e. c. 1.35-1.50 m above the V-shaped point

No. 28/35

a. Wall-fragment, probably from a cup service 2 Haltern type 8 of 'Italic' terra sigillata with orange-brown surface.

b. As, halved; Lugdunum; AD 10-13; RIC 230.

e. From the upper fill of the ditch, i.e. c. 1.50-1.70 m above the V-shaped point

No. 28/3

a.* Large fragment from a plate service 2 Haltern type 2 of 'Italic' terra sigillata with orange-brown surface and with stamp SEX ANNI. Plate: Von Schnurbein 1982, 44 sub 1. Stamp: Oxé & Comfort 1968, 27 and 29 nos. 88.68, 75 and 91; Oxé, Comfort & Kenrick 2000 type 183.35 (88). Diameter 16 cm. Von Schnurbein 1982, 71: '... Zeitansatz von 10 v. Chr.-10 n. Chr. ... ein gutes Stück in das 2. vorchristliche Jahrzehnt hinaufzuschieben ...'.

No. 33/1

a.* Rim-fragment from a plate service 1c Haltern type 1 of 'Italic' terra sigillata with orange-brown surface. Von Schnurbein 1982, 31 Variante C or D.

b.* Rim-fragment from a cup service 2 Haltern type 8 of 'Italic' terra sigillata with orange-brown surface. Diameter c. 8 cm.

c.* Rim-fragment from a cup service 2 Haltern type 8 of 'Italic' terra sigillata with orange-brown surface.

d.* Wall-fragment, probably from a cup service 2 Haltern type 8 of 'Italic' terra sigillata with orange-brown surface.

No. 201/17

a. Rim-fragment from a terra sigillata bowl Dragendorff 1985, type 29 with orange-brown surface. The rim is decorated with a roulette ornament, the lower decorated zone has been lost.

From the fill of a posthole belonging to the ramparts

No. 210/60

a. Quinarius; Rome; 97 BC; RRC 331.1.

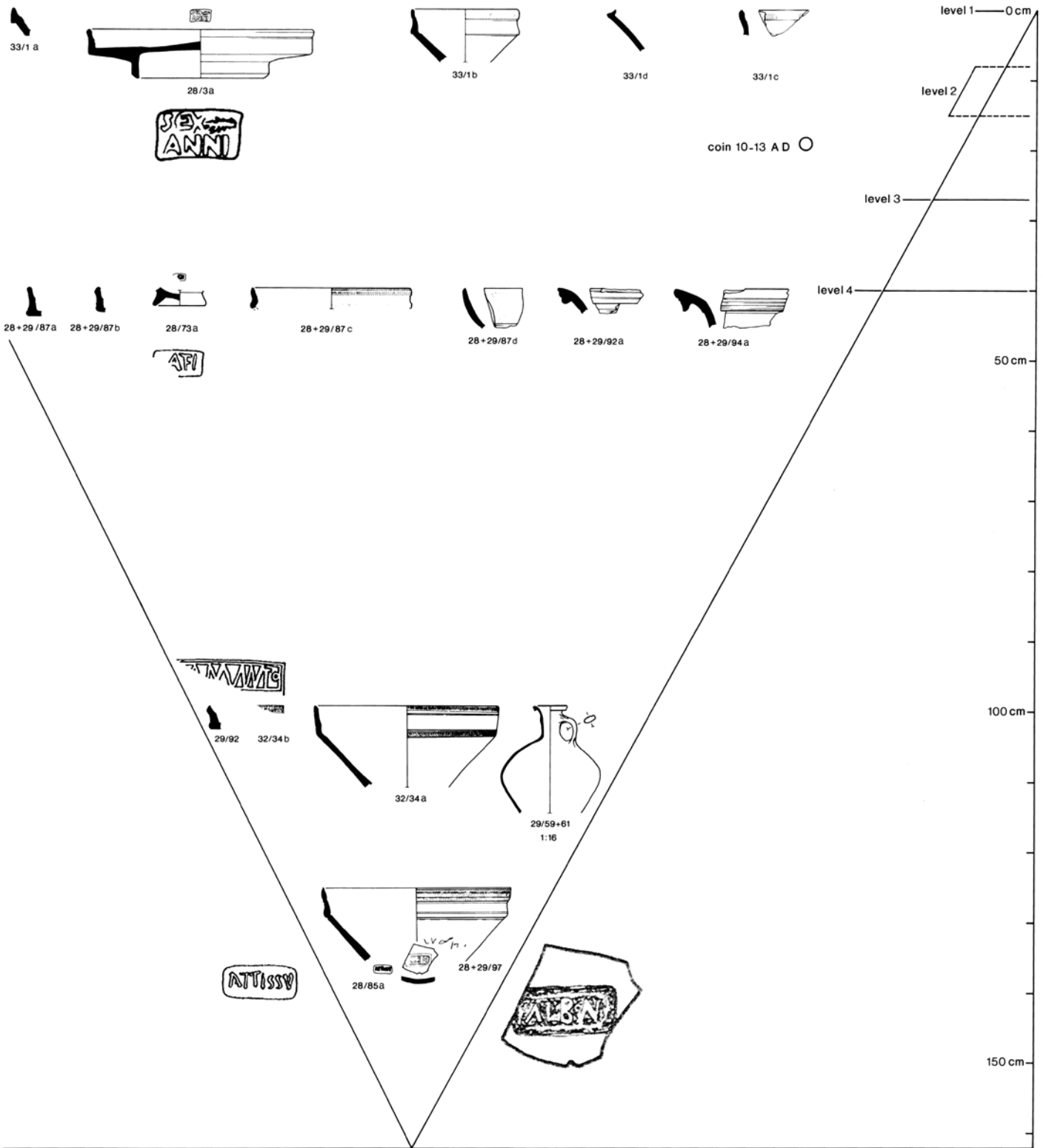


Figure 3.11 Nijmegen. The small fortification near Trajanusplein; datable finds and their location projected on the schematic section of the single ditch. Section scale 1:8; finds scale 1:4 except when specific indicated; stamps scale 1:1.

Dating

Indications for the dating of the period in which the fortification was in use are the proportion of terra sigillata services 1 and 2 1:14, the late Augustan to early Tiberian stamp ALBANVS from the deepest part of the ditch and the unusual shape of Haltern type 8 with a straight 'late' rim (no. 32/34) also from the lower fill of the ditch. Although caution is called for when using the proportion in number of the services 1 and 2 as a means of dating, and there are only 15 fragments to be determined according to type, the predominance of service 2 points unmistakably to a relatively late date. In this respect the complex tends towards that of the legionary fortification at Vindonissa which came into use in AD 16,⁸³ the harbour fort at Velsen⁸⁴ and the pot find from Mainz with a coin dating from AD 11-14.⁸⁵ In comparison with other places, all these complexes show a remarkably high proportion of service 2.⁸⁶ On the other hand, the absence of South Gaulish terra sigillata is surprising; it is found among the earliest forms not only in Velsen and Vindonissa, but it is also of importance in Ubbergen in the layers (nos. 3-5) in which service 2 dominates over service 1.⁸⁷ The fact that there are no late stamp shapes ('*in planta pedis*' and 'Kleeblatt') is of no significance when dealing with such a small number of sherds. The dating of the ALBANVS stamp and the late Haltern 8 cup support the above. However, the as from the upper fill of the ditch does indicate that the ditch had fallen into disuse at any rate after AD 10-13.

The beginning and end of the fortification can therefore be placed in Gechter's 'TS-Phase 5', c. AD 5-20.⁸⁸ In Ettlenger's chronological classification the complex from the ditch of the small fortification at Nijmegen seems to fit best in the 'Nach-Haltern-' horizon.⁸⁹ Dating in the second decade AD is certainly justifiable.

3.2.4 Conclusion

A small fortification with a surface area of about two hectares was built in the second decade AD to the east of the present Valkhof. Its location must have been determined by the proximity of the Waal and its orientation with respect to the road running from the large military camp on the Hunerberg to the northwest. It is very likely that this road ran

right through the small fortification (see also Section 3.6). After its original construction, changes took place at a later stage, namely the removal of a dam in the ditch in the northeast and the re-building of the wood-and-earth wall in the south and southeast; other indications, such as, for example, the re-excavation of the ditch, were not found. The fortification is predominantly rectangular in shape; the southeast corner is cut off to form a gentle curve, perhaps in connection with a depression in the area outside the fortification. The shape stands midway between the polygonal military camps which are considered characteristic of the late Republican and Augustan period, and the regular rectangular shapes which are most common later.⁹⁰ The shape and dimensions of the ramparts correspond entirely with what is known about the early Roman military camps in the Rhine area.⁹¹ The simple gate in the reconstruction without towers projecting behind the wall corresponds with type I in the typological series of wooden gates, as drawn up by Manning and Scott.⁹² If the gate really did have towers projecting behind the wall, the construction belongs to type IVa. According to Manning and Scott's review of the publication of their excavation, neither form was yet known in the Augustan period. In the meantime, a similar type of gate has been discovered during the excavation of the Tiberian harbour fortification at Velsen.⁹³

Not much can be said about the length of time that the fortification was in use, nor whether it was temporary or permanent. The absence of recognizable building traces, the small number of refuse pits even in less disturbed areas and the temporal homogeneity of the composition of the finds from the ditch make it likely that the camp was short-lived. On the other hand, the alterations in its construction indicate that it was in use long enough for changes or repair to have been necessary. A period of use of some years seems reasonable. As to the nature of its occupation nothing precise can be said either. The size of the fortification could indicate that it was able to accommodate a cohort or some other army unit of comparable size. Only the graffito on the terra sigillata cup no. 29/97 from the bottom of the ditch can give a clue. If the graffito is to be read as LVCIVS, it could point to the Italian origin of the owner of the cup; and if this owner belonged to the garrison one could

⁸³ Tomasevic 1970, 16 (service I : service II = 2 : 9).

⁸⁴ Glasbergen & Van Lith 1977, 7 (service I : service II = 1 : 22).

⁸⁵ Von Pfeffer 1961-1962, 210 (service I : service II = 1 : 5).

⁸⁶ Bechert & Vanderhoeven 1984, 207.

⁸⁷ Bogaers & Haalebos 1975, 140.

⁸⁸ Gechter 1979, 20, 35 and Tab. 13.

⁸⁹ Ettlenger 1983, 102-103.

⁹⁰ Jones 1975, 824; Johnson 1983, 222-249. Recently two regularly constructed fortifications were excavated at Friedberg-Rederzhäusen in Bavaria which can be dated to the second or third decade AD (Von Schnurbein 1985, 30).

⁹¹ Jones 1975, 14-18.

⁹² Manning & Scott 1979, 19-20.

⁹³ Morel & De Weerd 1980, Fig. 29. 2 at H; Morel 1986, 203 Fig. 2; 1988, 36-40, 55-58 and 109-112.

deduce that it entirely or partially belonged to the regular units of the Roman army. The number of fortifications of this size from the second and third millennium AD in Germania inferior, the shape and construction of which are fairly well known, is small. The best-known is the harbour fortification at Velsen.⁹⁴ A ditch and wall of wood and earth was found at Vechten, dating 'from after AD 10 until after 37/41'.⁹⁵

At what point in time the fortification fell into disuse cannot be pinpointed. However, it is clear that at the time of Claudius the fortification had disappeared altogether and the ditch was completely filled in. The whole site was littered with refuse pits and the remains of other activities connected with the settlement around the Valkhof (see Section 3.3).

3.3 THE PRE-FLAVIAN SETTLEMENT AROUND THE VALKHOF

3.3.1 Introduction

In the 1970s the city council of Nijmegen made preparations to renew the inner city, in particular the so-called Benedenstad or Lower City which is the part between the Valkhof and the Nijmegen-Arnhem railway line on the east and west side, and the part between the Burchtstraat-Stikkehezelstraat-Lange Hezelstraat and the Waal on the south and north side. The preparations included the building of parking lots and multi-storey car parks in and around the city centre in 1976, as laid down in the 'Structuurplan Stadscentrum Nijmegen'.⁹⁶ In anticipation of the construction of these parking facilities, an excavation was carried out from 1979 to 1983 south of the Valkhof at the parking lot belonging to the Kelfkensbos and the former Jozefschool. The first site was almost completely excavated, and up to the end of 1983, it looked as if the second site of the Jozefschool could be investigated in a similar fashion. However, residents' violent protests against building multi-storey car parks forced the city council to abandon the plan and to make do with a parking lot at the Jozefschool. For the time being then, the threat to this site was averted and a long trial trench from north to south sufficed. Despite the limited size of this excavation important preliminary insights into the significance of the

site were gained. As part of the medieval city centre investigation under the direction of H. Sarfatij it was possible to excavate the Eiermarkt area and its surroundings.⁹⁷ Only the traces of settlement from the early Roman period will be discussed here in a selected form (Fig. 3.1 no. 2 and 3.12 no. 2).

Recently - between 1993 and 1997 and in 2005-2006 - additional excavations are carried out by the Archaeological Section of the Municipality of Nijmegen (Bureau Archeologie en Monumenten van de gemeente Nijmegen BAMN) in the Kelfkensbos area including the St. Josephhof and the Gerard Noodtstraat. These excavations are very important since they have provided a much broader overview of the settlement discovered between 1979 and 1983. The results do not contradict the observations presented in the following paragraphs, rather they give them a meaningful context. However, it must be pointed out that the excavators consider a substantially earlier dating for the beginning of this occupation.⁹⁸

3.3.2 General orientation

Most of the settlement traces with a clearly recognizable axis from the early Roman period lie northwest-southeast or at a right-angle, northeast-southwest (Fig. 3.1 no. 2 and 3.12 no. 2). This is in roughly the same direction as the longitudinal axis of the small early Roman fortification. The oldest feature, stratigraphically speaking, the trench 188.340/428.745, already has this position (Fig. 3.15.a) and runs parallel to the trench or ditch 188.353/428.818 which is a little further northwest and which cannot be dated precisely. The two small house plans b. and c. (188.350/428.740), which will be discussed later and which cut through the trench mentioned first, and the enclosure presumably belonging to them may be contemporaneous (Fig. 3.15.b-c and g). The building traces in this part appear to have the same layout, as far as can be seen from the limited width of the excavation trench 212 on the Jozefschool site. Moreover, with a little imagination and taking the two house plans b. and c. with enclosure as an example, it is possible to distinguish a division into units of 20-25 m in width, 5-10 m apart. Although in detail this cannot be proved conclusively, there does appear to be a regular construction

⁹⁴ Morel & De Weerd 1980; Morel 1986; 1988.

⁹⁵ Van Giffen 1944-1948, 33 and Pl.10; Zandstra & Polak 2012, 44-47 and Afb. 21-22 ('fase 2') and 260.

⁹⁶ Docter 1982.

⁹⁷ Bloemers 1985.

⁹⁸ Van Enckevort & Thijssen 1996, 55-57; idem 2001, 94-95; Willems & Van Enckevort 2009, 70-72; Van Enckevort 2012, 131-180.





Figure 3.12 Nijmegen. Topography during the period c. AD 30-70 (situation 1982).⁹⁹ Scale 1:10,000.

Legend: 1. contour lines; 2. railway; 3. excavated areas; 4. topographical coordinates; 5. contours of Roman buildings; 6. Roman ditches enclosing (occupied) military areas; 7. during this period inhabited area (investigated and/or many finds); 8. during this period inhabited area (not investigated by ROB and/or few finds); 9. during this period enclosed but not inhabited area (investigated); 10. cemetery during this period in use (investigated and/or many finds); 11. cemetery during this period in use (not investigated and/or few finds); 12. (hypothetical) Roman road.

Site numbers: 1. cemetery in the Kronenburgerpark (Willems 1981 no. 400); 2. settlement around the Valkhof (Willems 1981 no. 403); 3a-b. one or more ditches and trenches considered to be the boundaries of the settlement around the Valkhof; 4. cemetery on the Hunerberg (Willems 1981 no. 409): a. Museum Kamstraat; b. Hugo de Grootstraat; 5. large fortification on the Hunerberg, not in active use (Willems 1981 no. 412); 6. fortifications on the Kops Plateau (Willems 1981 no. 417); 7. cemetery on the west side of the Kops Plateau; 8. cemetery on the southeastern side of the Kops Plateau (Willems 1981 no. 418); 9. cemetery southwest of the large fortification on the Hunerberg (Willems 1981 no. 413); 10. cemetery southeast of the large fortification on the Hunerberg (Willems 1981 no. 414).

⁹⁹ For a more recent overview see Willems & Van Enckevort 2009, 20 Fig. 4.



11  12 

of houses and open spaces, or *insulae* and roads. Building traces and trenches or ditches situated more on the edges of the settlement area (e.g. building 188.140/428.830 (trench 161), trench 188.242/428.784 (trench 179-181) and foundation trench c. 188.370/428.528 (trench 151) also deviate from this layout. It is not certain either whether they are contemporaneous.

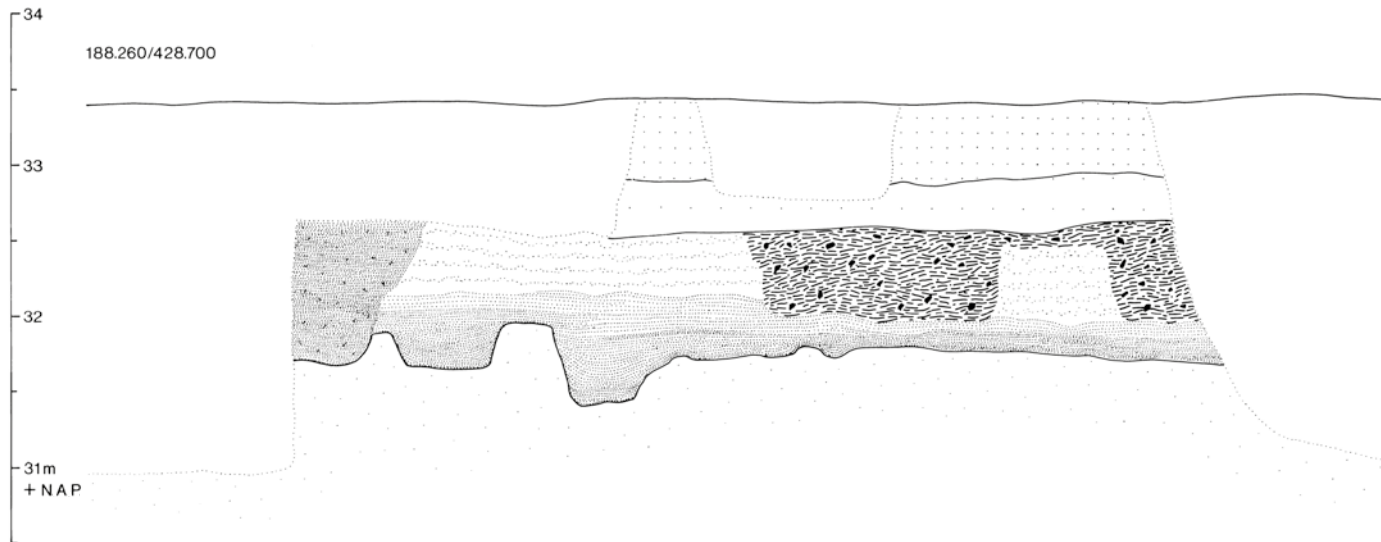


Figure 3.13 Nijmegen. The early Roman settlement around the Valkhof; section of a profile of trench 212 seen from the east. Scale 1:50. Legend: 1-16. features referring to Section 3.3.3 and Figure 3.14; 212/41 located find with number of inventory.

3.3.3 The periodization and the stratification

The features

The periodization and stratigraphy of the settlement on and around Kelfkensbos will be discussed by means of a profile from trench 212 (Fig. 3.13-14). The part dealt with will, for the time being, be considered as representative of this area. From top to bottom the following features can be distinguished in the profile:

16. 1952 excavation;
15. recent and subrecent disturbances;
14. a black layer;
13. a dark-brown layer with rubble;
12. two ditches from the fourth century;
- 8, 10, 11. robbing level of a probable stone building no. 8. This phenomenon was only observed in the profile. The highest level had been dug too deep here to retrace the plan;¹⁰⁰
9. the 0.10-0.12 m thick floor level of the probable stone building in no. 8;
6. a 0.10-0.12 m thick loam floor belonging to the probable stone building in no. 8;
4. a 0.20-0.50 m thick raised layer of brownish-grey sand, extending over more than 30 m and which was observed again 70 m further south (188.230/428.625).
2. a plan of a wooden building no. 2;
1. a plan of a wooden building no. 1;
0. the undisturbed subsoil.

The most important characteristic for the early Roman settlement is the sequence of two periods of wooden buildings and a stone building. The two periods of wooden buildings correspond with the observations in trench 218 and trenches 171 up to and including 174. In the latter trenches no stone building was found, in contrast to trench 218. Fragments of limestone, tuff and other natural stone were regularly found.

The finds

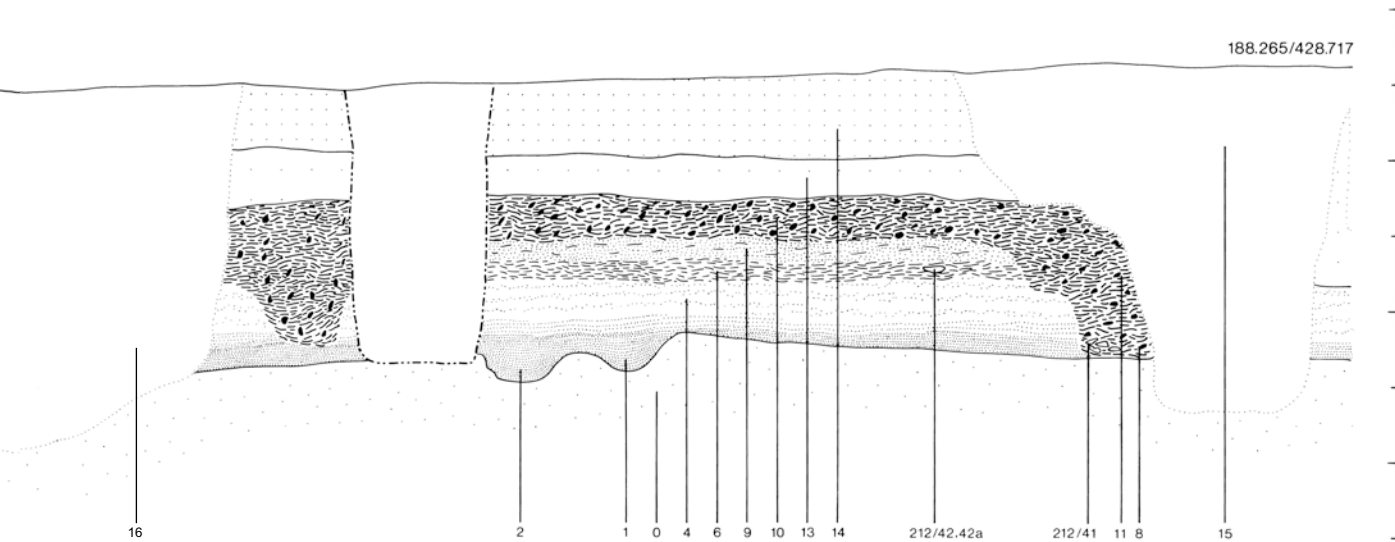
The important finds for the dating of the periodization and stratigraphy will be discussed in connection with the related features such as, for example, the two fourth-century ditches. Important finds from features mentioned in this paragraph and not to be dealt with in detail, are now described. They are finds from the brownish-grey raised layer no. 4 and the loam floor belonging to building no. 8.

The 0.20-0.50 m thick raised layer of brownish-grey sand

No. 212/37

- a. Rim and base of a terra sigillata dish service 2 Haltern type 2 with orange-brown surface; foot ring and rim are heavily used. On the bottom part of a graffito A[---]I, which is for the greatest part broken and lost in Roman times. Diameter c. 16 cm.
- b. Rim of a dish Holwerda 1941, 63 form 77a ('... speciaal omstreeks het midden van de 1e eeuw

¹⁰⁰ During the excavations in 2005-2006 it has been attested that these robbed foundations belong to a large courtyard building (Van Enckevort & Heirbaut 2010a, 241-252).



...') with a matt glossy blue-greyish surface and light grey core (technique VI.2). Diameter c. 37 cm.

The 0.10-0.12 m thick loam floor belonging to the probable stone building in no. 8

No. 212/42A

a. As; Lugdunum; 10-13 AD; RIC 230; catalogue Boersma/Raap in ms. no. 431.

b. *Denarius*; Lugdunum; 7-6 BC; RIC 207; Boersma/Raap in ms. no. 432.

c. Round copper alloy amount with pointed protrusion. Diameter 1.5 cm; height 0.7 cm.

d. Minimum of four folded strips of copper alloy sheet with holes at the ends to take small tacks. Length c. 12 cm; width 1.7 cm; diameter holes for tacks 0.15-0.2 cm.

3.3.4 The buildings

The features

The most easily recognizable complex of buildings lies in the northeast part of the excavated settlement area (Fig. 3.15). It concerns two small houses with a possible extension or third building (188.350/428.740).

The oldest house (Fig. 3.15.b) is approximately 7 m wide and probably 10 m long. As far as it was not disturbed by the more recent plan, it was divided into two rooms separated by a passage across its entire width. The west room is 2.50 m

wide and perhaps partitioned further by another wall. The passage is at least 1 m wide, and the east room at least 5 m wide. The wall trenches are mostly 0.25-0.30 m wide, but the one on the west side measures 0.50 m. Most of the wall posts are of an elongated rectangular shape, and are 0.10 x 0.20 m and 0.10-0.35 m deep, the postholes in the wide west trench are larger, c. 0.40 x 0.40-0.60 m and are deeper, 0.35-0.58 m under the second excavation level.

The later house (Fig. 3.15.c) is located on practically the same spot as its predecessor and has almost the same measurements, 7.00 x 10.70 m. This house was also divided lengthwise by a (foundation ?) trench into two unequal parts, 4 m and 2 m wide respectively. The trenches are 0.30-0.35 m wide. Easily recognizable wall posts were only observed in the dividing wall and on the east side. These were sometimes very deep, as, for example, one post, approximately in the middle of the east side, which stuck 0.78 m under the second excavation level: it is possible that this post may have supported the ridge of the roof.

The interpretation of a series of rather large pits with a dark fill forming a rectangle (Fig. 3.15.d) of 7.00 x 18.50 m poses more problems. The rectangle has the same orientation as the houses nos. 1 and 2; the southeast half lies on the same spot as these houses and the northwest half lies in line with them. It is not clear whether the postholes belong to the rebuilding of house b,

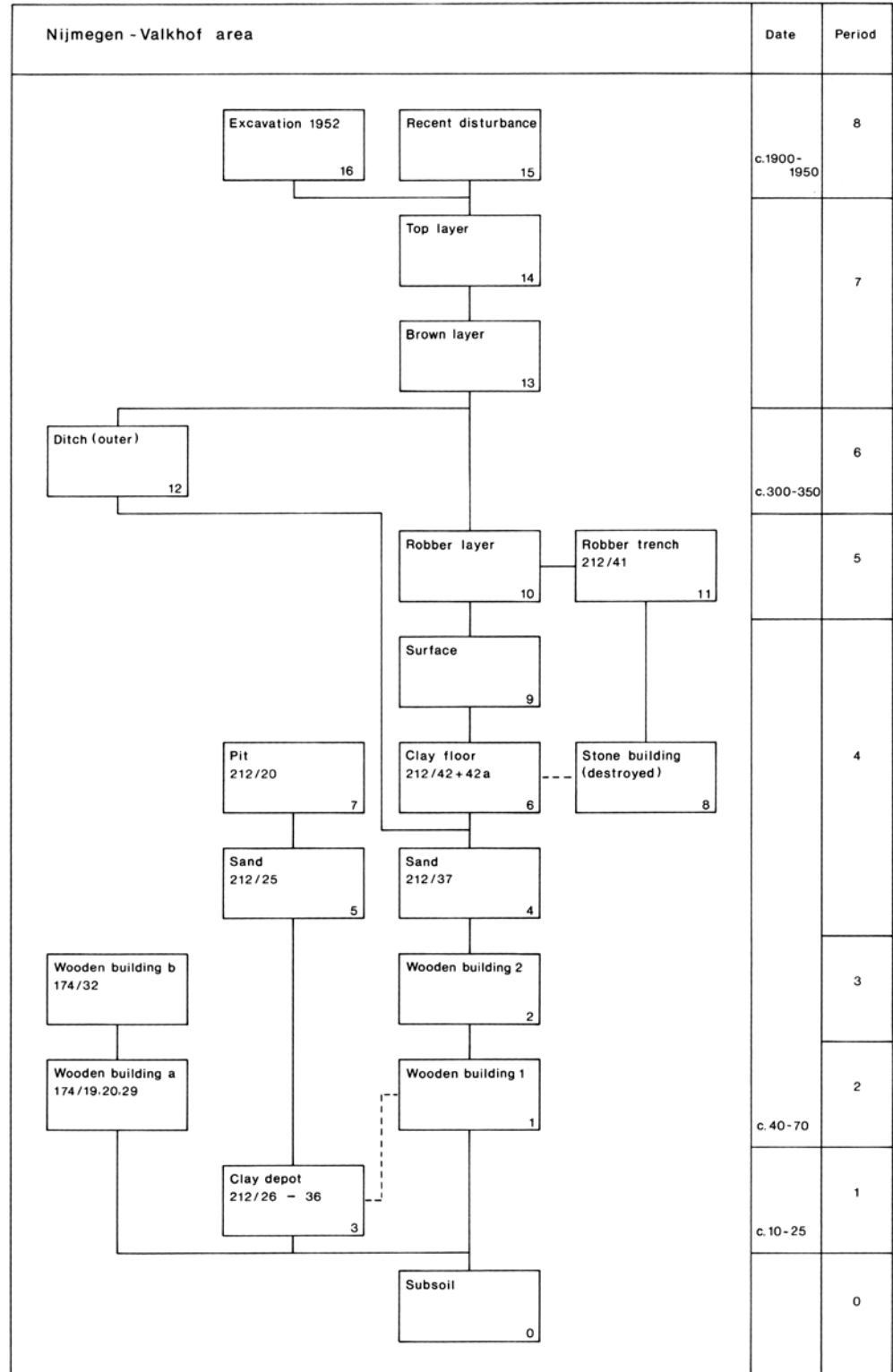


Figure 3.14 Nijmegen. The early Roman settlement around the Valkhof; Harris-matrix for the section of a profile of trench 212 (Fig. 3.13). Legend: 1-16. features referring to Section 3.3.3 and Figure 3.13; 212/26 located find with number of inventory.

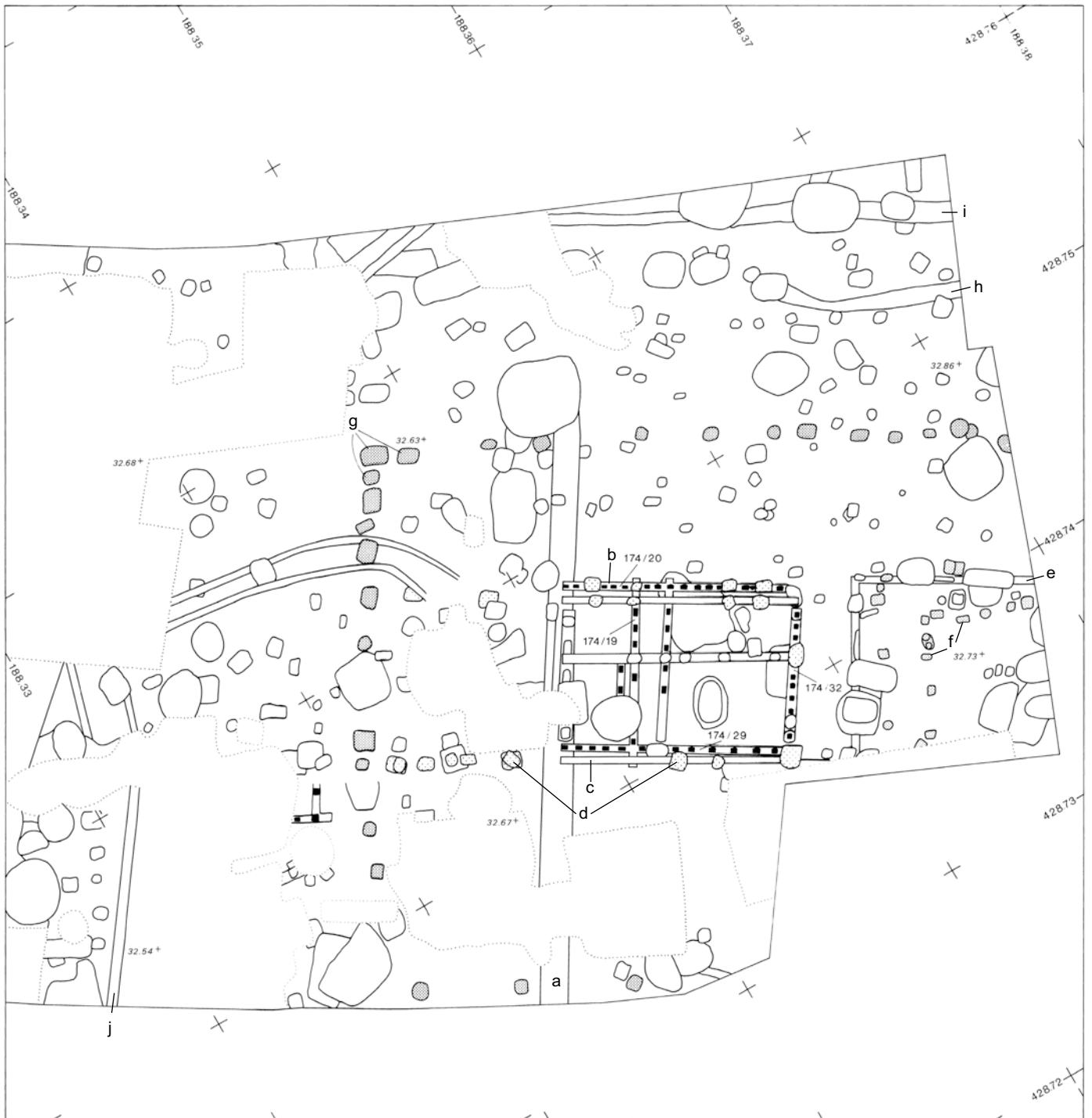


Figure 3.15 Nijmegen. The early Roman settlement around the Valkhof; complex of buildings in the northeast part of the excavated area.

Scale 1:250.

Legend: a. trench; b-f. traces of (possible) (phases of) buildings; g. enclosure?; h, i, j. trenches.

to the removal of the posts of house a or to a separate building from a third period. In the first two cases the west part of the rectangle can be interpreted as an extension to house b, possibly a porch-like construction without walls. In the last case it is a separate building with a different and possibly heavier construction, all the postholes of which have perhaps not been found.

To the east of this complex of houses is an L-shaped trench 7.50 m long with a more or less similar row of postholes approximately 5.00 m long. Both could form the northwest corner of two other houses (Fig. 3.15.e and f) with practically the same alignment as the houses b-d. On the west side of the rectangular plan d there is a somewhat irregular row of postholes g which appears to enclose the site on which the houses b-f stand on the west, northeast and perhaps also southwest sides. A rectangular parcel of land could thus be reconstructed c. 23 m wide and at least 27 m long. In the northwest corner of this enclosure there is an interruption 2.50 m wide which is in line with an equally wide interruption in the northwest row of posts belonging to house d. Parallel to the northeast side of the enclosure, at intervals of rather more than 6.00 and 9.00 m, there are two small trenches h and i which are intersected by several pits in a row. On the west side at about 7.50 m parallel to the enclosure a trench with something like a row of pits j can also be distinguished. It is possible that, between the enclosure and the pits, there may have been a road or the border zone of a road. In that case the houses b-f with the enclosure form one parcel on the corner of a fork in the road.

Important finds for dating purposes

Only those finds are mentioned here which, because of their find circumstances and their value for dating, give specific evidence for the absolute chronology of the features. All other finds are not discussed.

The foundation trench of house b

No. 174/19

a. Wall fragment from a terra sigillata bowl Dragendorff 1895, type 29 with glossy orange brown surface and some white inclusions in the core. Decorated upper zone: style of, among others, Aquitanus, Labio, and Murranus (Knorr 1952, Taf. 32.B, 44.A and 66.A; Dannell 1971, 279 Fig. 128.22); leaf: Mary 1967, Taf. 7.6. Decoration

lower zone: style of, among others, Aquitanus (Knorr 1952, Taf. 4.F); arrow: Knorr 1919, 21 Textbild 10 and Taf. 8.6 (Aquitanus). Dating: Claudio-Neronian.

b. Base from a terra sigillata bowl Dragendorff 1895, type 29 with glossy orange brown surface, possibly belonging to the fragment sub a.

No. 174/20

a. Rim from a Gallo-Belgic pot Holwerda 1941, 37 form 27c ('midden 1e eeuw en daarna ...') of matt black polished ware (technique VI.1), e.g. Pl. 8.318 and 322. Diameter c. 13 cm.

No. 174/29

a. Rim from a terra sigillata dish service 2 Haltern type 2 with orange brown surface. Diameter c. 18 cm.

The foundation trench from house c

No. 174/32

a. Rim from an orange colour-coated beaker Stuart 1977b, 20 type 1 (p. 23: '... c. 40-110 ...') in technique a. Diameter c. 10 cm.

Posthole in the palisade ascribed to houses b and c

No. 174/3

a. Rim from a *mortarium* Stuart 1977b, type 149 ('... vanaf de tijd van Hofheim ...') of brown pink ware.

The dating

On the basis of the small number of finds which cannot be dated precisely and because of their direct relation to the features mentioned earlier, the settlement in this part of the area around the Valkhof is to be dated in the Claudio-Neronian period.

3.3.5 The clay pit

The features

A remarkable phenomenon is the rectangular pit containing a large mound of clay which was discovered on the north side of trench 212 (188.267/428.715; Fig. 3.16-17). The pit is 5.20 m wide and at least 3.00 m long; its exact length cannot be retraced due to a large disturbance, but because of the symmetry of the bell-shaped clay mound in the pit it could be estimated at approximately 4.80 m. The depth of the pit is at least 1.80 m from the earliest Roman surface. The walls have an entirely decayed wooden

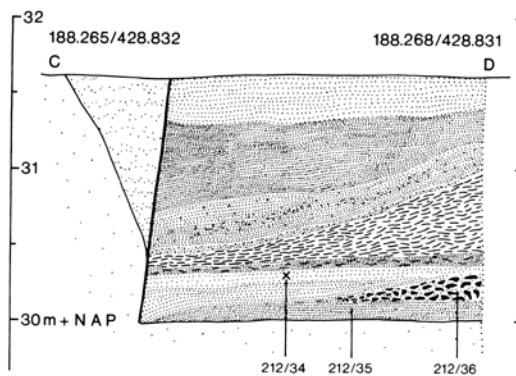
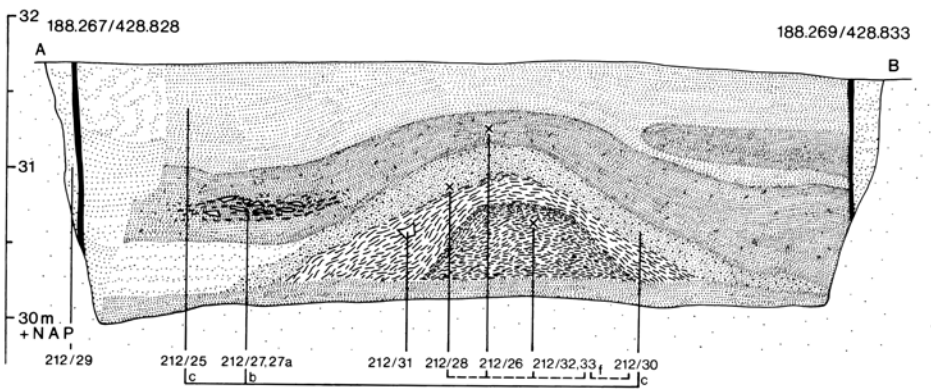
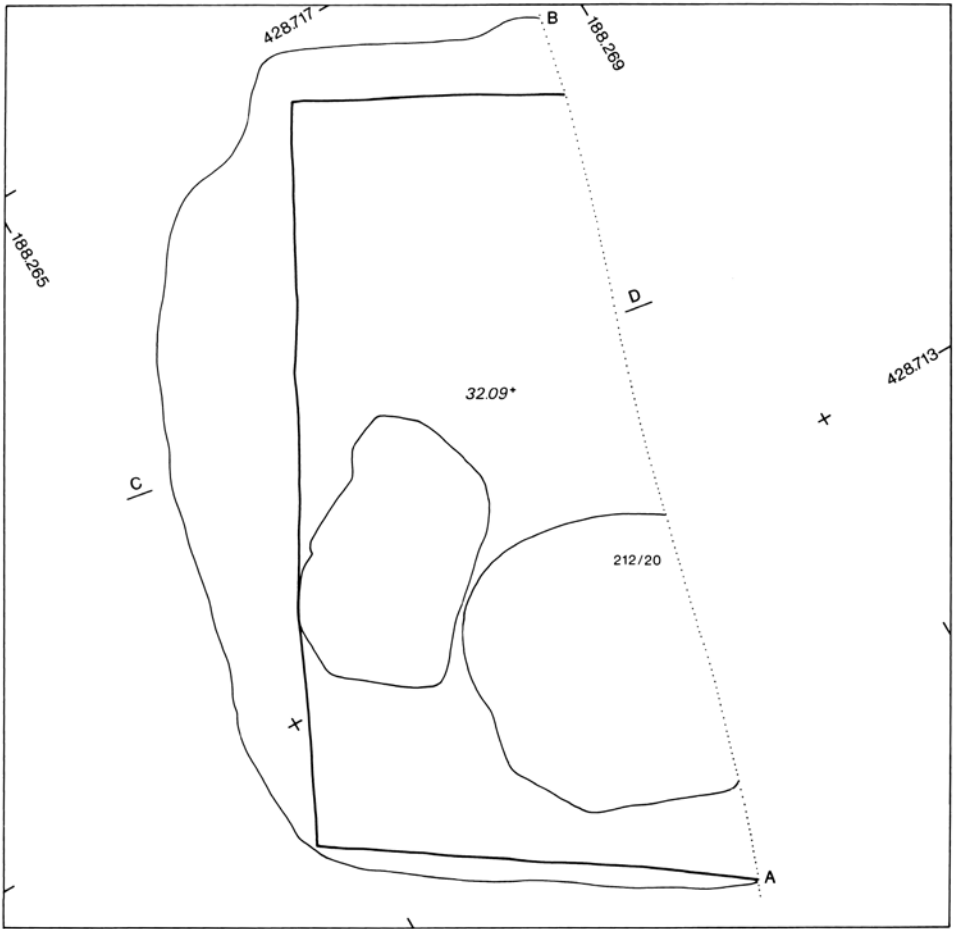


Figure 3.16 Nijmegen. The early Roman settlement around the Valkhof; the clay pit. Scale 1: 50.

Legend: uninterrupted line: pottery fragment belonging to the same rim; interrupted line: pottery fragment possibly belonging to the same rim.



Figure 3.17 Nijmegen. The early Roman settlement around the Valkhof; the clay pit with the section C-D (Fig. 3.16) seen from the south.

cladding of 2-4 cm thick planks extending up to approximately 0.50 m from the bottom; below this no cladding was observed, nor any traces of a wooden floor. At the bottom of the pit there was a bell-shaped mound of bluish-grey clay 0.60 m high and with a diameter of at least 2.80 m at the base. On top of the clay mound there was a 0.20 m layer of dark brown soil. The rest of the pit fill consisted of a 0.20-0.60 m layer of brown soil and a 0.30-0.60 m layer of fairly clean sand, which may correspond to the raised layer no. 4 in the profile description in Section 3.3.3. This could imply that the clay pit was finally filled at the same time as the site was raised. Stratigraphically, therefore, the clay pit could be contemporaneous with the two wooden buildings in the profile description in Section 3.3.3. The clay pit does in fact have the same orientation and lies right next to these

houses. The distance to the trench of the earliest house is 0.15 m, and to the later house 1.25 m. Contemporaneity with the latest house would therefore be more acceptable in order to prevent the wall of the house subsiding. However, it is also possible that the pit is older.

The finds

The following description covers the major part of the collected finds and all those finds which distinguish themselves by their stratigraphic position, their dating evidence or their intrinsic value (Fig. 3.18-19).

The pit for the construction of the wooden cladding

No. 212/29

a. Wall fragment from a Gallo-Belgic dish in Holwerda 1941, 117 technique IV.1 ('terra rubra').

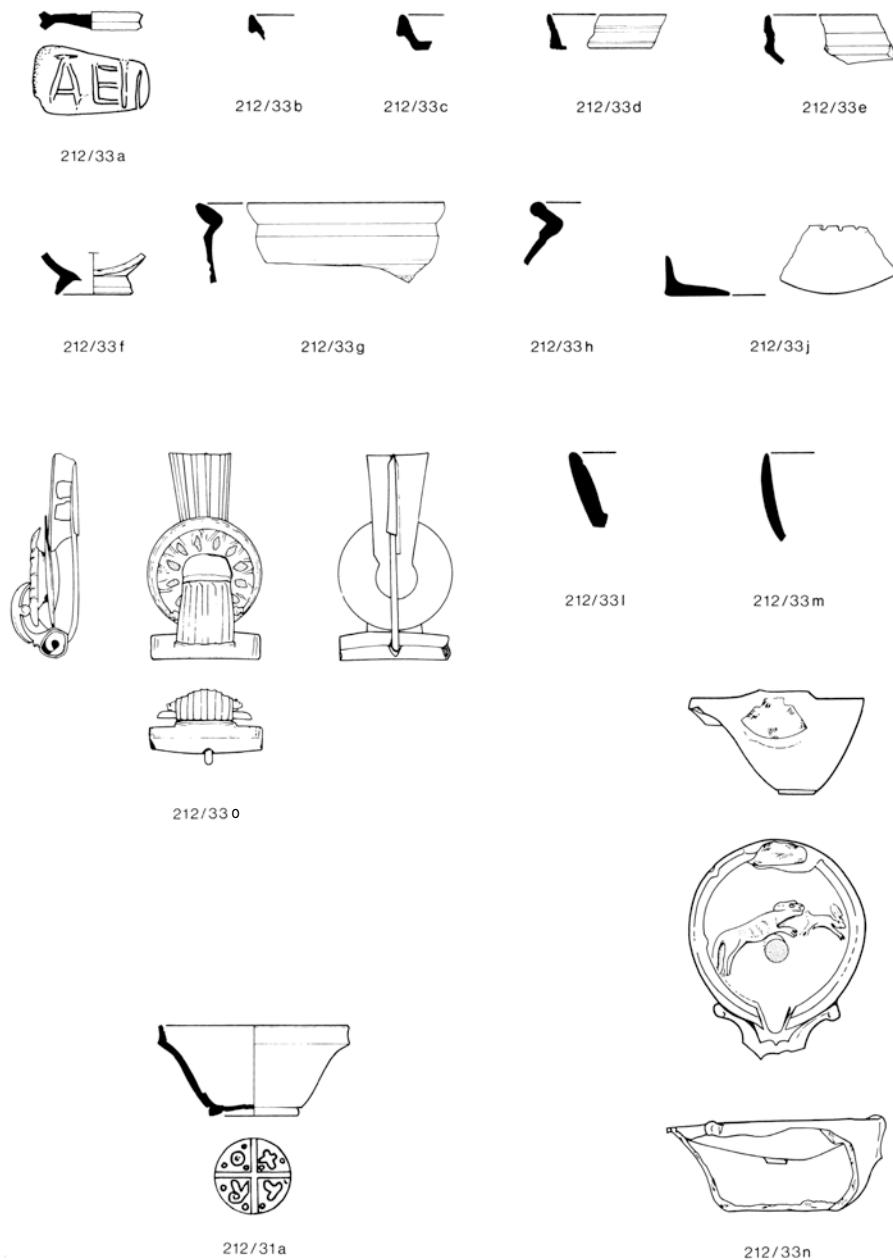


Figure 3.18 Nijmegen. The early Roman settlement around the Valkhof; finds from the core layers of the clay pit. Stamps scale 1:1; lamp scale 1:2.

The lowest level within the wooden cladding

No. 212/36

a. Fragment of the neck of an amphora with the attachment of a handle.

The humus layer below the clay mound

No. 212/34.

a. As; Lugdunum; 10-13 AD; RIC 230.

From the core of the clay mound

No. 212/33 (Fig. 3.18)

a.* Bottom from a terra sigillata cup service 2 type Haltern 2 with orange brown surface. Stamp ATEII: Oxé & Comfort 1968, 50 no. 144.697; Oxé, Comfort & Kenrick 2000 type 269.4 (144) no. 31.

b.* Rim from a terra sigillata dish service 1c type Haltern 1 with patchy orange brown surface. Diameter c. 16 cm.

c.* Three rim fragments from a terra sigillata dish service 1c type Haltern 1 with orange surface and soft core. Diameter c. 18 cm. Von Schurbein 1982, Taf. 21, e.g. 233 and Taf. 22 e.g. 238-239 ('Variante J'). See also no. 212/28 sub a. and 212/26 sub a.

d.* Rim from a terra sigillata dish service 2 type Haltern 2 with orange surface; on the angle of the outer wall strong traces of wear. Diameter c. 19 cm.

e.* Two rim fragments and two wall fragments from two terra sigillata cups service 2 type Haltern 8 with orange brown surface. Diameter c. 8 and 13 cm.

f.* Base fragment from a terra sigillata cup type Haltern 11 or Dragendorff 1895, type 27 with matt glossy surface. Diameter c. 3.5 cm.

g.* Rim fragment and four wall fragments from a pot Holwerda 1941, 21 Form 9a ('Augustus-Tiberius') with violet gray outer wall and light orange inner wall (technique III.1). Diameter c. 18 cm. Two similar wall fragments, probably belonging to the same pot, are found in no. 212/30.

h.* Rim from a Gallo-Belgic pot Holwerda 1941, 25 form 3a ('in hoofdzaak ... Augusteïsch ...') with orange slip over light brown core (technique IV.1). Diameter c. 16 cm. A wall fragment with a coarse roll stamping in a similar technique could belong to the same pot.

i. Base from a Gallo-Belgic pot Holwerda 1941, 25 form 3a, possibly of orange ware (technique III.1). Diameter 11 cm. 15 wall fragments, of which 6 with roll stamping, in a similar technique could belong to the same pot.

j.* Bottom fragment from a Gallo-Belgic pot Holwerda 1941, 25 form 3a or similar and in technique VI.1. The fragment has three holes and could be (secondarily?) used as a sieve.

k. Wall fragment from a Gallo-Belgic 'gordelbeker' with roll stamping and in technique Holwerda 1941, VI.1. A similar fragment, possibly from the same vessel, but not fitting is found in no. 212/30d.

l.* Rim fragment from a Gallo-Belgic dish Holwerda 1941, 66 form 79 c-e ('in de late Augusteïsche en de Tiberiaanse periode') with polished blue grey surface (technique VI.2). Diameter c. 33 cm. A bottom fragment with used foot ring could belong to this rim on the basis of

its technique and size.

m.* Rim fragment from a Gallo-Belgic dish Holwerda 1941, 69 form 81a ('Claudius en kort daarna') with black surface and light grey core (technique VI.2). Diameter c. 33 cm. A bottom fragment with foot ring could belong to this rim on the basis of its technique and size.

n.* Lamp of yellow beige ware. The handle, the end of the snout and a part of the bottom have disappeared. On the upper side (diameter 4.6 cm) is a decoration representing a dog hunting a hare. An identical lamp is illustrated by Gechter 1979, 45 Taf. 19.1. The lamp belongs to the type Loeschcke 1909, type IA which is dated in the first quarter of the first century AD (Leibundgut 1977, 22).

o.* Bronze brooch. Length 5.4 cm; diameter plate 3.0 cm. Van Buchem 1941, 71 type 9; Ulbert 1959, 66: '...Augustus bis von Claudius ...'; Riha 1979, 106 ('... Möglicherweise sind die flachen Distelfibeln aber etwas später aufgekomen und länger getragen geworden [als Distelfibeln mit gewölbtem Bügelteil] ... 1. bis 3. Viertel des 1. Jahrhunderts. '); Feugère 1985, 292-299.

The upper layer of the clay mound

No. 212/31 (Fig. 3.18)

a.* Almost complete Gallo-Belgic cup Holwerda 1941, 73 form 82 (p. 61: 'hoofdzakelijk ... Augustus-Tiberius') with matt glossy black surface and grey core (technique VI.2). Diameter 10.4 cm, height 4.5 cm. On the bottom a round stamp T..R..O..X. within the four quadrants of a cross: Hawkes & Hull 1947, 58 and Pl. XLVII.149 (Colchester Period I: c. 1-43 AD).

Thin dark brown layer over the clay mound

No. 212/28

a. Rim fragment of a terra sigillata dish service 1c type Haltern 1 with orange surface. Diameter c. 18 cm. Von Schnurbein 1982, Taf. 21, e.g. 233 ('Variante J'). The rim may belong to the rims nos. 212/33 sub b and 212/26 sub a.

No. 212/30 (Fig. 3.19)

a.* Rim fragments of a terra sigillata dish service 1c type Haltern 1 with orange surface. Diameter c. 16 cm. Von Schnurbein 1982, Taf. 21, e.g. 236 ('Variante J').

b.* Rim fragment of a terra sigillata dish service 1b (or 1c?) type Haltern 1 with orange surface and soft core. Diameter c. 17 cm. Von Schnurbein 1982, Taf. 2.10.

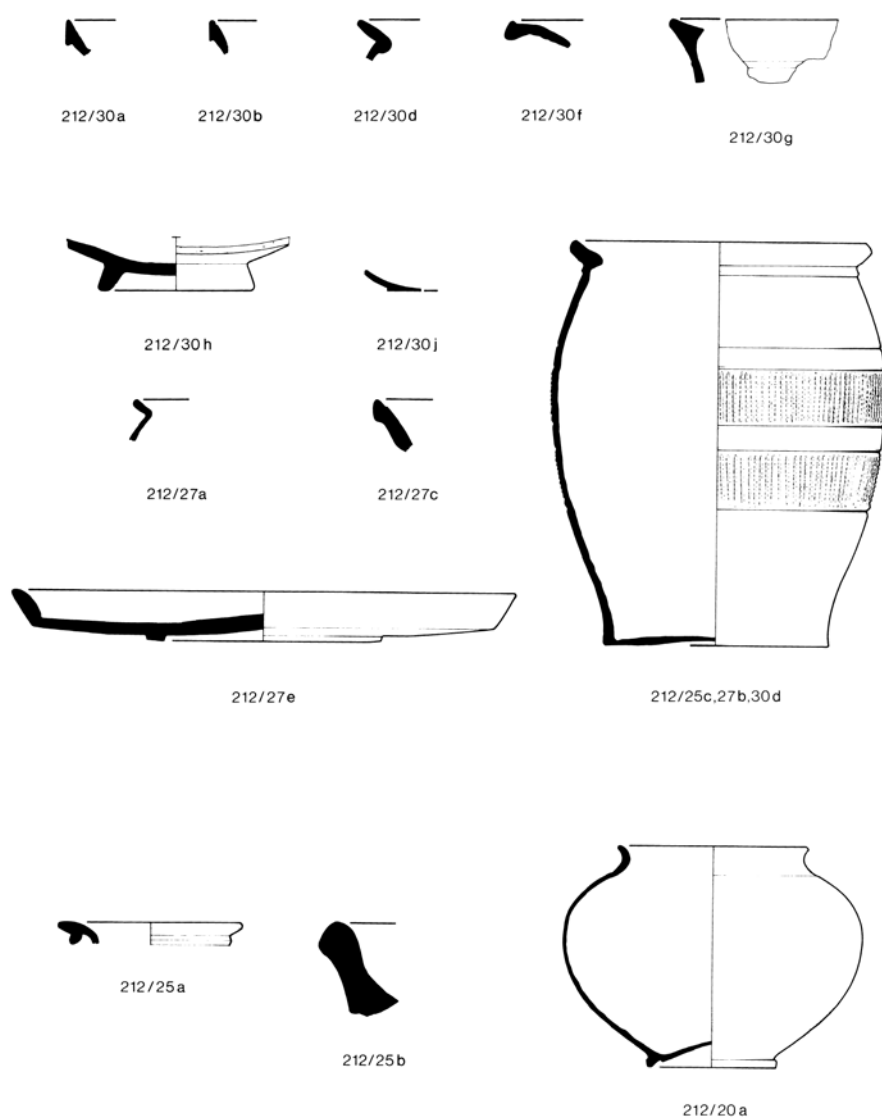


Figure 3.19 Nijmegen. The early Roman settlement around the Valkhof; finds from the upper layers of the clay pit.

c. Rim fragment from a Gallo-Belgic pot Holwerda 1941, 21 form 9a ('Augustus-Tiberius') or 24 form 13 with the same rim; the outer wall is grey, the inner yellow orange (technique III.2). Diameter c. 15 cm.

d.* Two fitting rim fragments from a Gallo-Belgic pot Holwerda 1941, 22 form 11a ('Augustus') with orange surface and core. Diameter c. 16 cm. A wall fragment with two zones decorated by roll stamping could belong to it. Nos. 212/27 sub b and 212/25 sub c fit to the rim as do at least four wall fragments with two zones decorated by roll stamping.

e. Bottom fragment from a Gallo-Belgic 'gordelbeker' of orange ware; the rim of the foot

is worn. Diameter 9.3 cm.

f.* Rim fragment from a Gallo-Belgic dish Holwerda 1941, 64 form 77d (p. 56 'in Haltern en Hofheim' and p. 64 'speciaal omstreeks het midden van de 1e eeuw') with matt black surface (technique VI.1) and brown grey core. Diameter c. 29 cm.

g.* Two rim fragments from a Gallo-Belgic pot, possibly Holwerda 1941, 74 form 86a with black surface (technique VI.1) and brown grey core. Diameter c. 25 cm.

h.* Base with foot ring of brown grey coarse terra nigra, possibly Holwerda 1941, 118 technique VI.2. Diameter 8.1 cm.

i. Base fragment with foot ring of brown grey

coarse terra nigra Holwerda 1941, 118 technique VI.2. Diameter c. 8 cm.

j.* Base fragment with foot of orange yellow thin walled ware, possibly from a hemispherical cup or bowl. Vegas 1975, 14 and Taf. 2.20: in this fabric 'augusteisch'. Diameter 3.7 cm.

Thick dark brown layer over the clay mound

No. 212/26

a. Rim fragment of a terra sigillata dish service 1c type Haltern 1 with orange surface. The lower side of the lip is heavily worn. Diameter c. 18 cm. Von Schnurbein 1982, Taf. 21, e.g. 233 ('Variante J'). The rim may belong to the rims nos. 212/28 and 212/33 sub b and 212/26 because of the form, colour and the impressions of the potter's wheel.

No. 212/27 (Fig. 3.19)

a.* Rim fragment from a Gallo-Belgic pot Holwerda 1941, 22 form 11a ('Augustus') of orange ware with grey violet tint (technique III.2). Diameter c. 10 cm.

b.* Rim fragment and at least three fitting wall fragments with two zones decorated with roll stamping, various decorated and undecorated wall fragments and five bottom fragments belonging to nos. 212/30 sub d and 212/25 sub c.

c.* Rim fragment from a Gallo-Belgic dish Holwerda 1941, 59 form 78d with orange smooth surface (technique IV.1). Diameter c. 19 cm.

d. Bottom fragment with broken stamp in the centre of a Gallo-Belgic cup Holwerda 1941, 60 form 82 with matt orange surface (technique IV.1) ('hoofdzakelijk ... Augustus-Tiberius').

e.* Almost complete Gallo-Belgic dish Holwerda 1941, 67 form 87a ('Augustus-Tiberius') with blue grey matt glossy surface and light grey core (technique VI.2). Diameter c. 27 cm.

f. Two fragments from the bottom of a large Gallo-Belgic vessel Holwerda 1941, 75 form 94 ('Augusteisch ... Claudisch ...') coarse porous and with fine gravel tempered ware (technique VII.1). Diameter c. 11 cm.

Sandy filling above the brown soil

No. 212/25 (Fig. 3.19)

a.* Rim fragment of a jug Filtzinger 1972, 11 type 13 and Taf. 18.14-16 of a good quality white yellow ware. Diameter 9.8 cm.

b.* Rim fragment of mortarium Stuart 1977b, 65 type 148 of light brown ware. Diameter c. 35 cm.

c. Rim fragment belonging to nos. 212/27 sub b

and 212/30 sub d.

Pit or depression in the upper fill of the wooden cladding

No. 212/20 (Fig. 3.19)

a.* Three rim fragments, various wall fragments and bottom with worn foot from a Gallo-Belgic pot Holwerda 1941, 37 form 27a ('Tiberius en vlak daarna') of thin ware with matt glossy polished surface (technique VI.1). Diameter mouth c. 12 cm; diameter foot 6.8 cm.

The dating

Because of the as dated to AD 10-13 from the humus layer below the clay mound and the terra sigillata with a stamp ATEII and fragments belonging to service 1 and 2 from the core of the clay mound the clay pit must have been constructed and used between AD 10 and 25. On the basis of stratigraphical observations the clay pit might precede the wooden buildings.¹⁰¹

3.3.6 Special pits or cesspools

The features

Two, perhaps even three pits, a relatively unusual concentration, are to be found near a possible house plan in the middle of trench 212. One of these is pit 188.258/428.677 (Fig. 3.20). The pit is c. 3.90 m deep and has a rather small circular diameter of 0.80 m at the bottom to 1.00 m at the top. On the basis of these measurements and the shape, it is likely that the revetment of the pit consisted of two or more wine barrels placed on top of each other, as is often the case. Due to the bad preservation conditions no trace of wood has remained. The bottom 1.60 m of the fill is fairly clean and even in colour, then there is a 0.10 m dirty layer with above it dark brown soil up to the top of the pit. In the upper part of this fill is a 0.80 m deep core with, among other things, the remains of tuff and wall paintings which could be connected with the stone building 25 m further north. Other concentrations were found in trench 218 (188.294/428.675 and surroundings) where at least three pits are located together. These pits may have been used as cesspools and it is possible that each parcel had its own sanitary facility.¹⁰²

Finally, attention must be drawn to a large and irregularly shaped depression in the northwest

¹⁰¹ For the possible function of this clay pit see Section 3.3.7.

¹⁰² Willems & Van Enckevort 2009, 71; Heirbaut 2010, in particular 21-26; Van Enckevort 2012, 148.

of Kelfkensbos (188.270/428.780). Its diameter is at least 19.00 m and the depth at least 2.00 m, as far as it has been excavated and not disturbed by later activities. A 5.00 m wide and 15.00 m long extension protrudes on the northeast side. The recorded profiles show that the bottom of the depression slopes down gradually. Perhaps this depression can be interpreted as a pool with a gradually declining access from the northeast, for watering animals, for example. It is striking that a large pool was also to be found at the same spot in the Late Middle Ages.¹⁰³ The edge of it was probably found on the south side of the excavated site which intersects this depression from the early Roman period.

The finds

The following finds description represents the main finds from the pit in trench 212 (188.258/428.677; Fig. 3.21). This assemblage can be dated to the Claudio-Neronian period.

The upper fill of the pit or cesspool

No. 212/60 (Fig. 3.21)

a. Wall fragment from a South Gaulish terra sigillata bowl Dragendorff 1895, type 29. Decorated upper zone: column, rank and rosette identical with Knorr 1919, Taf. 88.C (p. 83 '... im zweiten Viertel des ersten Jahrhunderts ...'); similar Hawkes & Hull 1947, 170 and Pl. XXII.6 ('early Claudian').

b.* Rim fragment from a terra sigillata cup Dragendorff 1895, type 24/25 with glossy orange brown surface and relatively hard fabric.

c.* Rim fragment from a terra sigillata cup Dragendorff 1895, type 24/25 with changed colour caused by secondary firing. Diameter c. 13 cm.

d. Rim fragment from a Gallo-Belgic pot Holwerda 1941, 22 form 11, 12 or 13 in technique III.2.

e.* Rim fragment from a Gallo-Belgic cup Holwerda 1941, 62 form 83c in technique IV.1 ('Tiberius tot Claudius'). Diameter c. 15 cm.

f.* Rim fragment from a dolium with a hole for repair and fitting to the dolium fragment no. 212/64 sub j.

g.* A bronze lit with three holes and an eye for a hinge, possibly belonging to a seal-box. Diameter c. 2 cm.

No. 212/61 (Fig. 3.21)

a.* Four fitting fragments from a wall painting

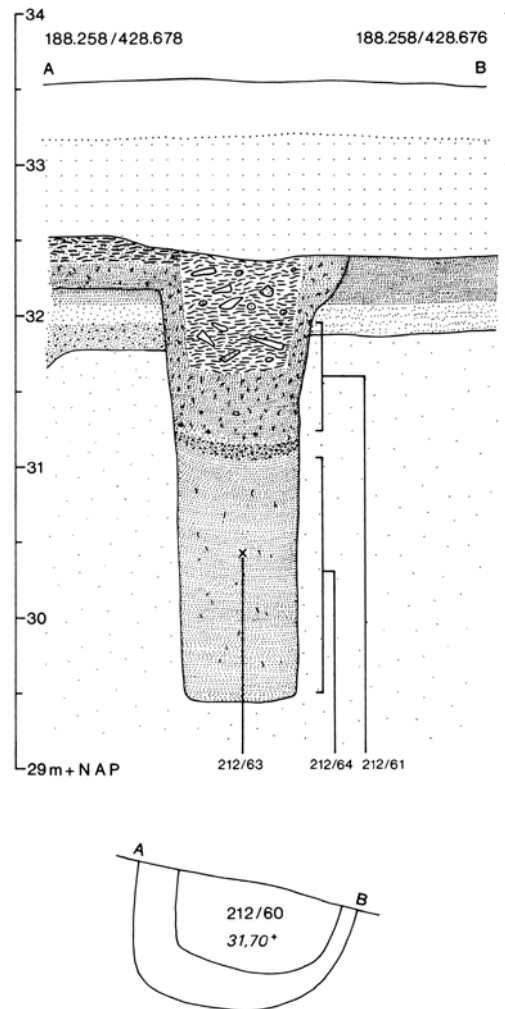


Figure 3.20 Nijmegen. The early Roman settlement around the Valkhof; special pit or cesspool. Scale 1:50.

with white and brown red vertical zones containing dark brown red plant or twig motifs. A fifth fragment has olive green and white vertical zones. The thickness of the mortar is c. 1.1 cm, the structure is fine, the colour white.

The lower fill of the pit or cesspool

No. 212/64 (Fig. 3.21)

a.* Half a terra sigillata bowl Dragendorff 1895, type 24/25 with orange brown surface. On the bottom a stamp ACVTVS. Diameter c. 14 cm.

b.* Almost half a terra sigillata bowl Dragendorff 1895, type 24/25 with orange brown surface. On the bottom a stamp MACIR.

c.* Rim fragment from a terra sigillata bowl Dragendorff 1895, type 25 with 'strap handle' of South Gaulish terra sigillata with a matt glossy

¹⁰³ Gorissen 1956, 107.

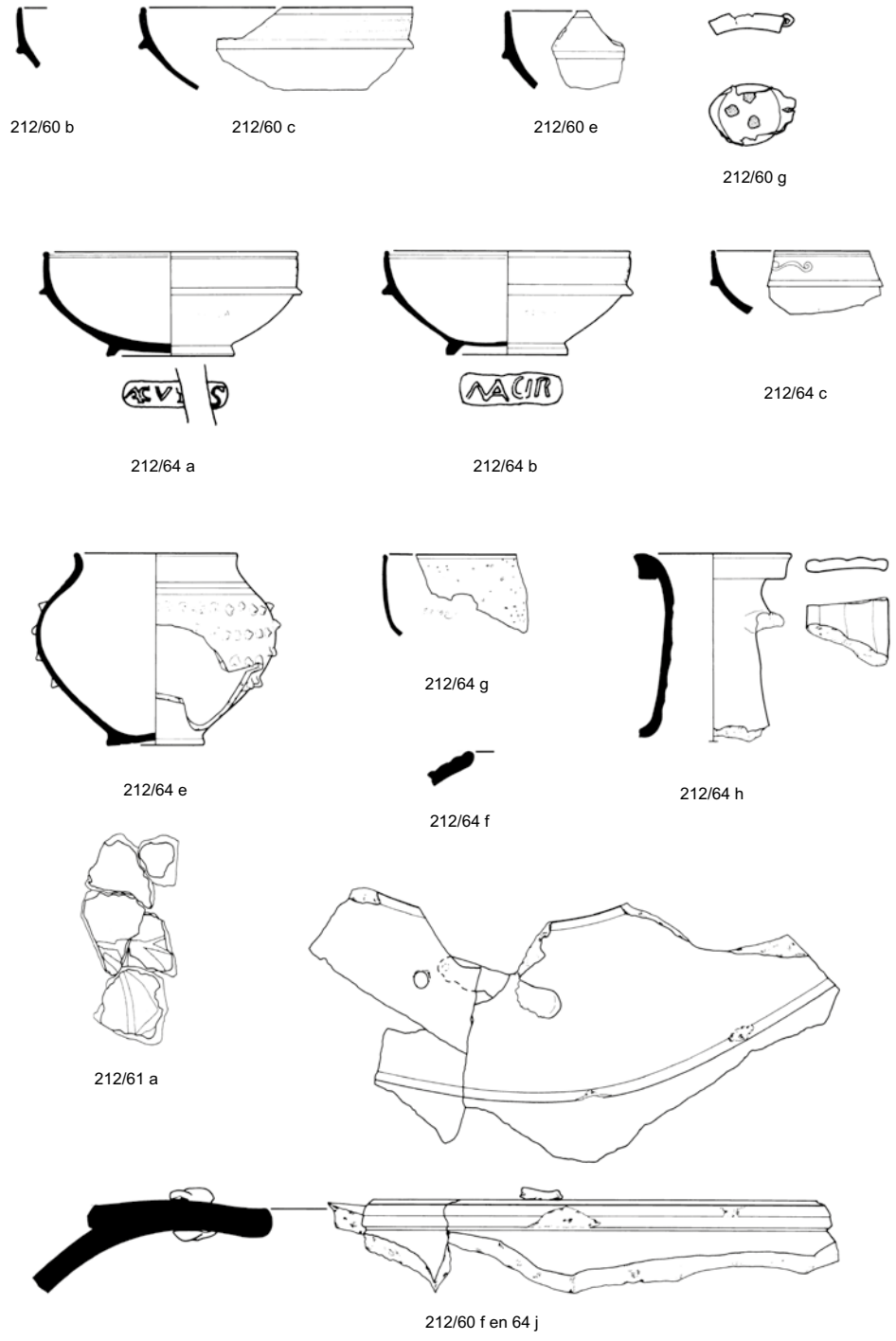


Figure 3.21 Nijmegen. The early Roman settlement around the Valkhof; finds from the special pit or cesspool. Scale of stamps 1:1.

orange brown surface of relatively hard fabric; Mary 1967, 20 ('tiberisch'). Diameter c. 13 cm.
d. Wall fragment from a terra sigillata dish Dragendorff 1895, type 18 with orange brown surface and brown pink core with yellow inclusions.

e.* Six rim, wall and bottom fragments from a Gallo-Belgic small vessel Holwerda 1941, 53 form 74a of relatively hard dark grey ware (technique VI.7). The foot is somewhat worn. Diameter 9.1 cm, diameter of the foot 5.5 cm.

f.* Rim fragment from a Gallo-Belgic pot Holwerda 1941, 76 form 94d of black porous and over the rim matt glossy polished ware (technique VII.1). Diameter c. 21 cm.

g.* Rim fragment from a cup of orange colour-coated ware with 'bestrooiing' on the inner and outer wall. Diameter c. 11 cm. Filtzinger 1972, 26 Form 48c; Stuart 1977b, 42: 'ca. 25? tot ca. 70'.

h.* Neck from a flagon with a four ribbed handle Stuart 1977a, 45 and 49 type Hofheim 50 ('Erdlager te Hofheim is ca. 40 - ca. 70/80') of white ware. Diameter 8.8 cm; height 9.9 cm. Two bottom fragments of the same ware could belong to the neck. Diameter 11.6 cm.

i. Rim from a dolium Filtzinger 1972, Form 28 with black surface on the inner and outer wall. Diameter inner side c. 35 cm; width of the rim 6.9 cm.

j.* Rim from a dolium Filtzinger 1972, Form 28 with light brown surface. The rim is repaired by a lead clamp (length c. 7.5 cm; width c. 1.8 cm); the fragment no. 212/60 sub f. with the hole for a repair fits with this fragment. Diameter inner side c. 40 cm; width of the rim c. 10.1 cm.

3.3.7 Conclusion

In the late Augustan period¹⁰⁴ a settlement developed above the outwash plain around what was later to become known as the Valkhof, which appears to have attained its greatest size and intensity in the Claudio-Neronian period. The surface area of the settlement at its peak can be determined fairly accurately, as far as this can be deduced from the distribution of finds and by excavation: it is approximately 20 ha. The nucleus with traces of intensive settlement may have been about 10 ha. A small part of the whole area was excavated; large parts were either disturbed because of building and groundwork or inaccessible for excavation. Many refuse pits were found in the border areas as well as surface

finds, but there were no building traces. There is no immediate cause to assume that these traces were too shallow to have been recovered by archaeological investigation. Directly west and south of the Valkhof however buildings were discovered, so that it may be assumed that the nucleus of settlement was around here.

The buildings and property divisions have a fairly systemic layout with a northwest-southeast orientation or one at right angles to this.¹⁰⁵

The alignment roughly corresponds with that of the small fortification east of the Valkhof. It is quite possible that the continuation of the road from the small fortification forms the main axis of the settlement. The nucleus with its traces of intensive settlement also appears to be concentrated on both sides of this axis, but is several parcels deep. Therefore there can be no question of a kind of linear village. One of the earliest phenomena is a large clay pit, the use of which can be dated to between AD 10 and 25 (Section 3.3.5). It might be related to the making of pottery. Actual indications of pottery-making such as kilns, kiln refuse or wasters were not found, but may be present in the adjacent site which has not yet been excavated. At almost the same spot and with the same orientation as the clay pit, two wooden buildings were found on top of each other, which can only be dated approximately from the stratigraphical position (Section 3.3.3 nos. 1-2). At the very earliest, the older of the two buildings is contemporaneous with the clay pit, but it is possible that the clay pit belongs to an older stage of settlement. Elsewhere in this area traces of wooden structures were found which appear to mark at least three other parcels. The only completely excavated plans of two wooden houses (Fig. 3.15.b-c), one above the other, correspond closely with, for example, *centurio* houses in the army camp of the Tenth Legion, as far as construction methods and measurements are concerned! They are located within a spaciouly planned and enclosed yard or parcel. These two houses can be dated to the Claudio-Neronian period (Section 3.3.4). At two places in the excavation, for instance next to the clay pit (Section 3.3.3 nos. 8, 10-11), the remains of foundations and robbing trenches of stone buildings are found above the wooden houses. These will have to be associated with the later finds from the first century, i.e. the Neronian material. The stone buildings were

¹⁰⁴ Willems & Van Enckevort 2009, 70 for a possible early Augustan start. For finds indicating an earlier beginning of the occupation c.10 BC or even earlier: Visser 2010, 63-64 and 2011, 1-43; Van Enckevort 2012, 133.

¹⁰⁵ See also Van Enckevort & Heirbout 2008, 21-23 and Afb. 2.

erected after the site at that spot and possibly all around it had been raised 0.20-0.50 cm (Section 3.3.3). A few small fragments of wall paintings found in a pit (see Section 3.3.6) may have some connection with the stone buildings. In any case there appears to have been a great deal of continuity in the succession of buildings and locations, even where the site was raised considerably prior to the construction of stone houses.¹⁰⁶ Pits were found regularly, and may have been lined with wooden wine barrels (Section 3.3.6). The number and position of these pits make it likely that their function (as cesspool?) was organized per parcel or house-site.

It is worth mentioning that no ditches were found in the whole area, with the exception of one place (Section 3.3.2 trench or ditch 188.353/428.818) which might be considered as an indication for a military nature of the settlement. The excavations were extensive and far enough apart to reveal a fortification two hectares or larger. The only ditch found lies in the south (188.278/428.470), outside the settlement area and the encircling ditch (see Section 3.5).

The archaeological material covers the entire span from AD 5-10 up to the Neronian period and clearly indicates that the settlement up on the outwash plain came to an end around AD 70. Moreover it tells us something of the nature of the settlement. Roman wheel-thrown pottery makes up about 90% of all the ware; local hand-formed ware does not exceed 10%. As well as this, graffiti is often found, including no. 161/15 with the text ATEPOMARI on Italic terra sigillata.¹⁰⁷ The nature, quality and quantity of finds give a picture of what in Germania inferior in the pre-Flavian period is generally attributed to findspots with a military function.

On the basis of the above observations several assumptions can be made as to the nature of the settlement. The regular layout and the size of the settlement, the shape and construction of the buildings, the quantity and wealth of Roman and Gallo-Roman finds and the graffiti make it clear that we are not dealing with a local settlement.

No indications of an older pre-Roman local settlement were found anywhere. The absence of ramparts and ditches, the spacious division of parcels and the decentralized water supply all speak against the primarily military function of the settlement at its peak. The only

possibility left is that it must have been a civilian settlement with a (Gallo-)Roman character. This settlement can be reasonably compared with the Batavodurum of Tacitus and Ptolemy.¹⁰⁸ The characteristics of this settlement are strongly reminiscent of those of the settlement from the same period at Xanten, which lies under the later Colonia Ulpia Traiana (CVT).¹⁰⁹

3.4 THE PRE-FLAVIAN CEMETERY ON THE HUNERBERG

3.4.1 Introduction

At the beginning of the century the town of Nijmegen began to expand eastwards beyond the former town ramparts. During this process of expansion an extensive cemetery from the beginning of the Roman period was uncovered, situated west of the large military camp on the Hunerberg (Fig. 3.1 no. 4 and 3.12 no. 4). The sizeable collection of Roman finds built up by G.M. Kam at the time, originated to a large extent from this cemetery and formed the basis for the foundation of the former Rijksmuseum G.M. Kam. This museum is inside the boundaries of the cemetery, as it is now believed to have existed.¹¹⁰ The pottery alone attributed to the cemetery amounts to more than 2,500 items¹¹¹, not counting glassware, lamps, fibulae etc. and untraceable finds which have disappeared via private individuals and trade or due to carelessness.

Up to 1975 no systematic excavation had been carried out in this cemetery at all. The only investigation perhaps deserving of this qualification is that performed in 1906 and 1907 under the direction of F.M.L. Leydekkers on the site of Canisius College and covering the southeast end of the cemetery.¹¹² When the reconstruction of two streets in the cemetery area was announced in 1975 and 1976, Hugo de Grootstraat and Museum Kamstraat, it was decided in consultation with the Nijmegen council to allow an excavation first. The premise underlying the plan was the consideration that the streets had already been built before the start of the great treasure hunt for the grave finds at the beginning of the century.¹¹³ In this case the sewerage and possibly pipes would be the only systematic disturbances. The correctness of this argumentation was confirmed

¹⁰⁶ Another construction in stone - a cellar - from the same pre-Flavian occupation was excavated in the Gerard Noodtstraat: Van Enckevort & Thijssen 1996, 56.

¹⁰⁷ Mócsy 1984, 202 Abb. 6.

¹⁰⁸ Bloemers, Greving & Zoetbrood 1979, 30-31; see however Willems & Van Enckevort 2009, 69-70 for a different suggestion.

¹⁰⁹ Von Petrikovits 1960, 103-105; Bechert 1982, 57; Von Detten 1983, 118; Schmidt 1985, 106-109; Zielsing 1989; Heimberg 1998; Precht 2008.

¹¹⁰ For a discussion summarizing the way in which the existence of the cemetery was discovered and the finds were collected: Daniëls 1955, 305 and 325-329; Stuart 1977a, 38. For the founding of the Rijksmuseum G.M. Kam: Stuart 1985.

¹¹¹ Holwerda 1941, 80114 (Belgian ware: 1405 specimens including those from several other small cemeteries); Stuart 1977a, 71 (other pottery: 1447 specimens).

¹¹² Vermeulen 1932.

¹¹³ Vermeulen 1932, 1; Daniëls 1955, 326 and 309 Afb. 137.

by the excavations. Another consideration concerning the excavation of the streets was that they offered the opportunity of making a relatively narrow but continuous section through an area which was for the most part built up and divided up into relatively small parcels because of the division of property, and therefore provided little scope for investigation. In this way some information would at least be gained as to the extent, stratigraphy, composition of the finds and dating of archaeological settlement. The expectation was that the chance of completely excavating larger elements such as houses would be small. However, it would be possible to excavate partially or completely less sizeable elements, as for example, linear and pointed structures such as ditches, trenches, refuse pits and graves. During the excavation of the streets in the cemetery area this assumption also proved to be correct.

3.4.2 The location, shape and size of the cemetery

The road

The location of the cemetery appears to have been determined by the Roman road which runs in a northwesterly direction from the west gate of the large military camp on the Hunerberg to the east gate of the small fortification (Fig. 3.1 nos. 5 and 3 and 3.12 no. 5). Starting points for the alignment of this road are the two entrances to these camps from the beginning of the first century AD and two sections through the road itself.

About 45 m west of the ditches of the large fortification, but 30 m north of the continuation of the centre line of the gate (188.915/428.325) runs a road embankment with a width of 7.5-8 m and a preserved thickness of at least 0.30 m. The top consists of a 0.10-0.12 m thick layer of leached sand on a band of iron ore as is often found under a layer of gravel. The latter however was not found even though c. 0.15 m of the profile on top of it is still present undisturbed in the form of dark-brown soil. North of this there is a 2-4 m wide and 0.80 m deep trench at a distance of 9 m and another one 1 m wide and 0.40 m deep at a distance of 15 m running in a northwest-southeast direction; both of them have a fairly clean fill. The road area distinguishes itself from its surroundings by the almost complete absence of other features.

Another road embankment was discovered about 150 m more to the north and c. 40 m southeast of the supposed southeast gate of the small fortification (188.820/428.455). It consists of a layer of soil approximately 0.25 m thick, the top layer of which is divided into a band of ore and a leached zone; on top of this over a width of c. 7 m there is a 0.20-0.25 m layer of finer gravel with above it a 0.10 m thick layer of somewhat coarser gravel across a width of about 8.5 m. On the south side of the road there are three parallel trenches 0.60 m deep with a space of 2 m between them which can be connected with the upper surface of the leached layer, the fine gravel layer and the coarse gravel layer respectively. There are also three trenches on the north side but at 2 m intervals. The southernmost one and the northernmost one were dug from the top of the coarse gravel layer, and the middle trench probably from the top of the layer of leached sand.

The relief

The relief of the surface at the beginning of the Christian era has probably been a factor influencing the course of the road and hence also the location of the cemetery. The surface gradually declines in a northwesterly direction, without any visible irregularities. This is in contrast to the surface in the northeast-southwest direction, where the two excavation trenches in the streets (Fig. 3.1 and 3.12: 4a. Museum Kamstraat to the east; 4b. Hugo de Grootstraat to the west) provided the opportunity of reconstructing the old surface over a length of at least 300 m. The road running northwest-southeast within the large fortification which continues in a northwesterly direction outside the camp was chosen as a relatively fixed element in the horizontal plane. The sections in both streets show a similar picture: a drop of 3-4 m in the undisturbed soil, i.e. the level on which the earliest Roman activities took place, from northwest to southeast. What is important is that the two road trenches in the Museum Kamstraat show a bend about 30 m north of the projected extension of the road from the large fortification. This bend marks the beginning of a lower-lying area which extends southwards. The old surface drops 2.5-3 m from the bend over a distance of 60-90 m southwards, and then continues at the lower level without many irregularities. The area between the two fortifications is therefore

characterized by a higher and relatively flat part and a considerably lower part which is quite clearly marked. If the road had been built as a continuation of the one inside the large fortification, there would have been a drop of approximately 1.80 m over a distance of about 150 m; this was however only about 0.60 m in the observed part. When constructing the road it was apparently decided not to build it close to the edge of the low-lying area but to maintain a distance, thus making the drop in the road less sharp.

The cemetery

In the northwest (188.780/428.395) graves were found in a strip stretching from 30 to 40 m south of the Roman road across the relatively high area; no graves were observed north of the road (Fig. 3.1 no. 4b and 3.12 no. 4b). These graves are among the earliest excavated, and date from the first quarter of the first century AD (see Section 3.4.3). The finds consist of at least 11 positively identifiable graves. During the intensive excavation of the site which lay 50 m more to the west and where, for example, a large part of a cemetery dating from the fourth century AD was excavated, not one grave from the first century was found.

In the southeast (Fig. 3.1 and 3.12 no. 4a), most of the graves lie in a zone stretching from the Roman road over a distance of 115 m southwards and hence situated for more than 50% in the lower-lying area. Less than 5 m from the southernmost grave three to four 0.70-1.00 m wide ditches run in a north-south direction and curve in the south towards the northeast. Three more ditches were observed at a distance of 50 m, but in a northerly direction. South of these ditches at a distance of 75 m from this point only one grave was found. North of the road at a distance of more than 90 m three graves were found, the one closest to the road at a distance of 40 m.

If one links up the boundaries of the grave concentrations in the northwest and southeast, it becomes clear that the shape of the cemetery is characterized by a north-south axis. This is also the orientation of the three to four ditches in the southeast, which could very well be considered to be a border to the graves on this side. This fits in with the distribution of the graves which were discovered in 1906/1907 on

the site of Canisius College.¹¹⁴ The centre of the cemetery extended south of the road over a distance of more than 200 m in a north-south direction. The total surface area would thus have been at least 1.5 ha. The burials must have begun in the north and have more or less fanned out southwards in the course of time, making increasing use of the lower-lying area.¹¹⁵

At least eight certain and some possible graves were found in an area covering more than 200 m² in the northwest (Fig. 3.1 and 3.12 no. 4b), and at least 140 certain and several dozens of possible graves in an area of about 850 m² in the southeast (Fig. 3.1 and 3.12 no. 4a). An average density of one grave per 10 m² is quite probable. Altogether at least 1,500 burials could have taken place. The c. 150 certain graves yielded approximately 325 complete pieces of pottery, i.e. 2.1 pot per grave on average. The estimated 1,500 graves could therefore have contained approximately 3,170 pieces of pottery. More than 2,500 specimens have ended up in the collection of the former Rijksmuseum G.M. Kam and the Rijksmuseum van Oudheden and have been described. The total amount of pottery from the museums and the excavations more or less corresponds to the estimated minimum amount of pottery. However, it has to be taken into account that not all the gardens in the area and two streets running right across the cemetery, Pater Brugmanstraat and Jan van Goyenstraat (surface area inside the cemetery c. 1,250 m²), were excavated systematically. If one assumes that pottery from the treasure-digging period did not end up in the museum collections either, an estimate of 4,000 pieces of pottery, i.e. c. 2,000 burials, is justifiable. The estimated size of the cemetery would then be 1,500-2,000 graves.¹¹⁶

3.4.3 The graves

The types of burial

By far the most burials consist of rectangular to square pits, which were dug in a regular fashion. The measurements generally vary from 0.50-0.95 m square to 0.40-1.00 x 0.60-1.60 m. Approximately 15% of the graves consist of a simple round pit (0.40-0.50 m in diameter). The graves are usually close together at intervals of less than 1 m, but overlapping of the positively identified graves does not occur. However, this does occur with some of the graves and the pits, which possibly had something to do with the

¹¹⁴ Vermeulen 1932, Pl. III. A and B. See also Haalebos *et al.* 1995, 26-28 and *idem* 1998, 19-38.

¹¹⁵ In accordance with Holwerda 1941, 14 and in disagreement with Daniëls 1955, 308. Vermeulen 1932, 196 mentions an 'early' grave, no. 87.

¹¹⁶ Bloemers, Greving & Zoetbrood 1979, 35 comes out about twice as high because of a slightly larger surface area and twice the burial density; see also Van Enckevort 2011, 35-36. A complete analysis of the human cremations collected in 1975-1976 and the population involved has been performed by L. Smits (2006).

Table 3.1 Nijmegen. The cemetery on the Hunerberg. Number of specimens of pottery per grave.

	Number of specimens per grave									Total
	1	2	3	4	5	6	7	8	more than 8	
Number of graves	43	30	26	7	5	9	7	2	2	131
Percentage	33	23	20	5	4	7	5	1.5	1.5	100
Number of specimens	43	60	78	28	25	54	49	16	21	374
Percentage	11.5	16	21	7.5	6.6	14.5	13	4.3	5.6	199

burials, although this cannot be verified. It is possible that the position of the graves was indicated on the surface. Border elements such as ditches or enclosures are very rare, and in many cases the density of burial does not allow room for these kinds of structures. The marking on the surface must have been done in the form of wooden or stone tombstones or pottery.

There is a fairly certain relation between a burial pit and a border structure in only two cases.

The border structure of grave no. 105/249 is an almost square ditch (2.50 x 2.60 m) and 0.35 cm wide. The burial pit is located a little off-centre with regard to the border structure. Although the grave is quite big, it does not differ much from the others; the same goes for its contents. One side of the border structure of grave no.

105/71 could not be excavated, but the ditch corresponds both in measurements as well as shape to the previously-mentioned grave. Here again, the burial pit is located a little off-centre, and does not differ much from the others in size or contents. More than 7 m away from the grave there is a more or less oval closed ditch without any indication of a burial or any other sort of pit (diameter 3.00-3.50 m). In the middle of the cemetery there are still parts of large rectangular ditch structures, which it was not possible to excavate completely. They are much larger than the ditches mentioned above (8.00 x at least 5.50 m and at least 6.50 x at least 4.50 m respectively) and are overlapped by three (nos. 105/115, 118 and 306) and two graves (nos. 105/305 and 310) respectively. As far as could be observed, there was no question of a clearly centralized burial. Within the most complete structure there are as many as 5-7 burials, two of which were apparently discovered and ransacked when the sewers were installed.

Three graves lie near or right next to the inner side of the ditch and one of them is exactly in the corner. It is difficult to prove that they were contemporaneous. At the moment it is assumed, mainly on the basis of the overlapping by five graves, that these large rectangular ditches have no connection with the burials since overlapping is as earlier mentioned most unusual in this cemetery.

The contents had been placed both whole and unburnt as well as broken and burnt in the graves. Approximately half of the c. 150 graves contain exclusively complete and unburnt objects and more than a quarter contain both complete and unburnt objects and burnt ones, mostly potsherds. In at least 10% of the graves there is only burnt material, again usually broken pottery.

The grave gifts

Observations as to the nature, size and composition of the grave gifts from the cemetery were of a general and indicative nature and must be regarded for the time being as provisional, until the final detailed investigation of the graves has been completed. What follows is based on the processing of data mainly recorded during the excavation and the provisional first inventory and overall determination made immediately afterwards. Both allocations as well as numbers may be altered in the future. The description below mainly refers to graves with complete objects, whether in combination with burnt and broken specimens or not: about three-quarters of the c. 150 certain graves are concerned.

The distribution of the number of specimens of pottery per grave is as follows (Table 3.1).

Table 3.2 Nijmegen. The cemetery on the Hunerberg. Functional division of pottery.

	Pots	Flagons	Plates	Beakers	Total %	Total nos.
Percentage	46	23	16	13	98	c. 370

Table 3.3 Nijmegen. The cemetery on the Hunerberg. Average number of pieces of pottery per grave.

	Pots	Flagons	Plates	Beakers	Total %	Total nos.
Specimen per grave	1-3/4-9	1-3/4-9	1-3/4-9	1-3/4-9	1-3/4-9	1-3/4-9
Percentage specimens	58/36	21/25	13/19	7/20	99/100	c.175/190
Average specimen per grave	1/2.1	37/1.5	.23/1.1	.1/1.1		
Increase factor	2	4	4	11		

The graves containing 1-3 pieces of pottery (99 altogether) make up three-quarters of all burials with complete pottery; the graves with one specimen only form a third of the total. These 99 graves contain almost half of all the complete pottery. Table 3.2 presents the pottery divided according to function into large pots, flagons, plates and beakers. If this is split up further into graves with 1-3 pieces and 4-9 complete pieces of pottery, one can calculate for both groups the average number of pieces per grave and also the increase factor of the different types of pottery (Table 3.3).

This means that on average there is always a large pot in the graves with 1-3 specimens. This is confirmed by the 38 graves with one specimen, which, in 32 cases, consists of one large pot. In almost all the graves with 2-3 specimens there is also almost always one large pot. As it would appear, the large pot was usually used to hold remains after cremation. One-third of the graves with 1-3 specimens contain a flagon and one-quarter of them a plate. It is useful to establish, in the case of the graves with 4-9 specimens, in what category an increase occurs. It is most striking in the beakers, drinking utensils perhaps connected with the flagons. Flagons and plates are, after beakers, the next category to show an marked increase. The large pots come last, when seen from this angle. One could therefore assume that, apart from the large pot as a receptacle for cremation remains, pottery used for drinking is relatively the most important. What is striking is that there are practically no mortaria. Graffiti occur only four times,

twice in the form of a cross and twice in the form of several letters or figures, which are illegible. The occurrence of local pottery which was not wheel-thrown is worth a special mention. There are 13 graves with this type of pottery, and in six cases there are whole pots (nos. 71/10 and 85; 105/75, 198, 204 and 243*). The complete specimens were found in four cases in graves with two or three specimens of pottery, and in one case in a grave with eight specimens. It would certainly not be correct to assume that the graves with native handmade pottery differ from the others as far as the composition of grave gifts is concerned and that they are relatively poor for instance. Unusual finds among the grave gifts are oil lamps, glassware and the remains of wooden boxes. Oil lamps are found in ten of the graves: four in graves with three to five specimens of pottery and four in graves with seven to nine specimens. Lamps, therefore, would appear to be restricted to those graves containing rather more pottery. In three cases a wooden box was certainly placed in the grave (grave nos. 71/4, 105/113 and 177). In four cases it is possible that the grave pit had some sort of cladding (nos. 105/66, 68*, 76 and 77). The more uncommon grave gifts include metal mirrors (in six graves) and coins (in eight graves). An iron knife was found twice in a grave, once a bronze spoon; there are no weapons at all. There are indications on a limited scale that food was given in the form of animal bones and seeds; these have to be investigated more closely. Ornaments such as fibulae, bracelets, rings and bead necklaces give us something to go on with

Table 3.4 Nijmegen. The cemetery on the Hunerberg. Identification of women's and girls' graves on the basis of ornaments.

Grave no.	Bracelet	Ring	Beads	Fibulae	Diverse	Woman/girl
105/110	1	34		2		x
105/141	5			3		x
105/155		3			bronze needle bone needle	x
105/172*	3		1			x
105/212*	1	12				x
105/222	2			8	1 lamp	x
220/1	2			2	1 glass balsamarium	x

Table 3.5 Nijmegen. The cemetery on the Hunerberg. Number of fibulae per grave.

	Number of fibulae/grave					Total
	1	2	3	4	6	
Number of graves	21	14	3	2	1	41
Percentage	51	34	7	5	3	100
Number of fibulae	21	28	9	8	6	72
Percentage	29	39	12.5	11	8.5	100

Table 3.6 Nijmegen. The cemetery on the Hunerberg. Number of fibulae of commonly found type and number of graves.

Fibulae type	Thistle/rosette	Eye	Wire	Hinge	Total
Number of graves	8	8	8	2	26
Percentage of all graves (Table 3.5: 41)	20	20	20	5	65
Number of fibulae	22	13	9	7	51
Percentage of all fibulae (Table 3.5: 72)	30	18	12	10	70

determination of age and sex. On the basis of grave gifts such as bracelet, ring and beads, women's or girls' graves could be identified (Table 3.4).

The analysis of the cremation remains by L. Smits of twenty male and female graves which contained also age and sex related grave gifts confirmed in 16 cases the proper correlation.¹¹⁷ Fibulae form another aspect of personal goods which can provide information as to the sex and possibly even the character of the population buried. The fibulae can be classified as follows

from Table 3.5.

Half of the graves with fibulae contain one specimen, 1/3 contains two specimens and together they make up 5/6 of the total number of graves which together contain 7/10 of all fibulae. Divided up into the most commonly found types of fibula this produces Table 3.6. Thistle and rosette fibulae, eye and wire fibulae each constitute 1/5 and together 2/3 of all grave contents concerned. Considering the number of fibulae, the rosette and thistle fibulae account for 1/3 and the eye fibulae 1/5 of all

¹¹⁷ Smits 2006, 84.

Table 3.7 Nijmegen. The cemetery on the Hunerberg. Number of fibulae of commonly found type.

Fibulae type	Thistle/rosette	Eye	Aucissa	Hinged	Hook	Bow	Total
Number	71	85	30	64	34	26	310 of 405
Percentage	18	21	8	16	8	7	78 of 100

the brooches and together they represent half of them. Rosette and thistle fibulae belong to the category of flat fibulae of an ornamental nature, which often occur in pairs or even in threes. In general they are considered part of women's clothing.¹¹⁸ For this reason graves nos. 105/107, 113 (with mirror), 137, 141, 150, 152, 153 and 307 can be regarded as belonging to women. The custom of wearing two or three fibulae has been well-documented for the Central Rhine area.¹¹⁹ Furthermore, it is significant that the flat ornamental brooches are only very rarely found in places known to have a military character, whereas in findspots which are not necessarily typically military (such as Titelberg, Luxemburg; Colchester, England) they are found relatively frequently.¹²⁰ In this context it is remarkable that the Aucissa fibula, which is considered typical of military use, was only discovered in the graves once.¹²¹ On the other hand the wire fibula is well represented; this fibula is thought to have been commonly, but not exclusively, worn by soldiers, and is therefore often known as the 'Soldatenfibel'.¹²² It should be pointed out, moreover, that quite a number of Aucissa fibulae were found among the old finds from the cemetery. These old finds as a total also confirm the remarkable importance of the rosette and thistle fibulae, as demonstrated by Van Buchem's classification of 'early Roman' brooches (Table 3.7).¹²³ The only other group of objects connected with clothing are nails and small fragments of leather from footwear.

A florilegium of five graves

Of the 160 positively identified burials, a mere five have been selected here to give a first impression of the nature of the graves. The choice was made on the basis of chronological distribution, variety in number and sort of the grave gifts, and, finally, the state in which objects were placed in the grave, i.e. whether they were

complete or burnt.

No. 71/16 (Fig. 3.22)

Rectangular grave pit (0.70 x 0.90 m) with clean fill. The southern corner of the grave pit was disturbed in (sub-)recent time, which caused the loss of half the terra sigillata cup sub c.

a.* Complete dish service 2 type Haltern 2 with stamp CN.ATEI in bifoil of 'Italic' terra sigillata with orange brown surface. Stamp: Oxé & Comfort 1968, 54 no. 145 and Oxé, Comfort & Kenrick 2000 type 275.30 (145) without exact identification of type of stamp. On the bottom a graffito FAVTVSX or FAVSTI; Galsterer 1983, 47 No. 102 and 103 AD Taf. 7.102-103 FAV(---); the X may be a marker of the end of the name (Galsterer 1983, 15); possibly to be read as Faustus. The foot is heavily worn, as the rim, but mostly at the upper and outer side. Diameter 16.8 cm.

b.* Complete cup service 2 type Haltern 8 with stamp ATEI of 'Italic' terra sigillata with orange brown surface. The foot and the upper side of the rim are heavily worn. Stamp: Oxé & Comfort 1968, 229 No. 696 (?). Diameter 7.9 cm; h. 4.5 cm.

c.* Half a cup service 2 type Haltern 8 of 'Italic' terra sigillata with orange brown matt surface. The upper side of the rim is heavily worn. Diameter c. 8 cm.

d.* Broken, but complete large pot Holwerda 1941, 32 form 25a of thin walled matt shining terra nigra (technique VI.2). Diameter belly 28 cm; neck 13.5 cm; h. 29 cm. The foot ring is clearly worn.

e.* Complete bronze brooch Van Buchem 1941, 81 type 14B.a. On the wings on both sides of the bow a grooved cross; over the bow a superficially pointed line. The catch-plate has two circular piercings. Length 5.5 cm.

f.* Complete bronze brooch Van Buchem 1941, 81 type 14B.a. over the bow two grooves, possibly with superficial point decoration in

¹¹⁸ Ettlenger 1973, 82; Riha 1979, 101; Haalebos 1984-1985, 73.

¹¹⁹ Wild 1968, 204-207 and 232; Gechter 1979, 77.

¹²⁰ Gechter 1979, 7782 (Titelberg: 17%; Colchester: 26%); also Ettlenger 1973, 82 and Karte 16 for Vindonissa: 'fast völlig fehlen'. See also Rieckhoff 1975, 45.

¹²¹ Haalebos 1984-1985, 43-46 and Fig. 17 no. 15 (Nijmegen).

¹²² Ettlenger 1973, 94; Rieckhoff 1975, 48; Riha 1979, 114.

¹²³ Van Buchem 1941, 30.

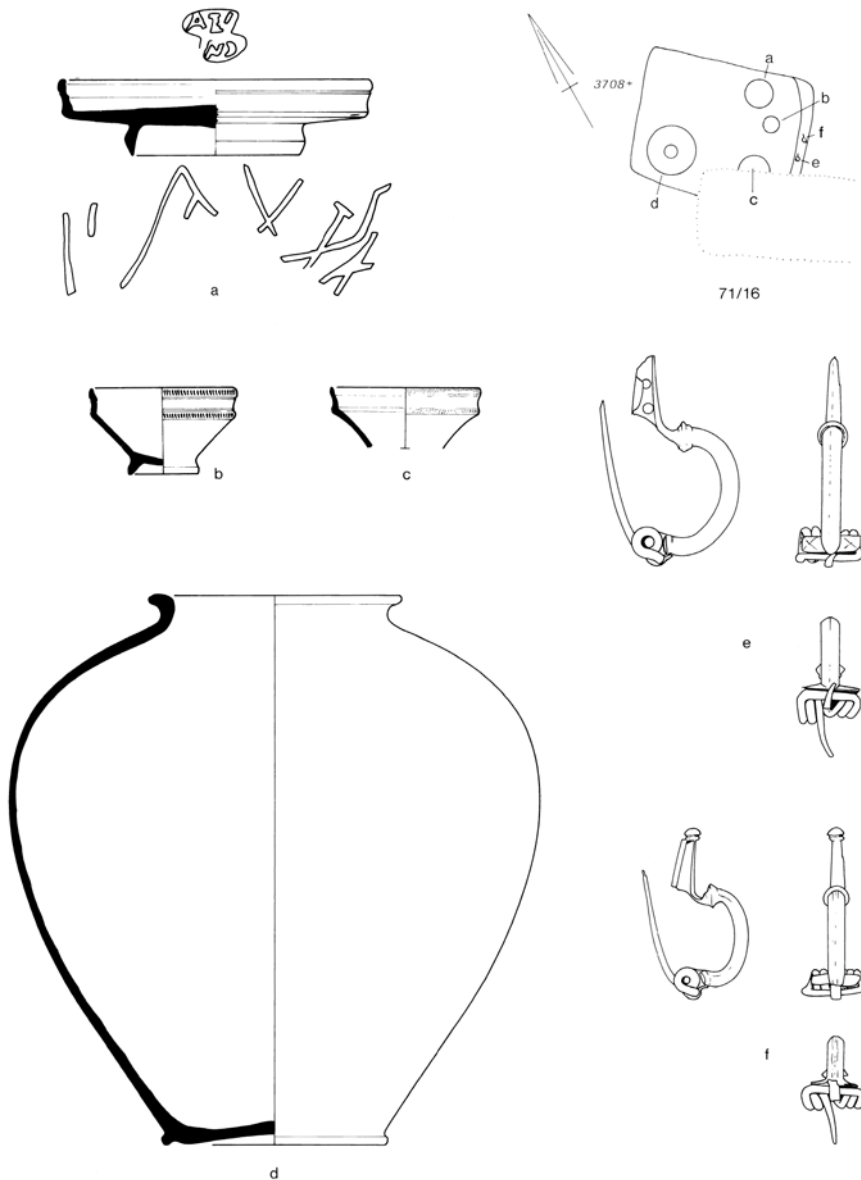


Figure 3.22 Nijmegen. The cemetery on the Hunerberg; inventory from grave no. 71/16. Grave scale 1:40; pottery scale 1:4; metal scale 1:2; stamp and graffito scale 1:1.

between. Length 4.5 cm.

g. Some stray fragments of cremation are found in the grave pit.

h. Four iron nails were found scattered in the grave pit.

Conclusion: On the basis of the composition of the terra sigillata forms and the two ATEIVS stamps the grave can be dated in Gechter's phase 5 which corresponds mainly with Ettlenger's 'Nach-Halterner-Horizont', i.e. between c. AD 5 and AD 20; an earlier dating cannot be entirely excluded, but is less probable.¹²⁴ It is

remarkable that the pottery shows clear signs of use and may therefore not have been primarily intended as grave gifts. The two brooches show definite differences in make and size so they were not originally made as a pair.

¹²⁴ Gechter 1979, 20 and 35; Ettlenger 1983, 102-105. See also the discussion in Section 3.2.3.

No. 105/68 (Fig. 3.23)

Square grave pit (0.80 x 0.84 m). Nails were found in the four corners indicating that the grave pit was clad with wood; however, clear traces of this were not found. 143 grams of human cremation remains belonging to an adult of c. 24–60 years old.

a.* Complete dish Dragendorff 1895, type 17 with stamp OFIC.ACVTI of South Gaulish terra sigillata with orange brown matt surface; Mary 1967, 17: '... um 35 n. Chr. ausser Mode ...'. Stamp: Oswald 1964, 3 (Acutus I); dating: Mary 1967, 27–28 and 37 (25–45 AD); Stuart 1977a, 19 for a somewhat different stamp ('c. A.D. 30–45'); Polak 2000, 158 no. A10 ('c. AD 20–40'). Diameter 17.2 cm; height 3.8 cm. Foot ring and upper side of the rim and parts of the stamp are clearly worn. On the bottom a graffito AI.

b.* Complete cup Dragendorff 1895, type 24 with stamp OF.IVL: of South Gaulish terra sigillata with orange brown matt surface. Stamp: Oswald 1964, 151 (Julius I); Polak 2000, 246 no. I29 ('c. AD 20–45'). Diameter 15.1 cm; height 5.2 cm. The foot ring and the upper side of the rim are heavily worn.

c.* Almost complete pot Holwerda 1941, 76 form 94d ('... in den tijd van Tiberius-Nero ...') of which only the bottom is lacking. Diameter 26.7 cm; height 21.5 cm.

d.* Complete beaker Holwerda 1941, 53 form 74a of light grey ware (technique VI.7) with low relief spots. Diameter 10.3 cm; height 7.5 cm.

e.* Complete jar Stuart 1977a, 47 type 102 ('de periode Haltern tot ca. 25 na Chr. of iets later') of grey white smooth walled ware with three-ribbed handle. Diameter 12.7 cm; height 14.2 cm. The jar does not appear to have been in use.

f.* Complete jar Stuart 1977a, 47 type 102 ('de periode Haltern tot ca. 25 na Chr. of iets later') of grey white smooth walled ware. Diameter 13.1 cm; height 17 cm. The handle, probably two-ribbed, and a large part of the rim were broken before they were excavated. The foot ring is somewhat worn.

g.* Jar Stuart 1977a, 36 type 101? ('about Ia') of yellow white smooth walled ware. Diameter 30.8 cm; height min. 26.5 cm. The neck and the handle are broken, but a five-ribbed fragment of a handle was recovered.

h.* Fragment of the bottom and a four-ribbed handle belonging to a jar of grey white smooth walled ware.

i.* Complete small bottle of light blue glass

Isings 1957, 24 Form 8. Diameter 2.3 cm; height 5.5 cm.

j.* Fragment of a bottle of olive brown glass Isings 1957, 22 Form 6. Diameter min. 5.5 cm. The glass bottles i. and j. lay under the terra sigillata dish sub a.

k.* Three possibly fitting fragments of a bronze mirror with silver overlay. The mirror probably had a square or rectangular form and a minimum size of 7.5 x 7.5 cm. Lloyd-Morgan 1981, 3 Group A.a. The edges are perhaps decorated with small notches.

l.* Catch-plate of a brooch Van Buchem 1941, 95 type 19. A fragment of a foot with the pin still in the original position probably belongs to the same brooch or to a brooch of the same type.

m. Some fragments of burnt bone.

n. Four iron nails.

Conclusion: On the basis of the terra sigillata form Dragendorff 1895, 17, the stamp OFIC.ACVTI and the two jars Stuart 1977a, 47 type 102, the grave can be dated in about AD 25–35. The terra sigillata may originally have had a different function before being given to the deceased as a grave gift. The small beaker d., the small jar e. and the small glass bottle i. may have been used primarily as grave gifts.

No. 105/172 (Fig. 3.24)

Rectangular grave pit (0.90 x 0.56 cm). 7 grams of animal bones (sheep/goat).

a.* Complete Gallo-Belgic bowl Holwerda 1941, 47 form 50b of smooth polished light grey terra nigra (technique VI.2). Diameter 16.5 cm; height 8.5 cm.

b.* Complete small colour-coated beaker Stuart 1977a, 40 type 1 ('ca. 40–100') of white clay with orange coating. Diameter 8.7 cm; height 8.0 cm. The foot is somewhat worn.

c.* Complete jar Stuart 1977a, 49 type Hofheim 50 with three-ribbed handle of beige white smooth walled ware. Diameter 17.5 cm; height 21.0 cm.

d.* A fragment of a neck (d.1) and four fragments of two-ribbed handles of a two-handled flagon Stuart 1977b, 55 type 130. The fragments are clearly burnt and represent less than 10% of the original vessel.

e.* 10 glass beads lying in a circle in the grave and probably belonging to a necklace. The diameter of the beads varies from 1.4–1.8 cm. Four beads are of green glass (e.1–4), two of dark blue (e.5–6), one of brown (e.7) and two of black

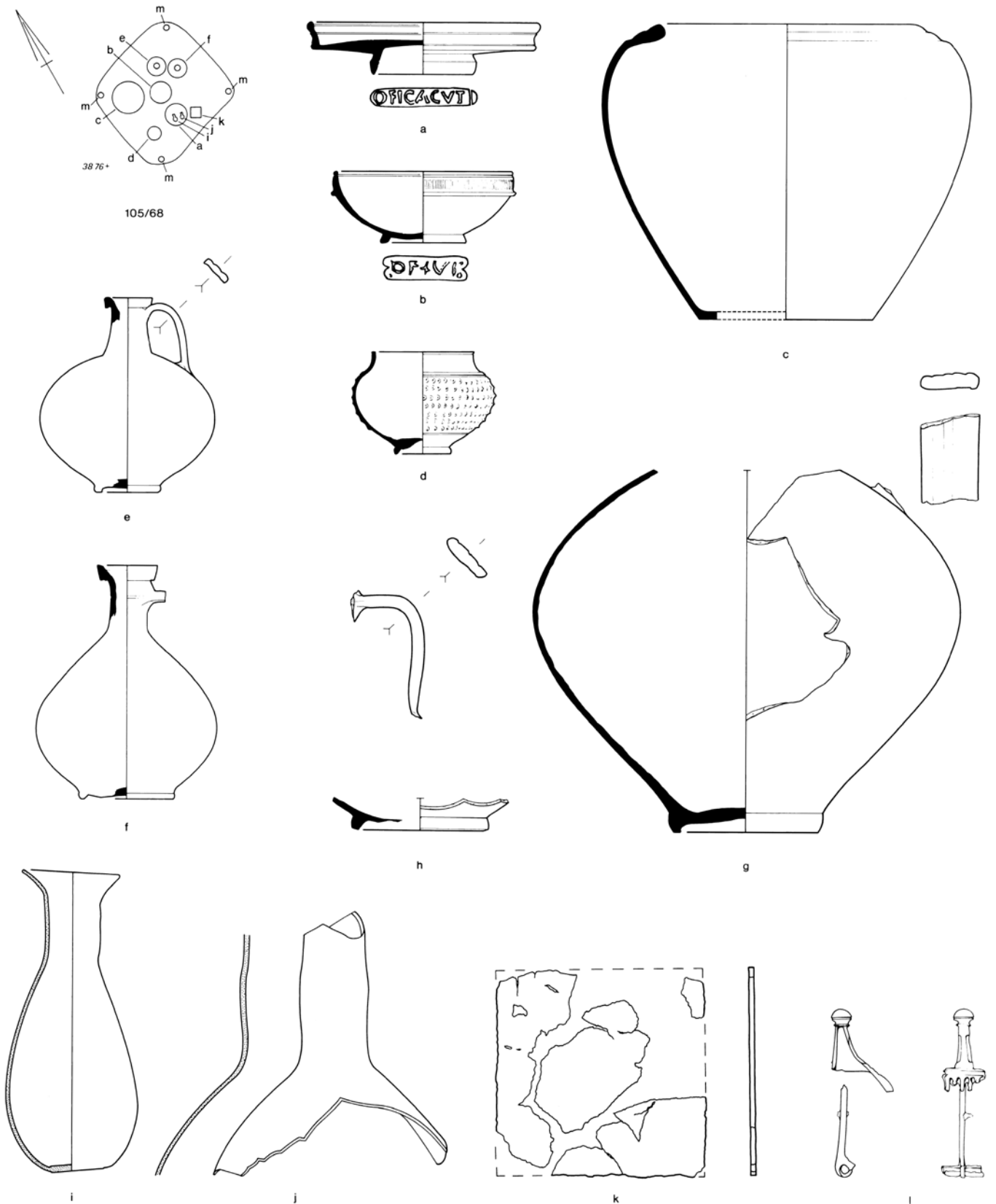


Figure 3.23 Nijmegen. The cemetery on the Hunerberg; inventory from grave no. 105/68. Grave scale 1:40; pottery scale 1:4; metal scale 1:2; stamp scale 1:1.

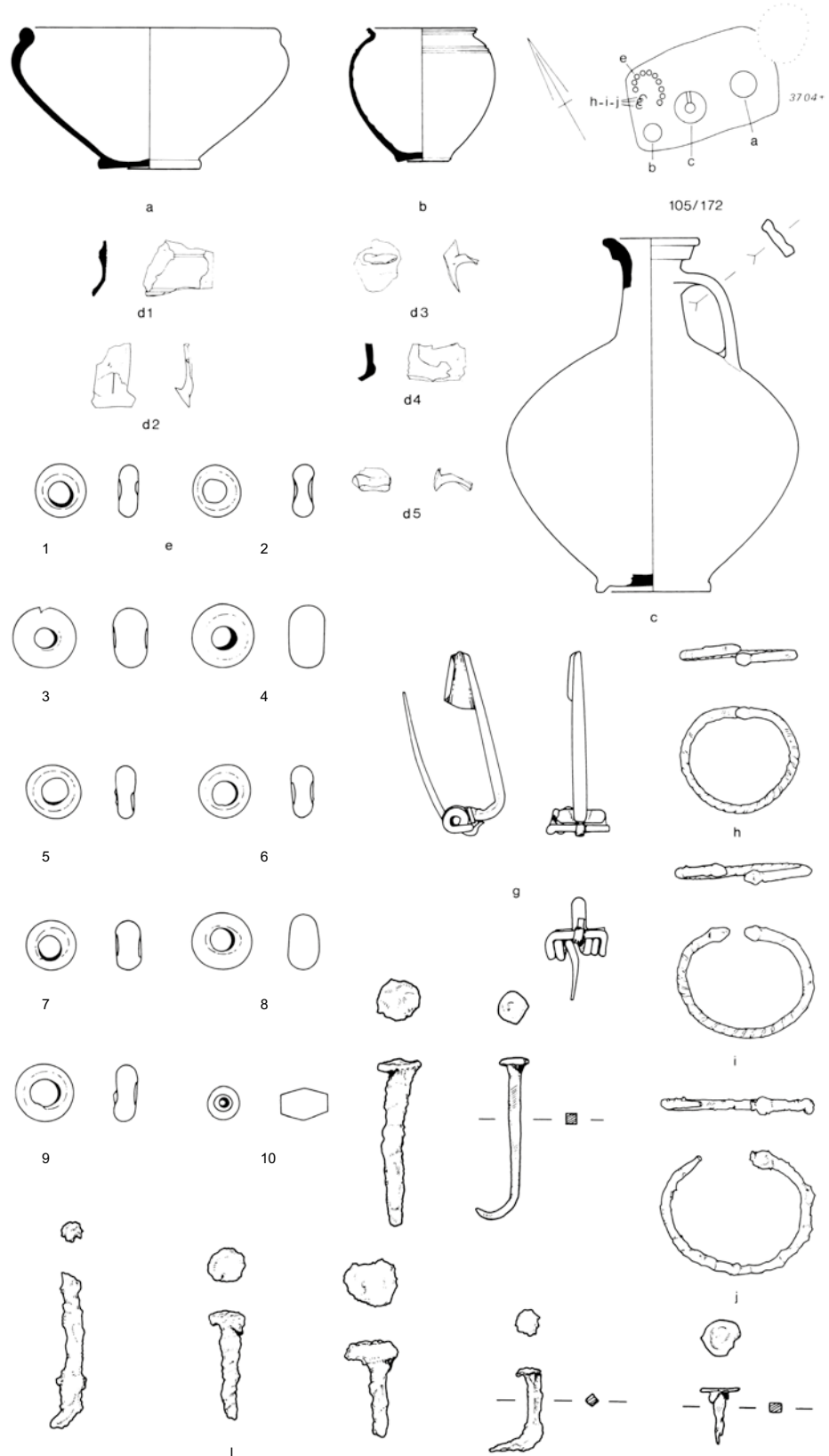


Figure 3.24 Nijmegen. The cemetery on the Hunerberg; inventory from grave no. 105/172. Grave scale 1:40; pottery scale 1:4; metal and glass beads scale 1:2.

(e. 8-9) glass. One bead has the form of a barrel and is of red glass paste, the opening is much narrower (0.2 cm) than of the other beads.

f. Six fragments of molten green glass.

g.* A complete bronze brooch Van Buchem 1941, 102 type 22.C and D. Length 5.5 cm.

h.* Open bronze arm ring with thickened ends and decorated with a torsion motif. Diameter in somewhat closed condition 3.5 cm; thickness 0.3 cm.

i.* Open bronze arm ring with thickened ends and decorated with a torsion motif of similar form as sub h. Diameter 4.1 cm; thickness 0.35 cm.

j.* Open arm ring of heavily corroded iron. One end is thickened. Diameter 4.5 cm. The three arm rings h, i and j were deposited together in the grave pit.

k. A small quantity of burnt bone.

l.* Seven iron nails of different lengths (1.5-5.0 cm). The curved ends of two nails indicate a thickness of the wood of 1.7-4.0 cm.

Conclusion: The grave can be dated in the Claudio-Neronian period. The small diameter of the three arm rings indicates a child burial, arm rings and beads point to a girl.

No. 105/212 (Fig. 3.25)

Rectangular grave pit (1.00 x 0.80 m). 18 grams of human cremation belonging to an adult of c. 30-60 years old, possibly a woman.

a. Three very small wall fragments of Roman pottery. Probably deposited in the grave pit together with the fill.

b.* Eight beads of green glass. Of two there is only one half present, one shows damage from heat. Diameter 2.2-2.5 cm. The beads in the grave followed a circular pattern like a string.

c.* Two fragments of molten green glass, perhaps from beads.

d.* Bronze bracelet with a fastening and a hinge. The outer side of the bracelet is decorated with three horizontal zones of two, four and two grooves, which border one, three and one ridges. Largest diameter 6.4 cm; width 2.0 cm. Exactly the same bracelet is found in the immediately adjacent grave no. 105/222.

e. A small quantity of burnt bone.

f.* Two iron nails with square sections. Length 5.8 and 2.8 cm.

Conclusion: The grave cannot be dated more precisely. On the basis of the beads and the diameter of the bracelet it may have been the

grave of an adult woman. Although the grave gives the impression of being intact it contains very few gifts and surprisingly few cremated remains.

No. 105/243 (Fig. 3.26)

Rectangular grave pit (1.25 x 0.50 m). 844 grams of human cremation remains belonging to a female adult of c. 23-40 years old. Also some cremated pig bones.

a.* A complete jar Stuart 1977a, 49 'Hofheim type 50 (ca. 40 - ca. 70/80 ...)' of beige smooth walled ware with three-ribbed handle. Part of the neck with the rim had disappeared before the grave was excavated; a small rim fragment of similar fabric has been recovered, but does not fit. Diameter 18.2 cm; height minimum 21.7 cm.

b.* A complete pot of handmade ware with smooth brown black surface. Diameter 18.2 cm; height 17.3 cm.

c.* Iron ring with a setting for e.g. a *gemma* Henkel 1913, 184 and Taf. LXXII.1931. The stone in the setting has been lost. Diameter 2.3 cm.

d.* A bronze finger ring Henkel 1913, 13 B.II.a.1 of which only one half is preserved. Perpendicular to the ring an open worked T-shaped decoration with curved sides is fixed. Diameter of the ring 2 cm.

e.* Complete bronze brooch Van Buchem 1941, 86 type 17. The eyes are not open, over the bow runs a pointed line, on the end of the foot a V-shaped decoration is applied. Length 5.5 cm. On the pin drops can be seen, caused by heat from fire.

f. Bow with spring from a bronze brooch Van Buchem 1941, 100 type 22.A or B. The brooch is badly affected by heat. Minimum length 4.1 cm.

g. A small burnt plant fragment, which may be a legume, e.g. a bean, because of its size.

h. A large quantity of burnt bone scattered through the grave.

i.* Nine iron nails of different lengths (1.5-6.0 cm) with square sections. The curved ends of two nails indicate a thickness of the wood of 1.5-2.5 cm.

Conclusion: The grave can be dated in the Claudio-Neronian period. The combination of Roman and native pottery is interesting. Ornaments had been partially exposed to heat and must therefore have accompanied the deceased on the funeral pyre which was not the case with the pottery.

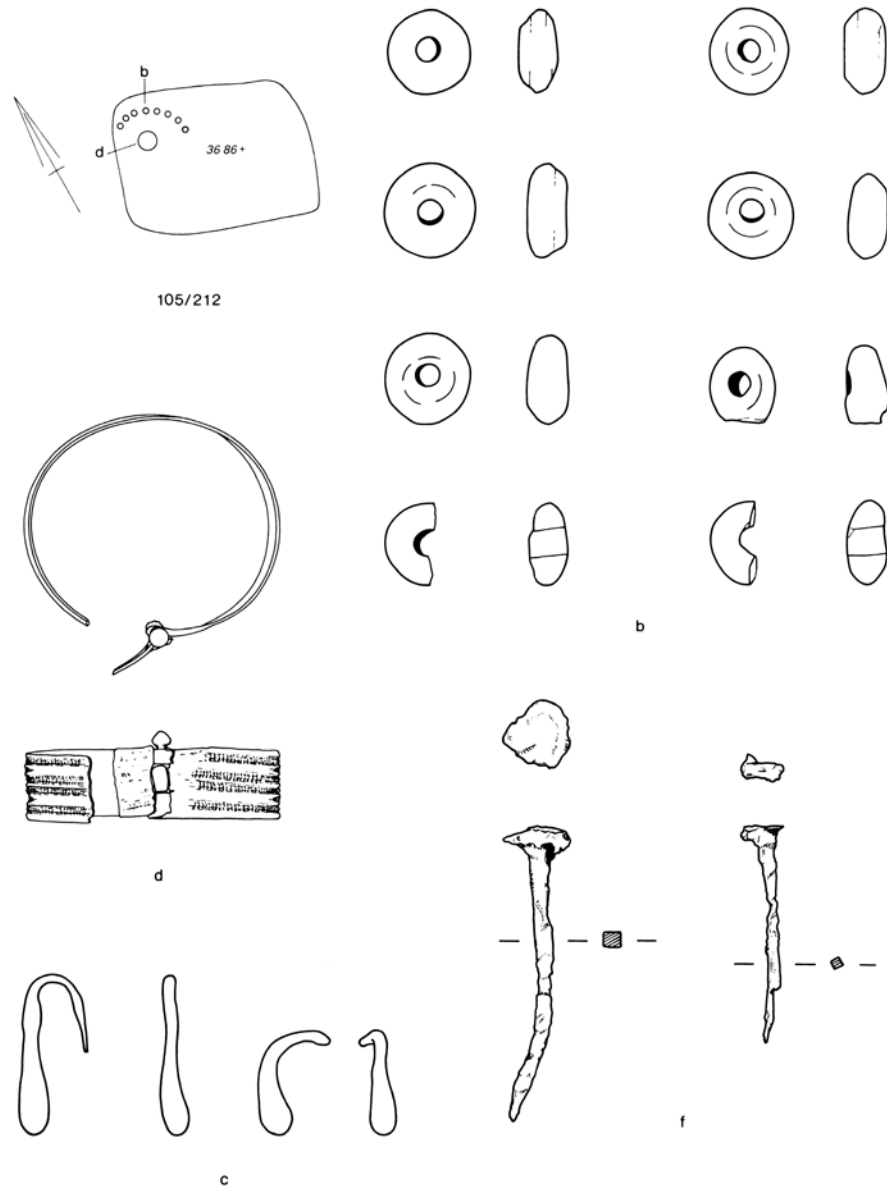


Fig. 3.25 Nijmegen. The cemetery on the Hunerberg; inventory from grave no. 105/212. Grave scale 1:40; pottery scale 1:4; metal and glass beads scale 1:2.

3.4.4 The dating of the cemetery

The dating of the cemetery as a whole, together with a possible specification within the development of the cemetery, is of particular importance to the topography and interpretation of the significance of settlement structures in the pre-Flavian and Flavian periods. Stuart has gone into the dating fully, and adjusted Holwerda's interpretations, as did Daniëls.¹²⁵ Two aspects make up the essence

of the dating question: the length of time the cemetery was in use and its development. Holwerda was of the opinion that the cemetery came into use between AD 5 and AD 10 and fell into disuse in AD 70; Daniëls and Stuart believed that after AD 70 a fair number of burials took place. With regard to the beginnings of the cemetery, Stuart's description of the stamped 'Italic' terra sigillata ware can be summarized according to type and findspot, i.e. sector O in the northwest, E in the north and centre and S in

¹²⁵ Stuart 1977a, 9-10 and 71-73.

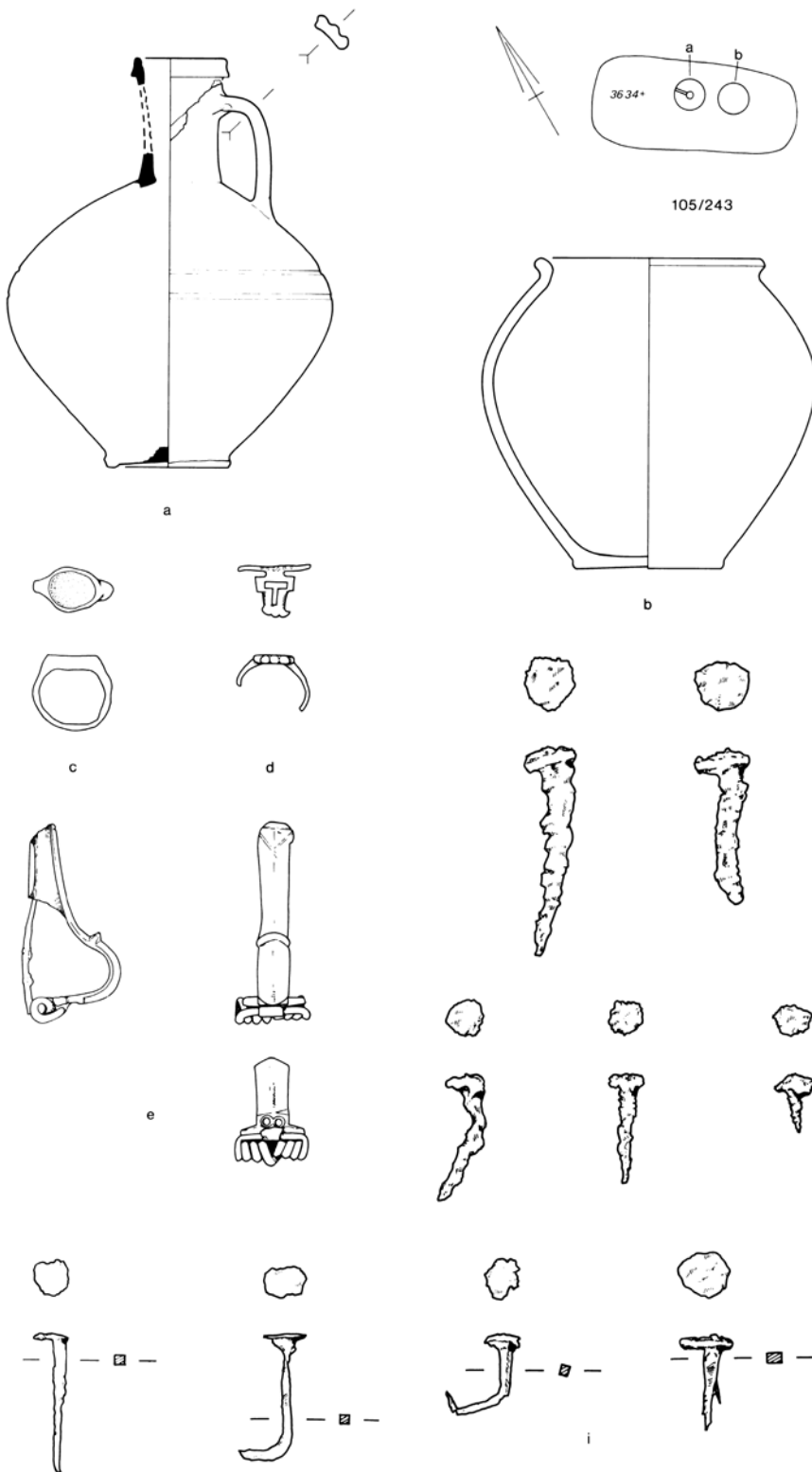


Figure 3.26 Nijmegen. The cemetery on the Hunerberg; inventory from grave no. 105/243. Grave scale 1:40; pottery scale 1:4; metal scale 1:2.

the southeast. (Table 3.8)

Service 2 predominates, as has already been observed by Stuart among others. To the above can be added the small number of early South Gaulish stamps beginning with OFIC. (Table 3.9) The combination of the well-represented 'Italic' service 2 and the early South Gaulish stamps dates the beginning of the cemetery in Gechter's Phase 5 and 6, if not only in 6 (c. AD 5-20 and c. AD 10-20 respectively) which can be compared to Ettlenger's 'Nach-Halterner-Horizont'.¹²⁶ This view is supported by the finds from recent excavations. All four specimens of 'Italic' terra sigillata ware (grave nos. 71/7 and 71/16) belong to service 2 and come from sector O. The one OFIC. stamp (grave no. 105/68) comes from sector E/S.

The end of the cemetery was dated by Stuart to c. AD 100, based on the occurrence of a series of complete pottery types which are generally dated in that period. Stamped terra sigillata and smooth-walled flagons Stuart 1977a, types 106 and 108 are significant here for they amount to about 75% of the group of datable finds. When evaluating the data and Stuart's resulting conclusion one must remember that they are based on the typo-chronological characteristics of the different types of pottery. An independent and direct testing by

means of association with other finds was not possible due to the method of excavation c.q. plundering. The graves recently excavated, however, do offer this prospect. Together with Stuart himself the author examined all the flagons from the excavation in the cemetery, more than 50 specimens altogether. Almost all the flagons belong to the Stuart 1977, 49 Hofheim 50 and 51 types. There are only two possible 'later' ones, i.e. Flavian specimens: grave no. 105/198 (Stuart 1977a, 49 type 106) with a terra sigillata plate Dragendorff 1895, type 15/17 from Aquitanus and no. 105/210 (Stuart 1977a, 50 type 109) with no accompanying finds. The terra sigillata ware does not give the impression that it was in use for very long, as far as can be concluded from traces of wear. Because of this, Stuart and the author concluded that the different types of flagons from the recently excavated graves indicate that the cemetery was not in use after AD 70. This is supported among other things by the terra sigillata stamps: Acutus, Aquitanus (3x), Ardacus, Albinus, Bassus (4x), Donatus, Fabus, Fortis, Iulius, Iunius, Lupus, Maccarus (2x), Marinus, Modestus, Primus, Quartus, Scotnus, Secundus (2x) and Vapuso; the pre-Flavian character clearly predominates. In general the coins from the graves indicate the same dating. There are 11 coins from 9 graves: Augustus (5x AD 10-13, of which 3x with countermark; 2x 16/15-7/6 BC with countermark), Tiberius, Caligula and Claudius. Finally, the development of the cemetery should be considered. The recent investigation confirmed the old views insofar as the location of the excavation permitted. The earliest burials are found in the northwest, i.e. sector O. In the north and southeast or sectors E and S the emphasis is in the Claudian period and later; in the case of O it is difficult to be precise, because the centre of O and E was not excavated. Roughly speaking, the cemetery appears to have developed from northwest to southeast. The occasional occurrence of early stamps in

Table 3.8 Nijmegen. The cemetery on the Hunerberg. Number of 'Italic' terra sigillata and distribution over the sectors of the cemetery according to Stuart 1977a.

	Service 1	Service 2	Uncertain	Total
Sector				
O	2	15	0	17
E	0	5	2	7
S	1	0	0	1
Diverse	3	2	0	5
Total	6	22	2	30

Table 3.9 Nijmegen. The cemetery on the Hunerberg. Number of early South Gaulish stamps on terra sigillata beginning with OFIC according to Stuart 1977a, 19-39.

Sector	O	E	S	Diverse	Total OFIC	Total stamps
Number	4	4	2	2	12	353

¹²⁶ Gechter 1979, 20 and 35; Ettlenger 1983, 102-105.

the southeast indicates however that this must not be taken as absolute.

3.4.5 Conclusion

The location of the cemetery is determined by the large Augustan military camp on the Hunerberg and the small early Roman fortification east of the Valkhof, the road between these two fortifications and a large depression in the south. When the cemetery was at its largest, it extended south of the road as far as the depression. Between the beginning of the second decennium and AD 70, 1,500-2,000 burials must have taken place over a surface area of at least 1.5 hectares. According to formulas of Acsádi and Nemeskéri, this number of deaths from the above-mentioned period points to a population of c. 675-1,205, with an assumed life-expectancy of 28-30 years and a burial duration of 50-60 years.¹²⁷ Only 160 of these graves and some dozens of possible burials have been investigated, i.e. hardly 10%. In all cases they were cremation burials.

Only in two cases a grave was surrounded by a ditch. This in particular is why the cemetery differs so much from the one at Nijmegen-Hartert, where border structures are the rule.¹²⁸ Grave gifts in the form of pottery mainly consist of Roman and Gallo-Roman material; local ceramics are the exception. Graffiti on pottery is rare. The nature and complex of the brooches do not correspond to what is usually found at findspots with a military function but are characteristic of civilian findspots. Moreover, 20-30% of the brooches are from women's clothing.

The size of the cemetery, the absence of border structures and the grave gifts indicate that it does not fit in with the native tradition as we have come to know it in the course of time in the riverine area and the sandy area of Brabant.¹²⁹ The population belonging to it had a great number of Roman and Gallo-Roman products at their disposal. The range of brooches indicates a civilian population. It would be obvious to assume that at first the cemetery belonged to the large settlement around the Valkhof; it is possible that, at an early stage, members of the garrison of the small fortification also buried their dead here.

3.5 THE BOUNDARIES OF THE EARLY ROMAN SETTLEMENT AROUND THE VALKHOF

3.5.1 Introduction

The remains of one or more ditches and various trenches (Fig. 3.12 nos. 3a-b) were observed at a fair distance from the settlement traces which were discussed in Section 3.2 and 3. The observations were made over a period of years. They are concentrated in the extreme west and east; no observations were made in the 650 m area in between. An excavation in the middle of the southwest side did not yield any further information, since large segments of the ditch had been considerably disturbed by the construction of the post-medieval fortifications of Nijmegen (188.350/428.517). Short reports and speculations on the segments of the ditch have already been published.¹³⁰

3.5.2 The excavated segments of the ditch

In the west

In the west, the ditch was observed at two points approximately 200 m apart (Fig. 3.12 no. 3b, 3.27.1 and 3.28). The southwest part is about 50 m long and has a definite bend, so that it can be assumed with certainty that this was the southwest corner of the boundary (187.965/428.730). The northwest part was observed for a length of 23 m and curves northeast (187.995/428.950). The width of the ditch varies between 2.00-2.40 m, and the depth is at least 1.40 m, depending on the level of the excavation with regard to the bottom of the ditch. Both in the northwest as well as in the southwest the ditch has a sharp asymmetrical section. The less sharply inclined side of the ditch is on the settlement side (Fig. 3.27.1 and 3.28). The ditch fill is rather dark (Munsell 7.5 YR 3/2 to 7.5 YR 4/2) and consists of various washed-in layers. In the southwest at a distance of 2 m from the settlement side of the ditch there is a small trench for a distance of 10 m with the same orientation. 8.50 m further to the northeast and parallel to this trench there is a second trench. The distance between the two trenches makes it unlikely that they both belonged to a rampart; the trench closest to the ditch could have held a single palisade, however, there are no post traces.

¹²⁷ Acsádi & Nemeskéri 1970, 65-66.

¹²⁸ Bogaers & Haalebos 1980; Haalebos 1990. On the adjacent field of the former Canisius College an additional circular structure around a central grave pit was found in 1995-1996 (Haalebos *et al.* 1998, 23-24).

¹²⁹ Van Es 1981, 214; Van der Sanden 1987; Bridger 1996, 246-249.

¹³⁰ Bloemers 1980a, 36; 1985, 33; Bloemers, Greving & Zoetbrood 1979, 30-33. See also Van Enckevort & Thijssen 2001, 94 and note 37.

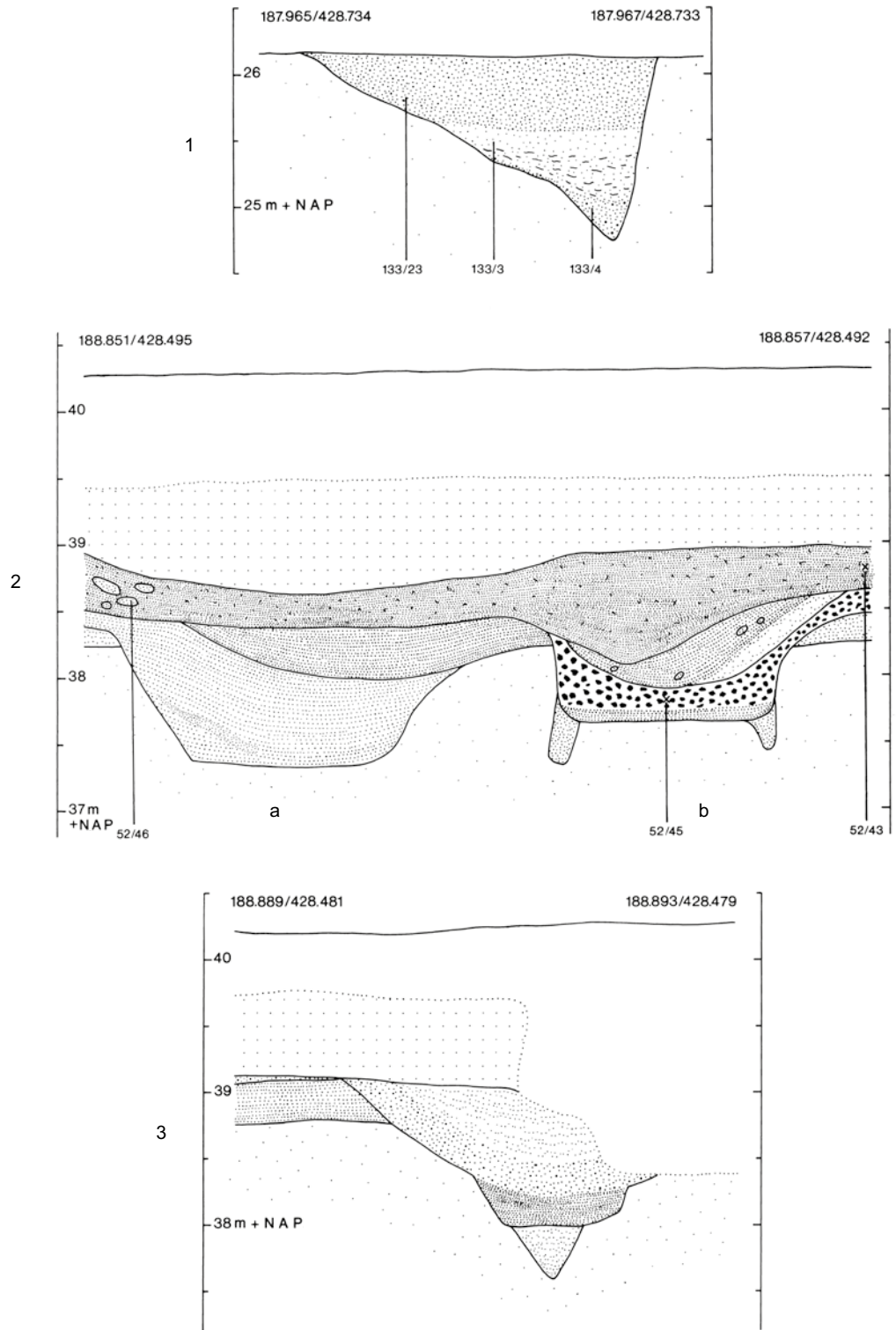


Figure 3.27 Nijmegen. The boundaries of the early Roman settlement; sections over the ditch in trench 133 (1), trench 52 (2) and 60 (3). Scale 1:50. Legend: a. ditch; b. pit.

In the east

In the east a ditch which runs in a long curve from northeast to the west was excavated for a distance of approximately 380 m at three points (namely 188.900/428.528, 188.710/428.370 and 188.590/428.423) with intervals of 90-110 m (Fig. 3.12 no. 3a and 3.27.2). The width of the ditch varies depending on the level of excavation in relation to the bottom of the ditch from 2.40-3.00 m, and the depth from 0.70-1.20 m. The ditch has a bowl-shaped section and in places the walls have sagged causing it to show a somewhat erratic course. Only in one section (188.709/428.418) was a sharp and rather asymmetrical section observed, with the less sharply inclined side on the settlement side. The fill is generally rather light and homogeneous in colour with different washed-in layers. Only the southwest part has a much darker fill. In the southeast the ditch has a small interruption about 2.00 m wide (Fig. 3.29). The northeast end of the ditch makes a small outward bend here, giving the impression of a *clavicula*-like course (188.695/428.415).

The fact that the ditch runs between the east side of the small fortification and the west end of the cemetery and that it is more or less parallel to the curved east side of the fort makes it seem as if the course of the ditch was also influenced by the position of the fortification and of the cemetery.

The stratigraphical position

The segments of the ditch overlie only one older feature for the actually excavated distance of more than 200 m. This consists of two parallel trenches in the southwest of the boundary (187.965/428.725). This could mean that the segments of the ditch were dug in a more or less uninhabited area; this may be indicated by the relatively clean fill of the ditch segments. However it could also imply that the ditch segments were a comparatively early feature. This is made more plausible by several intersections in the east by later structures: the small road along which the western *canabae legionis* developed in the Flavian period (188.8788/428.512), a wooden building from this period (188.910/428.540), the Flavian occupation level extending over the small ditch (Fig. 3.27 no.3) and a trench which intersects both this ditch and probably the trench in the southeast corner of the fortification (188.674/428.410 and 188.685/428.468 respectively).



Figure 3.28 Nijmegen. The boundaries of the early Roman settlement; section over the western part of the ditch (trench 133 seen from the north).

The finds from the segments of the ditch

The following description of the finds covers the majority of the finds which were collected from the different segments of the ditch discussed in the previous paragraphs (Fig. 3.30). Apart from all the pottery useful for dating, the presence of tile is also mentioned because this category is generally considered to indicate a dating in the Flavian period or later. Other groups of finds like bones, slag etc. were not studied in this phase of research.

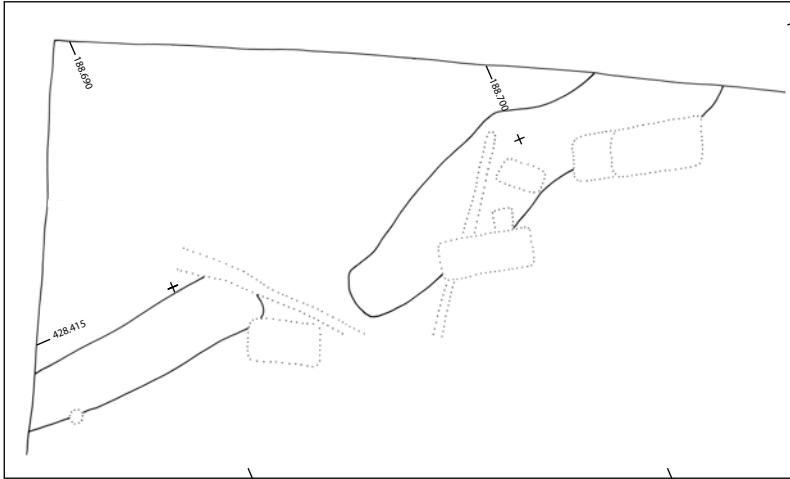


Figure 3.29 Nijmegen. The boundaries of the early Roman settlement; interruption in the eastern part of the ditch (trench 184). Scale 1:200.

From the lower fill of the ditch in the west (188.965/428.730)

No. 133/4

a. A fragment of a tile.

As above, but from the middle fill

No. 133/3

a. Rim fragment of a terra sigillata bowl Dragendorff 1895, type 29 with horizontal pearl line and the beginning of a leaf motif (?). Dating: because of the soft quality, the matt orange brown surface and the proportion of the width of the two rouletted zones below the rim (Mary 1967, 47-48): Tiberian-Claudian.

b. Wall fragment from a terra sigillata bowl Dragendorff 1985, type 29 with shiny orange brown surface, but heavily worn relief. Leaf: Dannell 1971, 217 Fig. 126.2 (c. 40-55 AD).

c. Wall fragment from a terra sigillata beaker with shiny orange surface, probably South Gaulish fabric. On the wall the fragment of a stamp --]RODO[--.

d. Fragment from the bottom of a (two handed?) jar with beige white smooth-walled ware. Diameter c. 8 cm.

e. Fragment from the bottom of a pot in black coarse ware. Diameter c. 6 cm.

f. Two fragments from tiles.

As above, but from the upper fill

No. 133/23 (Fig. 3.30)

a.* Rim fragment from a dish with black coarse surface and brown grey core. Diameter c. 20

cm. Hawkes & Hull 1947, 223 and Pl. LI.42; Filtzinger 1972, Form 38 and Taf. 37.15 and 38.1: Claudio-Neronian.

b. A fragment from an *imbrex*.

From the ditch in the east (188.590/428.423)

No. 95/8 (Fig. 3.30)

a.* Wall fragment from a cylindrical vessel Holwerda 1941, form 3a in orange brown polished Gallo-Belgic ware (technique IV.1) and decoration 11.b. Dating: 'In hoofdzaak Augusteïsch ...'.

b.* Bottom with foot ring, possibly from a small dish Holwerda 1941, form 72 (Pl. XII.634), from black Gallo-Belgic ware (technique VI.2). Diameter c. 7 cm.

c.* Bottom with foot ring, probably from a small bottle Holwerda 1941, form 25 or pot form 27, from black Gallo-Belgic ware (technique VI.2). Diameter c. 5 cm.

d. A fragment from a tile.

From the ditch in the east (188.710/428.370)

No. 191/6

a. A fragment from a tile.

3.5.3 The outwork

Outside the segments of the ditch described in Section 3.5.2 some other trenches are observed which we have indicated together with the term 'outwork'.

Course and form

To the east and south of the eastern ditch segments there are a number of palisades, trenches and one small ditch, which deserve closer attention. Since they are very different in form and were not excavated over their entire length, there is some uncertainty as to whether they belong together. Three parts can be distinguished, a small ditch in the east (188.900/428.500), a collection of trenches lying close together in the southeast (Hugo de Grootstraat; 188.775/428.385) and a group of trenches lying further apart in the south (Dr. Claas Noorduystraat: trench b(1-4), c, d, e, g, h; 188.585/428.415 - 188.680/428.390).

The small ditch in the east begins at the edge of the outwash plain and curves very gradually southwest (Fig. 3.27.3). It is up to 2.00 m wide and 1.20 m deep, depending on the excavation level. It has the same V-shaped section over its

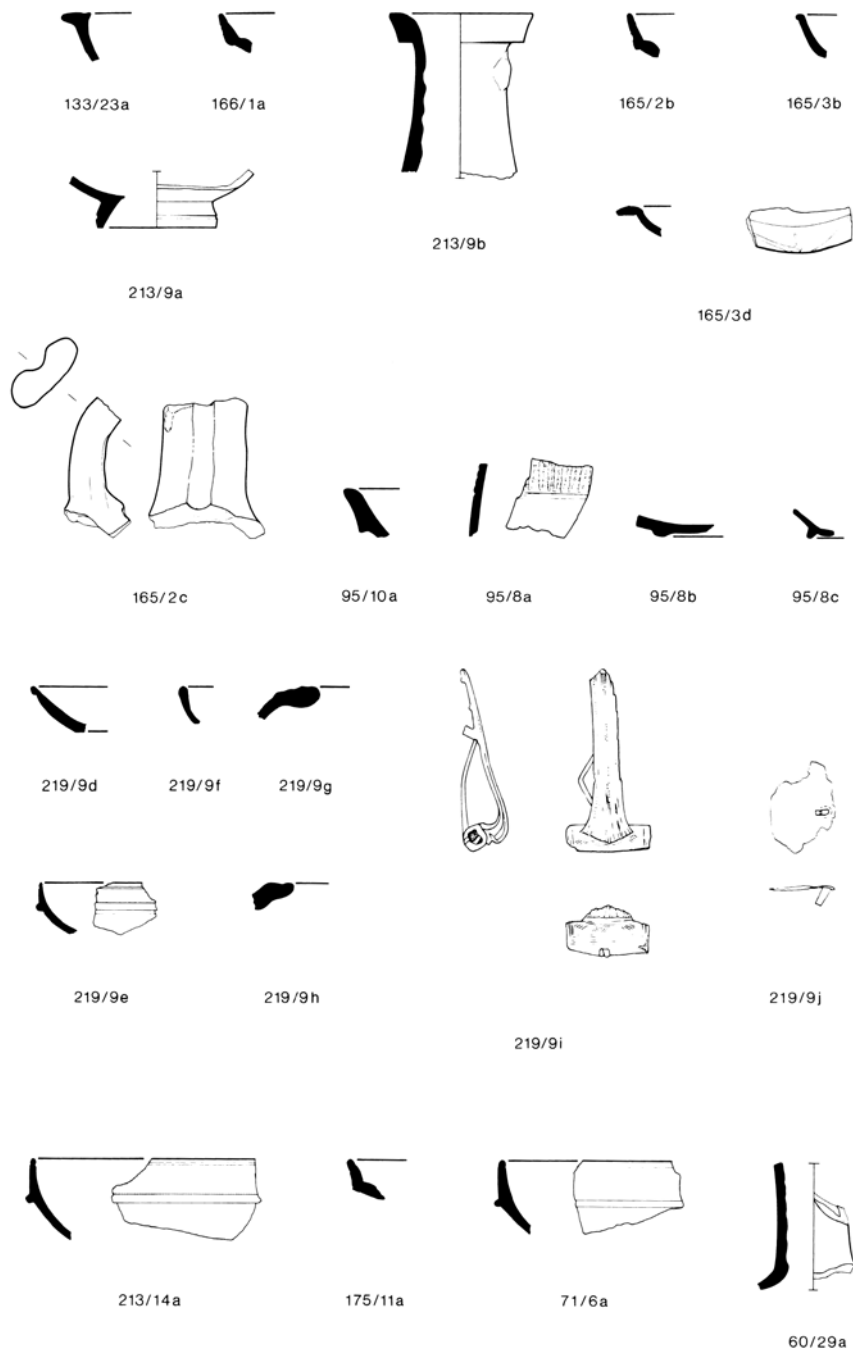


Figure 3.30 Nijmegen. The boundaries of the early Roman settlement; selected finds from the ditch and outwork. Pottery scale 1:4; metal scale 1:2.

entire length of 65 m, as far as was observed. The fill is fairly light in colour. There are two trenches 0.20-0.30 m apart in the southeast, one 0.50 m wide with a dark fill and the other 1.00 m wide with a V-shaped profile and a mixed fill. In addition, a double row of posts with about the same orientation as the trenches was discovered

approximately 4.00 m southeast over a distance of at least 10 m.

The system of trenches in the south was exposed with short interruptions over a length of more than 125 m. It is the best example of the continually changing form of the archaeological features.

In the west there are basically two 2.00-2.50 m wide trenches or a group of trenches running together and approximately 9 m apart, and 7 m further north two narrow trenches lying close together. 15 m east of this point the picture changes and the middle ditch splits into two or three trenches which gradually diverge. One of the two narrow trenches in the north becomes wider over a distance of 45 m and then ends, whereas the other one continues. The most southerly ditch continues for about 100 m and could connect up with a similar ditch running in a more northeasterly direction via an interruption or an unusual bend. All of the ditches have a rather dark fill.

Summing up all this, it is very likely that the triple ditch system in the south which constantly changes form and the trenches lying close together and possibly the row of posts in the southeast all belong together.¹³¹ The small trench in the east also differs greatly from the previously-mentioned features. It is possible that the small trench and the ditch system might be different manifestations of the same boundary structure. The difference in construction could have occurred from the point where this boundary must have crossed the early Roman road between the large fortification and the small one (c. 188.845/428.435).

The stratigraphical position

The small ditch in the east is, stratigraphically speaking, the earliest feature in this part of the site. The ditch does transect a brown humus zone, such as is found in many places in this part of Nijmegen. The Flavian road with respectively a palisade and trench boundary (188.897/428.495) and a wooden building (188.915/428.535) clearly intersects the ditch. The system of trenches in the south overlies several older features: the middle one and the most northerly one each intersect a north-south oriented trench, the most southerly one a trench with a dark fill, which in turn crosses two parallel north-south foundation trenches (188.628/428.390). These two foundation trenches may belong to two similar trenches which are intersected about 95 m further north by the ditch on the south side of the small fortification (188.655/428.480); in this case they must date from the beginning of the Christian era or even earlier.

All in all, the trenches and ditch discussed here must have been a comparatively early feature in the relative history of settlement of this site.

The finds from the outwork

The following description of the finds covers part of the finds which were collected in the different sections of the system of trenches discussed in the previous paragraphs. Apart from all the pottery useful for dating, also the presence of tile is mentioned because this category is generally considered to indicate a dating in the Flavian period or later.

The system of trenches in the south; trench b (Dr. Claas Noorduynstraat; 188.585/428.412)

No. 95/9 Trench b.1

a. A fragment from a tile.

No. 165/3 *Idem* trench b.3 (Fig. 3.30)

a. Rim fragment of a terra sigillata bowl Dragendorff 1895, type 29 with matt orange brown surface and a narrow roulette decoration.

b.* Rim fragment of a terra sigillata dish Dragendorff 1895, type 18 with matt shiny orange brown surface and yellow inclusions. Diameter c. 17 cm.

c. Bottom fragment of a terra sigillata dish Dragendorff 1895, type 18 with matt shiny orange brown surface.

d.* Rim fragment of a terra sigillata bowl Dragendorff 1895, type 35/36 with matt shiny orange brown surface and yellow inclusions. Diameter c. 15 cm. Dating: Mary 1967, 24: 'Entstehungszeit in Südgallien wohl mit Recht um etwa 45 n. Chr. ...'.

No. 165/2 *Idem* trench b.4 (Fig. 3.30)

a. Rim fragment of a terra sigillata dish with matt shiny orange brown surface.

b.* Rim fragment of a terra sigillata dish Dragendorff 1895, type 15/17 with matt shiny orange brown surface. Diameter c. 16 cm.

c.* Two-ribbed handle from a two-handled jar.

Idem trench c (188.580/428.405)

No. 95/10 (Fig. 3.30)

a.* Rim from a large jar of white smooth walled ware Stuart 1977a, 49 type Hofheim 50 ('ca. 40 - ca. 70/80.') and e.g. Filtzinger 1972, Taf. 16.8 with white smooth walled ware. Diameter c. 11 cm.

¹³¹ Van Enckevort considers this group of trenches as belonging to a road; Van Enckevort 2011, 34 Fig. 11 sub D and 69.

No. 166/1 (Fig. 3.30)

a.* Somewhat burnt rim fragment from a terra sigillata dish Dragendorff 1895, type 15/17. Diameter c. 20 cm.

No. 213/9 (Fig. 3.30)

a.* Bottom of a terra sigillata bowl Dragendorff 1895, type 27, of which the central part is lost or deliberately removed; around the foot a groove. Matt orange brown surface and yellow inclusions in the core. Diameter of the foot 6.3 cm; the foot is heavily worn.

b.* Neck from a large jar of beige white smooth walled ware Stuart 1977a, 49 type Hofheim 50 ('ca. 40 - ca. 70/80. '); the handle has completely disappeared. Height of the neck c. 9 cm; diameter of the rim 7.6 cm.

Idem from trench d (188.631/428.405)

No. 219/9 Idem trench d.1 (Fig. 3.30).

a. Wall fragment of a terra sigillata bowl Dragendorff 1895, type 29 with matt orange brown surface and soft core. Upper zone: Dannell 1971, 278-279 and Fig. 128.22 (c. AD 50-65).

b. Wall fragment of a terra sigillata bowl Dragendorff 1895, type 29 with matt orange surface and orange-red core.

c. Wall fragment of a terra sigillata bowl Dragendorff 1895, type 37 with matt orange brown surface. Within a double circle an eagle: Simpson 1968, 152 and Pl. 81.23 with stamp Frontinus (c. AD 70-90).

d.* Rim fragment of a terra sigillata dish Dragendorff 1895, type 18 with matt orange brown surface. Diameter c. 18 cm.

e.* Rim fragment of a terra sigillata cup Dragendorff 1895, type 24/25 with matt orange brown surface and soft core. Diameter c. 7 cm.

f.* Rim fragment of a terra sigillata cup Dragendorff 1895, type 27 with matt orange brown surface. Diameter c. 12 cm. The rim is atypical because of the lacking outward bending lip and the absence of an internal offset.

g.* Rim fragment of a Gallo-Belgic pot Holwerda 1941, form 94f and Pl. XVII.1369 in technique VII.1. Diameter c. 17 cm. Dating: Holwerda 1941, 77: 'Zeker ... 2de eeuw ...' !).

h.* Rim fragment of a Gallo-Belgic pot Filtzinger 1972, Taf. 65.5-6 and technique Holwerda 1941, VII.4. Diameter c. 21 cm. Dating: Filtzinger 1972, 50-51: 'tiberisch-klaudisch'.

i.* Bronze brooch with broken foot and

catch-plate Van Buchem 1941, Pl. V.26. Length 4.8 cm.

j.* Bronze strip with nail. Diameter minimum 2.3 cm.

Idem from trench e (188.630/428.397)

No. 213/14 Trench e.2 (Fig. 3.30)

a.* Rim fragment of a terra sigillata cup Dragendorff 1895, type 24/25 with matt orange brown surface. Diameter c. 13 cm.

Idem from trench g (188.680/428.394)

No. 175/11 Trench g.1 (Fig. 3.30)

a.* Rim fragment of a terra sigillata dish Dragendorff 1895, type 15/17 with matt orange brown surface. Diameter c. 17 cm. Comparable to Mary 1967, Abb. 5.6: 'tiberisch'.

Idem from trench h (188.675/428.386)

No. 219/11 Trench h.2

a. Bottom of a terra sigillata bowl Dragendorff 1895, type 27, with matt orange brown surface. Stamp OFPR[IMI]: Hawkes & Hull 1947, 198 and Pl. XLIII.149 ('Claudian-Vespasian'); Polak 2000, 298 no. P104 ('c. AD 65-80').

From the system of trenches in the southeast (Hugo de Grootstraat; 188.775/428.385)

No. 71/5

a. Wall fragment of a terra sigillata dish Dragendorff 1895, type 15/17.

No. 71/6 (Fig. 3.30)

a.* Rim fragment of a terra sigillata cup Dragendorff 1895, type 24/25 with matt orange brown surface. Diameter c. 13 cm.

From the small ditch in the east (188.900/428.500)

No. 60/29 (Fig. 3.30).

a.* Fragment from the neck with lip or handle of a jar of yellow smooth walled ware Stuart 1977a, 49 type Hofheim 50 ('ca. 40-70/80.').

Reviewing the above, the complex of datable finds appears to be characteristic of the Claudio-Neronian period. The decorated terra sigillata, the significance of the undecorated terra sigillata types Dragendorff 1895, type 15/17 and 24/25 and the smooth-walled flagons Stuart 1977a, 49 type Hofheim 50, all three of which occur, provide the data. Exceptions are the terra sigillata form Dragendorff 1895, type 35/36 (no. 165/3d* from trench b.3), the fragment of the

terra sigillata bowl Dragendorff 1895, type 37 (no. 219/90 from trench d) and the terra sigillata bowl with stamp Primus (no. 219/11a from trench h), which have a much later dating. Various arguments can be found to explain these finds away. Trenches may have been wrongly attributed to the outwork, the fragments came from the upper fill or refill of the trench, or the fragments came from a later feature which went unnoticed.

3.5.4 Conclusion

The segments of the ditch in the west and east (Section 3.5.2) may belong together in view of the course of the ditch, but this is uncertain because of the large hiatus between them. The sections through the ditch segments in the west differ from those in the east, which does not support the assumed connection; however, difference in form over such a great distance is not unthinkable. What both segments have in common is that there are no indications of the existence of a rampart construction; the excavation conditions were such that if any traces of that kind had existed, they would have been discovered. Both in the west and the east the fills of the ditch segments are fairly clean and contain comparatively few finds, which points to them having been dug in an extensively occupied part of the area. Because of this and because of the intersections a pre-Flavian dating would seem obvious. The scanty finds indicate that the ditch was in use especially in the Claudian (and Neronian?) period. This is supported by the fact that the eastern ditch runs between the small fortification east of the Valkhof and the cemetery on the Hunerberg, and that the form and location of the ditch also appear to have been determined by the presence of these two topographical elements from the pre-Claudian period. The ditch segments also bound an area of c. 28 hectares, in which traces of settlement are to be found which attained their greatest size and intensity in the Claudio-Neronian period (Section 3.3). On the basis of the above, it is assumed that the ditch segments were contemporaneous with the peak of the settlement around the Valkhof and that they mark out the settlement area belonging to it. Because there was no rampart construction the ditch cannot have had a primary defensive function.¹³²

The system of trenches and the ditch which were

found in the southeast may be connected with the ditch segments in the east (Section 3.5.3). They roughly follow the course of these ditch segments and their stratigraphical position is similar. They must have run through the northwest and earliest, i.e. late Augustan and Tiberian part of the cemetery on the Hunerberg. It is true that Daniels and, later, Stuart observed that in this northwestern part ('O') there were also a considerable number of burials dating from the Claudian period, but the fact that they come from the part of the cemetery which lies southeast of the small ditch and the trenches certainly cannot be excluded.¹³³ In contrast to the ditch segments the trench system in particular has yielded quite a number of datable finds, which generally point to a dating in the Claudio-Neronian period. The small ditch and the trench system could therefore be connected with the ditch segments in the east; possibly they are only a local phenomenon which may or may not have been added when the primary ditch was constructed. The comparatively large quantity of finds would support the argument that they were added later.

3.6 SYNTHESIS AND INTERPRETATION

3.6.1 Early Roman Nijmegen: from military base to proto-urban settlement

The early and middle Augustan period: a military base with an offensive function

The c. 42 hectare military camp which was built on the Hunerberg in the early Augustan period forms a dominant topographical element for the whole of the first century. This is due to the fact that the entire area was reserved as military terrain, certainly up to c. AD 70, and was also recognizable as such. As a derivative the road from this military camp to the southeast and in particular to the northwest was also a decisive element for more recent settlement features in the area outside the large camp, an element, moreover, which was to serve this purpose in the northwest at least up to the end of the fourth century.

The military camp was large enough to accommodate over c. 12,000 men or even more, a force of two legions, within its walls. This is an indication of its offensive task, which, in

¹³² See also Willems & Van Enckevort 2009, 70-71.

¹³³ See Section 3.5.2 'in the east'. Daniels 1955, 311 and Stuart 1977a, 10 and 72-73.

the period in question, can only be linked with the wars in Germania. However, it is difficult to determine which of the campaigns against Germania the camp was connected with. Based on a recent study of the coins found in the northwestern part of the camp a founding date of c. 19 BC has been proposed and an abandonment between 15 and 12 BC.¹³⁴ There are various indications of activities between 12 and 7 BC, but no conclusive evidence can be given for a link with the boundaries of the territory at its largest. There is also evidence of its use at a later stage, based on the predominance of the Italic terra sigillata service II, a fragment of which was found in a post-hole of the great gate on the southwest side of the fortification.¹³⁵ The significance of this find is disputable: is it connected with the construction of the gate, its re-building or perhaps its demolition? At any rate, it is generally agreed that after the episode of the great Germanic campaigns, i.e. after AD 16, the large military camp on the Hunerberg was no longer actively used. After AD 70 successive legionary fortifications would be built inside these boundaries, surrounded by a series of different elements of settlement, such as, for example, the amphitheatre.

The late Augustan and early Tiberian period: a military base with a consolidating task

In the course of the second millennium AD, a fortification covering approximately two hectares was built east of the Valkhof. The road running from the large camp on the Hunerberg must have formed the main axis of the small fortification. On the west side of the large camp the road makes a bend to the north. The reason for this may have been that there was a depression of at least several hundred metres in the southwest lying as much as 2.5 m lower than the road. The military significance of this fort must have been completely different from that of the large fortification on the Hunerberg. A garrison for about 500 men, as may be assumed from its size, c. two hectares, must have had a mainly consolidating and defensive function. The small fortification may have played a part in maintaining the Roman military presence at Nijmegen during the periods when the large fortification was not in active use. The same can also be said of the settlement on Kops Plateau, where clear indications were found of military occupation between 10 BC and AD 10.¹³⁶ What

the relation between them was in this respect depends also on the dating of the active use of the large camp, which, moreover, does not have to be restricted to one period. It is possible that, during the periods in which the large camp was passively used, up to c. AD 10, the consolidating function was performed by a military base on the Kops Plateau, and that in the following millennium this task was supported, or less probably, taken over by the fortification east of the Valkhof.

Scattered finds and features were discovered northwest of the small fortification and south of the Valkhof on the Kelfkensbos, which may be partly contemporaneous with the small fortification. Although the distribution of these finds cannot be determined precisely for the whole area because of the nature of the observations, they may have some connection with the continuation of the road from the small fortification towards the northwest and the river Waal. The alignment of settlement traces from the Claudio-Neronian period may be an indication. The clearest and most interesting feature is a cladded pit with a clay depot further to the south on the St. Josephhof from the first quarter of the first century AD (Section 3.3.5). It points to a traditional craft in the form of pottery production outside the fortification. During the second millennium AD people started to bury their dead south of the road, between the small fortification east of the Valkhof and the large camp on the Hunerberg. The earliest graves are found in the northwest, i.e. approximately 50 m outside the gate in the southeast side of the small fortification. The position of the graves was unquestionably determined by the road. The dead may have belonged to the garrison of the small fortification.

The Tiberian, Claudian and Neronian period: the proto-urban settlement of Batavodurum

The small fortification east of the Valkhof certainly did not function far into the third millennium AD. It is not clear whether it had a successor. Despite the somewhat limited and scattered investigation of the area around the Valkhof it does not seem very likely that the ditches of a fort with a surface area of 1-2 hectares could have escaped notice.¹³⁷ The only spot where it could have been situated and escaped notice is the Valkhof itself. There

¹³⁴ Kemmers 2005; Willems & Van Enckevort 2009, 29-31.

¹³⁵ Bloemers 1977, 89.

¹³⁶ Bogaers & Haalebos 1975, 167-169; Bloemers, Greving & Zoetbrood 1979, 20; contradictory views: Van der Werff 1984, 365-367 and Willems 1984, 76. Willems & Van Enckevort 2009, 35-41.

¹³⁷ Willems & Van Enckevort 2009, 20 Fig. 4.7-8 and 41: remains of ditches discovered south of the proto-urban settlement and interpreted as 'auxiliary camps for Germanicus' army.'



Figure 3.31 Nijmegen. The two parts of the sculptured column from the large late Roman ditch on their way to the former Rijksmuseum G.M. Kam (see Appendix XVII Section 5.2 nos. 182/21-22).

is no evidence of military occupation of any significance during the period between AD 25/30 and 70, and it is possible that there may not have been any at all.

The settlement traces from this period which were found south of the Valkhof especially on the St. Josephhof (Section 3.3.3) probably have a completely different meaning. They point to a civilian settlement of an unusual size for such an early period, and built in a regular pattern with, possibly, the road to the north coming from the small fortification as its central axis. The nucleus must have been at least 10 hectares in size, but the finds were scattered over approximately 20 hectares. Moreover it may have been surrounded by a ditch enclosing an area of c. 28 hectares. The regular construction, the house-plans, the large quantity of (Gallo-) Roman pottery and the frequency of graffiti point to the foreign character of the inhabitants. They reflect a non-military settlement which may perhaps be identified with the

Batavodurum of Tacitus and Ptolemy.¹³⁸

The great cemetery which spread during this period from the area south of the road up to the ditches of the large camp on the Hunerberg which had fallen into disuse and as far as the depression, undoubtedly belongs to the settlement round the Valkhof. In about AD 70 1,500-2,000 dead were buried here in an area covering at least 1.5 hectares. The grave gifts consist mainly of (Gallo-) Roman products, and the shape of the graves differs from what is now considered to be characteristic of the native method of burial in this part of the country. All the evidence points to the fact that the dead were of (Gallo-) Roman origin. The relatively high percentage of ornamental brooches which are typical of women's attire indicates that the cemetery must at any rate have had a civilian component. This is supported by the results of the analysis of the cremated human bones: 60% of a population of 60 individuals is female and 40% of a population of 107 individuals is non-adult. Children at the age of 1-5 years are well represented.¹³⁹ All these features correspond, to a large extent, with those of the large settlement, and even the number of dead calculated for one generation is of an order of magnitude appropriate to the size of the settlement and a population of 675-1,205 individuals (see Section 3.4.5). Even if one were to take into account the existence of a military garrison during this period, the number of dead still remains large enough to assume that there was a civilian settlement of unusual size in this period.

Finally, attention should be drawn to the discovery of two parts of a sculptured column in the large ditch dating from the fourth century AD (Section 5.3.1 and 6 and Appendix XV section 5.1.2), which intersected the area of the pre-Flavian settlement (Fig. 3.31). The dating of this unusual find has been the subject of discussion. Two possibilities in literature have been put forward: approximately AD 17¹⁴⁰ or approximately AD 40.¹⁴¹ It could be assumed that the findspot of the two blocks did not lie far from the place where the column originally stood, so then there may have been a logical connection between this monument and the settlement. In this case a monument like this would emphasize yet again the exceptional nature of the settlement mentioned here.

¹³⁸ Bloemers, Greving & Zoetbrood 1979, 30-33; Van Enckevort 2012, 175-177 and Fig. 83-84. See also Section 3.3.1 for the extensive excavation on the St. Josephhof.

¹³⁹ Smits 2006, 77-78.

¹⁴⁰ Bloemers 1986a, 126. Confirmed by a recent study of Panhuysen (2000, 17; 2002, 35-38 and 42; see also Panhuysen in Noelke 2010-2011, 266-267). Willems & Van Enckevort 2009, 71.

¹⁴¹ Bauchhenss & Noelke 1981, 311-312.

On the basis of the above it can be assumed that

1. the settlement had a mainly civilian function, including activities such as government, trade and possibly crafts, which were also carried out by the later *civitas*-capital, *Ulpia Noviomagus*;
2. the size, construction and architecture show features of Roman scale and structure appropriate to a (proto-)urban structure; in this respect the settlement represents in addition to the military fortifications a completely new type in the Lower Rhine area;
3. the population must have been of Roman or rather Gallo-Roman origin; there is absolutely no evidence of a permanent pre-Roman native settlement of any size;
4. the settlement can be compared with the pre-Flavian *Batavodurum* and *Oppidum Batavorum* of Ptolemy and Tacitus.¹⁴²

3.6.2 The relation between the Roman occupation at Nijmegen and the surrounding Batavian tribal territory

It is most important that insight be gained into the relation between the extensive Roman activities during the pre-Flavian period at Nijmegen and those in the surrounding native tribal territory of the Batavians. As regards the Late Iron Age and the Roman period, there are excellent surveys by Roymans and Willems of the archaeological and historical evidence in this area which roughly encompasses the riverine area and the sandy areas of Brabant adjoining it in the south.¹⁴³ Apart from Nijmegen there is of course the string of other attested and presumed military fortifications along the Rhine and the Meuse which formed part of the military system: these include Driel, Arnhem-Meinerswijk, Lobith (?) and Cuijk (?) in the period from 12 BC to c. AD 50, and Kesteren (?), Driel (?), Arnhem-Meinerswijk, Huissen (?), Loowaard, Herwen-De Bijland and Cuijk (?) in the period between AD 50 and 69.¹⁴⁴ They emphasize the increasing Roman influence in the area, as already indicated by the settlement at Nijmegen.

Some observations concerning the Batavians in the pre-Flavian period

Four factors are of importance to the relation between the Roman authority and the native population: the location of possible

pre-Roman native centres, the occurrence of Roman imported goods in a native context, the building of the Gallo-Roman temple at Elst and the recruitment of native auxiliary troops in connection with the granting of Roman civil rights.

The hierarchic differentiation of the native settlement system in the area between the Rhine and the Meuse during the first century BC is simple. Nevertheless there is some evidence of the existence of two regional centres: one in the middle of the riverine area in the vicinity of 's-Hertogenbosch and a second not far southwest of Nijmegen in the Wijchen area. Roymans and Van der Sanden have published a remarkable quantity of brooches, bracelets, swords and especially coins, dredged up from the Meuse at Rossum-Lith. They date the coins to 50-30 BC, give them the name Lith type and interpret them as a Batavian issue. Stylistically, this series of coins shows great similarity to coins of the Mardorf type from the Central Rhine area.¹⁴⁵ In Empel, not far from Rossum-Lith, a Gallo-Roman temple has been excavated, which had an origin in the (second) half of the first century BC.¹⁴⁶ A little further south the famous altar of Ruimel was found, which was dedicated in about AD 50 to *Hercules Magusanus* by *Flavus*, the son of *Vihirmas*; *Flavus* was *summus magistratus civitatis Batavorum*, an unknown high post within the regional administrative structure.¹⁴⁷ These facts could point to a political, administrative or religious centre in this area at the time of the birth of Christ. Willems has a series of findspots which appear to be much richer and larger than usual in the area around Wijchen, about 10 km southwest of Nijmegen.¹⁴⁸ The number of Roman imported goods in Batavian territory between 50 BC and AD 70 is far smaller than might be expected considering the proximity and size of the early Roman presence. Willems has established that, of the 142 settlements in this period, only eight have imports from the Augustan period¹⁴⁹, 13 from the first half of the first century and 15 from the pre-Flavian period. Although this does reflect the increase in imports during the first century AD, it generally concerns only very small numbers, mostly not more than one to three fragments. Compared to the numbers found in the early Roman findspots at Nijmegen these are of no importance whatever. It is therefore all the more significant that complete and

¹⁴² Bloemers, Greving & Zoetbrood 1979, 30-33.

¹⁴³ Bloemers 1983b, 162 Fig. 8.2; Roymans 1983, 1987 and 1990; Willems 1981 and 1984a.

¹⁴⁴ Willems 1984, 76-78 and 89-98.

¹⁴⁵ Roymans & Van der Sanden 1980, 205-215. For a recent discussion see Roymans & Scheers 2010.

¹⁴⁶ Roymans & Derks 1994, 14-19.

¹⁴⁷ Bogaers 1960-1961, 268-271.

¹⁴⁸ Willems 1984, 81.

¹⁴⁹ See also Roymans 2009, 94-95 and Abb. 10.

sometimes unusually valuable imports are found during the same period in the native cemeteries of Zoelen, Tiel-Passewaaij, Hatert, Uden and Oss-Ussen. The cemeteries are situated in the country, sometimes even in the vicinity of a native settlement, and differ from the Roman cemeteries at Nijmegen in that they have rectangular and round trenches around the graves. As well as graves without any grave gifts, native pottery is found and, occasionally, complete terra sigillata, and sometimes even an intact glass ribbed bowl.¹⁵⁰ These are often found in grave structures which are larger than usual, making it likely that the Roman imported goods at the time were, above all, important as far as personal prestige was concerned, which found expression in the life after death. Apart from Nijmegen, there is only one well-dated non-military findspot of this period known: the Gallo-Roman temple under the church at Elst. The first phase consists of a simple rectangular plan and must have been built of stone or at least founded on stone in about AD 50. This is a second case of an unusually early use of natural stone, best explained by official connection with the building in some form or other. There are some indications of the existence of an earlier native building, possibly with a religious character.¹⁵¹ The temple probably points to a third regional centre. Again, the important thing is that, just as in the case of the imports found in native graves, the earliest expression of Roman influence is found in the sphere of symbols and religion. Finally, attention should be drawn to the part played by the Batavian auxiliaries. Batavian troops were highly valued, and, in about the middle of the first century AD, nine cohorts, one mounted division and one elite unit to serve as imperial bodyguard had been formed. If one agrees with Alföldy and Bellen that, in this period, these troops already had the strength of normal units, then the number of soldiers in permanent service must have been c. 5,500.¹⁵² They had their own commanders, some of whom are known to us with their Roman-sounding names: Claudius Paulus, Claudius Victor, Julius Briganticus and the most famous of all, Caius Julius Civilis. The Julio-Claudian emperors had obviously granted them Roman civil rights. Large numbers of Batavian warriors must therefore have come into increasingly close contact with Roman

military organization and culture. In doing so, they acquired prestige by their behaviour on the scene of battle and by favours and honours from the Roman authority. However, contact and prestige remained limited to one specific section of the native community in one specific context: men in service as soldiers for the Roman army.

An analysis of the relation between Batavians and Romans

The observations concerning the Romans at Nijmegen and the surrounding tribal territory of the Batavians in the first half of the first century AD result in a form of contact between the two with the following characteristics:

1. There is no relation between the location of pre-Roman or early Roman native centres of settlement and the proto-urban central position of the future *civitas capital*. The location of the latter appears to have been mainly inspired by the same factors as those which determined the choice of location of the military fortifications: a position which was as strategic as possible with regard to the geographical and morphological features of the region. On the other hand, this large civilian settlement does not seem to have developed out of a military settlement nor the settlement surrounding it.

The size, construction and function of the settlement and the nature of the inhabitants indicate that the proto-urban settlement must have been founded purposely under Roman authority and more or less artificially. Immigrants from northern Gaul must have made up a considerable part of the founding population. Army veterans also may have made up part of this population, but they might have been too few in number to have been the driving force of this development.

2. Contact between the Roman authority and the native population ran mainly via the local elite at this early stage and was focused on the recruitment of auxiliary troops. As a result, contact was restricted to the male part of the population. This may have linked up well with the specific social and economic features of the native community. It was usual among certain Celtic and Germanic tribes for much status to be acquired in battle. Moreover, manpower was easier to mobilize and more useful for Roman purposes in the short term than the simple native agricultural economy. Courage and loyalty were rewarded with gifts such as pottery,

¹⁵⁰ Willems 1984, 83-85; Hatert: Haalebos 1990; Oss-Ussen: Wesselingh 2000, 183-188; Tiel-Passewaaij: Aarts & Heeren 2007; Heeren 2009.

¹⁵¹ Bogaers 1955, 42-42 and 174-517; Willems 1984, 79; Lauwerier 1983, 33 and 1988, 111-121.

¹⁵² Alföldy 1968, 13-14 and 45-48; Bellen 1981, 34-57; Speidel 1984, 36-37; Willems 1984, 229-230.

glassware, Roman civil rights and special rights such as tax exemption. Tacitus himself describes it as follows: 'Their (i.e. the Batavians) distinction persists and the emblem of their ancient alliance with us: they are not insulted, that is, with the exaction of their tribute, and there is no tax-farmer to oppress them: immune from burdens and contributions, and set apart for fighting purposes only, they are reserved for war, to be, as it were, our arms and our weapons.'¹⁵³

3. The integration of the native economic system and the Roman one must have been very limited in this early Roman period. The native agriculture was certainly not capable of a surplus production of food and other products of any size and of sufficient quality. Evidence of the native community playing such a part is not found until the Flavian period. The administrative and commercial infrastructure must still have been insufficiently developed and to this end the development of the large civilian settlement was stimulated. This settlement must have been supported economically by the central Roman authority to a large extent as were the military fortifications at this early period.

3.6.3 A comparison with observations elsewhere in the northern Meuse and Rhine region

It is evident that the developments at Nijmegen and in the eastern riverine area c.q. the tribal territory of the Batavians need not be isolated developments nor need they represent the only form possible. For this reason the observations of the Rhine and Meuse region will be discussed here, if they are relevant to the problems already outlined dating from the period between the beginning of the Christian era and the Batavian revolt.

The military fortifications dating from the pre-Flavian period

The large military camp from the Augustan period is one of a series of fortifications in the Rhine and Meuse area more or less comparable in size and dating from the same period. To the right of the Rhine in the valley of the Lippe there is the fort at Oberaden, which has a surface area of about 65 hectares and was in use for a relatively short period between 11 and 8/7 BC.

Most of the fortifications are situated to the left of the Rhine and were in use for longer than this. These are Xanten-Vetera I (surface area c. 45 hectares; Augustan-Tiberian/early Claudian), Neuss (surface area 13-80 hectares; 16/15 BC - AD 43), Cologne (surface area uncertain, but the two-legion camp 'Apud Aram Ubiorum' has historical evidence; AD 9/14 - AD 30/40 in use) and possibly Tongeren (surface area 140 hectares at the most; Augustan). Moving south, the next known camp of similar size is found at Mainz.¹⁵⁴ Of these fortifications it is known that two legions were stationed at Xanten and Cologne, and also which legions they were.¹⁵⁵ It is true that the camp at Nijmegen was in active use for a shorter period of time than the camps at Xanten and Cologne, but the terrain remained free from any other kind of use during the whole of the pre-Flavian period and as a result has possibly always retained a military purpose. It is remarkable that the position of (most of) the larger fortifications corresponds with that of the later capitals of the civitates. One could then assume that the motives for selecting the locations of the largest army units were the same as those for founding these capitals. Too little specific information is available about the actual size of the military fortification in the case of Tongeren to make the same assumption, but here too there may have been a similar relation. The small late Augustan/early Tiberian fortification on Trajanusplein at Nijmegen fits into the series of contemporaneous fortifications of similar size at Velsen, Vechten, Arnhem-Meinerswijk (?), Altkalkar (?), Xanten (?), Moers-Asberg, Cologne-Alteburg and Bonn.¹⁵⁶ Of this list, the most interesting is the possible fortification under the later Colonia Ulpia Traiana because of the proximity of the so-called 'Vorgängersiedlung' and the similarity of this combination to the situation at Nijmegen.

Pre-Flavian proto-urban settlements in the Rhine-Meuse delta and the adjoining part of Gallia Belgica

There are four places in the northern basin of the Rhine and Meuse where there is good reason to suspect a similar development of a large civilian settlement with a proto-urban character: Xanten, Cologne, Tongeren and Trier. Xanten and particularly the Colonia Ulpia Traiana region is the first and most important parallel to the Nijmegen problem. It is one of

¹⁵³ Tacitus, *Germania* 29.

¹⁵⁴ Schönberger 1985, 427-430 nos. A.8, 11, 14, 15 and 18.

¹⁵⁵ Schönberger 1985, 346.

¹⁵⁶ Schönberger 1985, 426-430, nos. A.3, 4, 5, 7, 8, 13, 16 and 25.

the most important military bases connected with Roman activities around the beginning of the Christian era left and right of the Rhine, it is, at a distance of only 70 kilometres, Nijmegen's most important neighbour along the Rhine, and it has been the object of systematic archaeological research for some decades. Without the data from Xanten the interpretation of the Nijmegen evidence would have been far riskier. The Roman town of Colonia Ulpia Traiana which was founded in about AD 100 is situated approximately 2.5 kilometres northwest of the large fortification of Vetera on the Fürstenberg. Numerous traces of an older settlement were found under the Colonia, which is commonly known as the 'Vorgängersiedlung' and is sometimes interpreted as a settlement of the tribe of the Cugerni. The settlement is in three to four stages with two phases of wooden structures and one to two of stone. The earliest stage is provisionally dated to about AD 10-20, and the second must have burned down between AD 69-70 during the revolt of the Batavians. The usual construction of the foundations of the wooden houses consists of sleeper beams. The general layout of the parcels is regular and differs only slightly from that of the later Colonia in alignment. The finds are mainly Roman or Gallo-Roman; only a small percentage are native products, and pre-Roman finds are the exception. The economy appears to have been founded on trade and crafts rather than on agriculture. On the north side evidence was found of the early Tiberian fort previously mentioned. The settlement and the military finds cover an area of 30 hectares or more. On the southeast side dozens of graves were discovered from the second and third quarter of the first century AD. The graves contain Roman and Gallo-Roman objects exclusively, sometimes in large numbers.¹⁵⁷ The precise relation between the graves and the settlement traces of the 'Vorgängersiedlung' is not known. Lenz has proposed to interpret these features linked with the 'Vorgängersiedlung' as belonging to three auxiliary camps with their military vicus.¹⁵⁸ Bridger and Precht mention the possibility of a combination of civil and military settlements and contemporary cemeteries within the area of the later Colonia Ulpia Traiana.¹⁵⁹ In his description of the revolt of the Batavians Tacitus mentions the fact that there was a settlement 'in modum municipii' not far from the legionary

fortress, which is possibly identical to the 'Vorgängersiedlung'. Oelmann believed that the name of the settlement might have been Oppidum Cugernorum, and Bogaers proposed the name Cibernodurum on the basis of a fragmentary inscription.¹⁶⁰ The archaeological evidence about Cologne is less clear than the historical evidence. It is known, from Tacitus' descriptions of what happened at Cologne as a result of the death of Augustus, that in AD 14 the Ara Ubiorum, the Oppidum Ubiorum and the two-legion fortress Apud Aram Ubiorum were situated close together. The Ubians were a Germanic tribe who originally lived on the right of the Rhine but who were allowed to settle on the left bank, possibly in about 38 or 19 BC.¹⁶¹ The Ara Ubiorum must have been dedicated before AD 14 with the purpose of becoming the political and religious centre of the intended province of Germania. The Oppidum Ubiorum received the status and name of the Colonia Claudia Ara Agrippinensium in about AD 50 through the Empress Agrippina who was born there in AD 15. The First and the Twentieth Legions were stationed at the legionary fortress between about AD 10 and 40. Archaeological features, undoubtedly from one of the topographical elements mentioned above, are extremely scarce. A pre-Claudian street pattern appears to have the same form as the later regular street network. Settlement finds are found over a surface area of at least 80 hectares and consist of Roman and Gallo-Roman products and Roman sculptures and monuments of stone. There are no indications of any pre-Roman native settlement. In a large part of the site there are finds from the Augustan period and later. Parts of a ditch with an earth-timber wall and the foundations of a so-called praetorium were found in the north, observations which point to a military function. In the south there are potters' kilns from the Tiberio-Claudian period. The surface area of 80 hectares is large enough to have contained a two-legion fortress of c. 50 hectares on the north side next to a civilian settlement of c. 30 hectares in the south.¹⁶² With this the interpretation of the clearance of a native Oppidum Ubiorum in order to build a two-legion fortress, which later became a veteran colony, on its site is no longer necessary; Vittinghof has already voiced his doubts about this line of reasoning which stems from Filtzinger, and prefers the development

¹⁵⁷ Von Petrikovits 1952, 53-101 and Period 1-3; Binding 1972; Hinz 1975, 826-839 and 1984; Rieger 1980, 495; Von Detten 1983; Schmidt 1985; Zielsing 1989; Fischer 2001; Leih 2001, 25-26.

¹⁵⁸ See Schalles 2008 for a critical review.

¹⁵⁹ Lenz 2001 and 2003; Bridger 2001, 62; Precht 2001, 56.

¹⁶⁰ Bogaers 1984 and 1989.

¹⁶¹ Eck 2004, 46-55.

¹⁶² See however Galsterer 1990, 122-123.

of the veteran colony from the Oppidum Ubiorum.¹⁶³

Tongeren is strategically situated at a junction of roads connecting the Rhine with the Gaulish hinterland. Finds dating from the early Augustan period were found over an area of approximately 80 hectares. In the southwest there is a concentration of Celtic coins, and part of a ditch from the pre-Flavian and possibly early Roman period has been excavated. Settlement in this southwestern part appears to have made way for a cemetery before the reign of Tiberius. The settlement moved further eastwards. There at the time of the Emperor Claudius a rectangular street pattern was constructed which extends for approximately 56 hectares. Wooden buildings with sleeper beam constructions and foundation trenches with remains of natural stone date from the same period and overlie traces from the Augustan period. No traces were found of pre-Roman native settlement. These building traces differ markedly from the house-plans which are now regarded as typical of the native farmhouse type in these parts of the Low Countries.¹⁶⁴ Surprisingly, however, during recent excavations clear house-plans of native type as known from the rural area have been discovered which fit into the rectangular street pattern and the urban development.¹⁶⁵ Little can be said about the nature of economic activities.¹⁶⁶

The settlement is generally identified with *Atuatua Tungrorum*. At about 13 kilometres east of Tongeren there is a 20-hectare hill fort at Kanne on the left bank of the Meuse. Dendrochronological dating of tree-trunks belonging to the rampart construction sets the date the trees were felled in 31 BC. It is the most northerly fort of this kind known, and it is possible that it may have been a sort of centre in the Late Iron Age. The location of the large settlement at Tongeren and that of the contemporaneous settlement at Maastricht near the spot where the Roman Tongeren-Cologne road crosses the Meuse within sight of this hill fort emphasizes the rift with the pre-Roman native settlement structure.¹⁶⁷

Trier is the last place to be discussed in this connection. In 18-17 BC a bridge was built here across the Moselle.¹⁶⁸ It is assumed that there was an early Roman military fortification here, but this has not yet been found. In the Tiberian period a rectangular street system was constructed over a surface area of approximately

85 hectares at this river crossing. Celtic coins, dating mostly from about the beginning of the Christian era, were found all over this area. There are detailed but sparse observations of wooden and stone buildings from the early Roman period. Although there is evidence of scattered settlement in the late La Tène period along the Moselle and in the Altbach valley, it is agreed that the Roman settlement was not the continuation of a pre-Roman native centre. A similar native centre was in fact localized in the large oppidum on the Titelberg, west of Trier. The urban settlement in this early period was called *Augusta Treverorum*.¹⁶⁹

It is not easy to gain as clear an insight into the occurrence of early Roman imports in the surroundings of the places discussed above as into the tribal territory of the Batavians. This is because of the difference in the state of research and publication. Gechter and Kunow have compiled a survey for parts of the countryside near Xanten and Cologne.¹⁷⁰ From this it appears that in both areas the number of imports from the first century AD is very small. However, in the second half of the first century they show a sharp increase. As far as the surroundings of Tongeren with its large number of villas are concerned, it is generally assumed that the Roman imports increased, particularly in the Flavian period.¹⁷¹

On the basis of the above certain common characteristics can be established:

1. All the findspots discussed indicate the existence of a large and probably civilian settlement, where considerable building activities started in the first quarter of the first century AD, or at least in the reign of Claudius;
2. in all the findspots there is some sort of military occupation in the Augustan or occasionally Tiberian period, in the vicinity of the civilian settlement, which ends before or during the early settlement phase;
3. in none of the findspots was there clear evidence of the existence of a native pre-Roman regional centre which indicates that the location of such a centre must have shifted;
4. all the settlements have much larger dimensions than the usual native settlements in the region concerned, they have a regularly constructed plan and the buildings differ, as far as could be seen, from the usual native house-plans;¹⁷²

¹⁶³ Filtzinger 1962-1963; La Baume 1972; Hellenkemper 1972-1973; Doppelfeld 1975, 718-728 and 732-737; Vittinghof 1976, 78 and note 23; Gechter 1979, 95-97; Päffgen & Zanier 1995.

¹⁶⁴ De Boe & Lauwers 1980, 28-36; De Boe 1982, 71-72 and 1984; Slofstra 1991, 137-157.

¹⁶⁵ Vanderhoeven 1996, 210, 212-213, 218, 221-222 and 240-243; Vanderhoeven & Vanderhoeven 2004.

¹⁶⁶ Vanderhoeven 1996, 243-244.

¹⁶⁷ Kanne: Roosens 1975; Hollstein 1976 and 1980, 69-70; Tongeren: Vanvinckenroye 1975, 15-29; Mertens 1985, 262-263.

¹⁶⁸ Hollstein 1980, 135.

¹⁶⁹ Schindler 1971, 69-82; Ternes 1975, 334-345 and 1984; Cüppers 1984; Haffner 1984; Heinen 1985, 41-53 and 61-67;

¹⁷⁰ Schönberger 1985, 431-432, Nos. A.31-32. Gechter & Kunow 1986 and 1988.

¹⁷¹ Roosens & Lux 1970, 21-27;

Vanvinckenroye 1975, 57.

¹⁷² Frere 1977, 103: 'town-planning ... normally thought important for *coloniae* and other administrative centers.'

5. in all the settlements large quantities of Roman and Gallo-Roman products were found from the Claudio-Neronian period;

6. as far as could be observed and is expressed in the Roman imports, the contact between the civilian settlements and the surrounding countryside was very limited in the first half of the first century AD, and increases considerably in the second half of the century. These observations may indicate that similar explanations for these phenomena in the period AD 1-70 could be given to those already formulated for the tribal territory of the Batavians. The founding of a new type of civilian settlement with a majority of non-native inhabitants was, in the early stages, coupled with a very restricted economic interaction between the settlement and the surrounding area. Originally, contacts were made through the local elite and were aimed at agreements on alliances, political stabilization and, for example, the recruitment of native soldiers.

The relation with urbanization in northern Gaul

The above observations link up with the current theories about the way in which urbanization in north Gaul may have been effected. Wightman distinguishes three forms of urban development: the local continuation of a pre-Roman settlement, the continuation of a pre-Roman settlement at another spot and finally a completely new settlement. The location of the early Roman urban centres is closely connected with junctions in the Roman road network and the course of the rivers, a feature which they share with the larger military fortifications.¹⁷³ One common feature of a number of towns is that they are constructed according to a rectangular pattern.¹⁷⁴ In general it is assumed that the Emperor Claudius particularly stimulated urban development in Gaul and Germania.¹⁷⁵ The socio-economic relation between urban settlements and the surrounding native area in the early Roman period or at an early stage in the urban development has not received much attention up to now, partly because evidence of this is so limited. In this connection, Jones' observation is interesting, namely that the contacts between the native economy and the Roman legion in York were very limited for the first thirty to forty years of its occupation, as far as can be concluded from the types of cereals

in the native settlements and in the legionary fortress and from the Roman imported goods in the countryside.¹⁷⁶ Similarly, not much has been said about the origin of the inhabitants in the early forms of urban settlements. In the case of Gaul, it is generally thought that these were the inhabitants of the area concerned.¹⁷⁷ This is less likely in Germania inferior and the neighbouring Gallia Belgica, as we have already seen. A second possibility might be that veterans from the legions carried out urbanization, but this is not as acceptable demographically, the reason for this being the number and age of the veterans, who retired from service after 25 years. On average, this cannot have concerned more than 100 men between the ages of 40-45 per legion per year, in varying condition after a period of active military service during a period of conquest, and with a diversity of technical, administrative and economic skills.¹⁷⁸ The number of veterans available from four legions in Germania inferior in the pre-Flavian period is not particularly large compared to the number and size of the proto-urban settlements. Moreover, many veterans appeared to prefer to stay on in the surroundings of the place where they were stationed rather than move to a new environment. The age of the veterans implies that their strength had been exhausted in military service and could no longer be deployed to carry out an urbanization policy. Even if these considerations were only partially correct, there would still be a third group necessary to support an urbanization process in the Rhine area. In principle, this group could consist of the same citizens as those in the hinterland of Gaul, the native Gallo-Romans.

3.6.4 A wider context of the establishment of colonial cities and the early phase of integration with the native society

The observations and theories described above fit into a wider concept of the relation between the Roman empire and native societies in the Rhine and Meuse delta. This concept is inspired by insights into the historical and current relation between the western world and the third world expressed in core-periphery relations and into the characteristic features of expanding border regions. The most important features of this concept have been extensively dealt with by Willems and concern, among other things,

¹⁷³ Wightman 1985, 75-80; Frézouls 1984, 73-77.

¹⁷⁴ Frere 1975; Drinkwater 1985, 53-54.

¹⁷⁵ De Laet 1966.

¹⁷⁶ Jones 1990.

¹⁷⁷ Frézouls 1984, 84.

¹⁷⁸ Mann & Roxan 1983, 59-62.

the concept pairs of imperialism-colonialism and power-force.¹⁷⁹ Here only features of this concept will be discussed which can place the significance of the proto-urban settlements and that of the nature of the relation within a wider and more elucidatory context. The emphasis lies here on the early phases in the contact between native society and intruding power.

Following Horvath, Bartel has described the difference between imperialism and colonialism on the basis of (the degree of) absence or presence of permanent settlers of the dominating group in the periphery.¹⁸⁰ This description corresponds with the difference between both concepts in terms of energy: imperialism prefers the use of power whereas colonialism is compelled to use force. Force is a direct proportion of the quantity and quality of the energy put in by those exerting force and consequently limited; power works by eliciting responses of those subject to power, who supply the energy.¹⁸¹ An imperialist policy can avoid employing force by making use of the influence of the indigenous elite and its striving to maintain its own position; in this respect Galtung uses the concept of the structural relation of dependency between core and periphery based on the cooperation between the elite of both areas to serve their collective interests.¹⁸² Another method of saving the force from the core is the use of a so-called 'intervening group' in the form of import of settlers from another area outside the core.¹⁸³ On the basis of ethnographical and archaeological examples, Horvath and Bartel outline the results of the combination of imperialism and colonialism with three possible strategies: social equilibrium, acculturation, eradication and resettlement. These three strategies increasingly encroach on the socio-economic structure of the native society and run parallel with a growing use of force:

	COLONIALISM (settlers)	IMPERIALISM (no settlers)
ERADICATION-RESETTLEMENT	abrupt culture change (replacement)	regional 'empty cell'
ACCULTURATION	slow indigenous culture change	slow indigenous change in economics
EQUILIBRIUM	settlement enclaves, 'two cultures'	indigenous cultural maintenance

The strategy of equilibrium is possible both in permanent situations of limited influence from the core as well as in the phase preceding the acculturation strategy in which the limited influence is of a temporary nature. The equilibrium/colonialism strategy in particular is important in the case of the proto-urban Roman settlements in the Rhine-Meuse area; as Bartel says 'this approach represents a low-profile strategy which allows for the most efficient control and exploitation of locations and resources believed important, while indigenous populations are limited in cultural exposure and retain their native values'. This indicates the context within which the limited integration of the proto-urban settlement with the surrounding area, the 'enclave' becomes understandable. This strategy combines the equilibrium/imperialism strategy which is characteristic of the last half of the first century BC with the acculturation/colonialism strategy of the second half of the first century AD. The 'enclave' character decreases in the course of the process.

The proto-urban settlements show a number of similarities with the so-called colonial cities in historical and recent times; some of the similarities even support the character of the enclave. The general characteristic of the colonial city is that power is principally in the hands of a non-indigenous minority, this minority is superior in terms of military, technological and economic resources and, as a result, in social organization, the colonized majority are racially or ethnically, culturally and religiously different from the colonists. Variations on these lines are determined by the size of the population, the nature of the economy and the degree of urbanization in the indigenous area. More specific features are, among other things, the dualistic character of the economy, i.e. orientation on the regional economy and at the same time on that of the core or sub-core, existence of an intervening population, centre of colonial administration, focus of communication networks and a gridiron planning.¹⁸⁴ In the case of the proto-urban settlements described, for the most part archaeologically, the regular planning, the presence of non-native inhabitants, the administrative function and the level of economic activities, which at that time were still unfamiliar in the native context, are similarities with the so-called colonial cities.

¹⁷⁹ Willems 1984, 217-226.

¹⁸⁰ Horvath 1972; Bartel 1985.

¹⁸¹ Luttwak 1976, 195-200.

¹⁸² Galtung 1973 and 1981.

¹⁸³ Bartel 1980 and 1985; Horvath 1972.

¹⁸⁴ King 1985, 9-12.

The way in which the native and the intruding economy will relate is of great importance in colonial and imperialist relations. French anthropologists like Meillassoux, Godelier and Rey have developed the concept of 'articulation', i.e. the combination of production methods, for the African situation. In this concept the intruding production method does not take the place of the native one, but a new method of production develops under the influence of the foreign one, based on the continuous functioning of the older 'subordinate' one.¹⁸⁵ This is more than just a combination of two different methods of production, it affects the social structure of the native societies. In the African examples, in the case of agricultural products of the self-sufficient societies with a domestic or lineage method of production a distinction is made between consumer goods and prestige goods, which are used as exchanges and therefore have a social value. Exchanges in the form of prestige goods aim at the realization of additional work for the benefit of the reproduction of the group in these situations. Under the influence of the intruding production

method, the additional work can gradually be used to favour one particular category.¹⁸⁶ The 'articulation' concept shows a similarity here to the system of so-called peasant societies, in which peasants become dependent on a landed elite and the core.¹⁸⁷ All of this becomes significant to the situation in the Batavian region if Willems' theories about the social implication of an economy based on stock-breeding and its internal changes during the Roman period are correct. Willems assumes that stock-breeding was of major economic and social significance within the native society in the early Roman period; in the middle-Roman period agriculture became more important under the influence of the needs of the Roman town and those of the army and this may have affected the social atmosphere and found its expression in the different types of Roman villas.¹⁸⁸ In that case one may speak of articulation, since a new method of production has developed. It is also possible that in an early urbanization phase the intruding Roman economy and the native method of production hardly link up with each other yet.

¹⁸⁵ Raatgever & Geschiere 1982, 4.

¹⁸⁶ Raatgever 1982, 251, 260-262 and 272-282.

¹⁸⁷ Slofstra 1983, 79-84.

¹⁸⁸ Willems 1984, 262-267.

4 The Flavian-Trajanic legionary fortress: a pilot study for future analysis

(with R.M. van Dierendonck)

4.1 INTRODUCTION

4.1.1 Definition of the problem

The subject of this chapter is the great legionary fortress on the Hunerberg at Nijmegen dating from the period of the Flavian emperors and Trajan, large parts of which were excavated between 1951 and 1983.¹⁸⁹ In the Flavian-Trajanic period, the fortress was the central element of the military complex on the Hunerberg which also included the extra-mural settlement - the *canabae legionis* - and the cemeteries belonging to it outside the fortress (Fig. 4.1).

The excavations in the legionary fortress were carried out under the direction of H. Brunsting (mainly from 1957 to 1967) and the author (from 1972 to 1982). Two field technicians, R. Woudstra, until 1972, followed by K. Greving, played an important part in the fieldwork. Up to now, only brief preliminary surveys or sub-aspects chosen more or less at random have been published on this extensive investigation.¹⁹⁰ The volume and complexity of the data collected is exceptional by current standards, and analysing all of it requires the effort and dedication of a small, though constant team of researchers during a succession of years. The main problem is how to analyse and publish the results of these excavations so that they will be useful, and this is essentially technical as well as a matter of content. To what end must the huge quantity of data be analysed and how is it to be published in text and illustration? The problem stems from two general trends in the archaeology of the 1970s, which were not confined to the Netherlands. One was the expansion of fieldwork in the excavation of more or less complete settlements and their inclusion in regional projects; the other was the change in objective in which, under the influence of the processual paradigm, more value is attached to 'meaningful analysis' by a method and hypothesis which are more explicitly formulated than was usually the case. The increase in scale and project organization means that research spans many years and even decades. Staff members, hypothesis and method change in the course of time, so that there can be a discrepancy between the nature and quality of the data collected and the desired objective in the final analysis.

As to the technical difficulties, we may be

relatively brief. Basically, they consist of how to condense hundreds of cubic metres of finds, thousands of finds numbers and tens of thousands of square metres of archaeological features into a manageable and reasonably intelligently ordered pile of bound paper, known as a book. The answer to this problem cannot be exclusively sought in technical solutions such as the use of computer science, even though these may prove useful. Nor is a restriction to 'objective' reporting and documentation of observations acceptable in the present view. Only the conscious and explicit formulation of the concept and objective for analysis can restrict the quantity of information and produce 'meaningful' statements which will still be satisfactory in the future. The significance attached to the term 'meaningful' depends on the trend followed by the researcher, be it conscious or not.¹⁹¹ This is the 'subjective' element in the research which is inherent in the chosen analysis. There is no need to go into these general developments whose validity and topicality is not confined to Dutch or European archaeology.¹⁹²

The conceptual point of departure, which is that processual archaeology is a useful frame for investigating the cultural, historical and ecological aspects of human communities in context, was specifically chosen for the investigation in question. This approach is useful in ordering the wealth of data and possibilities, and in tracing links and solving problems. The quantification of the relations in a strictly systemic sense or the formulation of generalizations of an explanatory nature is not the goal pursued here. It is clear that explanations will tend to be qualitative and that they will not exclusively result from the processual approach. The theories of contextual archaeology about the significance of human actions and perception may also play an important explanatory part.¹⁹³

The general spatial and socio-economic starting-point is the extensive settlement at Nijmegen, particularly in the decennia around AD 100. It is evident that its significance cannot be separated from the eastern river area which surrounds it and part of the Roman border defences along the Rhine.¹⁹⁴ The actual integration of the two levels of investigation, settlement at Nijmegen and in the surrounding area, is, in itself, a methodological problem; it

¹⁸⁹ A short version or abstract of this chapter has been published in Bloemers 2002.

¹⁹⁰ Bloemers, Greving & Zoetbrood 1979, 37-56. For the excavations in the western part of the Flavian-Trajanic legionary fortress by the Radboud University Nijmegen between 1974 and 1977 see Bogaers & Haalebos 1977 and 1980 and Kloosterman, Polak & Zandstra 2014. For an overview of the excavations since 1982 see Willems & Van Enckevort 2009, 48-75. Recent plans of the legionary fortress period 4 (in wood) are published in Driessen 2007, Fig. 45-47.

¹⁹¹ For a survey of trends Hodder 1986 and 1991.

¹⁹² Renfrew 1983.

¹⁹³ Bloemers & Van Dorp 1991, 63-72.

¹⁹⁴ Bloemers, Hulst & Willems 1980; Willems 1981 and 1984a.

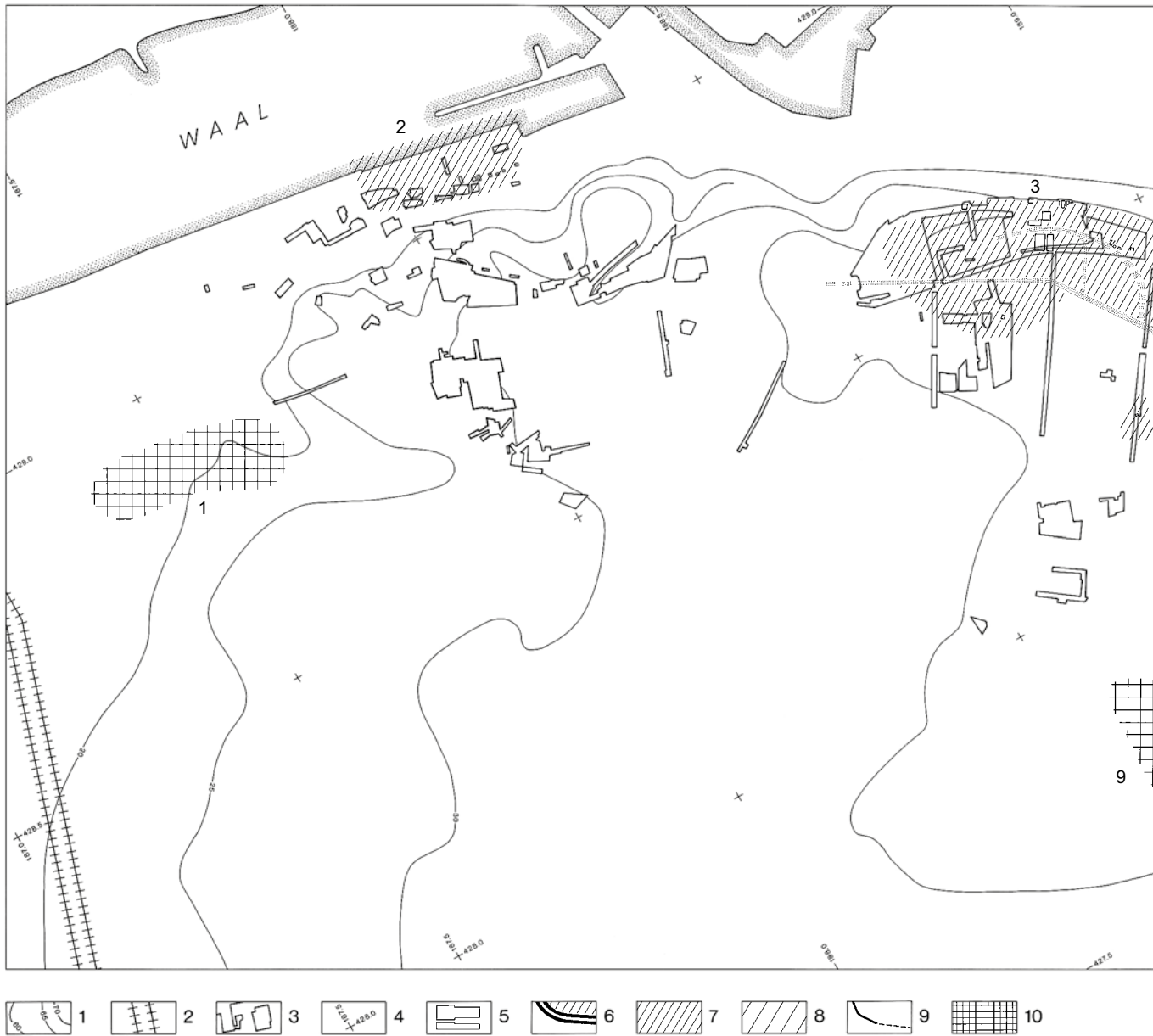
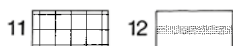


Figure 4.1 Nijmegen. Topography during the period AD 70 - c. 120 (situation 1982).¹⁹⁵ Scale 1:10,000.

Legend: 1. contour lines; 2. railway; 3. excavated areas; 4. topographical coordinates; 5. contours of Roman buildings; 6. Roman ditches enclosing (occupied = hatched) military areas; 7. area inhabited during this period (investigated and/or many finds); 8. area inhabited during this period (not investigated by ROB and/or few finds); 9. area enclosed but not inhabited during this period (investigated); 10. cemetery in use during this period (investigated and/or many finds); 11. cemetery in use during this period (not investigated by ROB and/or few finds); 12. (hypothetical) Roman road.

Site numbers: 1. cemetery in the Kronenburgerpark (Willems 1981 no. 400); 2. settlement along the river Waal at the foot of the Valkhof plateau (Willems 1981 no. 403); 3. the western part of the canabae legionis on the Hunerberg (Willems 1981 no. 407); 4. the amphitheatre (Willems 1981 no. 408); 5. enclosed area; 6. legionary fortress on the Hunerberg (Willems 1981 no. 412); 7. eastern part of the canabae legionis on the Kops Plateau (Willems 1981 no. 416); 8. large building belonging to the eastern part of the canabae legionis on the Kops Plateau (Willems 1981 no. 416); 9. cemetery southwest of the legionary fortress on the Hunerberg (Willems 1981 no. 413); 10. cemetery south-east of the legionary fortress on the Hunerberg (Willems 1981 no. 414); 11. cemetery on the south-eastern side of the Kops Plateau (Willems 1981 no. 418).

¹⁹⁵ For a more recent overview see Van Enckevort & Thijssen 1996, 57 and Willems & Van Enckevort 2009, 25 Fig. 7.



was mentioned in the last chapter and will not be discussed here. This means that the emphasis comes to lie on the so-called 'intra-site' analysis of finds and features and their interrelation as an expression of the use of space by human communities, and also on the transformation processes to which finds and features are subjected.¹⁹⁶ This type of analysis is advisable for settlements from the Roman period, but has not yet been carried out often.¹⁹⁷ In the cases where this has been done, the first results are promising. Several more or less random examples of this kind of research or attempts

at it are the analyses of finds and features from military fortifications at Valkenburg, Longthorpe, Newstead, Usk, Oberstimm and Windisch and the villa at Stutheien.¹⁹⁸ Results of analysis in analogous subrecent contexts of border settlements with a specific function also point in the same direction.¹⁹⁹

The Roman military occupation in the widest sense of the term in the period around AD 100 at Nijmegen and the investigation into it is perhaps particularly suitable for spatial and socio-economic analysis because of the inherent characteristics of this kind of settlement and

¹⁹⁶ Intra-site analyses: Carr 1984; Hietala 1984; Sinopoli 1991. Transformation processes: Shott 1989; Bloemers & Van Dorp 1991, 144-145. Especially for pottery studies Millett 1987.

¹⁹⁷ Von Petrikovits 1975, 53.

¹⁹⁸ Valkenburg: Glasbergen & Groenman-van Waateringe 1974; Longthorpe, Newstead and Oberstimm: Bishop 1986; Lincoln: Darling 1998; Newstead: Clarke & Jones 1994; Usk: Greene 1984; Schönberger 1978; Stutheien: Roth-Rubi 1986; Windisch: Holliger & Holliger 1985 and 1986.

¹⁹⁹ South 1977; Lewis 1977; Feister 1984.

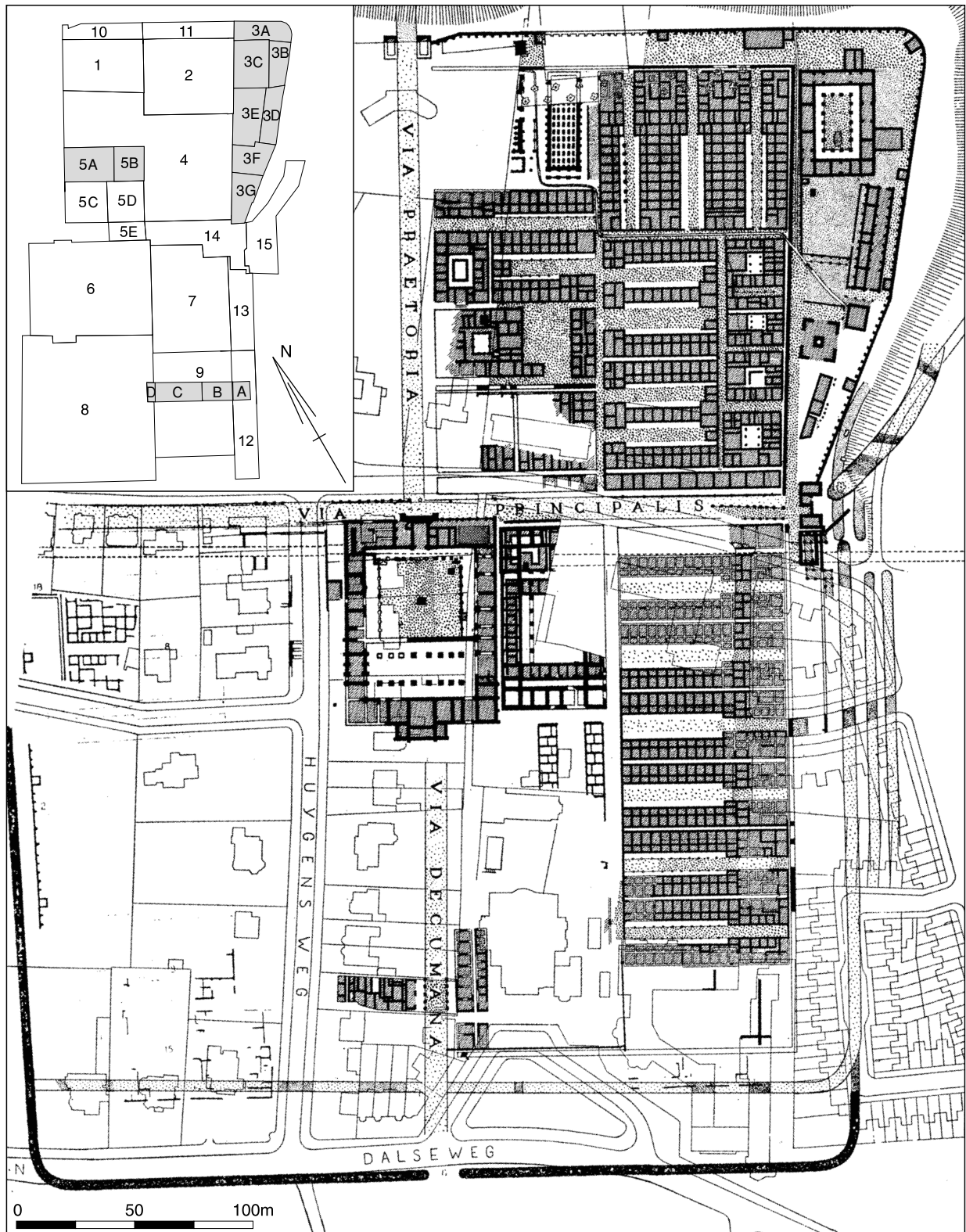


Figure 4.2 Nijmegen. The legionary fortress: stone phase.²⁰⁰ The division into different socio-economic and functional areas and the location of the three selected areas (nos. 3, 5 and 9) analysed in the pilot study. Scale 1:2,500.

Legend: 1. black: rectangular foundation trenches of buildings belonging to the stone phase and contemporary ditch (curved); 2. shaded: open space; 3. open (partially shaded) double line: ditch contemporary with wooden phase.

(Sub-)areas: 1. warehouses (*horrea*); 2. soldiers' barracks for *centuriae*; 3. workshops, water supply and adjoining *intervallum*; 4. barracks for the First Cohort; 5. housing for senior officers (*tribuni militum*); 6. headquarters (*principia*); 7. soldiers' barracks for *centuriae*; 8. unknown function; 9. barrack(s) for a *centuria* (cohort) and adjoining *intervallum*; 10-13. *intervallum*; 14. *via principalis* and gate (*porta principalis dextra*); 15. ditch.

²⁰⁰ To illustrate the analysis of Chapter 4 the map of the legionary fortress in its stone phase has been used, since the differences in layout with the preceding timber phase are limited (see Driessen 2007, 109-110 and Fig. 45).

our detailed knowledge of the most common types of finds. The settlement features consist of the legionary fortress, the surrounding extra-mural settlement, the cemeteries and the rubbish dumps. The legionary fortress and its occupants can be considered a reflection of Roman society at the end of the first century AD, albeit on a reduced scale, in the context of military organization, and therefore with the emphasis on the male component (Fig. 4.2). The layout of the fortress was determined by functional and social aspects. The infrastructure serves the housing and support of an army unit of about 5,000 men with a wide range of requirements, tasks and specialisms. The general social branches and military hierarchy also found their expression in the division of space. Approximately 75% of the eastern part of the fortress was excavated, i.e. c. 35% of the total surface area of 15-16.5 hectares. In combination with our general knowledge of Roman army organization this is a good basis for formulating a number of hypotheses for analysis. The existence of the extra-mural settlement is closely connected with that of the fortress, but it has a much more irregular structure and knowledge of this type of settlement is far more limited because it received less attention during the investigation. It is usually assumed to have had a trading, craft and recreational function for the fortress. Since 1972, large sections of the extra-mural settlement Nijmegen have been excavated, and eventually this settlement feature may play an interesting part in the analysis.²⁰¹ For the time being, however, it will be left aside, as will the large rubbish dump between the fortress and the extra-mural settlement in the northeast. This dump offers the opportunity to gain insight in the way in which rubbish was dealt with. The position of the cemeteries has been determined fairly accurately but up to now not one site excavation has been done. This is regrettable since it prevents a comparison being made between the culture of the living and the dead. Earlier research in connection with the military occupation of Nijmegen resulted in a singular knowledge of the typochronology of the most common groups of finds, in particular pottery. The pottery analyses of Holwerda (Belgic and Holdeurn Ware), Brunsting and Stuart (the so-called coarse ware) provide an excellent instrument for accurately describing the large

quantity of pottery from the excavations as to form and date.²⁰² In addition, knowledge of terra sigillata, coins, glass and bronze ware/ vessels is available in a more or less specific form thanks to years of research. This means that the analysis of a great many finds can concentrate on the socio-economic information instead of the typochronological information.

Finally, it is of the utmost importance that, according to the present view, the active military occupation was limited to a relatively short and sharply defined timespan of no more than 50-60 years between about AD 70 and 120-130. Roughly speaking, two periods of settlement can be distinguished in the fortress and the extra-mural settlement at that time in the form of wooden buildings and defences which were replaced by stone structures.²⁰³

4.1.2 Aim and starting-points

The aim of the study described here is to determine the feasibility of the approach outlined above, which focuses on the spatial and socio-economic aspects of the entire Roman military occupation of Nijmegen in the period AD 70 to 120-130. In short, it concerns a pilot study to find the key to the final analysis and presentation. Three sub-regions of the legionary fortress were taken as a first experiment. In this way, we can gain insight in the kind of questions that may arise and the type of information provided by the answer to these questions. In the second place, the method of working and its results can be determined. Finally, a decision will have to be made on the basis of this experiment whether the approach is useful and feasible. The nature of the experiment implies that the approach and the method are, in a certain sense, more important than the present archaeological results, but also that the development and working out of both are unfinished and incomplete at this stage of the investigation. The basic assumption is that archaeological features and material remains reflect human behaviour of the past in a meaningful way. This reflection, nevertheless, has been distorted by cultural and natural transformation processes. In the case of the legionary fortress, we should first be aware of the fact that the fortress underwent a conversion from wood to stone, and was finally abandoned in a regular way; as to the manner of dismantlement, nothing

²⁰¹ Driessen 2007, 128-142; Willems & Van Enckevort 2009, 59-64. For the western canabae legionis see also Kloosterman, Polak & Zandstra 2014; here the authors present a different approach to the analysis of the huge amount of data by applying correspondence analysis to establish a (typo-)chronological differentiation of the ceramics within the timespan of AD 70 to 120-130.

²⁰² Brunsting 1974; Holwerda 1941 and 1944; Stuart 1977a and b.

²⁰³ Bloemers, Greving & Zoetbrood 1979, 38-56.

is known at present. There is certainly no question of any Pompeii-like situation in which we find life petrified as it was at the moment the settlement was abandoned. Second, it is obvious that the extremely concentrated buildings and settlement meant that, from a functional and hygienic point of view, waste disposal had to meet special requirements; much of the refuse would have been removed from the fortress. Finally, there are two post-depositional processes which have resulted in much loss of information. In the Late Middle Ages and perhaps also already during the late Roman period, the remains of tuff stone walls were almost entirely broken away and used for mortar. It is from this period that the first Roman finds date, and also the first scientific interest in the Romans. The second and much more systematically performed process of destruction was archaeological investigation. In particular, the removal by machines of the so-called disturbed topsoil caused the loss of many finds which, it is true, were not usually in their original positions but may well have been approximately so. Agricultural use of the area in the period between these two great post-depositional processes of destruction would only have caused relatively slight damage.

If we take these transformation processes into account, we may assume that the fortress reflects the social, functional and economic-logistic structure of Roman army organization at the legionary level. This legionary level implies that organization was not a purely local task, but that it also played a part in the northwest sector of the Rhine border. Moreover, an essential aspect is that this organization could hardly have been self-sufficient as far as production and reproduction were concerned, but that it was embedded in the socio-economic system of the empire; in other words, the treasury was the main, if not sole economic basis. Social organization was very differentiated and a blend of civilian and military hierarchy. For the higher-ranking officers from the classes of senators or *equites*, the military position was often one stage in their careers, with civilian offices as another important part; the lower military ranks were occupied by professional soldiers. Military hierarchy can be summarized for our purpose in the ranks of commander, staff officers, officers, men and specialists. The functions of the fortress comprise

- the role as military centre for attack and defence in Nijmegen itself, but also for the coordination of attack and defence in the downstream area of the Rhine zone,
- the aspect of feeding and housing the garrison and
- care for the economic-logistic structure in the form of supply and treatment of raw materials for housing, food, equipment, transport etc.

These social, functional and economic-logistic aspects can all be found, to a certain extent, in the division of space and the use of the material culture. The division between defences, craft and housing facilities with their variation in surface area in accordance with rank, facilities for food storage and preparation, drinking water, hygiene in the form of buildings and inventory are the subjects of this investigation.

The objective of this pilot study - to determine the feasibility of a spatial and socio-economically oriented analysis - which is, for the time being, limited - naturally conceals a more fundamental problem: which of the questions about aspects outlined above will actually be answered by means of archaeological investigation in Nijmegen?

4.1.3 The choice of three sub-areas

In the eastern section of the legionary fortress three sub-areas were chosen from a provisional series of 14; they are numbers 3, 5 and 9 (Fig. 4.2). Area 3 is situated in the northeast of the fortress, has a surface area of 9,022 m², and probably served to meet general needs in the form of crafts and a central water supply; the outer side borders the northeast defence zone of the fortress. It was completely excavated in the first years of the investigation between 1959 and 1961, a period in which excavation was done mainly by hand. Area 5 lies in the centre of the camp and comprises four houses for high-ranking officers, probably with a living and working function for a comparatively small group of high-ranking persons together with their staff. The excavated surface area is 2,477 m², but only the northeast section of the area with a surface area of 2,084 m² was completely excavated. The excavation was carried out in various stages between 1962 and 1965 by hand and by machine. Area 9 is situated in the southeast of the fortress and has an excavated surface area of 1,533 m², in which a barracks for a

centuria and adjoining *intervallum* and road were uncovered. Living and working accommodation for about 80 soldiers and their officers must have been located here. A section was excavated in 1962 and again in 1974, and another section was investigated in 1974 and 1977.

The three areas are representative of various aspects which are of importance to the analysis. They are spread over the fortress producing different situations with regard to the intensity of occupation and nature of preservation. The socio-economic status and function is represented by staff officers, officers, infantrymen and craftsmen distributed over a space in which they lived and worked and where central facilities such as the water supply were to be found. Finally, the different excavation techniques which were used in the course of time are explained. Area 3 was one of the first areas to be excavated. The results may have been influenced on the one hand by unfamiliarity with the expected phenomena, or on the other hand by the fact that the excavation was mainly carried out by hand. By the start of the excavation of area 5, there was a good idea of the nature of settlement, but here the presence of modern buildings and parcelling made it difficult to achieve a complete and more or less simultaneous survey of the features. The same applied to excavations in area 9 in 1964, but a coherent picture was achieved in 1974 and 1977. This was the first time that more or less systematic use had been made of a metal detector and sieving and flotation techniques in search of special categories of finds.

The choice of these three areas means that a number of others which might throw more light on the matter in question have temporarily been left aside. For example, the differences in rank between the cohorts (e.g. areas 2 and 4), area 1 with its specific storage function in the form of *horrea*, the *principia* with its administrative centre in area 6 and the possible refuse dump outside the fortress along the southeast slope of the Beekmansdal.

4.1.4 The choice of analysed features and finds and the method of analysis

The choice of archaeological features

The features were analysed per area; wherever it proved necessary, the areas were subdivided into sub-areas. This was done when smaller functional units could thus be formed or when the variation in surface area of the areas could be given less extreme values. In most cases the sub-area was the most important unit for a first analysis. A division into periods was done on the basis of the division between wooden and stone buildings, for which there is generally one phase each; only very exceptionally are two phases found for each type of building. The division into sub-areas was generally applied to the wooden building phase as well as to the stone building phase, since there is great similarity between both periods with regard to the division of space. Incidentally, and particularly in area 3, occupation layers were useful for periodizing the features. Some of the pits can be placed in relative succession on the basis of cuts by building features.

The sub-areas are spread over the built and unbuilt space. Buildings were only analysed superficially. No more attention than absolutely necessary was paid to layout, function and periodization. Wherever possible, the position of rooms, galleries or inner courts and main entrances was determined. Variables in the analysis are the construction in wood or stone, the overall shape, the surface area of the building as a whole and obvious details such as interior plan, floors, entrances, basins and heating systems. Roads were also included in the open spaces outside buildings; variables used were surface area, shape and possible paving. In addition to the built and unbuilt space, special attention was focused on the pits. It is, after all, from these that most of the finds come, and insight in the significance of the pits is of course essential to finds analysis. All the pits, even those without any finds, were analysed, with the exception of true postholes belonging to buildings, fences and the like. In general, pools and deepened spaces of a hypocaust were counted as pits; ditches and gutters were not included. A total of 588 pits were found in all areas. The variables of the pits are numbers and measurements expressed in surface area and if possible in volume. It was

decided not to make a distinction between pits inside or outside buildings at this stage. In principle, attention was only paid to difference in function, form and fill during the preliminary analysis; it has not yet yielded any useful information in further analysis. Nevertheless, some pits stand out as a result of their extremely clean fill, large quantities of charcoal or roof-tiling material, or greater depth or content. This information has been mentioned whenever relevant.

The choice of finds

Only the finds from pits as described above have been analysed. The consideration is that most of the finds collected came from pits and that these have a reliable location and association. Pit contents were primarily analysed per individual pit (see Section 4.4.1), then per area and if necessary per sub-area and per period. The idea behind this was that the number of finds per pit was too small to produce reliable results, certainly if they were divided into categories. Greene came to the same conclusion when analysing the pit complexes of the legionary fortress at Usk.²⁰⁴ It can only be done in the case of very large complexes. No distinction was made between complexes situated inside or outside buildings.

Only the handmade and wheelthrown Roman pottery was included in the finds analysis; waste products, crucibles and fragments of millstones were only included ad hoc with the help of the preliminary inventory lists. Pottery is by far the largest group and here too the main problem is the method of analysis, objective and representativeness. The following were not included: coins, glass, metal, building materials, roof tile stamps, graffiti and bone material. Of the groups analysed, quantity, type or form, function, make, size, wear features and date were registered according to current typochronology. In the case of pottery, a preliminary conclusion was drawn on the grounds of generally accepted views, about the place of production in terms of local, regional and supra-regional origin without any kind of origin analysis being done. No attention was paid to aspects of distribution of finds which fitted each other or belonged together and the degree of fragmentation and weathering as a symptom of formation processes, the investigation of possible food remains on

pottery or the refinement of the current typochronology.

The method of analysis used for features and their relation to the finds

Within the scope of the pilot study, the most important unit for the analysis of features and finds is the sub-area or area, if the latter is not too large. The analysis of most of the data was limited to simple forms of quantification; whenever it was considered useful, incidental attention was paid to the qualitative aspects. Ratios were estimated whenever possible to facilitate comparison of data, and then mostly with regard to the surface area of the sub-areas. The chronostratigraphical difference between wood construction and stone construction was only used when the amount of data used remained large enough to be useful. The following positions or combinations of positions are chronostratigraphically possible: under (UFW), contemporaneous with (FW) and through or over (TFW) the Flavian wooden buildings, under (UFS), contemporaneous with (FS) and through or over the Flavian stone buildings (TFS). The features and finds were processed and described in two separate procedures (Section 4.2-4). The categories of data were subsequently linked up and analysed from a spatial and socio-economically oriented perspective (Section 4.5). The results were then considered in the light of the aims of the pilot study, which were to determine the practicability of this type of analysis (Section 4.6).

Methods of analysis for the contents of the pits

The methods of analysis used for the contents of the pits can be distinguished into methods connected with typochronology and chronostratigraphy, quality and quantity. The results of the analyses were finally recorded in such a way that the data could be processed by computer.

Typochronology and chronostratigraphy

Only limited use was made of typochronological and chronostratigraphical analysis. A number of pits had already been excluded on chronostratigraphical and typochronological grounds since a preliminary inventory had shown that they belonged to the pre-Flavian occupation of the site.²⁰⁵ In addition, a number

²⁰⁴ Greene 1984, 408-409.

²⁰⁵ This preliminary inventory was carried out by J.H.F. Bloemers, W.J.H. Willems and P.A.M. Zoetbrood in 1986-1987.

Table 4.1 Nijmegen. Ceramic groups (bold) and categories.

Terra Sigillata (TS)	Fine Wares (FW)	Gallo-Belgic Wares (GBW)
Arretine	Augustan	Terra rubra
South Gaulish (SG)	Fine Nijmegen Ware (FNW)	Terra nigra (GBWTNI)
Central/East Gaulish (C/EG)	White (egg-shell)	Cork urn (GBWCOR)
Argonne		Other Fabrics
Coated Wares (CTD)	Smooth Wares (SMO)	Thick-Walled Pottery (TWP)
Technique A (CTDTEC)	Jugs (SMOFLA)	Mortaria (TWPMOR)
Technique B (CTDTEC)	Two handled flagons (SMOTHJ)	Dolia (TWPDOL)
Technique C (CTDTEC)	Other Forms (SMOOTH)	Amphorae (TWPAMP)
Technique D (CTDTEC)		
Technique EF (CTDTEC)		
Pompeian Red (CTDPOM)		
Mica Dusted (CTDMIC)		
Glazed		
Coarse Wares (CRS)		Native Pottery (NAT)
Other Fabrics (CRSOTH)		Softly fired
Nijmegen Coarse (CRSNW)		Other Fabrics
Mayen		

of types and forms were removed from the database at a later stage for typo-chronological reasons because they were considered to be the evidence of earlier activities on the site of the castra. Neither method of analysis was used since it could be assumed that the Flavian and pre-Flavian settlement and use of the site had only lasted for about fifty years - and only thirty-five years on an intensive scale. It did not then appear relevant to this investigation to subdivide this period any further, partly because of the fact that a typo-chronological refinement, on the basis of the few fragments of easily datable terra sigillata, would prove difficult, if not impossible.

Qualitative analysis

The first qualitative analysis of the contents of the pits was done by means of a classification of the mobilia into material groups and categories. A similar though overall classification had already been made on the basis of a system designed by the State Service for Archaeological Investigations (ROB) for the computer processing of the Nijmegen finds.²⁰⁶

In the classification a distinction was made between eighteen material groups varying from pottery to organic material. However, since it was decided at a later stage in the investigation to restrict further analysis to the pottery found in the pits, we shall suffice with a list of the groups concerned, namely: Terra Sigillata, Fine Wares, Gallo-Belgic Wares, (Colour-)Coated Wares, Smooth Wares, Thick-Walled Pottery, Coarse Wares and Native Pottery (Table 4.1).²⁰⁷

The material groups were subsequently more closely specified into categories.²⁰⁸ These categories are of a different nature, mainly because of our inadequate knowledge of certain groups. In the case of Terra Sigillata, for example, the origin (and because of our familiarity with it an implicit rough date) is indicated, whereas this is not possible with other groups such as the Gallo-Belgic, Coarse and Smooth Wares. Another example is when the category already contains a clear indication of the function, as in the case of Thick-Walled Pottery. This group is divided into the categories *mortaria*, *dolia* and *amphorae*.

²⁰⁶ The system was designed and adapted to process the analyses by P.A.M. Zoetbrood. In the course of this research it was again adapted as described in this Section and applied in Section 4.4 by R.M. van Dierendonck.

²⁰⁷ Within the context of this qualitative analysis the listed ceramic groups referred to are written in capitals for the sake of textual clarity.

²⁰⁸ The techniques mentioned in Table 4.1 under Coated Wares are based on Stuart's description of these techniques: Stuart 1977b, 20.

- ²⁰⁹ Holwerda 1944, 5-7.
- ²¹⁰ Haalebos & Thijssen 1977, 107-108. Recently pottery kilns were found at the town of Ulpia Noviomagus in which similar pottery was produced. The kilns, however, date from after the middle of the second century AD, and the types found here are seldom found in military potteries: Haalebos 1990, 163.
- ²¹¹ A kiln was recently found in the western canabae in which reduced coarse pottery among other things was produced: Bogaers & Haalebos 1988, 34-37.
- ²¹² The Thick-Walled amphorae were identified by J.H. Van der Werff.
- ²¹³ The abbreviation used for the various types is given in brackets: Dragendorff 1895 (DRAG); Dressel 1878 (DRES); Déchelette 1904 (DECH); Knorr 1907 (KNORR); Loeschke 1909 (HA); Ritterling 1912 (HOFH); Oelmann 1914 (NB); Albrecht 1938 (OB); Holwerda 1941 (HBW); Holwerda 1944 (HNW); Pélichet 1946 (PEL); Hawkes & Hull 1947 (CAM); Stuart 1977b (ST); Van der Werff 1984; Peacock & Williams 1986.
- ²¹⁴ Hulst 1981, 355-363; Willems 1986, 178-179; Van den Broeke 1987a, 27-36 and 40-41; Van den Broeke 1987b, 111-112. Recent research into handmade pottery from the pre-Flavian Nijmegen Hunerberg and Kops Plateau areas yielded much more insight into this pottery group, its functions in early Roman military sites and its various origins: Stoffels 2006 and 2009; Van den Broeke 2014.
- ²¹⁵ Hilgers considers this flagon to be one of the forms referred to by the Latin name of *lagoena*: Hilgers 1969, 61-65 and 203-205. The place where a flagon was used and therefore also its function are partly determined by the contents. If the flagon contained water or wine it is more likely to be included among tableware, whereas if it contained oil it would be considered kitchenware. In addition, a distinction should perhaps be made between large and small flagons, as large flagons were possibly used more frequently in the kitchen.
- ²¹⁶ Hilgers 1969; Von Petrikovits 1972; Baatz 1977; Furger 1985; Gerlach 1986; Vanderhoeven 1989. The function of a particular form cannot always be identified conclusively. Furger, for example, sees a serving function in the form DRAG 37; Furger 1985, 172. Von Petrikovits classifies this form and the related form DRAG 29 as drinking vessels: Von Petrikovits 1972, 123; Hilgers gives preference to an eating function on the basis of the graffiti found on the form: Hilgers 1969, 237-238.

Some of the coarse pottery deserves special attention. The pottery of this category which was fired in an oxidizing atmosphere and which is mostly reddish-orange in colour is considered, on the basis of these features, to originate mainly from the military pottery on the Holdeurn near Berg en Dal, although this has not yet been confirmed by ceramological research.²⁰⁹ It could also have been produced in potteries in the immediate surroundings of the legionary camp.²¹⁰ We may assume that this category of Coarse Ware and the Fine Nijmegen Ware comes from the local legionary potteries. As to the assumed military provenance a distinction is made between the other Coarse Wares and the Nijmegen Coarse Ware. However, this does not mean that the other, mainly reduced Coarse Wares may not be of local origin, as one might expect from the large quantities found.²¹¹

A third variable in the qualitative analysis is identification according to form and type.²¹² This was done on the basis of the literature consulted, which was usual in the case of Nijmegen finds.²¹³ However, in the case of identification by form, the date sometimes inherent in the type was not always taken into account. Thus the Hofheim type 50 and 51 flagons were combined and together with related forms classified as type HOFH 50/51. Only in the material group of probably locally or regionally produced handmade so-called Native Pottery was no further determination done because our knowledge of this group at that time was still too limited and there was no sound system.²¹⁴

A fourth method of analysis regarding quality is research into and determination of the function of pottery forms. The aim of this research is eventually to gain insight in the spatial distribution of functions, so that activities connected with certain functions can be localized. It is still difficult to find an answer to the question of what specific purposes a certain type or form was used for, because our knowledge of functional analysis, even that of Roman pottery, is still very limited. Despite these restrictions an attempt was made to determine the function of each form. Even though the functions were sometimes contained in the categories, forms and names, the function was still separately mentioned in each determination. In doing so, the primary function

was taken, and any secondary function observed was recorded.

In order to determine the functions, an inventory was first made of the pottery functions expected. This provided a division of the functions into five main groups, namely: tableware, kitchenware, storage/transport, lighting and craft. Two groups were added for the remainder, diverse and unknown (Table 4.2). The groups table- and kitchenware, storage/transport and diverse were further subdivided into specific functions. Where there was more than one possibility, choices could not be avoided and the specific function was classified in the main group in which it might most be expected. For example, a single-handled flagon, which is a multifunctional form which can be used at table and in the kitchen was included in tableware because it would probably have been used most as such.²¹⁵ Subsequently the most common pottery types in Nijmegen were given a function in advance on consultation of the literature available.²¹⁶ If this proved impossible, the most likely function on the basis of form characteristics was given. For example, a form with a broad projecting rim or lip is not suitable for drinking from.

To support the identification of functions, an inventory was made for each specimen if possible, of features which could provide a clue to its use. At the same time the workability and possibilities of this analysis of wear features were tested. Since there was no time for microscopic and other detailed investigation, it focused only on features which were visible to the naked eye, and was for the time being confined to a simple analysis. The relation between the hardness of the material and visibility of the features, whereby features are often not visible to the eye on hard types of material but are clearly so and frequently present on softer material, was not seen as a drawback for the above reasons.

Traces made during the manufacturing process were disregarded. Intentional traces caused by scratches or butts, in the form of graffiti were not considered to be traces of use.

In the description of the traces of use, location, sort and intensity of the traces were indicated by means of a numeric code (Table 4.3).

Several remarks must be made about this description:

- for the sake of convenience and clarity a

Table 4.2 Nijmegen. Code for vessel functions.

1. Table vessels	2. Kitchen vessels	3. Storage/transport vessels
1.1 drinking vessels	2.1 cooking vessels	3.1 household/intra site; storage/transport vessels
1.2 eating vessels	2.2 baking/frying vessels	3.2 long distance transport vessels
1.3 serving vessels	2.3 mixing vessels	
1.4 pouring vessels	2.4 other functions	
1.5 other functions	2.5 unknown function	
1.6 unknown function		
4. Illumination vessels	5. Industrial vessels	6. Various functions
	5.1 melting pot	6.1 cult vessels
		6.2 toilet vessels
		6.3 writing vessels
		6.4 other
7. Unknown functions		

Table 4.3 Nijmegen. Code for wear traces on vessels.

Location 1	Location 2	Sort of traces	Intensity
0 no location 1	0 no location 2	1 scratches	1 no intensity
1 rim	1 inside	2 butts	2 light intensity
2 wall	2 outside	3 wear	3 medium intensity
3 lip	3 both in- and outside	4 burn traces	4 strong intensity
4 base		5 reparation	5 unknown intensity
5 footring		6 encrusted material	
6 flange		7 deposited material	
7 other		8 other	
8 unknown		9 unknown	

distinction was made in determining the location of the traces between the form elements of a vessel and the more general determinations inside and outside. By combining these two locations a clear location becomes possible;

- a distinction was made among the sorts of traces between encrusted material and a deposit, based on the degree of penetration in the sherd. Caked or encrusted material is found on the surface of the sherd, whereas a deposit has partly penetrated the sherd;
- the intensity of traces, determined by the eye and therefore a rather subjective qualification, comprises a combination of the size of the

area occupied by the traces, the depth or size of the traces themselves and their number and density.

As a guideline to the differences in intensity, 25% was considered low intensity, up to 50% medium, and more than 50% high intensity. A fifth form of qualitative analysis is that concerning the value of a vessel. Little or no attention was paid to this in the investigation, mainly because an analysis of this kind has not yet been systematically done anywhere and therefore we have little knowledge of this field. It is, however, important that attention is paid to this aspect in the future since it provides a good instrument for determining differences

in, for example, the level of wealth and status. Although not investigated and described as such, differences in value seen in the effort made in the decoration and the distance between area of production and place of use were taken into account in further analysis. A sixth method of qualitative analysis concerns the fragmentation of a vessel, although here there is an overlap with quantitative analysis. The number of rim, wall and base fragments of each vessel was recorded, but no further analysis of these data has been done.

Quantitative analysis

This method of analysis in particular is of the greatest importance to this type of investigation. All previous analyses were finally rounded off with the determination of the number of specimens present per material group, category, type or form, giving numerical insight in the proportions per established unit. At first, the individual pit was taken as the starting-point for the quantitative analysis of the finds, despite Greene's data.²¹⁷ The finds were inventoried per pit because this was their most direct finds context, bearing in mind the fact that further investigation would be done at the level of the individual pit, so that all the data required would be available. Starting from the pit as a closed finds complex, it was decided that each fragment or group of fragments which was unique on the basis of material and form characteristics within this context represented one specimen. In this way the number of vessels represented in the pit was then established. This approach was adjusted for various reasons at a later stage in the investigation.²¹⁸

4.2 DESCRIPTION OF THE BUILDING FEATURES

The best overview of the building features of the timber and stone phases of the legionary fortress is presented by Driessen.²¹⁹

4.2.1 Area 3

General characteristics

Area 3 comprises the section in the northeast corner of the camp between the actual living area in the *praetentura dextra* and the fortress wall. The surface area excavated was c. 9,022 m²,

which was the whole of the Roman settlement there plus a zone of 5 to 8.75 m outside the stone wall of the fortress. The latter was done because a detailed analysis of the course of the fortress wall in the pre-Flavian and Flavian periods still has to be undertaken. It is, however, quite possible that the fortress wall had more or less the same position in the timber building phase as well as in the stone building phase. Because of the extremely large surface area and the various functions of the site, area 3 has been divided into seven sub-areas, varying in size from 1,050 to 1,535 m².

The area played a part in the defence of the northeast corner of the fortress, in its water supply, very probably in craft activities and perhaps to a lesser degree in housing connected with these activities. In the overall division of space there is considerable conformity between the timber and stone building phases. Roman features from the pre-Flavian period are virtually all confined to the defence zone of the rampart and ditches. There is, however, a series of burial mounds from the Late Neolithic and Early Iron Age in the area.²²⁰

It was in this part of the legionary fortress that the first excavations were carried out under the direction of H. Brunsting and R. Woudstra. Area 3 was excavated between 1959 and 1961. It was a large open site which could be excavated comparatively peacefully, and in which large sections were suitable for detailed analysis of culture levels, stratigraphy and unusual features. There were few deep disturbances of the soil, with the exception of the robber trenches around the Roman stone foundations. The state of the features and culture levels was better here than anywhere else on the Hunerberg. A great deal of manpower was used for the excavations although occasionally machines were put into action for the heavy groundwork. For a field technician like Woudstra, with his great experience and interest in Roman military sites, acquired during the excavations in the fort of Valkenburg under the direction of Van Giffen, the excavation of the legionary fortress was right up his street. His attention was focused mainly on the features; finds were of secondary importance if they could not be used to date the features. This is why many wall (and base?) sherds of pottery, roof tile fragments and stone material were not kept during the excavation. The quantities

²¹⁷ Greene 1984, 408-409.

²¹⁸ See Analysis of the finds in Section 4.4.2.

²¹⁹ Driessen 2007, 231-243 (Bijlage 3.1: timber phase) and 245-269 (Bijlage 3.2: stone phase).

²²⁰ Brunsting 1961, 55-67; Louwe Kooijmans 1973.

Table 4.4 Nijmegen. Sub-area 3A: dimensions of units of building features.

Sub-area	Description	Surface area (m ²)	Surface area built (m ²)
3A.1	outside fortress wall	316	-
3A.2	fortress wall of stone building phase and intervallum	454	-
3A.3	(un)built space	509	-
	built: timber building phase	-	153
	built: stone building phase	-	82

Table 4.5 Nijmegen. Sub-area 3B: dimensions of units of building features.

Sub-area	Description	Surface area (m ²)	Surface area built (m ²)
3B.1	outside fortress wall	256	-
3B.2	fortress wall of stone building phase	237	-
3B.3	(un)built space	560	-
	built: timber building phase with adjoining enclosed area	-	178
	built: stone building phase	-	244
		-	111

were indeed large. Much was thrown away after being examined, washed or not, for graffiti, stamping or manufacturing traces. At that time, no sieving samples were taken.

Sub-area 3A

Sub-area 3A is on the northeast side of area 3 and is demarcated by the fortress wall and the buildings in sub-area 3C. It is about 62.5 x 22.5 m and has a surface area of c. 1,279 m²; outside the fortress wall a strip 5 m wide and with a surface area of 316 m² was excavated (3A.1). The sub-area can be divided into the following units as listed in Table 4.4.

The features consist of c. 117 pits, the stone fortress wall with buttresses and a corner tower, two wooden towers probably belonging to the Augustan fortress and/or the timber building phase²²¹, an elongated wooden building with a surface area of 153 m² and a stone construction on top of it with a surface area of 82 m² belonging to the stone buildings in sub-area 3A. The empty zone behind the intervallum was 356 m² in the timber building phase and 427 m² in the stone building phase. No Roman culture levels have been preserved; the chronostratigraphy was determined by the intersection of the timber and stone building phases.

Sub-area 3B

Sub-area 3B is the counterpart to sub-area 3A in the northeast corner of area 3. Again, the demarcation is indicated by the buildings in sub-area 3C, but now the large excavated zone between the stone fortress wall and the Beekmansdal (width 5-6.25 m) is included in sub-area 3B. The sub-area is about 43.75 x 22.5-26 m and has a surface area of c. 1,053 m². It is subdivided as follows from Table 4.5.

The features consist of c. 40 pits, the stone fortress wall with buttresses and intervallum and a wooden and a stone building. The wooden building consists of a structure measuring 178 m² and an adjoining enclosed and vacant area of 244 m², together 422 m². This finds complex is cut by a stone structure (12 x 9.25 m; 111 m²) belonging to the stone building in sub-area 3C. It also includes a floor of tuffstone material, which virtually covers the wooden building. The unbuilt surface area was 138 m² in the timber phase and 449 m² in the stone building phase. Various culture levels can be observed from top to bottom: a demolition level of the stone building phase, a tuffstone and loam floor belonging to the stone building, a burnt layer from the timber building phase, a raising layer of clean sand belonging to the construction of the wooden building. The

²²¹ Driessen 2007, Fig. 10 nos. 19 and 25.

Table 4.6 Nijmegen. Sub-area 3C (timber building phase): dimensions of units of building features.

Unit	Length (m)	Width (m)	Surface area (m ²)	Surface area built (m ²)
North	31.60	13.75	434	294
Centre	32.00	7.5-12.5	332	275
South	30.75	14.25	438	119
Total	-	-	1,204	748

chronostratigraphy is based on the intersections of the timber and stone building phases and the culture levels mentioned.

Sub-area 3C

Sub-area 3C forms the core of the north-eastern part of area 3. The demarcation is indicated by the perimeter of the large stone building with an inner court which largely coincides with the perimeter of the wooden complex beneath it. On the northwest side there is a road, of which a 1.50 m wide strip has been included in the sub-area. Sub-area 3C measures 43.90 x 35 m and has a surface area of c. 1,536 m², and was mainly used for working purposes.

There are a small number of pits (27), some of which are connected with basins or a hypocaust. There are also several pre- or early Roman trenches. The orientation and layout of the timber building complex and that of the stone building differ considerably. A preliminary analysis of the timber building complex makes it clear that this consists of three adjoining units with a rectangular inner court and an entrance from the road on the northwest side. The dimensions of these units are presented in Table 4.6.

The outside measurement of the stone building on top of it is 44.5 x 32.5 m (1,446 m²) and consists of four wings grouped around an inner court with a gallery (31 x 19.25 m; 597 m²). The main entrance is probably on the south side of the longitudinal axis which is northeast-southwest oriented. On this axis there were probably two basins at the narrow ends of the inner court. It is possible that there was a hypocaust in the northeast corner of the building. The inner court was covered with gravel, and the adjoining galleries with loam. Von Petrikovits describes the stone building as a 'Magazin vom Hoftyp'.²²² A wooden, and later a stone drain or water pipe ran in or along the

road on the northwest side.

The culture levels consist, from top to bottom, of a demolition layer belonging to the stone building phase, a loam layer and gravel floor belonging to the stone building, a burnt layer over the timber building phase and a sand elevation which forms the surface of the wooden building. The chronostratigraphy is made up of the stone building phase, the timber building phase, a two-aisled wooden house and a large circular trench, both of undeterminable age for the time being.

Sub-area 3D

Sub-area 3D adjoins the eastern outer side of the fortification along Beekmansdal. The demarcation is indicated by the defence zone and the perimeter of the stone building in this sub-area. The dimensions are 52.5-55 x 24-26 m; the surface area of c. 1,348 m² also includes a section of the outer stone fortress wall 6.25-9 m wide. The sub-area can be subdivided into a number of units listed in Table 4.7.

There are a small number of pits and several ditches perhaps belonging to the wooden building phase in sub-area 3E. In the zone outside the fortress wall there was a wooden tower which probably belonged to the Augustan fort. The stone fortress wall in this section has a tower and buttresses which only leave a narrow space of 2.5-3 m over for the intervallum between the fortress wall and the contemporaneous stone building. The stone building is rectangular (48.5 x 12.25 m; surface area 594 m²) and is subdivided lengthwise into two wings with buttresses on the inside and outside. On the southeast side there was probably a gallery 2 m wide. The main entrance was probably in the middle of the northwest side; along the front of this side there was a second gallery (see sub-area 3E). Inside the building there was a layer of loam from a floor

²²² Von Petrikovits 1975, 84.

Table 4.7 Nijmegen. Sub-area 3D: dimensions of units of building features.

Sub-area	Description	Surface area (m ²)
3D.1	outside the stone fortress wall	443
3D.2	stone fortress wall with tower and intervallum	257
3D.3	open terrain in wooden building phase	648
	stone building on 3D.3 with	594
	open space	54

level. Von Petrikovits refers to this building as a 'Werkhalle' or *fabrica*.²²³

The main culture levels are, from top to bottom, the demolition/rubble layer and the loam layer of the stone building phase and a sand and gravel raised layer beneath; no burnt layer was found. This may well be linked with the absence of a wooden building phase.

Sub-area 3E

Sub-area 3E is in the middle of area 3 and is defined by means of the wooden building in the sub-area itself, the demarcation of the stone buildings in sub-areas 3C and 3D and the water supply in sub-area 3F. It is 49-51.25 x 28.75-31.75 m and has a surface area of c. 1,484 m².

There are 62 pits in this sub-area. There was a building complex here in the wooden building phase, and it was an open and largely surrounded space in the stone building phase; a gravel-covered road ran along the northwest side. The wooden building is rectangular in form (51.5 x 24-30.5 m; surface area 1,427 m²) and connects with the buildings in sub-area 3C. The longitudinal axis runs northeast-southwest and is determined by an inner court with a gallery (31.75 x 10-14.25 m; surface area 412 m²) and a 3 m-wide entrance from the southwest. The wings round the inner court are 7.5 m wide on three sides and 10-10.75 m wide on the southwest side; the total built-up surface is 1,015 m². In the northwest corner of the west wing there was possibly a large basin.

During the stone building period there was a walled open space 3E.2 (31.75-34.5 x 20.75-26 m; surface area 776 m²) paved with gravel in the northern part in front of the building in sub-area 3C, with a basin and a towerlike foundation in the northeast corner. The entrance to this walled space was in the southwest and was marked by a gallery on the side of an open terrain 3E.5. This court connected with the large water reservoir

and wellhouse (sub-area 3F) and had a surface area of 864 m² (27 x 32 m) including part of sub-area 3F. The east side of both courts (3F.2 and 5) was bordered by the gallery of the stone building in sub-area 3D. In the wooden and stone building phases water pipes c.q. gutters ran from the water reservoir in sub-area 3F across the court 3E.5 to and into the road in the northwest.

Recognizable culture levels are, from top to bottom, the debris layer and the occupation layer in the form of a tuff and gravel layer from the stone building phase, a burnt layer over the wooden building phase, a dirty brown raised layer which was the building level of the wooden building phase and a pale grey raised layer belonging to two-aisled houses under the wooden building phase.

The chronostratigraphy consists of the stone building phase, the wooden building phase, the two-aisled houses and the pre- or early Roman circular ditch which we saw in sub-area 3C.

Sub-area 3F

Sub-area 3F is in the south part of area 3 and is bordered by the fortress wall and the buildings in the northeast, northwest and southwest. The surface area is c. 1,298 m² (25.75-50 x 30.5 m) including a zone 4-6.25 m outside the fortress wall. In this sub-area we find defences, a central water supply and a road alongside the barracks, with the following surface areas as shown in Table 4.8.

The features include burials from the Neolithic and Iron Age²²⁴, 24 pits from the pre-Roman and Roman periods, the fortress wall with buttresses and the intervallum 3.5 m wide on the inner side from the stone building phase, and the buildings in wood and stone.

In the wooden building phase there was a building or a structure 10 x at least 15 m (surface area at least 150 m²). Parallel to the

²²³ Von Petrikovits 1975, 90 Bild 23.3.

²²⁴ Brunsting 1960, 23 and 1961, 66-67; Louwe Kooijmans 1973.

Table 4.8 Nijmegen. Sub-area 3F: dimensions of units of building features.

Sub-area	Description	Surface area (m ²)
3F.1	outside fortress wall	79
3F.2	fortress wall with buttresses and intervallum	132
3F.3	water supply with open space	981
3F.4	road alongside barracks	106

Table 4.9 Nijmegen. Sub-area 3G: dimensions of units of building features.

Sub-area	Description	Surface area (m ²)
3G.1	outside fortress wall	119
3G.2	fortress wall with buttresses, towers and intervallum	170
3G.3	open space	579
	built up space in stone building phase	114
3G.4	road	156

fortress wall there is a rectangular single-aisled wooden building (at least 20 x 5 m; surface area at least 100 m²), whose connection to the previously-mentioned structure is unknown. It is impossible to be any more specific because of the disturbances caused by stone building. Shape and orientation show some similarity to the stone building in sub-area 3G. A water reservoir (10.25 x 9-9.5 m; surface area 94 m²) was built over the first-mentioned wooden structure, and this must have held 65,600 l. of water per metre in height.²²⁵ Next to it is a square wellhouse (16.25 x 16.25 m; surface area 264 m²), which covered a large well with tuffstone walls and an inside diameter of 2.5 m. It is probable that the first construction of the well took place in the wooden building phase. Waterpipes or gutters run from the stone water reservoir and the wooden structure underneath to the road alongside the barracks. On the southwest side of the complex this road has a paved section 5.75-6.25 m wide including the stone gutter or pipe. The greatest width between the corner of the stone wellhouse and the stone barracks is 5 m.

There are three recognizable culture levels: these are, from top to bottom, the gravel layer of the road, a burnt layer on the west side of the stone wellhouse and a layer of yellow sand on either side of the wellhouse, possibly originating from the well shaft.

The chronostratigraphy is composed of the

stone building phase, the wooden building phase, the Iron Age cemetery and the Neolithic burial mounds.

Sub-area 3G

Sub-area 3G is the southernmost part of area 3 and lies close to the *porta principalis dextra*. It is bordered by the fortress wall of the stone building phase and the buildings in sub-area 3F and outside on the northwest side. It has a surface area of c. 1,024 m² and measures 37.5-38.25 x 20.75-35.75 m including an excavated section of 4.25 m at the most, outside the fortress wall. The features comprise the defence zone, the built up and open space inside and the road alongside the barracks on the northwest side. The surface areas are shown in Table 4.9.

The Iron Age burials extend into this sub-area. The number of pits from the pre-Roman and Roman periods is ten. The fortress wall from the stone building phase has buttresses and a tower on the inner side; a wooden tower may well be attributed to the wooden building phase. In addition, there are elements from the defences of the Augustan fortification present in the form of a ditch and a rampart with tower. Sub-area 3G was completely unbuilt in the wooden building phase. In the stone building phase there was a narrow building of unusual shape and layout (26.5-28.25 x 4-4.25 m; surface area 114 m²). Shape and dimensions recall the single-aisled plan in wood parallel to the fortress wall in

²²⁵ Von Petrikovits 1975, 105-106 Bild 29.3.

sub-area 3F. The function of both buildings is obscure, but there may be a link with the proximity of the gate and the well, perhaps for watering horses and other draught or pack animals. The road on the northwest side had been paved with gravel and measures c. 6.25 m including the gutter or pipe.

From top to bottom a number of culture levels can be distinguished: on the inner side of the fortress wall there is a floor level belonging to the stone building phase, one, and occasionally two raised layers preceding the stone building and contemporaneous with the gravel layer of the road, a burnt layer which was only found under the stone building, and a dirty sand layer contemporaneous with the Augustan ditch and rampart belonging to it. The chronostratigraphy from top to bottom is composed of the stone building phase, the wooden building phase, Augustan defence works, the Iron Age cemetery and the edge of a Neolithic burial mound.

4.2.2 Area 5

General characteristics

Area 5 lies in the centre of the legionary fortress in the northeast corner of the intersection of the *via principalis* and the *via praetoria*. The reconstructed surface area of the original site is 5,094 m² (71 x 71.75 m) including the road on the northeast side of the buildings. To this must be added the elongated building with *tabernae* along the *via principalis* (sub-area 5E) which must originally have taken up a surface area of 502 m². Area 5 is divided into 5 sub-areas depending on the demarcation of the stone building phase. The differences in layout and use of the sub-areas between the stone and wooden building phases are often considerable, but do not actually influence the usefulness of the division of the sub-areas in the wooden building phase.

The greater part of the area (sub-areas 5A-D) was used to house and probably also for the work of 3-4 senior officers of the rank of *tribunus militum* or similar, with the possible addition of their staff.²²⁶ Sub-area 5E may have served as a work and storage space for the army baggage, trade and handcraft and for the use of specialists (*immunes*).²²⁷

The excavation of this area was completed under the direction of H. Brunsting and R. Woudstra over various periods between 1962

and 1965. The present use as school ground and sports field and private houses and the division of the property boundaries concerned made the investigation of a single connected area impossible, let alone the complete excavation of the site. Of the total reconstructed surface area of 5,596 m², c. 2,477 m² (44%) was exposed; the greater part of this being the sub-areas 5A and 5B, where a fair balance was achieved in the field between an overall picture and attention to detail. In the other sub-areas this overall picture is lacking, and in the case of sub-areas 5C and 5E this is so much so that they are virtually useless for any detailed analysis. Apart from the usual robber trenches of the stone foundations and the shallow ploughsoil there are few serious disturbances and the features are in a comparatively good state. Here and there Roman culture levels are to be found. Much use was made during the excavation here of manpower, partly because sections of the site were not easily accessible. Attention to features and finds was, in principle, as already mentioned in the case of area 3. Many fragments of roof tiles and wall (and base?) fragments of pottery were thrown away, regardless of whether they had been washed and checked, summarily registered or not. No sieve samples were taken.

Sub-area 5A

Sub-area 5A is the northwest part of area 5, directly adjoining the *via praetoria*. The borders are determined by the stone building phase in this sub-area, the first of two stone building phases in sub-area 5B and the surrounding roads and buildings. The construction on the southeast side of the stone building phase is inside sub-area 5B. The reconstructed surface area including roads cannot be defined exactly because the northwest section along the *via praetoria* has not been excavated, but it may vary from 1,377 to 1,423 m² (40.5-41.25 x 34-34.5 m); of this c. 790 m² has been excavated, so 55.5-57%.

The buildings must have been the house and place of work of a senior equestrian officer, for example a *tribunus militum*, as Von Petrikovits assumes was the case with the stone building phase in this sub-area.²²⁸ Perhaps his staff were also housed here.

The features consist of 36 pits, wooden and stone buildings and a road on the northwest

²²⁶ Von Petrikovits 1975, 67 and Bild 12.5.

²²⁷ Von Petrikovits 1975, 49-50, 53, 58-59 and 96.

²²⁸ Von Petrikovits 1975, 64-67 and Bild 12.5.

side. The wooden building phase was found to be rather incomplete, and as a result, is difficult to interpret in detail for the time being. One is inclined to assume that the wooden building phase in sub-area 5A is part of a connected complex of buildings extending over the whole of sub-areas 5A and 5B. The part situated in sub-area 5A may consist of one large unit or two smaller ones. It must have covered about 1,063 m² (40.5 x 26.25 m) or 1,164 m² (40.5 x 28.75 m), depending on the limit on the southwest side. There may have been one larger or two smaller inner courts in the middle, but there are no clear indications of a gallery or basin. The entrance to the complex must be sought on the via praetoria side.

In the stone building phase there is a free-standing building with a surface area of 1,114 m² excluding the extension on the southeast side in sub-area 5B (38.75 x 28.75 m; 1160 m² including the extension). On three sides of an *atrium* with gallery (13.25 x 13.75 m; 182 m²) there is a single row of rooms (7.5-10.5 m wide). On the unexcavated side along the via praetoria there is room for a double row; it may be assumed that the entrance was here too. There were two hypocausts in the northeast and southeast wings; some of the wall-paintings were found in the latter.²²⁹ On the southeast side there is an extension on top of the first stone building phase in sub-area 5B (8.5 x 5.5 m; 46.75 m²). The road on the northeast side had a width of 4-4.7 m in the wooden building phase (of which 26.25 x 4-4.7 m = 105-123 m² was excavated), but in the stone building phase it was narrowed to 2.25 m (of which 6 x 26.25 m = 157.5 m² was excavated). The width of the road on the southwest side cannot be determined in the wooden building phase; it was 6 m wide in the stone building phase, but only a very small section was excavated.

The culture levels are, from top to bottom, the debris level of the stone building phase, the gravel and loam floor belonging to the stone building, a burnt layer belonging to the wooden building phase and a grey sandy raised layer preceding the wooden building.

The chronostratigraphy in retrograde order consists of the stone building phase, the wooden building phase and pre-Flavian, possibly Augustan, pits.

Sub-area 5B

Sub-area 5B is the northeast section of area 5. The demarcation was based on the same criteria as in sub-area 5A. Of the reconstructed original surface area of 1,067 m² (35 x 30.5 m) including the road section on the northeast side, 1,020 m² was excavated, i.e. 96%. The section which was not excavated is in the road at the southwest corner of the sub-area.

In the wooden building phase the sub-area may have had a dwelling and work function for an equestrian officer. In the stone building phase, the buildings do not meet the demands for such a function, as far as form and size are concerned. The features consist of 29 pits, one of which is probably from the Augustan period, one wooden building and two periods of stone buildings and the adjoining roads.

In the wooden building phase, sub-area 5B was completely taken up by a building which formed one unit with the one in sub-area 5A. The dimensions cannot be precisely determined because of the indistinct limit on the southwest side, but are 29.25 x 26.25-28.75 m (surface area 841 m² or 768 m²). The centre of the building consists of an inner court with a gallery around it (18.5 x 10.5-11.7 m including the gallery; 194-208 m²). Around the inner court there were three narrower wings (c. 6.25 m deep) on the northeast, northwest and southwest sides. The southeast wing was 11.5 m wide and contained a double row of rooms. The entrance would probably have been in the longitudinal axis of the inner court, and, on the basis of details in the internal layout is assumed to be on the southwest side, for the time being.

Sub-area 5B is one of the few places in the legionary fortress where, exceptionally, two periods in the stone building phase were found. In stone building phase I, there was a freestanding U-shaped building with an open front facing southeast and a gallery in front of the main wing. The space between this building and the contemporaneous building in sub-area 5A was c. 1.2 m.

The surface area including the open space inside the wings (17.75 x 15.75 m = 278.5 m²) was 692 m² (28.25 x 24.5 m); the remaining open space in the sub-area was 177 m² (6.25 x 28.25 m). The further division of buildings and open space has been presented in Table 4.10.

In principle, all the wings contained a single row of rooms. A demolished hypocaust from

²²⁹ Peters 1965-1966 and 1969.

Table 4.10 Nijmegen. Sub-area 5B: dimensions of units of building features.

Description	Length (m)	Width (m)	Surface area (m ²)	Total (m ²)
Northwest wing (excl. gallery)	28.25	6.5	183.6	-
Northeast wing	18	6.5	117	-
Southwest wing	18?	6.5	117	-
				417.6
Open space inside wings	-	-	278.5	-
Open space outside wings	-	-	176.6	-
	-	-		451.1

which a large number of wall-paintings came was situated in the northwest.²³⁰ The main axis runs northwest-southeast, which implies a 90° rotation compared to the axis of the wooden building phase. The position and demarcation are more in keeping with the preceding phase than with the succeeding one. The entrance must be sought on the southeast side.

In the second stone building phase, a much smaller building than the one before (29 x 10.8 m; 313 m²) appears on the southeast side of the sub-area. With the exception of the small extension to the stone building in sub-area 5A in the southwest (8.5 x 5.5 m; 47 m²) sub-area 5B remains unbuilt on. The freestanding stone building has a symmetrical layout and is divided into two equal parts, 14.5 m in length. Each half presumably had an entrance from the northwest. On the northeast side the far end of the building has shifted slightly compared to stone building phase I, and has now come to be aligned with the stone building phase in sub-area 5A. Von Petrikovits designates this building as being accommodation for specialists.²³¹ The road on the northeast side (30 m long) varies in width during the various building phases: during the wooden building phase it is 4.5-4.75 (130 m²), during the stone building phase I 3.75 (112.5 m²) and during stone building phase II 3 m (90 m²). The road on the southwest side was at least 5.5 m and a maximum of 8 m wide during the wooden building phase, depending on whether or not there was a gallery; in the stone building phases it varied from 5.75 to 6.75 m; 96-140 m² of the road was excavated.

The culture levels found are, from top to bottom, the debris level of the stone building, a burnt layer in the northwest, the gravel layer of the roads and a dark-brown raised layer under

the stone building. The chronostratigraphy in retrograde order consists of the second and first stone building phases, the wooden building phase and possibly Augustan pits.

Sub-area 5C

Sub-area 5C is situated in the southwest of area 5. The demarcation is determined by the buildings in sub-area 5A and 5D and the projection of the via praetoria and sub-area 5E. Of the reconstructed surface area of 919 m² (37.5 x 24.5 m) only 166 m² or 18% was excavated. Because of its position in the centre of the camp and the functions of the surrounding buildings, it is assumed that a high-ranking officer and his staff lived and worked in this sub-area too. The road in the northeast served to connect the various sub-areas. The features consist of seven pits, the wooden and stone building and the road in the northwest. Little more can be said of the wooden building phase than that, in contrast to sub-areas 5A and 5B, it must have been a freestanding building. The same can be said of the stone building; the distance between the contemporaneous buildings in sub-area 5C and 5D is 2 m.

The width of the road on the northwest side cannot be determined in the wooden building phase, but in the stone building phase it is 6 m; on the south side there is a wide stone pipe/gutter.

There are no culture levels of importance. As for the chronostratigraphy, there are only the stone and wooden building phases.

²³⁰ Peters 1965-1966 and 1969.

²³¹ Von Petrikovits 1975, 43 and Bild 4.8.

Sub-area 5D

Sub-area 5D is situated in the southeast of area 5 and the demarcation is determined by the surrounding buildings and the road on the northeast side. Of the reconstructed surface area of 1,424.5 m² (38.5 x 37 m), 461.5 m² has actually been excavated, i.e. 32.4%. The centre of the buildings was not excavated.

Just as in sub-area 5C, it is assumed from the position and functions of the buildings to the north that a high-ranking officer and his staff were housed here.²³²

The features consist of nine pits, wooden and stone buildings and the road on the northeast side. Sections of the wooden building phase were excavated in the west and east corners of the building. As a result the limits can be determined (31.25-32.5 x 32.5 m; surface area 1,016-1,056 m²), but no further division. It was not possible to trace the locations of an entrance and a possible inner court. The stone building is 32 x 32 m and has a surface area of 1,024 m². There is enough evidence to reconstruct the plan if the stone building in sub-area 5A is referred to for comparison. It may have been a symmetrically built complex with an inner court of about 12.5 x 11.5 m, and an entrance part from the southeast. The latter is striking because the road on this side is much narrower than that on the northeast side which was 5.5-8 m wide in the wooden building phase and 5.75-6.75 m wide in the stone building phase. A wide gutter ran along the south side of the road in the stone building phase. Between the buildings in sub-areas 5D and 5E in the stone building phase there was a space of 1.5 m; in the southeast of this runs a gutter which comes from the stone building in sub-area 5D.

Two different culture levels can be distinguished from top to bottom: a clay layer or floor and a dark-brown raised layer. Chronostratigraphically, in retrograde order, there are wooden and stone buildings and a (pre-Roman?) circular ditch.

Sub-area 5E

Sub-area 5E covers the whole south section of area 5. The limits are determined by the surrounding buildings and the two main roads of the fortification, the *via principalis* and the *via praetoria*. Of the reconstructed surface area of 502 m² (71.75 x 7 m) only 39 m² has been excavated (7.7 %).

The function of the buildings may, on the basis

of their position along the *via principalis*, be linked with facilities for cavalry, transport, storage and craft, but also for specialists.²³³

From the excavation done so far, it can be seen that the stone building had been regularly divided lengthwise into rooms 4.25 to 5.25 m wide. There are no clear indications in the case of the wooden building. The culture levels are, from top to bottom, the rubble layer of the stone building phase, floor remains of *testa contusa* and clay belonging to the stone building and a layer of brown soil; there is no evidence of a burnt layer.

4.2.3 Area 9

General characteristics

Area 9 is situated in the southeast part of the legionary fortress, the *retentura dextra*. The reconstructed surface area including roads and *intervallum* is 1,834.5 m² (102.5 x 16.75-20.75 m). It is one element out of a series of military barracks. The limits are determined by the layout of the stone building phase (Fig. 4.3). The most important function was that of the housing of the soldiers of a *centuria* and their commander; in addition to which a segment of the defence zone in the form of a defence wall and *intervallum* was found in the area and the road sections at both ends of the barracks. The excavations belong to two campaigns, those of 1962 and 1977. Altogether more than 83%, 1,533 m² of the reconstructed surface area was investigated. The section which was not excavated lies partly in the road along the *intervallum* and partly at the site of the *centurio* house. The 1962 excavation had to be carried out in the garden of the Mater Dei complex and had to take into account the existing layout of the gardens and playground. It was done mainly by hand. In 1977 it proved possible to excavate almost the entire site in connection with the building of a new school, and in doing so, all the 1962 test trenches were again exposed. A machine was used to remove the turned ploughsoil, but attention was also paid to collecting finds from these layers by hand. To our surprise, many of the features which had been recorded during the 1962 excavation proved not to have been dug out completely. This was of importance, not only for linking up the drawings and features from the two excavation campaigns, but mainly to be able

²³² A small excavation in 1994-1995 has resulted in additional information for the northern part of the building in sub-area 5C and 5D (Haalebos 1995; 1995 et al. 1995, 33-38).

²³³ Von Petrikovits 1975, 49-50, 53, 58-59 and 96.

to judge the effects of the different ways of collecting finds. Whereas in 1962, as in the other sub-areas, many wall fragments of pottery and fragments of roof tiles without stamps were not kept, this was done in 1977. A metal detector was first used systematically in 1977, and sieving samples were taken systematically too. Without going into these results in detail, two remarks should be made which are specific to the Roman habitation on the outwash plain at that time. The use of the metal detector is not particularly encouraging because of the incredible quantities of iron nails. The energy invested is not really proportionate to the information acquired. The taking and sorting of sieving samples is also extremely labour-intensive and has only a limited result. It is more intensive than in normal clay or sandy soils because the bottom of the outwash plain is rich in gravel. This means that the selection of artifacts and ecofacts from the sieve residue requires more work than usual. Many garden paths in Nijmegen and the surrounding area are strewn with gravel from our sieving samples. The state of the features is relatively good, and in places, the lowest culture levels have even been preserved. The main disturbances are the robber trenches of the stone foundations and a very large pit in the southwest.

Sub-area 9A

Sub-area 9A is at the far southeast end of area 9. It is delimited by the buildings and layout of the stone building phase. In doing so, a projection was made of the long sides of the barracks in the *intervallum*, the inner side of the contemporaneous ditch and the limits of the excavation in the *intervallum*. Of the reconstructed surface area 333.5 m² was excavated, i.e. 96%.

The sub-area served for defence and traffic purposes. The dimensions of the various parts are listed in Table 4.11.

The features consist of 17 pits, one of which



Figure 4.3 Nijmegen. Excavation (1977) of the foundations of two rows of barracks in area 9 seen from the west.

possibly belonged to the Augustan period, the defence wall with buttresses from the stone building phase and wooden buildings. The latter consist of two small buildings 9.5 x 8 and 8.25 x at least 8.5 m, which, strangely enough, are situated in the middle of the *intervallum*. There are no recognizable culture levels. The chronostratigraphy from the top consists of the stone building phase, the wooden building phase and a possible Augustan pit.

Sub-area 9B

Sub-area 9B lies in the southeast of area 9 and the limits were determined by the *centurio* house with the adjoining open space and road

Table 4.11 Nijmegen. Sub-area 9A: dimensions of units of building features.

Sub-area	Description	Length (m)	Width (m)	Surface area (m ²)
9A.1	outside fortress wall	20.75	2.75-4.25	73
9A.2	wall with buttresses and <i>intervallum</i>	20.75	12.75-14	277
	wooden buildings	18.5	8-8.5	152

Table 4.12 Nijmegen. Sub-area 9B: dimensions of units of building features.

Description	Length (m)	Width (m)	Surface area (m ²)	Area excavated (m ²)
Centurio house (wood)	27	8.75	236	110
Open space (wood)	26.75	5.25	140	137
Centurio house (stone)	26.25-26.50	10.50-10.75	280	197
Open space (stone)	26.25	5	131	50

behind the intervallum from the stone building phase. The reconstructed surface area is 582 m² (34-34.5 x 17 m), 303 m² of which was actually excavated (52%). The section that was not excavated lies partly in the road and partly at the site of the centurio house. The function of the sub-area is road and housing for the centurio. The features consist of 24 pits, one of which dates possibly from the Augustan period, the road and buildings from the wooden and stone building phases. The dimensions of the buildings and the adjoining open spaces are shown in Table 4.12.

In both phases the entrance must have been from the intervallum in the southeast. The road along the intervallum was at least 4 and at most 7 m wide in the wooden building phase, and 7 m (8 x 7 m = 56 m²) in the stone building phase. A wide gutter or drain runs along the sides of the barracks.

The preserved culture levels consist, from top to bottom, of the demolition layer from the stone building phase, the layer of gravel in the open spaces and the clay floor layer of the stone building phase, a raised layer of sand and a burnt layer. The chronostratigraphy in retrograde is the stone building phase, the wooden building phase and a possible Augustan pit.

Sub-area 9C

Sub-area 9C forms the central part of area 9. The limits were determined from the stone building phase. The reconstructed surface area of 773 m² (45 x 17-17.25 m) was completely excavated. This area served to house an entire centuria with the exception of the centurio, so approximately 80 men.

The features consist of 121 pits, one of which from the period before the wooden building phase, and therefore possibly dating from the Augustan period.

In the wooden building phase there was a barracks here with 10 *contubernia*, with a surface

area of 256.5 m² and more than 7 m shorter (38 x 6.5-7 m) than the later stone barracks. At the front there was a gallery 1.25 m wide (surface area 47.5 m²). The adjoining inner court and the galleries of the two barracks which were built opposite each other covered 389.5 m² (38 x 10-10.5 m). The inner court must have been closed off in the northwest by a wall in which there was an entrance to the 3.75 wide road outside the barracks (126 m²). In the stone building phase the barracks was divided into eleven *contubernia* and had a larger surface area (excluding the gallery 45 x 8.5 m; 382 m²). The gallery at the front was now 2.25 m wide and bordered an inner court of 45.5 x 7.75-8.5 m (444-460.5 m²). On the northwest side the complex was closed off by a wall, but there must have been an entrance in it.

The recovered culture levels are, from top to bottom, the demolition layer from the stone building phase, the gravel layer on the inner court and the clay floor layer of the stone building phase, a burnt layer over the wooden building phase and a raised layer of sand preceding the wooden building phase. The periods distinguished are in retrograde the stone building phase, the wooden building phase and possibly an Augustan pit.

Sub-area 9D

Sub-area 9D is the far northwest end of area 9. The limits were determined from the stone building phase and the edge of the excavation. The reconstructed surface area of 123.5 m² (6.75-7.5 m) was completely excavated. The function was probably an open space c.q. road. The open space was larger in the wooden building phase (15-15.75 x 17.5 m; 268 m²) than in the stone building phase (5 m wide; 114 m²) because the barracks of the wooden building phase were shorter than those later on. There may perhaps have been a small wooden building there in the wooden building phase but this was difficult to

Table 4.13 Nijmegen. Structure for the description of the pits which formed the basis for the tables shown in Tables 4.14-19 and Appendices II-XIII.

	A. number	B. surface area (m ²)	C. volume (m ³)	D. surface area of C. (m ²)
1. surface area				
1a. area				
1b. sub-area (m ²)				
2. sum of pits	1. number	1. surface area	1. volume	1. surface area
	2. percentage	2. percentage	2. percentage	2. percentage
	3. ratio (2.1:1b)	3. ratio (2.1:1b)	3. ratio (2.1:1b)	3. ratio (2.1:1b)
		4. mean of sub-area ¹	4. mean of sub-area ¹	4. mean of sub-area ¹
	5. mean of area ²	5. mean of area ²	5. mean of sub-area ³	5. mean of sub-area ³
3. classes		1. percentage	1. percentage	1. percentage
4. phases		1. surface area	1. volume	
		2. ratio (4.1:1b)x100	2. ratio (4.1:1b)x100	
		3. mean sub-area	3. mean of sub-area	

Mean of sub-area:¹ total of surface/volume of pits per sub-area divided by the number of pits in a sub-area; mean of area:² total of number of pits per area divided by the number of areas; mean of (sub-)area:³ total of surface/volume of pits per (sub-)area divided by the number in an (sub-)area.

N.B. Ratios and means (2,3-5) are also calculated with corrections for very large pits.

establish due to a serious disturbance. Thirteen pits were found in this area. Only one culture level was observed, a remarkable black layer over the wooden building phase with pits and under the stone building phase.

4.3 DESCRIPTION OF THE PITS

4.3.1 Introduction

In addition to what has already been mentioned in Section 4.1.4 about the excavation methods used for the pits, more details about the system of analysis will be given here. The variables are numbers and dimensions expressed in surface area and, whenever possible, in volume. The numbers of pits and quantity of data available for the various variables give an indication of the representativeness and the quality of the documentation, and are referred to from now on as the representation and documentation levels. The absolute numbers in general and the evidence for phasing point to the representativeness in general and the context in

particular. The degree to which data on surface area and volume are present reflects the quality of the documentation. In principle, attention is only paid to a difference in function, shape and fill during pretreatment for the analysis; as a rule it yielded no further useful data during further analysis. Nevertheless, some pits are conspicuous for their clean fill, large quantities of charcoal or roof tile material or their greater depth or content. These data are reported wherever relevant.

The steps taken in the numerical processing of the pit data and the order in which they were performed can be seen more clearly in a diagram. Table 4.13 serves as a guideline, not as a legend, for the tables of pit data in this description; their legends are found with each table.

4.3.2 Area 3

The quality of the documentation level varies considerably per sub-area and the level of representativeness naturally decreases as more variables are included in the analysis (Table 4.14).

Table 4.14 Nijmegen. Area 3: number and percentages of pits with data for surface area, volumes and phasing, grouped in sub-areas.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Total	Mean of sub-area
Surface area (m ²)	1279	1053	1536	1348	1484	1298	1024	9022	-
A. number									
1. area	117	43	27	33	63	24	17	324	46.3
2. area+volume	92	40	11	17	43	11	10	223	31.9
3. area+phase	31	35	25	26	52	9	3	181	25.9
4. area+volume+phase	26	32	10	13	38	4	3	126	18
B. percentage									
1. area	100/36.1	100/13.3	100/8.3	100/10.2	100/19.4	100/7.4	100/5.3	100/100	-
2. area+volume	78.6/41.3	93/17.9	37.0/4.5	51.5/7.6	68.3/19.3	45.8/4.9	58.8/4.5	68.8/100	-
3. area+phase	26.5/17.1	81.4/19.3	92.6/13.8	78.8/14.4	82.5/28.7	37.5/5	17.7/1.6	55.9/100	-
4. area+volume+phase	22.2/20.6	74.4/25.4	37.0/7.9	39.4/10.3	60.3/30.2	16.7/3.2	17.7/2.4	38.9/100	-

Legends: A.1 number of pits with data for surface area; A.2 number of pits with data for surface area and volume; A.3 number of pits with data for surface area and phase; A.4 number of pits with data for surface area, volume and phase; B.1 percentage of A.1/percentage of the sum of all pits in the area; B.2 percentage of A.2/percentage of the sum of all pits in the area; B.3 percentage of A.3/percentage of the sum of all pits in the area; B.4 percentage of A.4/percentage of the sum of all pits in the area.

The absolute number of pits is far more than average in sub-area 3A (Table 4.14 sub A.1 and B.1). In sub-areas 3F and 3G the numbers are far fewer and can therefore be disregarded in further analysis because of the limited representativeness of the numbers, though not, of course, in the interpretation of this variable. Both the absolute numbers and the relative figures were taken into account when assessing the variables 'volume' and 'phase' (Table 4.14 sub A.2-4 and B.2-4). The documentation level of the variables 'surface area' and 'volume' is very high in sub-areas 3A and 3B, good in 3E and moderate in 3C and D (Table 4.14 sub A.2 and B.2). The context indicated by the variable 'phase' is good in sub-areas 3B, 3C, 3D and very good in 3E; in 3A it is good in terms of absolute figures but poor in relative figures (Table 4.14 sub A.3-4 and B.3-4). If all variables are considered together, the data of sub-area 3B are good for analysis on all levels, those in 3E to a slightly lesser extent, and those in 3A still less so; sub-areas 3C and 3D are not suitable.

The relevant information concerning the surface area and volume of the pits as presented in Appendices II-IV can be

summarized as follows (Appendix II-IV).²³⁴ If the pits from all periods are taken together, they occupy several hundred m² and m³. The average size regarding surface area and volume of the individual pit, after deducting the largest pits (>2.5 m² and 2 m³) is 2 m² and 1.2 m³ (Appendix III sub 2 and 4); more than 80% is smaller than 2.5 m² and 2 m³ (Appendix IV sub B and C). They are usually fairly small pits. In sub-area 3A the ratio of the number of pits with the variables 'surface area' and 'volume' to the surface area of the sub-area is very much higher than average, even after deducting the extremely large pits (Appendix II sub D.3 and D.4). In sub-areas 3D, 3F and 3G, relatively few pits are found, and these pits are much smaller than average in sub-areas 3D and 3F (Appendix II sub A.1-2) but not in 3G (Appendix IV sub D). Sub-area 3C takes up a place of its own. The ratio of surface area and volume to the size of the sub-area is very low (Appendix II sub D.3); the number of pits is relatively and absolutely small (Appendix II sub A.1-2). The average surface area (5.71 m²) and volume (3.2 m³) is still (very) much larger than in the other sub-areas (Appendix III sub 1 and 3), even after correction for very large pits (Appendix III sub

²³⁴ For a quick overview of the results of the analysis of the pits in area 3 see Table 4.47.

Table 4.15 Nijmegen. Area 3: specific filling of pits.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Total
1. charcoal								
Number	69	32	23	17	42	6	5	194
Percentage of all pits in this area	59	74.4	82.1	51.5	67.7	25	29.4	59.9
2. tiles								
Number	3	-	-	-	6	1	2	12

2 and 4; surface area 1.89 m²; volume 1.53 m³). The pits are therefore rather few in number but exceptionally large in size.

It is interesting to find out to what extent the above observations can be differentiated into phases with the help of the pits which can be stratigraphically positioned (Appendix V). In sub-area 3A far more pits than the average for the other sub-areas, from their surface area as well as their volume, appear to be younger than the wooden building phase (TFW), but also older than the stone construction phase (UFS); these are not, however, the same pits (Appendix V sub B.2 and 4). In sub-areas 3B and 3E, far more pits than average are older than the stone construction phase (UFS) from their surface area (Appendix V sub B.4), but there are also pits which are enclosed between timber and stone construction phases which cut each other (TFW/UFS; Appendix V sub B.3). It may be assumed that this was also the case for some of the pits which lie above the timber construction phase or below the stone construction phase. This means that in these three sub-areas there must have been great activity after the demolition of the timber constructions and before the construction of the stone buildings.

In sub-areas 3C and 3E there are more pits than average as far as surface area is concerned which are younger than the stone construction phase; in 3C this is coupled with more than average volume. This indicates intensive activities in connection with the demolition of the stone constructions in the Roman period; in 3C, in the large construction with an inner court, this entailed digging large deep pits, and in 3E, in the open space in front, by digging large pits of average depth.

A final observation is that in sub-areas 3B, 3C and 3E, the number of pits with much charcoal

in the fill is relatively high, but in 3A and 3E this number is absolutely high. In sub-area 3E there are a small, but relatively large number of pits with roof tile fragments in the fill (Table 4.15).

4.3.3 Area 5

The absolute number of pits in this area (89) is less than in area 3 (324) but compared to the total surface area the number is larger (Table 4.16). This can be seen from the ratio for the number of pits per area which is 0.036 in area 3 (Appendix II sub A.2), and 0.056 in area 5 (Appendix VI sub A.2). The documentation level of the pits is satisfactory. The surface area and volume of c. 60% or more of all pits is known; only in sub-area 5A is this level 50% (Table 4.16 sub B.2). The representation level for all variables is satisfactory to barely satisfactory only in sub-areas 5A and 5B, depending on the number of variables (Table 4.16 sub A and B). Sub-area 5D is just below this level, but is still usable as an indication of phenomena; sub-areas 5C and 5E do not even meet this criterion and can therefore hardly be considered in the analysis.

In the well-excavated sub-areas 5A and 5B, the total surface area of the pits from all periods covers 12-14% of the surface area of the sub-area; the excavated volume varies around 85 m³ (Appendices VI-VIII, especially Appendix VI sub B.2 and D.1 for sub-area 5A and 5B). If one disregards the very large pits, then the ratio for the variables 'surface area' and 'volume' in these two sub-areas does not differ from that of the other sub-areas (Appendix VI sub B.4 and D.4 compared with B.2 and D.2). In sub-area 5C and 5D the number of pits does not differ significantly from the average; in sub-area 5E the variation is larger, but then the number of

Table 4.16 Nijmegen. Area 5: number and percentages of pits with data for surface area, volumes and phasing, grouped in sub-areas.

Sub-area	5A	5B	5C	5D	5E	Total	Mean of sub-area
Surface area (m ²)	790	1020	166	462	39	2477	
A. number							
1. area	36	29	7	12	5	89	17.8
2. area+volume	18	20	4	9	3	54	10.8
3. area+phase	20	16	4	6	1	47	9.4
4. area+volume+phase	11	10	2	5	1	29	5.8
B. percentage							
1. area	100/40.5	100/32.6	100/7.9	100/13.5	100/5.6	100/100	
2. area+volume	50/33.3	69/37	57.2/7.4	75/16.6	60/5.5	60.7/100	
3. area+phase	55.6/42.6	55.2/34	57.2/8.5	50/12.8	20/2.1	52.8/100	
4. area+volume+phase	30.5/37.9	34.5/34.5	28.6/6.9	41.7/17.3	20/3.5	32.6/100	

Legends: A.1 number of pits with data for surface area; A.2 number of pits with data for surface area and volume; A.3 number of pits with data for surface area and phase; A.4 number of pits with data for surface area, volume and phase; B.1 percentage of A.1/percentage of the sum of all pits in the area; B.2 percentage of A.2/percentage of the sum of all pits in the area; B.3 percentage of A.3/percentage of the sum of all pits in the area; B.4 percentage of A.4/percentage of the sum of all pits in the area.

Table 4.17 Nijmegen. Area 5: specific filling of pits.

Sub-area	5A	5B	5C	5D	5E	Total
1. charcoal						
Number	9	12	1	3	1	26
2. tiles						
Number	8	-	2	-	3	13

pits is small (Appendix VI sub A.2). The average surface area and volume of the individual pits in area 5 is larger than in the other areas (Appendix VII sub 1 and 3: surface area 3.28 m²; volume 3.08 m³), even when very large pits are disregarded (Appendix VII sub 2 and 3: surface area 2.47 m²; volume 2.32 m³). Approximately 67% of all pits are smaller than 2.5 m² and 2 m³, which is less than in area 3 (Appendix VIII sub B and C compared with Appendix IV.B and C). Especially in sub-areas 5A and 5E, and to a slightly lesser extent in 5B, the pits are considerably larger and deeper (Appendix VIII sub D >3 m³). In particular, the robber pit of the hypocaust no. 992 and the large pits no. 963 in sub-area 5A and no. 983+984 in sub-area 5B

stand out from the others in size.

If one considers the stratigraphical aspects, a great many pits in sub-area 5A appear to be younger than the timber construction phase, absolutely and relatively speaking (TFW and TFW/UFS; Appendix IX sub A.2-3). This is supported by the same picture for pits older than the stone construction phase, although it is enhanced by the very large pit no. 963 (Appendix IX sub A.4, B.4 and C.40). It is, moreover, interesting that two pits should be enclosed stratigraphically between the timber and stone construction phases (TFW/UFS; Appendix IX sub A.3). The same is seen in sub-area 5B, but the numbers are smaller. Just as in area 3, one may assume that some of the pits which are

Table 4.18 Nijmegen. Area 9: number and percentages of pits with data for surface area, volumes and phasing, grouped in sub-areas.

Sub-area	9A	9B	9C	9D	Total	Mean of sub-area
Surface area (m ²)	334	303	773	123	1533	
A. number						
1. area	17	24	121	13	175	43.75
2. area+volume	16	18	118	13	165	41.25
3. area+phase	9	9	81	9	108	27
4. area+volume+phase	8	8	80	9	105	26.25
B. percentage						
1. area	100/9.7	100/13.7	100/69.1	100/7.4	100/100	
2. area+volume	94.1/9.7	75/10.9	97.6/71.5	100/7.9	94.3/100	
3. area+phase	52.9/8.3	37.5/8.3	66.9/75	69.2/8.3	61.7/100	
4. area+volume+phase	47.1/7.6	33.3/7.6	66.1/76.2	69.2/8.6	60/100	

Legends: A.1 number of pits with data for surface area; A.2 number of pits with data for surface area and volume; A.3 number of pits with data for surface area and phase; A.4 number of pits with data for surface area, volume and phase; B.1 percentage of A.1/percentage of the sum of all pits in the area; B.2 percentage of A.2/percentage of the sum of all pits in the area; B.3 percentage of A.3/percentage of the sum of all pits in the area; B.4 percentage of A.4/percentage of the sum of all pits in the area.

younger than the timber construction phase and older than the stone construction phase were enclosed between both phases. In that case there was much digging in sub-areas 9A and 9B and possibly also in 9C and 9D after the demolition of the timber buildings and prior to the construction of stone buildings.

In sub-areas 9A, 9B and 9E there are some pits which are younger than the stone construction phase (TFS; Appendix IX sub A.5). In 9B and 9E these are very large pits, the robber pit of the hypocaust no. 984 and pit no. 1587 (TFS; Appendix IX sub B.5 and C.5). This partly indicates demolition activities in the Roman period.

Finally there are some details worth mentioning (Table 4.17). In sub-areas 9A and 9B there are relatively many pits with a charcoal fill; pits with a fill of roof tiles are mainly restricted to sub-area 9A. In addition, it is striking that so few pits were dug in the inner court of the timber building in sub-area 9B, and that there was no pit for a basin. This could be interpreted as an indication that pits were not connected with living and working activities as much as with demolition and building activities.

4.3.4 Area 9

The absolute number of pits in this area (175) lies in between that of areas 3 (324) and 5 (89) (Table 4.18 sub A.1). The average per sub-area is about the level of area 3, but compared to the total surface area this number is, just as in area 5, much higher and is even the highest of all three areas. This can be seen from the ratio for the number of pits per area, which is 0.036 for area 3 (Appendix II sub A.2), 0.056 for area 5 (Appendix VI sub A.2), and 0.1 for area 9 (Appendix IX sub A.2). The documentation level of the pits is excellent. In three of the four sub-areas it is more than 94%; only in sub-area 9C is it 'a mere' 75% (Table 4.18 sub B.2). The representation level is good for all variables only in sub-area 9C (Table 4.18 sub B.3-4). In the other sub-areas this only applies to the variables 'surface area' and 'volume' (Table 4.18 sub A.2 and B.2); for the variable 'phase' the absolute number of 8-9 pits is low (Table 4.18 sub A.4). It should, however, be mentioned that in the phasing there is no information whatsoever about pits younger than the stone construction phase.

In sub-areas 9A and 9B, the ratio for the variables 'surface area' and 'volume' is smaller

Table 4.19 Nijmegen. Area 9: specific filling of pits.

Sub-area	9A	9B	9C	9D	Total
1. charcoal					
Number	11	1	18	-	30
2. tiles					
Number	-	2	33	2	37

than average (Appendices X-XII, especially X sub D.3). In sub-area 9C it is only slightly larger and in sub-area 9D considerably larger, although not after the deduction of the very large pit no. 123/41. The average surface area and volume of the individual pits is lower in sub-areas 9B and 9C than in the other areas, and in sub-area 9A it is the same (Appendix XI sub 1 and 3). Only in area 9D is it considerably higher, but not after deduction of the very large pit no. 123/41 (Appendix XI sub 2 and 4). In all sub-areas more than 85% of the pits are smaller than 2.5 m² and more than 80% are smaller than 2 m³, corresponding therefore to the picture shown in area 3 (Appendix XII sub B and C compared with Appendix IV sub B and C).

If one considers the stratigraphical evidence, there are many pits younger than the timber construction phase in sub-areas 9A and 9C, in the relative and absolute sense (TFW; Appendix XIII sub A.2 and B.2). For sub-area 9A this is not supported by pits older than the stone construction phase because this phase was not found here in the form of buildings. This was the case though in sub-area 9C, and very much so (UFS; Appendix XIII sub A.4 and B.4); moreover here, as in the other areas, there were several (7) pits enclosed between the timber and stone construction phases (TFS/UFS; Appendix XIII sub A.3 and B.3). Apparently there was considerable digging activity again here during or after the demolition of the timber construction phase and prior to the stone construction phase. This is also supported by the fact that 79 (TWF/UFS + UFS; Appendix XIII sub A.3 + A.4) of all the 175 pits (Table 4.18 sub A.1) are older than the stone construction phase. Among the others there may be pits which are younger than the stone construction phase, but there is no data available at all about this.

Details worth mentioning are the relatively large number of pits with charcoal in sub-area

9A, and the relatively large number of pits with roof tile fragments in sub-area 9C (Table 4.19). In addition, the position of the two very large pits no. 50/54 in the intervallum (sub-area 9A) and no. 123/41 in the road northwest of the barracks in sub-area 9D should be pointed out, which are respectively younger than the timber construction phase and older than the stone construction phase.

4.4 ANALYSIS OF THE FINDS (BY R.M. VAN DIERENDONCK)

4.4.1 Introduction

Originally it was the intention to carry out an analysis of all the finds from pits in the areas 3, 5 and 9.²³⁵ With this objective, an inventory was first made on the basis of the preliminary classification of the finds. However, it gradually became clear that a new and more detailed inventory was required. The archaeological material was too extensive, though, and the time available too short for all the groups of material to be processed adequately. The result was that material groups such as glass²³⁶, metal, building materials and organic material²³⁷ could not be included in the more detailed analysis.²³⁸ These groups will have to be analysed again after completion of the pilot study, firstly because then the entire inventory of each pit can be analysed simultaneously, and secondly because groups like these are essential elements in a finds complex, and their presence or absence and composition may contain important clues as to the functions of individual pits.

It was finally decided to restrict the analysis only to the pottery found in the pits since this made up most of the archaeological material, and, in view of our reasonable knowledge of this material, it was considered advisable to subject

²³⁵ See also Section 4.1.3.

²³⁶ The glass from the castra was being analysed by C. Isings.

²³⁷ Part of the bone material from the areas has already been examined and published by R.C.G.M. Lauwerier: Lauwerier 1988, 52-64.

²³⁸ The pottery and several other categories of finds were described by A. Vanderhoeven and R.M. van Dierendonck in 1985 and 1986. The description represents the then actual state of Roman pottery research in the Netherlands and has not been updated since. Van Dierendonck prepared the present integrated analysis in 1987; the manuscript was closed in 1991. The pottery types analysed in this study are written (first letter) or abbreviated in capitals (see also Table 4.1).

Table 4.20 Nijmegen. Pottery types and numbers (in brackets) removed from the analysis.

Material group	Removed specimens
Terra Sigillata	HA 8 (1)
Fine Wares	HA 43 (1)
Gallo-Belgic Ware	HBW 2 (5); HBW 3 (9); HBW 17 (1); HBW 74 (1); HBW 82 (1); terra rubra bowl (1)
Coated Wares	HOFH 22 (6)
Smooth Wares	ST 101 (1); ST 103/4 (1); ST 114 (1); ST 117 (1)
Thick-Walled Pottery	Mortaria HA 59 (5)
	Amphorae HA 70 (1); OB 83 (1); Pascual 1 (1)

it to further analysis which was expected to yield a positive result. Only in a very few cases were other material groups used to interpret data.²³⁹

4.4.2 Analysis of the pottery

Preparatory work

Before commencing the actual analysis, the complete database of the inventoried pottery still had to undergo several processes before a database could be obtained which was as true and balanced as possible for the comparison of the ratios.

In order to do so, all the data on forms and types which, in view of their dates, could be considered older remains of pre-Flavian settlement and activity in the study areas were first removed from the file. A total of 37 specimens was removed from the following material groups (Table 4.20)

In addition, two specimens which, because of their late dates, differ greatly from the other finds within the assemblages in which they were found, were not included in the analysis either. These are a wall fragment from a mortarium DRAG 45 and a rim fragment from a cooking-pot NB 89.²⁴⁰

However, this does not necessarily mean that all irregularities concerning dates have been removed from the file. Handmade pottery poses the greatest problem in this respect, in those places where it was found in pits without any accompanying datable finds. Native Pottery from such pits probably belongs to the pre-Flavian occupation of the site, although an (early) Flavian date cannot be excluded.²⁴¹

A following stage in achieving a balanced database was the removal of the wall fragments of Smooth and Coarse Wares, which were

originally considered to be specimens if they were unique in the finds complexes concerned. These fragments were removed for a number of reasons. It is clear that in the areas excavated considerable differences can be observed which stem from the excavation methods or finds processing used.²⁴² As far as the excavation method is concerned, mention should be made of the flotation and sieving techniques applied in the most recent investigation which yield an extra quantity of wall fragments of these types of pottery in particular. In addition, from the composition of the finds assemblages stemming from the earliest investigation it appears that a considerable number of these wall fragments were not or were no longer present. By removing this group, the great discrepancy in collection method was therefore largely accounted for. One should not omit to mention that, for the sake of convenience, and then only in the large finds complexes of area 3, the unidentifiable base fragments of the Coarse Wares were not recorded as specimens and were excluded from the file whenever the number of rims exceeded the number of bases. It proved impracticable to attempt to find bases belonging to the sometimes enormous quantities of rim fragments.

As a result of these computations, the total number of specimens was established from all the identifiable forms and types of which the number of specimens could be determined in each context, plus a number of bases which could not be identified further as to form and type and which were unique in their individual pottery assemblages.²⁴³ It should of course be observed that there are some forms that can easily be identified even on the basis of wall fragments, e.g. DRAG 29, HBW 28 and HBW 94.

²³⁹ For example, charcoal, metal slag, melting pots (Section 4.5.3) and millstone fragments (Section 4.5.4 sub-area 9C).

²⁴⁰ Similar finds of a later date are not unusual: Bogaers & Haalebos 1977, 80 and 86-87 (NB 98). The date of DRAG 45 indicate activities of unknown character in the legionary camp until after AD 175.

²⁴¹ Particularly in the early phases of the encampment of a large army unit such as a legion, it may have been necessary to make use of locally produced native pottery to replace the material the legion brought with it since there was not yet any local production nor were the supply routes for replacements stable enough: cf. Webster 1973, 2. In the meantime recent studies on pre-Flavian handmade pottery from Nijmegen military sites have been published: Stoffels 2006 and 2009 and Van den Broeke 2014.

²⁴² See Section 4.1.1.

²⁴³ Comparison with the numbers as estimated by Willems with regard to the eastern and western canabae and the castra appears to indicate that despite certain differences there are no substantial discrepancies: Willems 1984, 126 and fig. 82. The percentual ratios of Terra Sigillata, Coated Wares, Gallo-Belgic Wares, Smooth Wares and Coarse Wares estimated for all three areas together are, respectively, 11, 4, 6, 24 and 40 (Table 4.22).

Table 4.21 Nijmegen. Numbers of vessels and percentages of the (sub-)areas.

Area 3								
Sub-area	3A	3B	3C	3D	3E	3F	3G	Total area 3
Number	582	458	142	415	133	87	92	1909
Percentage	19.6	15.4	4.8	14	4.5	2.9	3	64.2
Area 5								
Sub-area	5A	5B	5C	5D	5E			Total area 5
Number	272	141	22	72	75			582
Percentage	9.2	4.7	0.7	2.4	2.5			19.6
Area 9								
Sub-area	9A	9B	9C	9D			Total area 9	
Number	42	39	349	50			480	
Percentage	1.4	1.3	11.7	1.7			16.2	

All together it may be obvious that the number of vessels used in this study are somewhat biased. Since this bias is similar for all contexts this does not hamper an internal comparison. The vessel numbers may not be used for comparison with other sites, however. After the preparatory work, a total remained of 2,971 vessels on which the detailed analysis was performed. They can be classified as follows from Table 4.21.

From the above table it is clear that, as far as the numbers of vessels are concerned, there are great differences both on the area level and on the sub-area level. Particularly in the sub-areas with small quantities, this leads to small fluctuations in the composition having major consequences proportionately. The totals of the sub-areas 5C, 9A, 9B and 9D are in fact too small to be analysed adequately, and this is slightly less the case with sub-areas 3F, 3B, 5D and 5E.²⁴⁴ Nevertheless, an attempt has been made to carry out an analysis of the percentages of pottery groups, categories of pottery and finally, of a number of forms and types.

The pottery groups

Although the sub-area was chosen as the unit of comparison, we first looked at the proportions of the pottery groups within the complete finds complex. It was assumed that the best way of obtaining a norm for the percentages which would serve as a starting point for further

comparison of the pottery groups per area and sub-area was to take the total number of vessels and their proportions as a norm value. Percentages of various analysed groups or areas differing more than 5 or 10% from this norm value are considered as being potentially meaningful. In Table 4.22 the numbers of vessels and the percentages within the complex of pottery can be seen.

From a comparison of the percentages of the sum with the proportions per area several differences are obvious. These variants can perhaps be regarded as tendencies indicating the places where even clearer differences will be seen at a more detailed level.

In all three areas the finer wares, Terra Sigillata, Fine Nijmegen Ware and the Gallo-Belgic Wares, are represented in almost identical proportions. In area 3 no important deviations from the norm can be observed, although this is so in the two other areas. Area 5 has a significantly lower percentage of Smooth Wares together with a considerably higher percentage of Coarse Wares. Native Pottery constitutes a negligible part of the complex from this area. In area 9, clear differences can be seen in the groups of Thick-Walled Pottery, Native Pottery and Coarse Wares. The latter scores a low percentage, and the other two are proportionally twice as large as the norm.

In order to gain area-level insight in another way in certain deviations and to be able to point out

²⁴⁴ In the text, figures and tables an asterisk is used to indicate whether it is a sub-area with a small number of vessels. 75 vessels or less was taken as a guideline.

Table 4.22 Nijmegen. Numbers of vessels and percentages of the sum of the areas 3, 5 and 9 and of each separate area concerning the ceramic groups.

Ceramic group	Total	TS	FNW	GBW	CTD	SMO	TWP	CRS	NAT
Sum of areas									
Number	2971	333	126	177	130	729	228	1181	67
Percentage	100	11.2	4.2	6.0	4.4	24.5	7.7	39.8	2.3
Area 3									
Number	1909	212	81	112	79	505	115	769	36
Percentage	100	11.1	4.2	5.9	4.1	26.5	6.0	40.3	1.9
Area 5									
Number	582	65	25	35	20	103	53	278	3
Percentage	100	11.2	4.3	6.1	3.5	17.7	9.2	47.7	0.1
Area 9									
Number	480	56	20	30	31	121	60	134	28
Percentage	100	11.6	4.6	6.2	6.4	25.2	12.5	27.9	5.8

Table 4.23 Nijmegen. Ratios in terms of percentage of the sum of all vessels and of the ceramic groups in area 3, 5 and 9.

Area	Area 3	Area 5	Area 9	Area 3+5+9
Ceramic group				
Total	64.2	19.6	16	100
TS	63.7	19.5	16.8	100
FNW	64.3	19.8	15.9	100
GBW	63.3	19.8	16.9	100
CTD	60.3	15.4	23.8	100
SMO	69.3	14.1	16.6	100
TWP	50.4	23.3	26.3	100
CRS	65.1	23.5	11.4	100
NAT	53.7	4.5	41.8	100

trends, a comparison was also made between the ratios in terms of percentage of the separate areas based on the sum of all the vessels, and the ratios in terms of percentage per ceramic group (Table 4.23). From this comparison it is obvious that in area 3 the Thick-Walled and Native Pottery are underrepresented. The latter is also evident in the very small percentage

present in area 5, as we have already seen. In area 9 the groups of Coated Wares, Thick-Walled and Native Pottery are on the other hand better represented than might have been expected from the percentages yielded by this area. Here too, the lower percentage of Coarse Wares in area 9 is striking.

From the above comparisons, we may assume

Table 4.24 Nijmegen. Numbers of vessels and percentages of (the sub-areas of) area 3 concerning the ceramic groups compared to the norm values for the sum of all areas.

Ceramic group	Total	TS	FNW	GBW	CTD	SMO	TWP	CRS	NAT
Norm value area 3+5+9	100	11.2	4.2	6.0	4.4	24.5	7.7	39.8	2.3
Area 3	100	11.1	4.2	5.9	4.1	26.5	4.0	40.3	1.9
Area 3A									
Number	582	53	27	42	22	164	26	230	18
Percentage	100	9.1	4.6	7.2	3.8	28.1	4.5	39.5	3.1
Area 3B									
Number	458	63	12	18	14	132	34	176	9
Percentage	100	13.5	2.6	3.9	3.1	28.7	7.1	38.5	2.0
Area 3C									
Number	142	21	4	8	2	51	13	43	0
Percentage	100	14.8	2.8	5.6	1.4	35.9	9.1	30.3	0
Area 3D									
Number	415	43	26	23	28	95	18	180	2
Percentage	100	10.4	6.3	5.5	6.7	22.8	5.3	43.4	0.5
Area 3E									
Number	133	10	4	6	9	32	10	59	3
Percentage	100	7.5	3.0	4.5	6.8	24.1	7.6	44.3	2.3
Area 3F									
Number	87	6	4	13	2	14	7	37	4
Percentage	100	6.9	4.6	14.9	2.2	16.0	8.0	42.5	4.6
Area 3G									
Number	92	15	4	2	2	17	7	46	0
Percentage	100	17.4	4.3	2.2	2.2	18.5	7.7	47.8	0

Deviations from the general norm of more than 5% are printed in bold type, deviations more than 10% are also underlined.

that the main deviations are to be found in the groups of Smooth and Coarse Wares and Thick-Walled and Native Pottery. However, the following analyses will show that this conclusion is not altogether correct. If we now analyse the ratios of the pottery groups at sub-area level, our first impression is that of a fairly uniform picture, even in the sub-areas which have smaller numbers of vessels (Tables 4.24-26). On closer

comparison with the norm, however, differences appear in other pottery groups than those indicated at area-level, although the differences are seen more frequently in the latter.

In area 3 (Table 4.24) one immediately notices that in sub-area 3C the percentages of Smooth and Coarse Wares deviate strongly in a positive and negative sense respectively from the norm and their percentages are almost reversed in

Table 4.25 Nijmegen. Numbers of vessels and percentages of (the sub-areas of) area 5 concerning the ceramic groups compared to the norm values for the sum of all areas.

Ceramic group	Total	TS	FNW	GBW	CTD	SMO	TWP	CRS	NAT
Norm value area 3+5+9	100	11.2	4.2	6.0	4.4	24.5	7.7	39.8	2.3
Area 5	100	11.2	4.3	6.1	3.5	17.7	9.2	47.9	0.1
Area 5A									
Number	272	25	10	11	6	49	23	148	0
Percentage	100	9.2	3.7	4.0	2.2	18.0	8.5	<u>54.4</u>	0
Area 5B									
Number	141	17	3	17	2	30	15	56	1
Percentage	100	12.0	2.1	12.0	1.4	21.2	10.7	39.7	0.7
Area 5C									
Number	22	2	0	2	2	3	1	12	0
Percentage	100	9.1	0	9.1	9.1	13.6	4.5	<u>54.5</u>	0
Area 5D									
Number	72	11	3	4	1	10	9	34	0
Percentage	100	15.3	4.2	5.6	1.4	<u>13.8</u>	12.5	47.2	0
Area 5E									
Number	75	10	9	1	9	11	5	28	2
Percentage	100	13.3	12.0	1.3	12.0	14.7	6.7	37.3	2.7

Deviations from the general norm value of more than 5% are printed in bold type, deviations of more than 10% are also underlined.

comparison with the norm. In the case of the Smooth Wares the deviation from the norm is more than ten percent. The other deviations are found in the sub-areas with smaller numbers of vessels, 3F and 3G. Sub-area 3F deviates with a high percentage of Gallo-Belgic Wares and a low percentage of Smooth Wares, and 3G by a high percentage of Terra Sigillata and Coarse Wares and a low percentage of Smooth Wares.

Area 5 (Table 4.25) shows the most deviations quantitatively. Here more deviations are seen in groups other than those indicated by the trend, namely a higher percentage of Gallo-Belgic Wares in sub-area 5B and higher percentages of Fine Nijmegen and Coated Wares in 5E*. As had already been established at area-level, the group of Smooth Wares lags far behind in all the sub-areas except for 5B. In the sub-areas 5C* and 5D* the deviation is more than 10%. The

Coarse Wares are much better represented in the sub-areas 5A, 5C* and 5D* than the norm would suggest, in 5A and 5C* as much as 14% more. What is also remarkable is that sub-area 5C*, which is the smallest as far as the number of vessels is concerned, only shows deviations in the groups of Smooth and Coarse Wares.

The expected trend is followed most closely in area 9 (Table 4.26), although this area is quantitatively the smallest. The only exception is the highest percentage of Terra Sigillata in sub-area 9B*. Apart from that, this sub-area shows deviations with a high percentage of Smooth Wares, 14% more, and 13% more Native Pottery, and a very low percentage of Coarse Wares, almost 20% less. In view of the fact that deviations from the norm are also found in the other groups of this sub-area, though to a lesser extent, it may be regarded as the most deviant sub-area. This

Table 4.26 Nijmegen. Numbers of vessels and percentages of (the sub-areas of) area 9 concerning the ceramic groups compared to the norm values for the sum of all areas.

Ceramic group	Total	TS	FNW	GBW	CTD	SMO	TWP	CRS	NAT
Norm value area 3+5+9	100	11.2	4.2	6.0	4.4	24.5	7.7	39.8	2.3
Area 9	100	11.6	4.6	6.2	6.4	25.2	12.5	<u>27.9</u>	5.8
Area 9A									
Number	42	5	3	1	3	11	4	15	0
Percentage	100	11.9	7.1	2.4	7.1	26.2	9.5	35.7	0
Area 9B									
Number	39	8	0	1	0	15	1	8	6
Percentage	100	20.5	0	2.6	0	38.5	2.6	20.5	15.4
Area 9C									
Number	349	35	17	25	28	87	43	97	17
Percentage	100	10.0	4.9	7.5	8.0	24.8	12.4	<u>27.7</u>	4.9
Area 9D									
Number	50	8	0	3	0	8	12	14	5
Percentage	100	16.0	0	6.0	0	16.0	24.0	28.0	10.0

Deviations from the general norm value of more than 5% are printed in bold type, deviations of more than 10% are also underlined.

also applies, though slightly less so, to sub-area 9D*, with its high percentages of Thick-Walled Pottery, 16% more, and Native Pottery, and low percentages of Smooth and Coarse Wares, the latter with 11% less. This is almost certainly due to the small numbers of vessels in both sub-areas, although sub-area 9A* has just as few vessels and still shows not a single unusual deviation. Finally, in sub-area 9C, the group of Coarse Wares, as in 9B* and 9D*, stands out with its low percentage, 19% lower than the norm. The tendency observed in this area is therefore confirmed.

To sum up, it may be concluded that analysis at sub-area level revealed striking, and occasionally exceptional deviations in slightly more than 20% of cases. However, more than half these deviations appear to be connected with the smaller numbers of vessels present in a sub-area. Nevertheless, the other cases (c. 10%) appear to indicate that there are clear deviations in the composition of a pottery assemblage which are influenced by factors other than the small number of vessels.

²⁴⁵ In the tables, the Terra Sigillata categories are already combined. The Central/East Gaulish Sigillata vessels were found in the sub-areas 3B (1), 3G (1), 5B (3) and 5D* (2).

The pottery categories

Continuing the analysis on the slightly more detailed level of pottery categories, we are confronted by a new phenomenon, namely categories which are too small to be of any importance in a useful analysis. These are the categories of Central/East Gaulish Terra Sigillata (7 specimens), Gallo-Belgic Cork urns (23 specimens), two categories of the Coated Wares, Pompeian Red Ware (3 specimens) and Mica Dusted Ware (15 specimens), and the Thick-Walled Pottery category consisting of dolia (14 specimens). Of these, only the first category was included in further analysis by adding the few specimens to products originating from Southern Gaul.²⁴⁵

No further analysis was done of the remaining categories because with such small numbers, one vessel has an considerable influence within the category it belongs to. Nor could they be added to categories within the same pottery group because they would be too unique, both as far as fabric and form or function are concerned. The Gallo-Belgic Cork urns are regularly found at

Nijmegen, but appear to be dated mainly in the pre-Flavian period.²⁴⁶ They are still found in the Flavian period, though in smaller numbers.²⁴⁷ We shall focus attention later on one particular form and fabric of this category.²⁴⁸

Pompeian Red Ware is represented at Nijmegen, as elsewhere,²⁴⁹ in comparatively small numbers, and also appears to occur here more frequently in the pre-Flavian period than later on.²⁵⁰ Mica Dusted Ware is generally rare at Nijmegen, despite the fact that this category dates from the middle of the first century AD to the end of the second century.²⁵¹

What is somewhat surprising is the conclusion that, in contrast to what was expected, only a small number of dolia were found in the three areas. However, the fact that few dolia are found inside the Flavian castra is confirmed elsewhere.²⁵² A possible explanation for the almost total absence of this category will be given later.

An analysis was carried out in two ways of the other categories which were deemed to contain a sufficient number of specimens, both based on the cross-tabulation of the categories and the sub-areas. The results of the cross-tabulation were then included in Tables 4.27 and 4.28-29, with Table 4.27 focusing on the proportion of sub-areas per pottery category, and Table 4.28-29 emphasizing the proportion of pottery categories per sub-area.

The first analysis originated from the data in Table 4.27. The starting point was the proportion of each sub-area in the total sum of the vessels. If one assumes that the pottery was normally and equally spread over the areas, i.e. that the possibility exists that each specimen could be found anywhere, one may expect that the proportion of each sub-area in each pottery category is approximately equal to the proportion of the sub-area in the sum. In this way a comparison is made between the proportion of the sub-area to the total (Table 4.27 row Percentages/norm value) and the proportion (= percentage) within each category in the sub-areas.

The data from Table 4.27 show that the percentages of the sub-areas in each category are equal in only a few cases to the percentages expected on the basis of the proportion of the sub-area to the total, and that there are a great many deviations. For this reason, only those percentages, including the deviations,

which are 5% or more higher or lower than the expected percentages have been considered.

It is understood that a margin of 5% or more may be regarded as indicative. In accepting this margin, the problem arises that in sub-areas with a percentage which is less than 5% of the total, a deviation of this nature can only be determined if the deviation is higher than the percentage expected. Deviations of 5% or more lower than the percentage expected cannot therefore be observed in this case, but this is being disregarded for the time being. If, however, this method of analysis proves effective and useful, a solution to this problem will have to be found.

Comparison of the data according to the method described above results in 30 cases of deviations of more than 5%, four of which were even more than 10%, namely: sub-area 3A (TWPAMP), 3D (NAT), 5A (CRSNW) and 9C (NAT) (Fig. 4.4). Sub-areas with only one deviation are 3E, 5B, 5E*, 9B* and 9D*. Sub-areas with the most deviations are 3D (6) and 9C (7). Sub-area 3A has 4 deviations, sub-areas 3B and 5A have three deviations and sub-area 3C has two deviations. No deviations were observed in the sub-areas 3F, 3G, 5C*, 5D* and 9A*. It is interesting that the result of this method of analysis shows that the greatest number of deviations are observed in the sub-areas with larger numbers of vessels. The sub-areas with smaller numbers of vessels have the fewest deviations, which may be inherent to the fact that deviations of 5% or more lower than the percentage expected cannot be determined.

The second method of analysis was carried out in a similar way (Table 4.28-29). Here too, the starting point was the premise that the pottery was normally and equally distributed, but from the point of view of the proportion of each pottery category to the total number of vessels. From this premise, we may expect that in each sub-area the proportions of pottery categories are approximately equal to the proportions of each pottery category to the total, in other words, that each sub-area contains an approximately equal percentage of a pottery category to the proportion of that category to the total number of vessels. In this way the two proportions are compared with each other and several deviations can be determined. It was subsequently decided to retain the 5% margins here, which resulted in the same

²⁴⁶ Holwerda 1941, 75-77, and 111-114.

²⁴⁷ Cork urns from the Flavian castra: Bogaers & Haalebos 1976, 175 and Bogaers & Haalebos 1980, 45 and 51.

²⁴⁸ See Section 4.4.2 p. 147 (Cork urns).

²⁴⁹ Peacock 1977, 158; Wynia 1979, 428.

²⁵⁰ Stuart 1977b, 29-30; Bogaers & Haalebos

1977, 101; Bogaers & Haalebos 1980, 71.

²⁵¹ Stuart 1977b, 86-88; Bogaers & Haalebos

1976, 175; Bogaers & Haalebos 1977, 119;

Bogaers & Haalebos 1980, 84. Bogaers &

Haalebos include the category Mica

Dusted Ware among the Gallo-Belgic

Wares.

²⁵² Stuart 1977b, 64-65; Bogaers & Haalebos

1976, 180; Bogaers & Haalebos 1977, 123;

Bogaers & Haalebos 1980, 87.

Table 4.27 Nijmegen. Numbers of vessels per sub-area and per category and their proportions in terms of percentage of the total of all areas per category compared with numbers of all vessels per sub-area and their proportions in terms of percentage.

Sub-area	3A	3B	3C	3D	3E	3F	3G	5A	5B	5C*	5D*	5E*	9A*	9B*	9C	9D*	Total
Number	582	458	142	415	133	87	92	272	141	22	72	75	42	39	349	50	2971
Percentage/ norm value	19.6	15.4	4.8	14.0	4.5	2.9	3.1	9.2	4.7	0.7	2.4	2.5	1.4	1.3	11.7	1.7	100
TSS/C/EG																	
Number	53	63	21	43	10	6	16	25	17	2	11	10	5	8	35	8	333
Percentage	15.9	19.0	6.3	12.9	3.0	1.8	4.8	7.5	5.1	0.6	3.3	3.0	1.5	2.4	10.5	2.4	11.2
FNW																	
Number	27	12	4	26	4	4	4	10	3	-	3	9	3	-	17	-	126
Percentage	21.4	9.4	3.2	20.6	3.2	3.2	3.2	7.9	2.4	-	2.4	7.1	2.4	-	13.5	-	4.2
GBWCOR*																	
Number	2	2	-	5	-	2	-	5	5	-	-	-	-	1	3	-	25
Percentage	8.0	8.0	-	20.0	-	8.0	-	20.0	20.0	-	-	-	-	4.0	12.0	-	0.8
GBWTNI																	
Number	40	18	8	18	6	11	2	6	12	2	4	1	1	-	22	3	154
Percentage	26.0	11.7	5.2	11.7	3.9	7.1	1.3	3.9	7.8	1.3	2.6	0.6	0.6	-	14.3	1.9	5.2
CTDTEC																	
Number	21	10	2	23	9	1	2	5	1	1	1	9	3	-	23	-	111
Percentage	18.9	9.0	1.8	20.7	8.1	0.9	1.8	4.5	0.9	0.9	0.9	8.1	2.7	-	20.7	-	3.7
CTDPOM*																	
Number	1	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	3
Percentage	33.3	-	-	-	-	-	-	33.3	-	33.3	-	-	-	-	-	-	0.1
CTDMIC*																	
Number	-	4	-	4	-	1	-	-	1	-	-	-	-	-	5	-	15
Percentage	-	26.7	-	26.7	-	6.7	-	-	6.7	-	-	-	-	-	33.3	-	0.5
SMOFLA																	
Number	126	100	29	69	21	11	11	32	24	3	5	7	8	14	60	6	526
Percentage	24.0	19.0	5.5	13.1	4.0	2.1	2.1	6.1	4.6	0.6	0.9	1.3	1.5	2.7	11.4	1.1	17.8
SMOTHJ																	
Number	27	19	14	18	3	1	2	7	4	-	5	2	1	-	22	-	125
Percentage	21.6	15.2	11.2	14.4	2.4	0.8	1.6	5.6	3.2	-	4.0	1.6	0.8	-	17.6	-	4.2
SMOOTH																	
Number	11	13	8	8	8	2	4	10	2	-	-	2	2	1	5	2	78
Percentage	14.1	16.7	10.2	10.2	10.2	2.6	5.1	12.8	2.6	-	-	2.6	2.6	1.4	6.4	2.6	2.6
TWPAMP																	
Number	4	11	4	6	5	4	2	7	9	1	3	3	4	-	16	4	83
Percentage	4.8	13.3	4.8	7.2	6.0	4.8	2.4	8.4	10.8	1.2	3.6	3.6	4.8	-	19.3	4.8	2.8
TWPDOL*																	
Number	1	1	-	1	1	-	2	1	-	-	1	-	-	-	3	3	14
Percentage	7.1	7.1	-	7.1	7.1	-	14.3	7.1	-	-	7.1	-	-	-	21.4	21.4	0.5

Table 4.27 Nijmegen. Numbers of vessels per sub-area and per category and their proportions in terms of percentage of the total of all areas per category compared with numbers of all vessels per sub-area and their proportions in terms of percentage (continuation).

Sub-area	3A	3B	3C	3D	3E	3F	3G	5A	5B	5C*	5D*	5E*	9A*	9B*	9C	9D*	Total
TWPMOR																	
Number	21	22	9	11	4	3	3	15	6	-	5	2	-	1	24	5	131
Percentage	16.0	16.8	6.8	8.4	3.1	2.3	2.3	11.5	4.6	-	3.8	1.5	-	0.8	18.3	3.8	4.4
CRSNW																	
Number	70	47	15	97	20	17	23	94	23	3	27	19	3	3	14	-	475
Percentage	14.7	9.9	3.2	20.4	4.2	3.6	4.8	19.8	4.8	0.6	5.7	4.0	0.6	0.6	2.9	-	16.0
CRSOTH																	
Number	160	129	28	83	39	20	21	54	33	9	7	9	12	5	83	14	706
Percentage	22.7	18.3	4.0	11.8	5.5	2.8	3.0	7.6	4.7	1.3	1.0	1.3	1.7	0.7	11.8	2.0	23.8
NAT																	
Number	18	9	-	2	3	4	-	-	1	-	-	2	-	6	17	5	67
Percentage	26.9	13.4	-	3.0	4.5	6.0	-	0.0	1.5	-	-	3.0	-	9.0	25.4	7.5	2.3

Proportions in terms of percentage (= norm value in bold) of the total of all vessels of all (sub-)areas. The deviations from the general norm value of more than 5% are printed in bold type, deviations of more than 10% are also underlined. For the abbreviations see Table 4.1; sub-area and category with asterisk: small number of vessels, deviation for this reason not indicated. Italics in last column: percentage from the total of all vessels of all sub-areas.

Subarea	3A	3B	3C	3D	3E	3F	3G	5A	5B	5C*	5D*	5E*	9A*	9B*	9C	9D*
Pottery categories																
TSS/C/EG																
FNW		□	○													
GBWTNI	○							□								
CTDTEC		□	○								○				○	
SMOFLA																
SMOTHJ			○												○	
SMOOTH	□		○	○											□	
TWPAMP	■			□					○						○	
TWPMOR				□											○	
CRSNW		□	○					●							□	
CRSOTH																
NAT	○			■				□						○	●	○

Figure 4.4 Nijmegen. Numbers of vessels and proportions in terms of percentage of the sub-areas per ceramic group (see Table 4.27). Categories with a small number of vessels are not considered. Sub-area number with asterisk: small number of vessels (see note 244). Legend of the deviations from the general norm value of more than 5% and more than 10%: ○ >5<10% more; ● >10% more; □ >5<10% less; ■ >10% less.

Table 4.28 Nijmegen. Numbers of vessels per sub-area and category and their proportions in terms of percentage of the total of all vessels per sub-area compared with the numbers per category and their proportions in terms of percentage.

Sub-area	3A	3B	3C	3D	3E	3F	3G	5A	5B	5C*	5D*	5E*	9A*	9B*	9C	9D*	Total
Number	582	458	142	415	133	87	92	272	141	22	72	75	42	39	349	50	2971
Percentage/ norm value	19.6	15.4	4.8	14.0	4.5	2.9	3.1	9.2	4.7	0.7	2.4	2.5	1.4	1.3	11.7	1.7	100
TSS/C/EG																	
Number	53	63	21	43	10	6	16	25	17	2	11	10	5	8	35	8	333
Percentage	9.1	13.7	14.8	10.4	7.5	6.9	17.4	9.2	12.0	9.1	15.3	13.3	11.9	20.5	10.0	16.0	11.2
FNW																	
Number	27	12	4	26	4	4	4	10	3	-	3	9	3	-	17	-	126
Percentage	4.6	2.6	2.8	6.3	3.0	4.6	4.3	3.7	2.1	-	4.2	12.0	7.1	-	4.9	-	4.2
GBWCOR*																	
Number	2	2	-	5	-	2	-	5	5	-	-	-	-	1	3	-	25
Percentage	0.3	0.4	-	1.2	-	2.3	-	1.8	3.5	-	-	-	-	2.6	0.9	-	0.8
GBWTNI																	
Number	40	18	8	18	6	11	2	6	12	2	4	1	1	-	22	3	154
Percentage	6.9	3.9	5.6	4.3	4.5	12.6	2.2	2.2	8.5	9.1	5.6	1.3	2.4	0.0	6.3	6.0	5.2
CTDTEC																	
Number	21	10	2	23	9	1	2	5	1	1	1	9	3	-	23	-	111
Percentage	3.6	2.2	1.4	5.5	6.8	1.1	2.2	1.7	0.7	4.5	1.4	12.0	7.1	-	6.6	-	3.7
CTDPOM*																	
Number	1	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	3
Percentage	0.2	-	-	-	-	-	-	0.4	-	4.5	-	-	-	-	-	-	0.1
CTDMIC*																	
Number	-	4	-	4	-	1	-	-	1	-	-	-	-	-	5	-	15
Percentage	-	0.9	-	1.0	-	1.1	-	-	0.7	-	-	-	-	-	1.4	-	0.5
SMOFLA																	
Number	126	100	29	69	21	11	11	32	24	3	5	7	8	14	60	6	526
Percentage	21.6	21.8	20.4	16.6	15.8	12.6	12.0	11.8	17.0	13.6	6.9	9.3	19.0	35.9	17.2	12.0	17.9
SMOTHJ																	
Number	27	19	14	18	3	1	2	7	4	-	5	2	1	-	22	-	125
Percentage	4.6	4.1	9.9	4.3	2.3	1.1	2.2	2.6	2.8	-	6.9	2.7	2.4	-	6.3	-	4.2
SMOOTH																	
Number	11	13	8	8	8	2	4	10	2	-	-	2	2	1	5	2	78
Percentage	1.9	2.8	5.6	1.9	6.0	2.3	4.3	3.7	1.4	-	-	2.7	4.8	2.6	1.4	4.0	2.6
TWPAMP																	
Number	4	11	4	6	5	4	2	7	9	1	3	3	4	-	16	4	83
Percentage	0.7	2.4	2.8	1.4	3.8	4.6	2.2	2.6	6.4	4.5	4.2	4.0	9.5	-	4.6	8.0	2.8
TWPDOL*																	
Number	1	1	-	1	1	-	2	1	-	-	1	-	-	-	3	3	14
Percentage	0.2	0.2	-	0.2	0.8	-	2.2	0.4	-	-	1.4	-	-	-	0.9	6.0	0.5

Table 4.28 Nijmegen. Numbers of vessels per sub-area and category and their proportions in terms of percentage of the total of all vessels per sub-area compared with the numbers per category and their proportions in terms of percentage (continuation).

Sub-area	3A	3B	3C	3D	3E	3F	3G	5A	5B	5C*	5D*	5E*	9A*	9B*	9C	9D*	Total
TWPMOR																	
Number	21	22	9	11	4	3	3	15	6	-	5	2	-	1	24	5	131
Percentage	3.6	4.8	6.3	2.7	3.0	3.4	3.3	5.5	4.3	-	<u>6.9</u>	2.7	-	2.6	6.9	10.0	4.4
CRSNW																	
Number	70	47	15	97	20	17	23	94	23	3	27	19	3	3	14	-	475
Percentage	12.0	10.3	10.6	23.4	15.0	19.5	25.0	35.6	16.3	13.6	37.5	25.3	7.1	7.7	4.0	0.0	16.0
CRSOTH																	
Number	160	129	28	83	39	20	21	54	33	9	7	9	12	5	83	14	706
Percentage	27.5	28.2	19.7	20.0	29.3	23.0	22.8	19.9	23.4	40.9	9.7	12.0	28.6	12.8	23.8	28.0	23.8
NAT																	
Number	18	9	-	2	3	4	-	-	1	-	-	2	-	6	17	5	67
Percentage	3.1	2.0	-	0.5	2.3	4.6	-	-	0.7	-	-	2.7	-	15.4	4.9	10.0	2.3

Proportions in terms of percentage (= norm value in bold) of the total of all vessels of all (sub-)areas. The deviations from the general norm value (=Table 4.27 column 'total') of more than 5% are printed in bold type, deviations of more than 10% are also underlined. For the abbreviations see Table 4.1; sub-area and category with asterisk: small number of vessels, deviation for this reason not indicated. Italics in last column: percentage from the total of all vessels of all sub-areas.

Subarea	3A	3B	3C	3D	3E	3F	3G	5A	5B	5C*	5D*	5E*	9A*	9B*	9C	9D*
Pottery categories																
TSS/C/EG							○							○		
FNW												○				
GBWTNI						○								□		
CTDTEC												○				
SMOFLA						□	□	□			■	□		●		□
SMOTHJ			○												○	
SMOOTH																
TWPAMP													○			○
TWPMOR																○
CRSNW		□	□	○			○	●			●	○	□	□	■	■
CRSOTH				○						●	■	■		■		
NAT														●		○

Figure 4.5 Nijmegen. Numbers of vessels and proportions in terms of percentage of the ceramic groups per sub-areas (see Table 4.28). Categories with a small number of vessels are not considered. Sub-area number with asterisk: small number of vessels (see note 244). Legend of the deviations from the general norm value of more than 5% and more than 10%: ○ >5<10% more; ● >10% more; □ >5<10% less; ■ >10% less.

Table 4.29 Nijmegen. Numbers of vessels for pits with more than 40 vessels per pit and category and their proportions in terms of percentage of the total of all vessels per pit compared with the numbers per category and their proportions in terms of percentage.

Sub-area	3A	3A	3B	3B	3B	3C	3D	3D	3D	3E	5A	5B	5E*	
Find number	568	718	527	529	530	579	1	2	38	21	963	1061	1587	
Volume in m ³	4	12.76	1.34	7.95	5.97	1.77	-	-	3.5m2	28.48	23.8	4.42	8.19	
Number	45	138	112	76	62	41	151	72	60	50	80	50	46	Total (=Table 4.28) 2971=100%
														Percentage/norm value
TSS/C/EG														
Number	2	14	11	13	7	5	--	-	13	4	11	8	4	333
Percentage	4.4	10.1	9.8	17.1	11.3	12.2	0.0	0.0	21.7	8.0	13.7	16.0	8.7	11.2
FNW														
Number	1	8	3	2	2	-	12	6	3	4	1	-	6	126
Percentage	2.2	5.8	2.7	2.6	3.2	-	7.9	8.3	5.0	8.0	1.2	-	13.0	4.2
GBWCOR*														
Number	-	1	-	-	-	-	-	4	-	-	20	-	-	25
Percentage	-	0.7	-	-	-	-	-	5.6	-	-	2.5	-	-	0.8
GBWTNI														
Number	1	10	6	3	-	1	6	3	1	-	1	3	1	154
Percentage	2.2	7.2	5.4	3.9	-	2.4	4.0	4.2	1.7	-	1.2	6.0	2.2	5.2
CTDTEC														
Number	-	1	3	2	-	1	4	8	6	2	1	-	5	111
Percentage	-	0.7	2.7	2.6	-	2.4	2.6	11.1	10.0	4.0	1.2	-	10.9	3.7
CTDPOM*														
Number	-	1	-	-	-	-	-	-	-	-	-	-	-	3
Percentage	-	0.7	-	-	-	-	-	-	-	-	-	-	-	0.1
CTDMIC*														
Number	-	-	1	1	-	-	1	2	-	-	-	-	-	15
Percentage	-	-	0.9	1.3	-	-	0.7	2.8	-	-	-	-	-	0.5
SMOFLA														
Number	27	19	27	11	19	8	21	11	10	8	7	5	4	526
Percentage	60.0	13.8	24.1	14.5	30.6	19.5	13.9	15.3	16.7	16.0	8.0	10.0	8.7	17.9
SMOTHJ														
Number	7	6	6	2	1	2	3	2	4	1	-	2	2	125
Percentage	15.6	4.3	5.4	2.6	1.6	4.9	2.0	2.8	6.7	2.0	-	4.0	4.3	4.2
SMOOTH														
Number	1	2	1	2	4	3	3	-	3	1	4	-	1	78
Percentage	2.2	1.4	0.9	2.6	6.4	7.3	2.0	-	5.0	2.0	5.0	-	2.2	2.6
TWPAMP														
Number	1	-	-	3	-	3	2	1	2	3	1	4	3	83
Percentage	2.2	-	-	3.9	-	7.3	1.3	1.4	3.3	6.0	1.3	8.0	6.5	2.8
TWPDOL*														
Number	-	-	-	-	-	-	-	-	-	-	1	-	-	14
Percentage	-	-	-	-	-	-	-	-	-	-	1.1	-	-	0.5

Table 4.29 Nijmegen. Numbers of vessels for pits with more than 40 vessels per pit and category and their proportions in terms of percentage of the total of all vessels per pit compared with the numbers per category and their proportions in terms of percentage (continuation).

Sub-area	3A	3A	3B	3B	3B	3C	3D	3D	3D	3E	5A	5B	5E*	
TWPMOR														
Number	2	5	4	3	2	7	3	-	5	3	7	5	2	131
Percentage	4.4	3.6	3.6	3.9	3.2	17.1	2.0	-	8.3	6.0	8.7	10.0	4.3	4.4
CRSNW														
Number	1	17	7	11	7	-	66	20	6	12	32	13	13	475
Percentage	2.2	12.3	6.2	14.5	11.3	0.0	43.7	27.8	10.0	24.0	40.0	26.0	28.3	16.0
CRSOTH														
Number	2	53	43	22	20	11	30	15	7	12	12	10	5	706
Percentage	4.4	38.4	38.4	28.9	32.3	26.8	19.9	20.8	11.7	24.0	15.0	20.0	10.9	23.8
NAT														
Number	-	1	-	1	-	-	-	-	-	-	-	-	-	67
Percentage	-	0.7	-	1.3	-	-	-	-	-	-	-	-	-	2.3

Proportions in terms of percentage (= norm value) of the total of all vessels of all (sub-)areas (bold). The deviations from the general norm value of more 5% are printed in bold type, deviations of more than 10% are also underlined. For the abbreviations see Table 4.1; sub-area and category with asterisk: small number of vessels, deviation for this reason not indicated.

problem as in the first method of analysis, i.e. a number of pottery categories are represented by percentages of less than 5%. As mentioned above, these have been disregarded for the time being.

On the basis of this comparison, a total of thirty-five deviations of more than 5% were observed, eleven of which were even more than 10% (Fig. 4.5). In only two sub-areas, 3A and 5B, were no deviations observed, whereas in five sub-areas, namely 3B, 3D, 3E, 5C* and 9C, there was a single deviation. There were two deviations in 3C, 3F, 5A and 9A*. Sub-area 9B* has the greatest number of deviations, which is six. The other sub-areas have three deviations - 3G and 5D* - or five: 5E* and 9D*.

The distribution of the deviations seems to be somewhat contrary to that of the first analysis. Most of the deviations now seem to occur in the sub-areas with small numbers of vessels, although one has the impression that the distribution of the deviations is slightly more differentiated. What is very striking is that the majority of deviations are found in the category of Coarse Nijmegen Ware, far more than in any of the other categories. In addition, deviations are now found in categories in which none were revealed by the first analysis,

namely Terra Sigillata, the Smooth flagons and the other Coarse Wares.

Both methods of analysis show that marked differences in the composition of the pottery assemblages of the sub-areas can be observed, some of which have no connection with the use of numbers which are possibly too small. Moreover, when the results of both analyses are compared, an observed deviation in a certain category in a number of sub-areas can be seen in both analyses. In the category of Coarse Nijmegen Ware, these are the sub-areas 3B, 3D, 5A and 9C, Native Pottery in 9B and 9D*, Coated 'Technique' Wares in 5E*, and Smooth two-handed jugs in 3C. We may perhaps conclude from this that there are significant differences in these cases. Here too, it is striking that most of the differences are again found in the Coarse Nijmegen Ware, which possibly indicates that this category is certainly not normally and equally distributed, and that it is an important indicator for marked differences.

In order to gain some insight in deviations which may occur at individual pit level, the pottery assemblages of a small number of pits were examined (Table 4.29 and Fig. 4.6). For this purpose, pits with at least 40 specimens were chosen so as to avoid obtaining too large

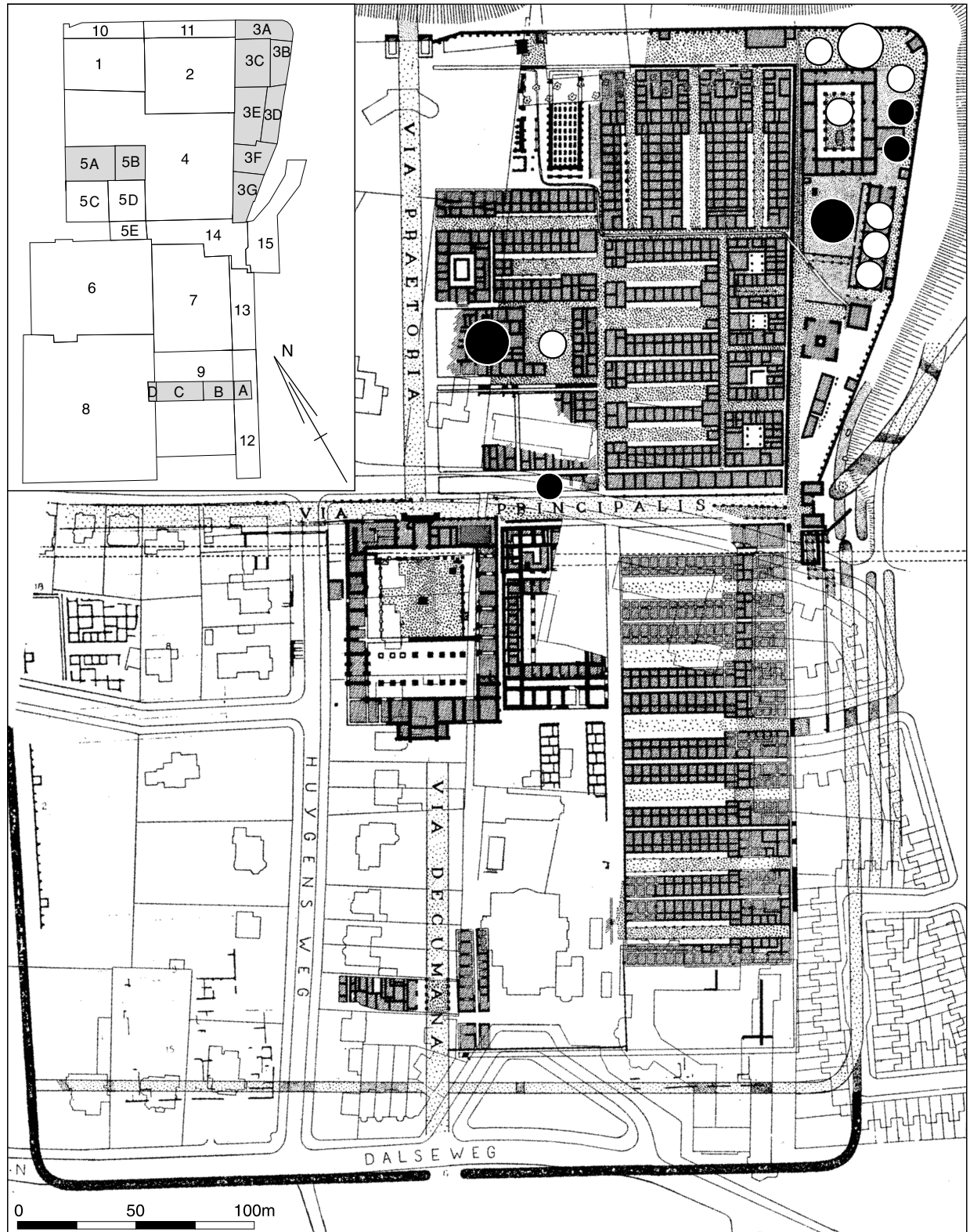


Figure 4.6 Nijmegen. Numbers of vessels and proportions in terms of percentage of the ceramic groups: distribution of pits with more than 40 vessels (see Table 4.29). Scale 1:2,500.

Legend for the volume of the pits: small circle 0-5 m³; small dot >5<10 m³; large circle >10<20 m³; large dot >20m³.

discrepancies as a result of too few specimens. These pits are, of course, unusual because of their great deviation from the average number of 8.7 vessels per pit. The proportions of the pottery categories from these pits were compared with the proportions of each pottery category to the total. Here too, the relatively small numbers have to be taken into account, as do the previously-mentioned consequences regarding pottery categories of less than 5%. For this reason only the most striking deviations will be considered per pit. Area 3 has the most pits with more than 40 vessels, namely 10. In area 5 there are only 3 such pits and in area 9 none at all. For this reason attention will only be paid to the most striking deviations per pit.

Pit 1961/568 (sub-area 3A) is unusual for the fact that more than three-quarters of the vessels belong to the Smooth Wares, the largest category of which being the flagons which account for 60% of the total. In contrast, the Coarse Wares are almost entirely lacking, Coarse Nijmegen Ware being almost 15% less, and Coarse Other Fabrics almost 15% more. The same deviation as the latter is also found in pit 1961/527 (3B). Pit 1961/529 (3B) shows no deviations worth mentioning, nor does pit 1959/21 (3E). In pit 1961/530 (3B) the only deviation is found in the Smooth Flagons with over 12% more. The finds from pit 1961/579 (3C) deviate with a high percentage of mortaria and the total absence of Coarse Nijmegen Ware vessels. The pits 1959/1 (3D) and 1959/2 (3D) show similarities in the total absence of Terra Sigillata vessels and much higher percentages of Coarse Nijmegen Ware. In pit 1959/1 this category accounts for almost 44% of the total, and in pit 1959/2 for 28%. Pit 1959/38 (3D) alone has a higher percentage of Terra Sigillata. In addition, this pit has a remarkably lower percentage of Coarse Other Fabrics. In the pits in area 5, all deviations are found in the Coarse Wares. The pits 1962/963 (5A) and 1963/1061 (5B) show, as does pit 1965/1587 (5E*), remarkably higher percentages of Coarse Nijmegen Ware with 24%, 12% and 14% more, respectively. The latter pit also deviates in the Coarse Other Fabrics by almost 12% less.

Despite the necessary restrictions, in these pits deviations from the expected pattern occur which are quite remarkable, and which are

worthy of attention at this level of analysis.

Some deviations, such as the Smooth Flagons and the Coarse Wares in pit 1961/568 (3A) and the Coarse Nijmegen Ware in pit 1959/1 (3D), may be regarded as significant.

Apart from the pits with more than 40 vessels, strong deviations in assemblages in pits with a smaller number of vessels were also considered, some examples of which follow. Pit 1961/512 (3B) is unusual in that almost half of the vessels belong to the material group of Thick-Walled Pottery, namely four amphorae and five mortaria out of 20 vessels. Five out of nineteen vessels from pit 1962/825 (5B) are decorated Terra Sigillata vessels: four DRAG 29 and one DRAG 30. In pit 123/41 (9D*) four amphorae out of 37 vessels are remarkable.

The pottery types and forms

The following stage in the pottery analysis is a classification at the detailed level of type or form. This refinement naturally means that the number of vessels on which the analysis is based is even smaller than in the preceding analyses. Nevertheless, in this case too, the analysis was done even with small numbers to see whether analysis at this level was useful, and it resulted in remarkable differences which could be interpreted at a later moment.

Obviously not all types and forms could be used in the analysis. It was clear that in the case of forms which had become clearly visible at category level, such as jugs, two-handled jugs and mortaria, further analysis of form would not produce any more information. This is certainly so with the Native Pottery which reached the final stage of analysis at the level of the pottery groups. It was decided that forms would be selected which are found in a number of categories, namely plates and beakers, cups or bowls, so that these types could be compared. In the Terra Sigillata category, the choice fell on the DRAG 18 and DRAG 27 types, in the Fine Nijmegen Ware the HNW 7 and HNW 37 types, in the Gallo-Belgic Wares the HBW 28 type and all Terra Nigra plates were taken, and in the Coated Wares a combination of the ST 1 and ST 2 types. In the latter category the plates were not included in the analysis since there were only 2 specimens of the ST 10 type present in the whole assemblage.

In addition, the decorated forms were selected from the Terra Sigillata category because these

Subarea	3A	3B	3C	3D	3E	3F	3G	Total	5A	5B	5C*	5D*	5E*	Total	9A*	9B*	9C	9D*	Total
Selected pottery types																			
TS/DRAG 18	□	○																	
TS/DRAG 27		○																	
TS/DRAG 29/37	■	□		□				■		●		○		●					
TS/DECORATED	■	□		□				■		○		○		●					
FNW/HNW 7	□	□						■	○				●	●			○		
FNW/HBW 37	■			○				■	●				●	●			■		■
GBW/TNI HNW 28	●	□						●	□		○			□			□		■
GBW/TNI PLATES		□		■		○		□	□	○							○	○	●
CTD/TEC ST 1/2				●	○			●	□					■			□		□
CRS/NW HNW 62	□	□		○			○		●			○		●			□		■
CRS/NWHNW 66	■	□		●					○					●			□		■
CRS/OTH ST 201		○						●						□					
CRS/OTH ST 210					○			●											□
TWP/AMP FISH SAUCE	■	□		□				■							●		●		●
TWP/AMP OLIVE OIL	■	●	○	■		○		□									●		●
TWP/AMP WINE	■	□		□				■		●		○		●				○	○

Figure 4.7 Nijmegen. The legionary fortress. Overview of the deviations of more than +/- 5% of the observed percentages of selected forms (plates, beakers, cups or bowls, amphorae) of pottery categories within the assemblages of areas 3, 5 and 9 arranged per sub-area and compared to the percentages expected on the basis of the proportion of the pottery category to the total of vessels of that category (see also Table 4.30-36). Sub-area number with asterisk: small number of vessels (see note 244). Legend of the deviations from the general norm value of more than 5% and more than 10%: ○ >5<10% more; ● >10% more; □ >5<10% less; ■ >10% less.

were suspected to belong to the most valuable forms of pottery. Both categories of Coarse Wares each provided two types which are quantitatively most frequently found in their category, and which are the same form in each category. These are the HNW 62 and HNW 66 types of Coarse Nijmegen Ware and ST 201 and ST 210 types of Coarse Other Fabrics.

The amphorae were the last category to be re-analysed. A different strategy was used here. Selection did not take place on the basis of form alone, but on the basis of the contents of the amphorae which were associated with various types, namely fish sauce, olive oil and wine.

Again, analysis was done by means of the

cross-tabulation of types and forms with the sub-areas. In each case the percentage of a type or form found in a sub-area was compared with that of the sub-area to the total of all vessels (Table 4.30-36). Since this is based on the largest number of vessels it is least subject to fluctuation.²⁵³ The expected proportion per type or form is based on this percentage. In addition, the level of the area is also included in this analysis and in each case a comparison is made between the sum of the percentages per form or type of the sub-areas of each area together, and the proportion of each area to the total number of vessels.²⁵⁴ It appeared that the results of these analyses were often clearest at this level. In all comparisons 5% margins were

²⁵³ In each table of selected types or forms the percentages of the categories to which the form or forms in question belong are also given.

²⁵⁴ Here, too, the percentage of each category in an area has been included in the table.

Table 4.30 Nijmegen. Numbers of vessels per (sub-)area and Terra Sigillata group of selected types and their proportions in terms of percentage of the total of all vessels of all areas of the selected type compared with percentages of the total of all vessels of all areas for the sub-area.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Total 3	5A	5B	5C*	5D*	5E*	Total 5	9A*	9B*	9C	9D*	Total 9	Total 3+5+9
Percentage/ norm value	19.6	15.4	4.8	14.0	4.5	2.9	3.1	64.2	9.2	4.7	0.7	2.4	2.5	19.6	1.4	1.3	11.7	1.7	16.2	100
Perct. TS	15.9	18.9	6.3	12.9	3.0	1.8	4.8	63.7	7.5	5.1	0.6	3.3	3.0	19.5	1.5	2.4	10.5	2.4	16.8	100
DRAG 18																				
Number	16	25	7	18	4	4	5	79	10	6	-	4	2	22	3	1	9	1	14	115
Percentage	13.9	21.7	6.1	15.7	3.5	3.5	4.3	68.7	8.7	5.2	-	3.5	1.7	19.1	2.6	0.9	7.8	0.9	12.2	100
DRAG 27																				
Number	16	24	7	12	4	-	4	67	6	-	2	3	4	15	1	1	12	2	16	98
Percentage	16.3	24.5	7.1	12.2	4.1	-	4.1	68.4	6.1	-	2.0	3.1	4.1	15.3	1.0	1.0	12.2	2.0	16.3	100
DRAG 29/37																				
Number	3	2	2	2	1	1	2	13	4	7	-	4	2	17	-	-	4	2	6	36
Percentage	8.3	5.5	5.5	5.5	2.7	2.7	5.5	36.1	11.1	19.4	-	11.1	5.5	47.2	-	-	11.1	5.5	16.7	100
DECORATED																				
Number	4	4	4	4	1	1	2	20	5	7	-	4	2	18	-	1	7	2	10	48
Percentage	8.3	8.3	8.3	8.3	2.1	2.1	4.2	41.7	10.4	14.6	-	8.3	4.2	37.5	-	2.1	14.6	4.2	20.8	100

(Percentage/norm value: see Table 4.27 'number' and 'percentage'). Form DRAG 29/37 is included in DECORATED Terra Sigillata. Sub-area number with asterisk: small number of vessels. The deviations from the general norm value of more than 5% are printed in bold type, deviations of more than 10% are also underlined.

allowed for in determining deviations, and the previously-mentioned implications were ignored.

The analyses according to form and type are summarized in Fig. 4.7 and discussed per form or type.

Terra Sigillata

The Terra Sigillata plate DRAG 18 shows the most proportional distribution of all the forms and types analysed (Table 4.30). Only in sub-area 3B is this type represented by a higher percentage than expected. The cup DRAG 27 was also found more frequently in sub-area 3B than the percentage expected. This type appears to score lower in the total of area 5, particularly as a result of lower percentages in the sub-areas 5A and 5B.

The analyses of the decorated Terra Sigillata forms show very striking deviations. In the first analysis the DRAG 29 and DRAG 37 types were combined. Comparison with the expected percentages indicates that in the sub-areas 3A,

3B and 3D lower percentages are found, and in 3A and 3B even approximately 10% lower, with the result that the total percentage of area 3 remains almost 30% below the percentage expected. Since only slight deviations were observed in area 9, the picture shown by area 5 is the reverse of area 3. In all the sub-areas of area 5 the percentages are higher, with the clearest deviations in sub-areas 5B and 5D*, at least 14% and 8% more, respectively. Almost half of the DRAG 29 and DRAG 37 types are therefore found in area 5.

If all the decorated Terra Sigillata types²⁵⁵ are taken together, the comparison shows that the percentages in area 3 remain low. The deviations are observed in the same sub-areas, but now more than 10% lower in sub-area 3A. The percentages of areas 3 and 9 rise slightly, causing the percentage in area 5 to drop with regard to the analysis with DRAG 29 and DRAG 37. The clearest deviations in area 5 are visible in sub-areas 5B and 5D*. The deviations in areas 3 and 5 remain highly unusual, i.e. 23% less

²⁵⁵ DRAG 29, DRAG 30, DRAG 37, DECH 67, and KNORR 78.

Table 4.31 Nijmegen. Numbers of vessels per (sub-)area of selected types of Fine Nijmegen Ware and their proportions in terms of percentage of the total of all vessels of all areas of the selected type compared with percentages of the total of all vessels of all areas for the sub-area.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Total 3	5A	5B	5C*	5D*	5E*	Total 5	9A*	9B*	9C	9D*	Total 9	Total 3+5+9
Percentage/ norm value	19.6	15.4	4.8	14.0	4.5	2.9	3.1	64.2	9.2	4.7	0.7	2.4	2.5	19.6	1.4	1.3	11.7	1.7	16.2	100
Perct. FNW	21.4	9.5	3.2	20.6	3.2	3.2	3.2	64.3	7.9	2.4	-	2.4	7.1	19.8	2.4	-	13.5	-	15.9	100
HNW 7																				
Number	3	2	1	3	-	1	-	10	4	1	-	-	4	9	-	-	5	-	5	24
Percentage	12.5	8.3	4.1	12.5	-	4.1	-	<u>41.6</u>	16.7	4.1	-	-	16.7	37.5	-	-	20.8	-	20.8	100
HNW 37																				
Number	1	2	-	3	1	-	-	7	4	1	-	1	2	8	-	-	-	-	-	15
Percentage	<u>6.7</u>	13.3	-	20.0	6.7	-	-	<u>46.7</u>	<u>26.7</u>	6.7	-	6.7	13.3	53.3	-	-	<u>0.0</u>	-	<u>0.0</u>	100

(Percentage/norm value: see Table 4.27 'number' and 'percentage'). Sub-area number with asterisk: small number of vessels. The deviations from the general norm value of more than 5% are printed in bold type, deviations of more than 10% are also underlined.

and 18% more than the percentage expected respectively. The decorated forms added therefore appear to even out the percentage proportion as it was in the case of the large decorated forms. In the Terra Sigillata category, the undecorated forms were fairly equally distributed, whereas the decorated forms showed striking differences in distribution, particularly per area.

Fine Nijmegen Ware

In this category the selected forms are few in number so the results of the comparison may be distorted (Table 4.31). The HNW 7 beaker is underrepresented in almost all sub-areas of area 3, and particularly in sub-areas 3A and 3B. The percentage of this area is therefore at least 20% under the percentage expected. In contrast, area 5 scores twice as high a percentage as expected due to striking deviations in 5A and 5E*. In area 9, sub-area 9C actually deviates more than 5% more than the percentage expected, but since this type is absent in the other sub-areas it does not affect the total percentage of this area. The HNW 37 plate is only represented by 15 specimens and is totally absent in area 9. Area 3 has a much lower percentage in sub-area 3A, but a much higher one in 3D. Nevertheless, the whole of this area does not come up to the percentage expected

for this type. Area 5 scores much higher due to strong deviations in sub-areas 5A and 5E*, and in sub-area 5A the deviation is more than 15% more than expected.

The distribution of the types of Fine Nijmegen Ware therefore produces a picture which is more or less identical to that of the terra sigillata, on the understanding that deviations are now also found in area 9.

Gallo-Belgic Wares

Of the drinking beaker HBW 28, almost 83% of the specimens were found in area 3, a deviation of at least 17% higher (Table 4.32). This deviation is mainly a result of the strong deviation in sub-area 3A, which has twice as high a percentage as was expected, and despite a lower percentage in sub-area 3B. This type scores lower than expected in both area 5 and area 9, more than 10% lower in area 9, due to a lower percentage in sub-area 9C and its total absence in the other sub-areas. The deviation in area 5 is caused by the complete absence of this form in sub-area 5A.

The percentages of Terra Nigra plates are too low in sub-areas 3B and 3D, causing a 10% lower percentage in the whole of area 3. Area 5 shows a lower percentage in sub-area 5A, but a higher one in sub-area 5B, so that there is hardly any deviation in the total of the area. Due

Table 4.32 Nijmegen. Numbers of vessels per (sub-)area of selected types of Gallo-Belgic Wares and their proportions in terms of percentage of the total of all vessels of all areas of the selected type compared with percentages of the total of all vessels of all areas for the sub-area.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Total 3	5A	5B	5C*	5D*	5E*	Total 5	9A*	9B*	9C	9D*	Total 9	Total 3+5+9	
Percentage/ norm value	19.6	15.4	4.8	14.0	4.5	2.9	3.1	64.2	9.2	4.7	0.7	2.4	2.5	19.6	1.4	1.3	11.7	1.7	16.2	100	
Perct. GBWTNI	26.0	11.7	5.2	11.7	3.9	7.1	1.3	66.9	3.9	7.8	1.3	2.6	0.6	16.2	0.6	-	14.3	1.9	16.9	100	
HNW 28																					
Number	15	3	3	6	1	1	-	29	-	2	2	-	-	4	-	-	2	-	2	35	
Percentage	42.8	8.5	8.5	17.0	2.8	2.8	-	82.8	0.0	5.7	5.7	-	-	11.4	-	-	5.7	-	5.7	100	
TNI PLATES																					
Number	8	2	2	1	-	3	2	18	-	4	-	1	-	5	1	-	6	3	10	33	
Percentage	24.2	6.0	6.0	3.0	-	9.0	6.0	54.5	0.0	12.1	-	3.0	-	15.1	3.0	-	18.2	9.0	30.3	100	

(Percentage/norm value: see Table 4.27 'number' and 'percentage'). Sub-area number with asterisk: small number of vessels. The deviations from the general norm value of more than 5% are printed in bold type, deviations of more than 10% are also underlined.

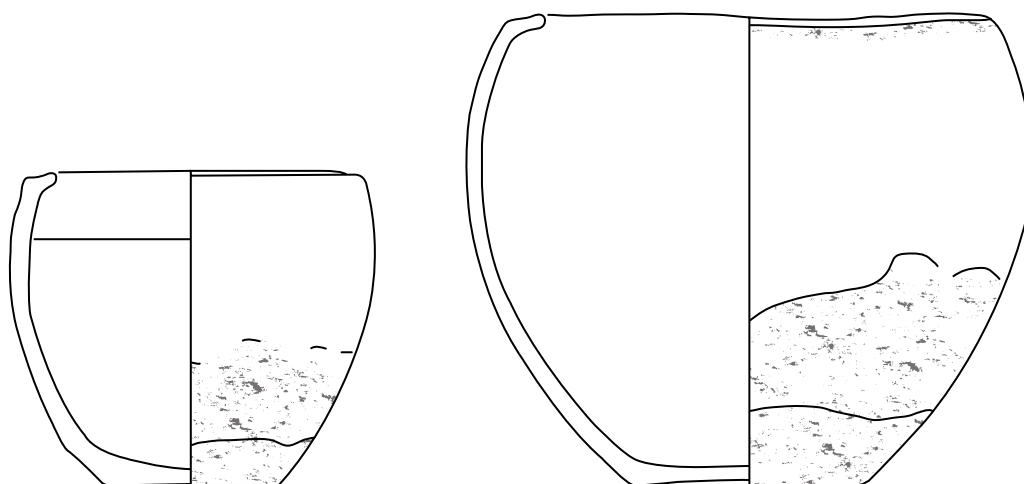


Figure 4.8 Nijmegen. The legionary fortress. Handmade inverted-rim jars produced in the Eifel region.

to deviations which were higher than expected in sub-areas 9C and 9D, there is a 14% higher percentage of Terra Nigra plates in area 9. The deviations in this category differ considerably per form.

The category of Cork urns deserved special attention among the pottery group of Gallo-Belgic Wares. Of the 25 specimens there are ten which differ in form, fabric and surface treatment from the known Cork urn HBW 94 with its calcareous and highly porous fabric. The porous wall structure of this fabric is due to the leaching out of part of the abundant

calcareous inclusions and the origin of these jars is thought to be the Ardennes.²⁵⁶ The deviant jars (Fig. 4.8) are handshaped and have an inverted rim like HBW 94. Underneath, the outside of the jars has been roughly trimmed, probably with a knife. The oxidized fabric has a coarse appearance and is orange-brown in colour with a grey to blackish-grey core.²⁵⁷ The rims are mostly covered by a thick layer of pitch, which was sometimes so thickly applied that drops of it ran down over the wall. Petrographical analysis has revealed that the production area of these jars must be sought in the volcanic

²⁵⁶ Van den Broeke 2014, 55.

²⁵⁷ Petrographical analysis was carried out by H. Kars (at that time ROB, Amersfoort).

Table 4.33 Nijmegen. Numbers of vessels per (sub-)area of selected types of (Colour-)Coated Wares and their proportions in terms of percentage of the total of all vessels of all areas of the selected type compared with percentages of the total of all vessels of all areas for the sub-area.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Total 3	5A	5B	5C*	5D*	5E*	Total 5	9A*	9B*	9C	9D*	Total 9	Total 3+5+9
Percentage/ norm value	19.6	15.4	4.8	14.0	4.5	2.9	3.1	64.2	9.2	4.7	0.7	2.4	2.5	19.6	1.4	1.3	11.7	1.7	16.2	100
Perct. CTDTEC	18.9	9.0	1.8	20.7	8.1	0.9	1.8	61.2	4.5	0.9	0.9	0.9	8.1	15.3	2.7	-	20.7	-	23.4	100
ST 1/2																				
Number	13	8	2	17	6	-	2	48	2	-	-	-	2	4	1	-	3	-	4	56
Percentage	23.2	14.3	3.6	30.3	10.7	-	3.6	85.8	3.6	-	-	-	3.6	7.1	1.8	-	5.4	-	7.3	100

(Percentage/norm value: see Table 4.27 'number' and 'percentage'). Sub-area number with asterisk: small number of vessels. The deviations from the general norm value of more than 5% are printed in bold type, deviations of more than 10% are also underlined.

part of the German Eifel region. This unusual pottery specimen is only found in sub-areas 5A (5 specimens) and 5B (5 specimens).

(Colour-)Coated Wares

As previously mentioned, the analysis here was only carried out on the ST 1 and ST 2 types together. In area 3, 48 of the total of 56 specimens of these types were found, i.e. 85.8% (Table 4.33). As a result, this form yields the most striking deviations, for it is, of course, underrepresented in the other areas. Almost a third of the total comes from sub-area 3D, while sub-area 3E also shows a high percentage. The deviations with percentages of more than 5% lower are found in sub-areas 5A and 9C.

Coarse Nijmegen Ware

The HNW 62 type shows four deviations in area 3: in sub-areas 3A and 3B the percentages are more than 5% lower, whereas in 3D and 3G they are more than 5% higher (Table 4.34). As a result, no deviation can be observed in area 3. Due to percentages which were higher than expected, at least 11% in 5A and 6% in 5D*, this form appears to score much higher in area 5. In area 9 the percentage remains well below expectation because of lower percentages in all sub-areas, in 9C more than 5%.

The analysis with type HNW 66 provides a similar picture. In sub-areas 3A and 3B, this type also remains below the percentage expected, in 3A even more than 11%. However, in sub-area 3D, more than a third of the total number

of vessels of this type was found, at least 20% more than expected. These deviations have no effect on the total of area 3. A percentage which is almost 10% higher in sub-area 5A results in a deviation of more than 10% in the total of area 5. With this form area 9 remains well under the percentage expected, mainly because of a lower percentage in sub-area 9C.

The Coarse Nijmegen Wares are therefore remarkably well represented in area 5 in terms of percentage, and unusually low in area 9, while in area 3 there are sub-areas with higher and lower percentages, the most obvious of these being that of HNW 66 in sub-area 3D.

Coarse Other Fabrics

The ST 201 type which can be compared in form to HNW 62 of the Coarse Nijmegen Ware, has higher percentages in all sub-areas of area 3, with the exception of sub-area 3G, and more than 6% in sub-area 3B (Fig. 4.35). The total of area 3 shows a percentage of at least 10% more than expected. This type is represented by lower percentages in all sub-areas of area 5, with the exception of 5C*, so that the whole of this area remains 8% below the percentage expected. The deviations in area 9 are for this type small.

In the case of type ST 210, which corresponds in form to the Coarse Nijmegen Ware HNW 66 form, a markedly higher percentage can only be observed for area 3 in sub-area 3E, with a higher percentage for the whole area. In area 5, only slight deviations can be observed. Due

Table 4.34 Nijmegen. Numbers of vessels per (sub-)area of selected types of Coarse Nijmegen Ware and their proportions in terms of percentage of the total of all vessels of all areas of the selected type compared with percentages of the total of all vessels of all areas for the sub-area.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Total 3	5A	5B	5C*	5D*	5E*	Total 5	9A*	9B*	9C	9D*	Total 9	Total 3+5+9
Percentage/norm value	19.6	15.4	4.8	14.0	4.5	2.9	3.1	64.2	9.2	4.7	0.7	2.4	2.5	19.6	1.4	1.3	11.7	1.7	16.2	100
Perct. CRSNW	14.7	9.9	3.2	20.4	4.2	3.6	4.8	60.8	19.8	4.8	0.6	5.7	4.0	35.0	0.6	0.6	2.9	-	4.2	100
HNW 62																				
Number	19	13	3	32	7	5	12	91	30	5	-	13	2	501	1	-	4	-	5	146
Percentage	13.0	8.9	2.1	21.9	4.8	3.4	8.2	62.3	20.5	3.4	-	8.9	1.4	33.3	0.7	-	2.7	-	3.4	100
HNW 66																				
Number	13	9	8	54	8	2	5	99	29	7	1	4	6	47	-	3	5	-	8	154
Percentage	8.4	5.8	5.2	35.1	5.2	1.3	3.2	64.3	18.8	4.5	0.6	2.6	3.9	30.5	-	2.0	3.2	-	5.2	100

(Percentage/norm value: see Table 4.27 'number' and 'percentage'). Sub-area number with asterisk: small number of vessels. The deviations from the general norm value of more than 5% are printed in bold type, deviations of more than 10% are also underlined.

Table 4.35 Nijmegen. Numbers of vessels per (sub-)area of selected types of Coarse Other Fabrics and their proportions in terms of percentage of the total of all vessels of all areas of the selected type compared with percentages of the total of all vessels of all areas for the sub-area.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Total 3	5A	5B	5C*	5D*	5E*	Total 5	9A*	9B*	9C	9D*	Total 9	Total 3+5+9
Percentage/norm value	19.6	15.4	4.8	14.0	4.5	2.9	3.1	64.2	9.2	4.7	0.7	2.4	2.5	19.6	1.4	1.3	11.7	1.7	16.2	100
Perct. CRSOTH	22.7	18.3	4.0	11.8	5.5	2.8	3.0	68.0	7.6	4.7	1.3	1.0	1.3	15.9	1.7	0.7	11.8	2.0	16.1	100
ST 201																				
Number	59	63	17	45	14	10	5	213	16	8	3	4	2	33	5	1	29	2	37	283
Percentage	20.8	22.3	6.0	15.9	4.9	3.5	1.8	75.3	5.7	2.8	1.1	1.4	0.7	11.6	1.8	0.4	10.1	0.7	13.1	100
ST 210																				
Number	14	12	2	14	9	2	3	56	9	3	3	1	1	17	-	-	8	1	9	82
Percentage	17.1	14.6	2.4	17.1	11.0	2.4	3.7	75.3	11.0	3.7	3.7	1.2	1.2	20.7	-	-	9.8	1.3	11.0	100

(Percentage/norm value: see Table 4.27 'number' and 'percentage'). Sub-area number with asterisk: small number of vessels. The deviations from the general norm value of more than 5% are printed in bold type, deviations of more than 10% are also underlined.

to lower percentages in all sub-areas, area 9 as a whole remains below expectations for this type.

With regard to the Coarse Other Fabrics, analysis shows a differentiated picture at type-level. Both types are better represented in area 3, while in area 5 ST 201 scores lower, as does ST 210 in area 9. The contrast between the

comparable types in Coarse Nijmegen Ware and Coarse Other Fabrics is remarkable, and is clearly visible in the area totals.

Thick-Walled Amphorae

As mentioned above, the analysis of the Thick-Walled Amphorae was based on the types of amphorae whose contents were reasonably

Table 4.36 Nijmegen. Numbers of vessels per (sub-)area of selected types of Thick-Walled Amphorae and their proportions in terms of percentage of the total of all vessels of all areas of the selected type compared with percentages of the total of all vessels of all areas for the sub-area.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Total 3	5A	5B	5C*	5D*	5E*	Total 5	9A*	9B*	9C	9D*	Total 9	Total 3+5+9
Percentage/ norm value	19.6	15.4	4.8	14.0	4.5	2.9	3.1	64.2	9.2	4.7	0.7	2.4	2.5	19.6	1.4	1.3	11.7	1.7	16.2	100
Perct. TWPAMP	4.8	13.3	4.8	7.2	6.0	4.8	2.4	43.3	8.4	10.8	1.2	3.6	2.6	27.6	4.8	-	19.3	4.8	28.9	100
Fish sauce																				
Number	2	2	1	2	-	2	2	11	3	-	-	1	1	5	3	-	6	1	10	26
Percentage	7.7	7.7	3.8	7.7	-	7.7	7.7	42.3	11.6	-	-	3.8	3.8	19.2	11.6	-	23.1	3.8	38.5	100
Olive oil																				
Number	-	6	2	-	1	2	-	11	1	1	-	-	1	3	-	-	5	-	5	19
Percentage	0.0	31.6	10.5	0.0	5.3	10.5	-	57.9	5.3	5.3	-	-	5.3	15.8	-	-	26.3	-	26.3	100
Wine																				
Number	2	2	1	2	1	-	-	8	2	7	1	2	1	13	-	-	3	3	6	27
Percentage	7.4	7.4	3.7	7.4	3.7	-	-	29.6	7.4	25.9	3.7	7.4	3.7	48.1	-	-	11.1	11.1	22.2	100

(Percentage/norm value: see Table 4.27 'number' and 'percentage'). Sub-area number with asterisk: small number of vessels. The deviations from the general norm value of more than 5% are printed in bold type, deviations of more than 10% are also underlined.

familiar (Table 4.36). The types are grouped according to supposed contents, and the percentages were subsequently compared. Amphorae whose contents were unknown or uncertain were not included. The contents of ten of the 82 amphorae were uncertain or unknown, and one amphora of the CAM 189 type, found in sub-area 9A, probably contained dates.²⁵⁸ The other amphorae had been used to transport fish sauce, olive oil and wine. The DRES 7-11 and PEL 46 types contained fish sauce.²⁵⁹ For olive oil, only one amphora type is known in the Nijmegen legionary fortress and that is the DRES 20 from Baetica.²⁶⁰ Four different types served as containers for transporting wine. The DRES 2-5 and PEL 47 forms are the most frequently found.²⁶¹ The CAM 184²⁶² type and the Pascual 1²⁶³ type are each represented by one specimen.²⁶⁴ Although for each group there are only small numbers of types combined according to contents, some information is obvious. The fish sauce amphorae are extremely underrepresented in area 3, with percentages which are more than 5% lower in sub-areas 3A, 3B and 3D. The deviation is slight in area 5, in contrast to area 9, where the percentage

is more than 10% more than expected in both sub-area 9A* and 9C, resulting in a very high percentage of fish sauce amphorae for this area. The olive oil amphora DRES 20 is also present in area 3 with a lower percentage than expected, although the sub-areas 3B, 3C and 3F show higher percentages, in 3B even 16% higher. The lower percentage is due to the complete absence of this type in sub-areas 3A, 3D and 3G. With this type too, the deviation in area 5 is slight. Area 9 has 10% more than expected, only because of the very high percentage in sub-area 9C. No olive oil amphorae are found in the other sub-areas of area 9. The most striking deviation, however, is found in the wine amphorae, where area 3 has a percentage which is more than 34% lower than expected due to each sub-area falling short of the percentage expected, and most so in 3A, 3B and 3D. In area 5, wine amphorae were found in all sub-areas, a quarter of the total being in sub-area 5B. Area 5 contains almost half of all wine amphorae, c. 30% more than expected. Area 9 also has more wine amphorae than expected, which is the result of a higher percentage in sub-area 9D*.

²⁵⁸ Peacock & Williams 1986, 109-110; Tyers 1996, 101.

²⁵⁹ Van der Werff 1984, 358-362. Recently form Dressel 6B has been identified as an olive oil amphora produced in Croatia. This form is rarely found in Nijmegen: Van den Berg 2012, 222-225.

²⁶⁰ Van der Werff 1984, 353-355.

²⁶¹ Van der Werff 1984, 355-358.

²⁶² Peacock & Williams 1986, 102-104.

²⁶³ Peacock & Williams 1986, 93-95.

²⁶⁴ Specimens of the Smooth Wares two-handled jug type ST 132, which are often made of the same fabrics as the HOFH 50/51 flagons but with a coarser tempering, are mostly comparable in size to the PEL 47 wine amphora. They are probably also transport amphorae, used for carrying wine from the Moselle and Rhine regions where these fabrics appear to have been produced. Since there is no clear evidence for the contents of ST 132, they are here considered to be transport amphorae with unknown content and are therefore not included in the amphora analysis.

Finally, it may be concluded that by this method of analysis at the level of individual types and forms results have been achieved which may be considered remarkable, to say the least. In particular, the percentages of decorated Terra Sigillata forms, the Terra Nigra HBW 28 beaker, the Coated beakers ST1 and ST2 and the amphorae illustrate that clear differences in the distribution of forms and types can be demonstrated in this way. However, the overall correlation between groups is limited. Nevertheless this form of analysis appears to be extremely useful, although one has to be aware of the fact that observations often are based on quantities less than 50 sherds.

The functions of the pottery forms and types

The analysis of traces of use

After an inventory had been made of the traces of use on all fragments, a more detailed analysis was carried out per type or form. A description of this analysis is, however, beyond the scope of this article. At any rate it made clear that the restricted form of analysis of traces of use based on the traces observed only yields comparatively little information. This is due, among other things, to the fact that some traces had disappeared as a result of the careless treatment of the pottery after excavation, particularly during washing. In the case of softer and more fragile kinds of pottery, new traces had sometimes appeared. This seriously hampered the observation of genuine traces of use, causing a great many notations of the code 0095: traces of use no longer visible.

The interpretation of the traces which were actually observed posed an even greater problem. In the majority of cases, the traces cannot be related to actions which were performed in, on or with a form, and which contain direct evidence for the function of the form concerned, because of our lack of information about the actions and the traces left by them. Moreover, there are of course actions which do not leave any traces, or hardly any, such as drinking. To solve this problem more detailed research must be done, but that was beyond the scope of this investigation. One possibility is experimental research based on an inventory of usage and users' actions as described in the works of classical authors like

Apicius, Cato, Columella and Petronius²⁶⁵ and illustrations of such actions on wall paintings and reliefs, for example.²⁶⁶

The interpretation of the traces observed led to the preliminary classification into five groups of traces resulting from actions which can only roughly be described:

1. A complete absence of traces, indicating that the form had not, or only scarcely been used, and was lost prior to, during or shortly after use.
2. Traces of internal treatment, consisting of scratches, traces of impact and wear inside a form. The exact nature of the treatment cannot be traced, with the exception of the traces found in mortaria. These include scooping, cutting, pounding, stirring, scraping, mixing and beating.
3. Traces of a deposit, consisting mostly of a black shiny substance. The majority of observations concern the inside walls and bases of pitchers or flagons. Once the deposit was seen on the inside of an amphora fragment. The deposit is probably the remains of resin which was used to decrease the porosity of the pottery.²⁶⁷
4. External traces, mainly traces of wear on base and foot ring, probably the result of lengthy and/or frequent use.
5. Traces of contact with fire i.e. a completely or partially burnt base in particular, but also rim and wall, and covered with burnt and encrusted material. If these are primary traces they clearly point to a function in the kitchen, namely boiling, baking, cooking and frying. The latter traces are almost always found in combination with the former, and are probably the remains of the contents of a form which had boiled over.
6. Traces of careless use, mainly impact traces on rims, lips or necks of forms.

Only the traces mentioned sub 5. point directly to a function, in the other groups it remains questionable as to what extent the traces are connected with the function of the form examined. This only appears to be so in the case of traces of internal treatment and deposits. On the basis of this evidence, no more can be achieved by analysis of traces of use in its present form than a distinction between pottery with a boiling, baking or frying function and pottery without these functions. To determine the function of pottery forms which

²⁶⁵ Marcus Gavius Apicius: *De re coquinaria*; Marcus Porcius Cato: *De agri cultura*; Lucius Junius Moderatus Columella: *De re rustica*; Caius Petronius Arbitrator: *Satiricon*. Of the latter work the *Cena Trimalchionis* in particular gives information about tableware and customs.

²⁶⁶ A similar investigation for mortarium was carried out by Baatz: Baatz 1977, 147-158.

²⁶⁷ Peacock & Williams 1986, 49-50.

Table 4.37 Nijmegen. Forms and types of tableware and their possible functions.

Drinking	
Terra Sigillata	DRAG 29, 30, 37; DECH 67; KNORR 78
Fine Nijmegen Wares	HNW 7
Gallo-Belgic Ware	HBW 26, 27, 28, 29, 31
Coated Wares	ST 1, 2, 301
Coarse Other Fabrics	ST 204
Eating	
Terra Sigillata	DRAG 15/17, 18, 18/31, 22; HOFH 8, 9; DRAG 23, 24/25, 27, 33, 35, 36
Fine Nijmegen Wares	HNW 36, 37; HNW 28, 34, 35
Gallo-Belgic Ware	HBW 78, 80, 81, 87, 89
Coated Wares	ST 10, 11
Serving	
Fine Nijmegen Wares	HNW 10, 25, 29, 84, 85
Gallo-Belgic Ware	HBW 52, 55, 86
Pouring	
Fine Nijmegen Wares	HNW 1, 4, 46
Coated Wares	ST 7
Smooth Wares	HOFH 50/51; ST 109, 110, 112, 113, 115; HNW 112
Coarse Nijmegen Wares	HNW 70, 73, 112
Coarse Other Fabrics	ST 214

²⁶⁸ The majority of Native Pottery will probably have had a kitchen function, though this could well have been a secondary function. The various origins of the Nijmegen Kops Plateau handmade pottery suggest that jars could have been used primarily as containers for imported food or delicacies: Van den Broeke 2014, 56-59. It is equally possible that part of the locally or regionally produced handmade native pottery served the same purpose.

²⁶⁹ Some forms may have been used in another context or in another period in a different way from that for which it was originally intended. In view of the obvious Roman military context and the largely Mediterranean origin of the legionaries, wherever possible the function known from the Mediterranean world was adhered to in this investigation.

²⁷⁰ In the table these types have been put in brackets and grouped under any possible functional (sub-)category.

²⁷¹ Drexel considers the small specimens of these forms to be acetabula, and larger ones to be paropsides: Drexel 1927, 52; Hilgers 1969, 33-34.

²⁷² Drexel 1927, 51-52; Hermet 1934, 320-321; Hilgers 1969, 142. From the sources it appears that the acetabula and the paropsides, but especially the catilli are frequently used as a serving form. These forms were probably never used as such by the soldiers who only had limited tableware at their disposal.

were not used as cooking utensils we must rely on other criteria and information.

Functions

Of 252 specimens from the pottery finds, including all the forms found in the Native Pottery group²⁶⁸, no function whatsoever could be established. It was only possible to establish with certainty the function of a small number of types, both on the basis of traces of use and other information.²⁶⁹ For the remaining forms and types, whose function had not been revealed by analysis of traces of use nor by other information, the most probable function which had originally been assigned to it was again evaluated with the help of evidence from literature. It was also checked whether the traces observed did not conflict with the probable function, and subsequently the definitive function for use was determined in the analysis. The probable function could

not even be established in a number of types (Tables 4.37-40).²⁷⁰ They could, however, be attributed to the coordinating functional categories of tableware, kitchen utensils and supply or transport pottery. The Terra Sigillata forms HOFH 8, HOFH 9, DRAG 23, DRAG 24/5, DRAG 27 and DRAG 33 belong very probably to a dining service and are equivalent to the *acetabula* and *paropsides* known from literature (Table 4.37).²⁷¹ The Fine Nijmegen Ware forms HNW 28, HNW 34 and HNW 35, which are similar, can also be included. The DRAG 15/7, DRAG 18 and DRAG 18/31 forms and probably also DRAG 23, DRAG 35 and DRAG 36 can be considered dining plates known as *catilli*.²⁷² Similar and related forms in Fine Nijmegen Ware, Gallo-Belgic Wares and (Colour-)Coated Wares probably also had the same function. Since these forms generally show no clear traces of burning or of burnt and encrusted

Table 4.38 Nijmegen. Forms and types of kitchen utensils and their possible functions.

Boiling	
Fine Nijmegen Wares	Lid
Gallo-Belgic Ware	Lid
Coated Wares	ST 202, 210, lid
Smooth Wares	Lid
Coarse Nijmegen Wares	HNW 62, 64, 66, 67, 73, 80, lid
Coarse Other Fabrics	ST 201, 202, 203, 210, 213, 214, lid; (ST 205, 211)
Boiling/baking	
Fine Nijmegen Wares	HNW 87
Coated Wares	ST 13
Coarse Nijmegen Wares	HNW 37; (HNW 69)
Coarse Other Fabrics	ST 215/216, 218; (ST 211)
Mixing	
Terra Sigillata	HOFH 12
Thick-Walled Pottery	HNW 77; ST 149
Coarse Nijmegen Wares	(HNW 85)

contents, their classification into the above functional category appears correct. It is striking that the tableware forms mainly belong to the categories of finer pottery such as Terra Sigillata, Fine Nijmegen Ware, Terra Nigra and (Colour-) Coated Wares.

The majority of the pottery, namely 1242 vessels, which, according to the traces had been used for boiling, cooking, baking or frying, belongs to the group of Coarse Wares (Table 4.38).²⁷³ Due to their fabric, usually with abundant inclusions of coarse quartz, these Coarse Wares probably resisted rapid heating better²⁷⁴ and possibly retained heat longer.²⁷⁵ In the Coarse Nijmegen Ware category, the types represented are HNW 37, HNW 62, HNW 64, HNW 66, HNW 67 and HNW 69, the HNW 42 lid, and probably also the jugs HNW 70 and HNW 73; the Other Coarse Fabrics are represented by the types ST 201, ST 202, ST 210, ST 211, ST 213, ST 215/216 and ST 218, the ST 219 lid and probably also the ST 214 jug. There are also forms belonging to several other pottery groups and categories which had the same kitchen function on the basis of the traces found. These are, however, relatively few in number: lids belonging to the pottery groups of Fine

Nijmegen Ware (9 specimens) and Smooth Wares (1 specimen), and to the categories of Terra Nigra (1 specimen) and Mica Dusted Ware (1 specimen); in addition, the Fine Nijmegen Ware type HNW 87 (1 specimen), the types ST 202 (1 specimen) and ST 210 (1 specimen) in the technique Coated Wares²⁷⁶ and the Pompeian Red type ST 13 (3 specimens).

Apart from lids, four basic forms can be distinguished in the group of boiling, cooking, baking and frying pottery: a tall, somewhat closed cooking jar represented in types HNW 62, HNW 64, ST 201, ST 202 and ST 213; a rather lower and more open wide-mouthed bowl shaped cooking vessel, types HNW 66, HNW 67 and ST 210;²⁷⁷ a low wide-mouthed pan with a flat wide base, types HNW 37, ST 13, ST 215/6 and ST 218;²⁷⁸ and a low wide-mouthed bowl with a narrow base, HNW 69 and ST 211. Apart from their shapes, there is also a difference in traces between the open and the closed cooking jar. The former, which appears to correspond in shape and development to the forms identified by Hilgers as being *caccabus*,²⁷⁹ frequently has light burning traces, and the rim is regularly damaged on the inside, whereas this is never

²⁷³ Tyers 1996, 180.

²⁷⁴ By analogy with the similar Romano-British black-burnished ware: Farrar 1973, 71.

²⁷⁵ Presumably the darker-coloured vessels, e.g. the black and grey ones, were able to retain heat longer.

²⁷⁶ Both vessels are made in a coarse fabric. Such fabric is known to be produced in a potter's kiln at Heerlen: Bloemers & Haalebos 1973, 261.

²⁷⁷ A cooking function had already been attributed to these forms on the basis of traces of burning: Schönberger & Simon 1983, 136; Van Driel-Murray 1983, 276.

²⁷⁸ Vegas refers to related Augustan forms as *Kochteller* or *Kochplatten*: Vegas 1975, 63-64, Taf. 17. In the literature this form is often called a dish, which implies a function as a table vessel: Stuart 1977b, 82-85; Lauwerier 1988, 80, fig. 22 (the bones found in the vessel are very probably the remains of the meal that was prepared in it); Haalebos 1990, 169-170.

²⁷⁹ Hilgers 1969, 40-41 and 124-125.

Table 4.39 Nijmegen. Forms and types of storage and transport pottery.

Intra-site storage/transport	
Smooth Wares	ST 129, 130, 131, 137; HNW 75
Thick-Walled Pottery	ST 147
Long distance transport	
Gallo-Belgic Ware	HBW 94; Eifel region jar
Smooth Wares	ST 132, 146
Thick-Walled Pottery	DRES 2-5, 7-11, 20, 43; PEL 46, 47; CAM 184, 189; PASCUAL 1

the case with the closed form. In view of the light burning traces it seems likely that this form was not used over an open fire.

The low, flat pan is probably the form referred to in the classical sources as *patina* or *patella*²⁸⁰, and was used in the preparation of many dishes of this name, both above an open fire and in an oven.²⁸¹ Because of its more differentiated use, this form stands out among the other cooking forms. The Coarse Ware types can very likely be seen as locally produced imitations and substitutes of the imported Pompeian Red platters ST 13.²⁸² The low bowl with the narrow base may possibly have been another kind of *patina* or *patella*, but this is uncertain. The Coarse Ware jugs ST 114, HNW 70 and HNW 73 may have been used for heating liquids, judging from the regular occurrence of burn marks on this form.

On the basis of the traces of burning and encrusted contents found, the Cork urn HBW 94 and the related Eifel region form described above may also have had a cooking function. Recent research would appear to show that this was not, however, the primary function of the small, *dolium*-like form. The presence of a thick layer of pitch on the rim seems to be incompatible with a cooking function, and is more likely to indicate that the vessel was hermetically sealed.²⁸³ Forms like these probably served as storage and transport containers for salted or otherwise preserved goods.²⁸⁴ A similar function can probably be attributed to the small Smooth Wares *dolia*, no fragments of which were found in the three areas, and the Smooth Wares so-called ‘honey jars’ ST 146 (19 specimens).²⁸⁵ These small *dolium*-like containers may well be the *doliola*²⁸⁶ or *seriola*²⁸⁷ frequently mentioned by classical authors.

The ST 146 type is identified by Hilgers as the *urceus* referred to in classical sources.²⁸⁸ The traces of use found on the Cork urn HBW 94 and the related form from the Eifel region, are possibly the result of heating the original contents or of secondary use of the container as a cooking-vessel.

For the kitchen function roughly described as mixing, the form is also known, namely the mortar or mortarium. Most of the traces on this form, represented by the Thick-Walled Pottery types ST 149 (113 specimens) and HNW 77 (15 specimens), point to an even wear on the inside of wall and rim. The base is also worn on the inside, though less frequently, and in one case was even completely worn through. Baatz’ conclusion that these traces were due to friction while stirring, and that the terms *mortario fricare* and *mortario terere* used by Apicius refer to the use of this form is supported by the analysis of traces of use.²⁸⁹ Traces of burning on the rims, particularly in the region of the spout, cannot be explained satisfactorily for the time being.²⁹⁰ Some specimens made in a coarse fabric lack quartz grains on the interior and appear to lack traces of wear, or show only slight traces. These may be specimens which might be referred to as *pelvis* and may have been used for skimming milk.²⁹¹

The function of the Terra Sigillata form HOFH 12 (3 specimens) poses a problem. From the traces observed on the fragments of two of the specimens, it cannot be concluded that this form which resembles a mortarium was actually used as such. The fact that it belongs to a fine pottery type might be an indication that this type and its later developments may rather have been used as a form in which the dishes which were normally prepared in mortaria were served. For

²⁸⁰ Hilgers correctly identifies the form of the *patina*: Hilgers 1969, 72-73. However, he is misled by graffiti *panna* on specimens of the Terra Sigillata form DRAG 37 which he considers to be a derivation of *patina*, so that there is no clear classification of the form. In view of the total absence of any traces on the form DRAG 37 which might indicate a cooking function, this form can certainly not be a *patina*. *Patella*: Hilgers 1969, 239-241.
²⁸¹ Alföldy-Rosenbaum 1984, 114-115; Furger 1985, 179.
²⁸² On the function of Pompeian Red platters as *patinae/patellae*: Grünewald, Pernicka & Wynia 1980, 260.
²⁸³ Van Enckevoort 2000, 124.
²⁸⁴ A cork urn hbw 94 was found in Nijmegen containing the bone remains of 28 song thrush breasts (*Turdus philomelos*): Lauwerier 1995.
²⁸⁵ For the type st 146 containing fish remains: Van Enckevoort 2000, 124.
²⁸⁶ Hilgers 1969, 171.
²⁸⁷ Hilgers 1969, 277.
²⁸⁸ Hilgers 1969, 83-86 and 299-300.
²⁸⁹ Baatz 1977, 149 and 151; Jensen 1984, 28-36. Vanderhoeven proposes an alternative function for mortaria, especially for those found in rural and native Roman settlements. They are thought to be used in grain processing, viz. the extraction of grain kernels from the chaff by pounding: Vanderhoeven 1989, 13-14.
²⁹⁰ Vanderhoeven 1989, 14.
²⁹¹ Vanderhoeven 1989, 11.

Table 4.40 Nijmegen. Forms and types of other observed functions.

Lighting	
Fine Nijmegen Wares	x
Coated Wares	x
Smooth Wares	x
Coarse Nijmegen Wares	x
Religion	
Smooth Wares	ST 145
Coarse Other Fabrics	(ST 205)
Writing	
Terra Sigillata	HOFH 13

the time being, this type is included among the mortaria.

The function of the amphorae belonging to the category of Thick-Walled Pottery was equally obscure. They have, in the meantime, been adequately described as containers for liquid as well as dry goods, and mainly for long distance transport by ship (Table 4.39).²⁹² Due to the presence of painted inscriptions (*tituli picti*) and, occasionally, the remains of contents, it proved possible even to identify the goods which were mainly transported in a certain type.²⁹³ Dolia ST 147 are large storage vessels which served as depositories for dry and liquid goods.²⁹⁴ They are often found dug into the ground.

In view of the many difficulties in identifying the functions, particularly in the tableware category, causing the proportions of the sub-categories within this category to be rather uncertain, it was decided that analysis should be carried out on the level of the coordinating functional categories (Table 4.40). This meant that the categories of lighting (17 specimens), religion (6 specimens)²⁹⁵ and writing (1 specimen)²⁹⁶ were excluded from the analysis because each of them comprised too few specimens for a useful analysis, so that the final analysis was done on the categories of tableware, kitchenware and storage/transport pottery. Whenever it appears useful to refer to deviants on the sub-category level, this will be done.

This analysis was also performed by means of

cross tabulation, namely that of functions and sub-areas. Cross tabulation produced two sets of data: one set with the proportions of each functional category to the total of all vessels of each sub-area (Table 4.41) and one set with the proportions of each sub-area to the total of all vessels of each functional category (Table 4.42). The same strategy was used with these data as in the analysis of types and forms.²⁹⁷ The proportion of each functional category to the total of each sub-area (Table 4.35) is compared during analysis with the proportion of each functional category to the total number of vessels with functions which were included in the analysis, which are considered the norm value: tableware (44.0%), kitchenware (46.3%) and storage/transport pottery (9.6%). On comparison of these data, a number of obvious deviations appear which will be discussed below per functional category.

In area 3 the percentage of table vessels hardly differs from the percentage expected, despite percentages which were lower than expected in the sub-areas 3E, 3F and 3G. In sub-area 3C, a higher percentage of this functional category was observed. The total of area 5 differs negatively with respect to the table vessels, particularly as the result of an almost 19% lower percentage in sub-area 5A. This low percentage in 5A is mainly due to a low percentage of drinking vessels. The sub-areas 5C* and 5D* also score lower percentages than expected, whereas sub-area 5E* has a higher percentage. Area 9 has rather more table vessels, particularly as a result of the percentage in sub-area 9B* which was more than 22% higher than expected. This was mainly because of the large number of drinking vessels.

In the category of kitchen vessels one can see the largest number of deviations. Most of these originate from deviations in the sub-category of cooking vessels. In area 3 the deviations are inversely equal to those in the category of table vessels: sub-areas 3E, 3F and 3G show percentages which are higher than expected, whereas sub-area 3C scores 10% lower. None of these deviations has much effect on the total of area 3. Area 5 has altogether a higher percentage of kitchen vessels than was expected, caused in particular by a percentage which was more than 13% higher in sub-area 5A, while sub-area 5C* also remains more than 5% above the percentage expected. Altogether, the percentage

²⁹² Van der Werff 1984, 347; Peacock & Williams 1986, 2.

²⁹³ Peacock & Williams 1986, 17. According to secondary marks/inscriptions, some amphorae, mostly of the DRES 20 type, were reused for the storage of commodities other than the original contents: Van der Werff 1988, 229-231.

²⁹⁴ Van Enckevort proposes a transport function for the dolia as well. Especially in the second and third centuries AD they are thought to have been used as vessels for processing, storing and transporting fish sauce: Van Enckevort 2000, 124.

²⁹⁵ Including specimens of the ST 145 type, which Hilgers considers to be *turibula*: Hilgers 1969, 82-83 and 294-295.

²⁹⁶ Terra Sigillata Inkpot HOFH 13, *atramentarium*: Hilgers 1969, 39 and 112.

²⁹⁷ See Section 4.1.4.

Table 4.41 Nijmegen. Numbers of vessels per functional category and (sub-)area and their proportions in terms of percentages of the total of all vessels per sub-area compared with the total of all vessels per category and their proportions in terms of percentages.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Total 3	5A	5B	5C*	5D*	5E*	Total 5	9A*	9B*	9C	9D*	Total 9	Total 3+5+9
Number	534	426	130	382	113	77	86	1748	262	139	21	71	68	561	35	33	299	43	410	2719
Percentage	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Table vessels																				norm value
Number	255	196	65	162	43	29	33	783	83	60	8	27	34	212	16	22	145	19	202	1197
Percentage	47.8	46.0	50.0	42.4	38.0	37.7	38.4	44.8	<u>31.7</u>	43.2	38.1	38.0	50.0	37.8	45.7	<u>66.7</u>	48.5	44.2	49.3	44.0
Kitchen vessels																				
Number	241	197	47	189	61	40	47	822	156	59	11	35	29	290	13	9	109	17	148	1260
Percentage	45.1	46.2	36.2	49.5	54.0	51.9	54.6	47.0	<u>59.5</u>	41.4	52.4	49.3	42.6	51.7	37.1	<u>27.3</u>	36.5	39.5	<u>36.1</u>	46.3
Storage/transport																				
Number	38	33	18	31	9	8	6	143	23	20	2	9	5	59	6	2	45	7	60	262
Percentage	7.1	7.8	13.8	8.1	8.0	10.4	7.0	8.2	8.8	14.4	9.5	12.7	7.4	10.5	17.1	6.0	15.0	16.3	14.6	9.6

Norm value=percentage of the total of all vessels of all (sub-)areas. Sub-area number with asterisk: small number of vessels. The deviations from the general norm value of more than 5% are printed in bold type, deviations of more than 10% are also underlined.

Subarea	3A	3B	3C	3D	3E	3F	3G	Total	5A	5B	5C*	5D*	5E*	Total	9A*	9B*	9C	9D*	Total
Functional pottery categories																			
TABLE VESSELS			○		□	□	□		■		□	□	○	□		●			○
KITCHEN VESSELS			■		○	○	○		●		○			○	□	■	□	□	■
STORAGE/TRANSPORT															○		○	○	○

Figure 4.9 Nijmegen. As Table 4.41, but presenting only deviations. Proportion in terms of percentages of functions: proportion of each (sub-)area of the total of each functional category. Sub-area number with asterisk: small number of vessels (see note 244). Legend of the deviations from the general norm value of more than 5% and more than 10%: ○ >5<10% more; ● >10% more; □ >5<10% less; ■ >10% less.

of area 9 is more than 10% lower due to deviations varying from 19% lower in sub-area 9B* to almost 7% lower in sub-area 9D*. In the latter sub-area the percentage is still lower than expected, despite a higher percentage of mortaria.

This manner of analysis only produces few deviations (Fig. 4.9).

The storage/transport pottery shows the fewest deviations in the analysis. Not one deviation is found in this functional category in area 3 as well as in area 5. Higher percentages in sub-areas 9A*, 9C and 9D* account for a deviation of 5%

in the total of this area.

Analysis of the other set of data was done by comparing the proportion of each sub-area to the total of each functional category with the proportion of each sub-area to the total of the vessels from the categories table vessels, kitchen vessels and storage/transport pottery which were included in the analysis (Table 4.42). Only in the category storage/transport pottery were there deviations of more than 5%. For example, almost 10% less of this category was found in area 3 than might have been expected. With the exception of sub-area 3C, each

Table 4.42 Nijmegen. Numbers of vessels per functional category and (sub-)area and their proportions in terms of percentages of the total of all vessels of all areas per functional category compared with the total of all vessels per category and their proportions in terms of percentages.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Total 3	5A	5B	5C*	5D*	5E*	Total 5	9A*	9B*	9C	9D*	Total 9	Total 3+5+9	
Number	534	426	130	382	113	77	86	1748	262	139	21	71	68	561	35	33	299	43	410	2719	
Percentage	19.6	15.7	4.8	14.0	4.2	2.8	3.2	64.3	9.6	5.1	0.8	2.6	2.5	20.6	1.3	1.2	11.0	1.6	15.1	100	
Table vessels																					norm value
Number	255	196	65	162	43	29	33	783	83	60	8	27	34	212	16	22	145	19	202	1197	
Percentage	21.3	16.4	5.4	13.5	3.6	2.4	2.8	65.4	6.9	5.0	0.7	2.3	2.9	17.7	1.3	1.8	12.1	1.6	16.9	100	
Kitchen vessels																					
Number	241	197	47	189	61	40	47	822	156	59	11	35	29	290	13	9	109	17	148	1260	
Percentage	19.1	15.6	3.7	15.0	4.9	3.2	3.7	65.2	12.3	4.6	0.9	2.8	2.3	23.0	1.0	0.7	8.6	1.4	11.7	100	
Storage/transport																					
Number	38	33	18	31	9	8	6	143	23	20	2	9	5	59	6	2	45	7	60	262	
Percentage	14.5	12.6	6.9	11.8	3.4	3.0	2.3	54.5	8.8	7.6	0.8	3.4	1.9	22.5	2.3	0.8	17.2	2.7	23.0	100	

Norm value=percentage for the sub-area of the total of all vessels of all (sub-)areas. Sub-area number with asterisk: small number of vessels.

The deviations from the general norm value of more than 5% are printed in bold type, deviations of more than 10% are also underlined.

sub-area scores a lower percentage here, with a deviation of more than 5% in sub-area 3A. Area 5 does not produce any striking deviations, but area 9 does. Apart from sub-area 9B*, more storage or transport vessels were found in each sub-area, in sub-area 9C even considerably more, due to higher percentages for intra-site as well as for long-distance storage and transport pottery. The total of area 9 is, as a result, almost 8% higher.

Analysis which includes the functional categories appears therefore to reveal a number of sometimes striking deviations, although the comparison of the proportions of each functional category to the total of each sub-area results in considerably more deviations. This form of analysis in particular appears to produce data enabling interpretations regarding the use of areas and sub-areas of a site. In one case a deviation was revealed by both analyses in the same sub-area and the same category, namely storage/transport vessels in sub-area 9C, which may indicate an important deviation.

4.4.3 Conclusion and interpretation

The results presented above of a number of forms of analysis for examining a large pottery complex appear to prove that the use of such methods is useful. The discrepancies brought to light by analysis certainly give rise to a number of questions which could not easily have been formulated in a purely documentary approach to the complex. In several cases an attempt can even be made to answer these questions, but most of them will have to remain unanswered for the time being.

Whatever method of analysis was used and on whatever level it took place, discrepancies were always found, some of which could, it is true, be linked to the obligatory use of limited numbers, but often based on a group comprising sufficient specimens. As the size of the group for analysis increases, the result of the analysis becomes more reliable. In the analyses performed, the results of pottery groups containing 10% or more of the total pottery assemblage appear to be well-founded, although even with smaller numbers surprising deviations from the pattern expected were observed.

If we consider all the deviations per sub-area,

a tendency can be observed that deviations are all the more striking as the level of analysis is more detailed. The difference in the number of deviations of pottery groups as well as pottery categories is slight, but in the latter, the discrepancy in the pottery groups is expressed more specifically. Deviations at the level of types and forms are the most striking.

The possibilities and problems of interpreting the data will be elucidated by means of an example. In an interpretation of this kind, one cannot depend only on data concerning the finds, but one must also take other factors into account such as the presence or absence of buildings, the number and status of inhabitants or users of an area, etc. In addition one must assume that the finds discovered in a certain area must be mainly related to the activities in the area concerned and to inhabitants or users of that area.

As an example, we shall take the composition of the pottery complex and the results of the analyses in area 5. This area comprises three houses, which, judging by their architecture and size served as the dwellings and places of work of, most probably, high-ranking officers like the *tribuni militum*.²⁹⁸ In addition, there is a row of 'tabernae' along the *via principalis*.

The most striking deviations in the composition of the pottery complex of area 5 are: large numbers of Coarse Nijmegen Ware vessels, almost half of all the large Terra Sigillata drinking vessels DRAG 29 and DRAG 37 and almost half of all the wine amphorae. In addition, other differences were also observed, though to a lesser extent, such as few table vessels and many kitchen vessels. It is assumed that the high percentages of Terra Sigillata drinking bowls and wine amphorae are an expression of the luxury connected with the officer status. The discrepancies are all the more remarkable if one takes into account the probably small number of inhabitants of area 5. The large Terra Sigillata drinking bowls which, because of the long distance which this pottery group had to be transported, not only belong to the most expensive kind of pottery, but, because of the effort involved in their production, are also the most expensive forms of this kind of pottery, may therefore be regarded as luxury-indicating forms among the pottery complex. Since a number of pits appear to belong to building or renovation activities

between the timber and stone building phases, the question arose as to how far the contents of these pits had been influential in determining the nature and activities of the inhabitants or users of this area. As a check, the stratigraphical position of the pits with the decorated Terra Sigillata drinking bowls and wine amphorae in area 5 was observed. It appeared that, of the 17 drinking bowls not one came from the pits of the rebuilding phase, and this was the case in 1 of the 13 specimens of wine amphorae. All the decorated Terra Sigillata drinking bowls and virtually all the wine amphorae were found in pits which can be clearly linked to the nature and activities of inhabitants or users of area 5.

Perhaps the unusual Cork urn forms, only found in area 5, which were possibly used for transporting delicacies from the German Eifel region, may be considered to be luxury-indicating forms too. Four specimens of this form, however, were found in two pits which may well be connected with building or rebuilding activities.

In view of the probable expressions of status mentioned above, it is all the more remarkable that the percentage of tableware in this area remains even lower than expected, based on the percentages of the functional categories, whereas one would expect there to be a large quantity considering the status of the inhabitants. In fact, even simpler forms of the finer pottery categories such as DRAG 27, Terra Nigra plates and Coated beakers are represented by lower percentages than expected. One quite plausible explanation for the absence of tableware is the use of forms of table vessels made of more durable materials such as bronze and silver which may not have been thrown away after a period of use because of the possibility of re-using the material, and so would not have been found.

The interpretation of the large quantities of Coarse Nijmegen vessels and the large amounts of kitchen vessels among them is more problematical. It is clear that a great deal of cooking was done in this area, that there were plenty of cooking vessels of all kinds and that there were almost certainly one or more rooms in the excavated section of sub-area 5A which had a cooking function. The quantity of this pottery becomes even more remarkable if we consider the number of inhabitants or users, and

²⁹⁸ Von Petrikovits 1975, 67; Bloemers, Greving & Zoetbrood 1979, 41 and 43.

compare the percentage of kitchen vessels with that of area 9 which comprises a low percentage of cooking vessels, whereas there must have been far more people living and cooking there than in area 5.²⁹⁹ Another question is why it is the Coarse Nijmegen Wares which have such a high percentage in this area. Was this based on a preference for its colour, was there a difference in quality in the various kinds of Coarse Wares, or was it the simple fact that this legionary pottery was easily attainable for high-ranking officers?

The results, interpretations and questions described above are reason enough to develop the methods and forms of analysis further and to perfect them, and to ensure that features observed are tested by statistical methods so that the information is well-founded.

4.5 SYNTHESIS OF BUILDING FEATURES, PITS AND SELECTED GROUPS OF FINDS, MAINLY POTTERY

4.5.1 Introduction

In this synthesis the information on building features, pits and finds as they were discussed in the preceding sections will be interpreted and analysed. The results will then be compared with the research objectives as described in Section 4.1.2: 1. the possibilities of making significant statements about the spatial and socio-economic aspects of the Roman military occupation of Nijmegen between AD 70-120/130, and 2. the working method pursued in order to arrive at these statements.

The summary of the three groups of information is made in three analytical steps: first the surface area of (sub-)areas, the pits and the finds are considered in relation to each other (Section 4.5.2), then the nature and the number of the finds in connection with the manner of use and deposition of the finds and with the function of the pits (Section 4.5.3), and finally the socio-economic significance of the (sub) areas on the basis of the archaeological features and the spectrum of finds (Section 4.5.4). The motivation for the first step is that only finds from pits were considered, and the relation between pits and (sub)areas was made by calculating the ratio between them; the second step has to indicate the value which may

be attributed to the spectrum of finds for the interpretation before commencing on the third and final step.

4.5.2 The relation between the surface area of (sub-)areas, pits and finds

Working method

In the step of analysis discussed here, the totals of the surface area of the (sub-)areas, the totals of the surface area of the pits and the totals of the finds quantities were used. In Section 4.3 the pits are compared with the first total. The second total is one of the four variables (B) of the pits which were analysed: the numbers of pits per (sub-)area (Section 4.3.1 and Table 4.13 variable A), the total surface area of all the pits (variable B), the total volume (variable C) and the total surface area of the pits whose volume is known (variable D). The reasons for the exclusive use of variable B are as follows: with variable A all the pits have the same value, whether they are large or small, and therefore a distorted picture of the relation between pits and finds is given. After all, the degree to which they contribute to the spectrum of finds is highly dependent on the volume as can be seen in areas 3A and 3C which have very small pits, often containing few or no finds. In the case of variable C and therefore also D which is derived from it, the depth of the pits is not known in quite a number of the cases so that the volume cannot be calculated; since this varies per area a good comparison between the (sub-) areas is impossible. Variable B is the most suitable in these circumstances. All the pits can be included in the analysis on the same basis, and the surface area theoretically reflects the volume of the pit; the latter is derived from the relation between the surface area of the pit and the volume of the pit in areas 3 and 9, where c. 80% of the pits with a surface area of 0-2.5 m² have a volume of 0-2 m³.

Two remarks can be made about the effect on the analysis of very large pits and of pits with no finds (Table 4.43-44). The influence of large pits on the numbers of finds is generally slight, since a large volume does not, in many cases, imply an extremely large number of finds. If this is the case, it need not substantially influence the character of a sub-area as a whole compared with the other sub-areas. This may of course occur in the odd case, as in sub-area

²⁹⁹ Johnson 1983, 197-202.

Table 4.43 Nijmegen. Large pits as regards surface area.

Sub-area	Pit number	Surface area (m ²)	Quantity of finds	
			< 40	40>
3A	718	13.6	-	138
	EA	10.2	0	-
3C	494	15.7	27	-
	496	13.7	16	-
	575	26.2	24	-
3E	355	29.2	3	-
5A	963	14.0	-	79
	992	18.0	37	-
5B	983 + 984	58.0	9	-
9A	50 + 54	11.7	9	-
9D	123/41	19.6	37	-
Total		216.2	379	

Table 4.44 Nijmegen. Large pits without and with finds.

Sub-area	Pits without finds	Pits with finds	Ratio	Total
3A	64	53	1.2	117
3B	8	35	0.23	43
3C	20	8	2.5	28
3D	8	25	0.32	33
3E	38	24	1.6	62
3F	11	13	0.85	24
3G	7	10	0.7	17
Subtotal	156	168	0.93	324
5A	17	19	0.89	36
5B	15	14	1.07	29
5C	5	2	2.5	7
5D	3	9	0.3	12
5E	0	5	0.0	5
Subtotal	40	49	0.82	89
9A	5	12	0.42	17
9B	10	14	0.71	24
9C	32	89	0.36	121
9D	4	9	0.44	13
Subtotal	51	124	0.41	175
Total	247	341	0.72	588

Bold: considerable deviation from the average ratio of 0.72 for the totals of 247:341 pits.

Table 4.45 Nijmegen. Overview of area 3, 5 and 9 for numbers and ratios of pits for surface area, volumes and phasing, grouped in sub-areas (see Appendix II-IV, VI-VIII and X-XII).

Sub-area	3A	3B	3C	3D	3E	3F	3G	Total
Surface area (m ²)	1279	1053	1536	1348	1484	1298	1024	9022
A.1 number	117	43	27	33	63	24	17	324
2. ratio number pits/area	0.09	0.04	0.02	0.02	0.04	0.02	0.02	0.036
B.1 total area of pits (m ²)	160.4	64.1	81.05	33.3	117.75	27.5	22.3	506.4
2. ratio area pits/sub-area	0.13	0.06	0.05	0.02	0.08	0.02	0.02	0.054
3. total area without large pits (m ²)	136.6	=	25.3	=	88.5	=	=	397.6
4. ratio as B.2 without large pits	0.11	=	0.02	=	0.06	=	=	0.044
D.1 total area+volume pits (m ³)	131.18	53.27	31.97	16.44	71.89	7.58	14.24	327.19
2. total area+volume without large pits (m ³)	92.58	=	10.712	=	1.42	=	=	246.86
3. ratio volume pits/sub-area	0.1	0.05	0.02	0.01	0.05	0.01	0.01	0.034
4. idem without large pits	0.07	=	0.01	=	0.03	=	=	0.027
Sub-area	5A	5B	5C	5D	5E			Total
Surface area (m ²)	790	1020	166	462	39			2477
A.1 number	36	29	7	12	5			89
2. ratio number pits/area	0.05	0.03	0.04	0.03	0.13			0.056
B.1 total area of pits (m ²)	107.6	125.3	10.8	26.1	11.9			281.7
2. ratio area pits/sub-area	0.14	0.12	0.07	0.06	0.31			0.14
3. total area without large pits (m ²)	79.6	67.3	=	=	=			195.7
4. ratio as B.2 without large pits	0.1	0.07	=	=	=			0.08
D.1 total area+volume pits (m ³)	84.57	88.45	3.58	15.11	11.15			202.81
2. total area+volume without large pits (m ³)	49.97	42.05	=	=	=			121.81
3. ratio volume pits/sub-area	0.11	0.09	0.02	0.03	0.29			0.11
4. idem without large pits	0.06	0.04	=	=	=			0.05
Sub-area	9A	9B	9C	9D				Total
Surface area (m ²)	334	303	773	123				1533
A.1 number	17	24	121	13				175
2. ratio number pits/area	0.05	0.08	0.16	0.11				0.11
B.1 total area of pits (m ²)	36.5	31.1	192.6	37.5				297.7
2. ratio area pits/sub-area	0.11	0.1	0.25	0.3				0.19

Legend: bold: extremely high value compared to the average of the area; -- extremely low value compared to the average of the area; = similar value as in previous row of this column with analogous calculation (sum of ratio). For the structure of A, B and D see Table 4.13; A.1 number of pits; A.2 number of pits (A.1) divided by surface area (m²) of the sub-area; B.1 total surface area of all pits in a sub-area (B.1) divided by surface area (m²) of the sub-area; B.3 as B.1, but without large pits; B.4 as B.2, but without large pits; D.1 total volume of pits (m³) with surface area (D.1) divided by surface area (m²) of the sub-area; D.2 as D.1, but without large pits; D.3 total volume of pits (m³) with surface area (D.1) divided by surface area (m²) of the sub-area; D.4 as D.3, but without large pits.

Table 4.45 Nijmegen. Overview of area 3, 5 and 9 for numbers and ratios of pits for surface area, volumes and phasing, grouped in sub-areas (see Appendix II-IV, VI-VIII and X-XII) (continuation).

	9A	9B	9C	9D				Total
3. total area without large pits (m ²)	24.82	=	=	17.87				266.39
4. ratio as B.2 without large pits	0.07	=	=	0.15				0.17
D.1 total area+volume pits (m ³)	27.41	13.45	116.05	63.82				220.72
2. total area+volume without large pits (m ³)	20.4	=	=	10.81				160.7
3. ratio volume pits/sub-area	0.08	0.04	0.15	0.52				0.14
4. idem without large pits	0.06	=	=	0.09				0.1

Table 4.46 Nijmegen. Overview of area 3, 5 and 9 for ratios of finds.

Sub-area	3A	3B	3C	3D	3E	3F	3G	3A-G
1. number of finds	582	458	142	415	133	87	92	-
2. total area of pits (m ²)	160.4	64.1	81.05	33.3	117.75	27.5	22.3	-
3. surface sub-area (m ²)	1279	1053	1536	1348	1484	1298	1024	-
4. ratio of 1:2:3 x 1000	2.84	6.8	1.14	9.32	0.76	2.5	4.08	-
5. average of the area								3.9
Sub-area	5A	5B	5C	5D	5E			5A-E
1. number of finds	272	141	22	72	75			-
2. total area of pits (m ²)	107.6	125.3	10.8	26.1	11.9			-
3. surface sub-area (m ²)	790	1020	166	462	39			-
4. ratio of 1:2:3 x 1000	3.2	1.1	12	6	160			-
5. average of the area								5.6
Sub-area	9A	9B	9C	9D				9A-D
1. number of finds	42	39	349	50				-
2. total area of pits (m ²)	36.5	31.1	192.6	37.5				-
3. surface sub-area (m ²)	334	303	773	123				-
4. ratio of 1:2:3 x 1000	3.49	4.15	2.35	10.99				-
5. average of the area								5.25

1. number of finds (see Table 4.27); 2. area of pits (see Appendix II sub B.1, VI sub B.1 and X sub B.1); 3. surface of sub-area.

5A where pits nos. 963 and 992 together account for 42.6% of all the finds of this sub-area or in sub-area 9D where pit no. 123/41 accounts for 74% of all the finds of the sub-area (see also Table 4.46 sub 5A en 9D sub number and ratio).

The effect of pits with no finds can be assessed by the average ratio for all areas together

between pits with finds and pits without finds (Table 4.44 247 : 341 = 42% : 58% with a ratio of 0.72). Areas which deviate considerably from this are the sub-areas 3C, 3E and 5C which have a great number of pits with no finds, and the sub-areas 3B, 3D, 5D and possibly 9C where there are very many pits with finds.

Table 4.47 Nijmegen. Summary of the characteristics of all the studied sub-areas in view of the area of pits, the relation of pits in relation to finds, and finds (see Table 4.45-46).

Sub-area	Area of pits	Relation between pits and finds	Finds	Conclusion
3A	very large number of somewhat smaller pits	average number of finds	many finds	many pits and many finds per sub-area, but also many pits without finds in an absolute, not in a relative sense
3B	average number of pits, but somewhat smaller in size	average number of finds; 54% of finds from three pits (nos. 527, 530 and 579)	many finds	a fair amount of pits and finds
3C	average number of pits, but very large in size	few finds	few finds	few, but very large pits with few finds; many pits with few finds
3D	few pits of small size	many finds; large pits have fairly few finds; 68% of finds from three pits (nos. 1, 2 and 38)	many finds	many finds from few and small pits
3E	average number of pits, but somewhat smaller in size	very few finds	few finds	fairly large amount of (smaller) pits with few finds and many pits without finds
3F	few pits of small size	average number of finds	few finds	few and small pits; few finds
3G	few pits	average number of finds	few finds	few pits and few finds
5A	average number and surface of pits; two very large pits (nos. 963 and 992)	average number of finds; large pits nos. 963 + 992 with 116 vessels = 42.6% of all finds in this sub-area	fair amount of finds	fair amount of finds, but 42.6% of this sub-area in two large pits nos. 963 and 992
5B	average surface of pits; one very large pit (no. 983)	few finds, also in large pit no. 983	few finds	few finds
5C		exceptionally high ratio	very few finds	result biased by small excavated area
5D		average number of finds		average number of finds and pits
5E		exceptionally high ratio		result biased by small excavated area
9A		average number of finds	few finds	
9B		average number of finds	few finds	
9C	fair amount of pits	average number of finds	many finds; 12 millstone fragments	many pits (75%) with average amount of finds
9D	one very large pit (no. 123/41)	many finds; large pit no. 123/41 with 37 vessels = 74% of all finds in this sub-area	few finds	contradiction between relation pits/finds and finds due to the effect of large pit no. 123/41 enlarged by small sub-area

Data concerning the relation of sub-area, pits and finds

The important data for the relation between sub-area, pits and finds are the surface area of the sub-area, the total surface area of the pits per sub-area (Table 4.45) and the total number of finds from all the pits in a sub-area (Table 4.46).

Conclusions about the relation of sub-areas, pits and finds

For convenience of comparison, the observations on sub-areas, pits and finds from the preceding sections have been schematically grouped in Table 4.47. The quantitative norms are referred to as 'many', 'average' and 'few', allowing for a certain degree of subjectivity in allocation. A more clear-cut division was not chosen because

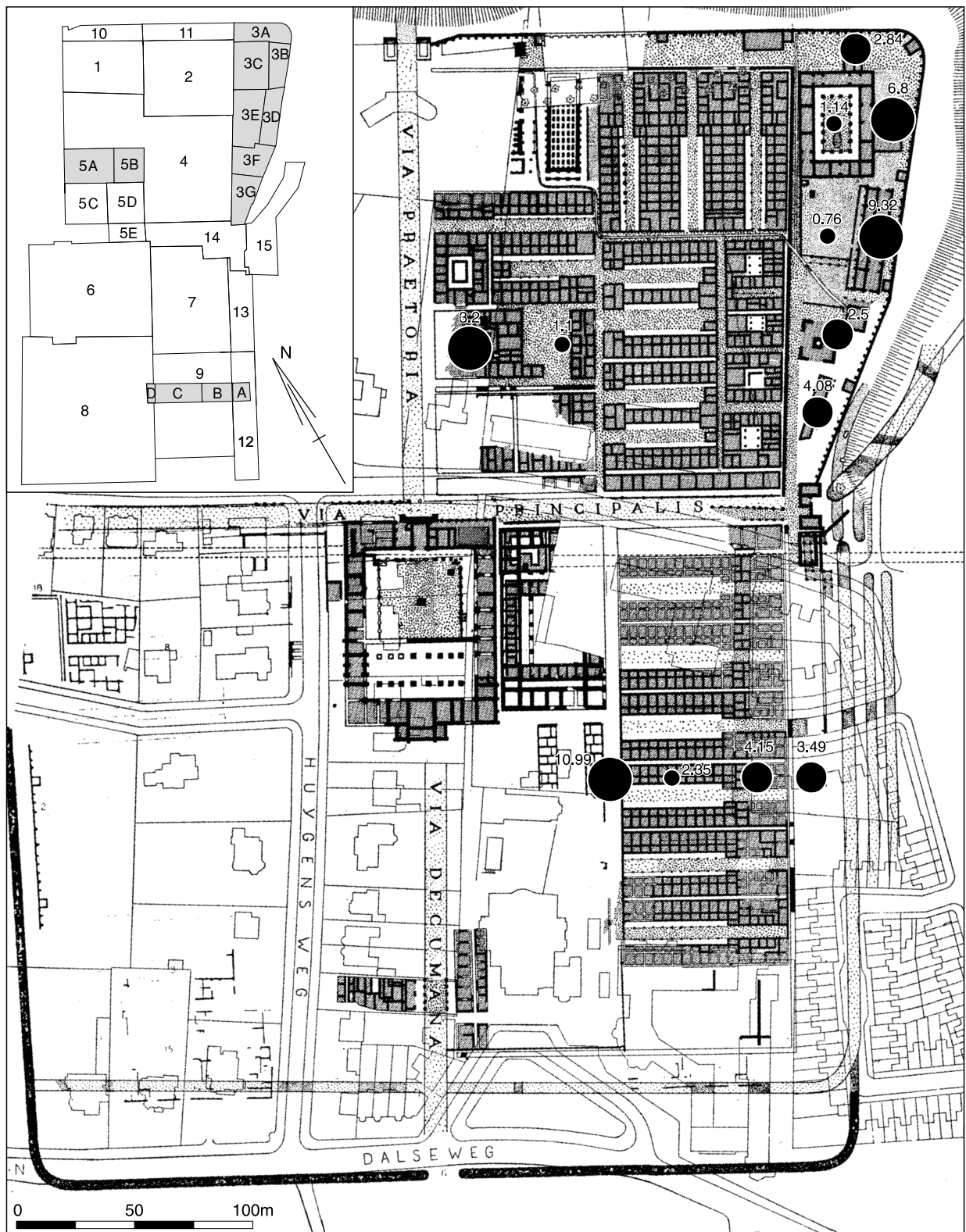


Figure 4.10 Nijmegen. The legionary fortress. Spatial arrangement over the (sub-)areas of the results of the combined observations of pits and finds (see Tables 4.43-47). Scale 1:2,500.

Legend: a. upper left corner: division in (sub-)areas; b. black dots: ratio of numbers of finds : area of pits (m^2) : surface of sub-area (m^2) \times 1000; c. small dot: low ratio = few finds compared to area of pits and surface; d. medium dot: average ratio = average finds compared to area of pits and surface; e. large dot: high ratio = many finds compared to area of pits and surface.

Figure 4.10 Nijmegen. The legionary fortress. The ratios underlying legend b-e.

Sub-area	3A	3B	3C	3D	3E	3F	3G	5A	5B	9A	9B	9C	9D
Ratio													
Low (< 2.5)			1.14		0.76				1.1			2.35	
Average (2.5-5)	2.84					2.5	4.08	3.2		3.49	4.15		
High (>5)		6.8		9.32									10.99

it would have to be based on a systematic statistical handling of the data which, at this stage, would be beyond the scope of the pilot study. It is, moreover, questionable whether this would affect the results to any degree.

In general, it can be established that the sub-areas 3B, 5A, 5D, 9A and 9B show no deviations, and the sub-areas 3D and 9D show every possible deviation from the average. The sub-areas 3F and 3G differ with regard to the number of pits (fewer pits) as do 3A and 9C (more pits); with regard to the number of finds the sub-areas 3C, 3E and 5B differ (few finds).

The function of the sub-areas is divided into built and unbuilt space (see Section 4.1.4) and may be of influence on the significance of the differences just mentioned (Fig. 4.10). As for the pits, it is remarkable that an average to large number of pits are found in the built sub-areas, some of which, from the stratigraphical evidence, are younger than the wooden building phase but older than the stone building phase. This applies to sub-areas 3A, 3B, 3C, 3E, 5A, 5B, 5D, 9B and 9C. Few pits are found, on the other hand, in the unbuilt sub-areas, at any rate before the stone building phase; these are sub-areas 3D, 3G and 3F. An exception is the unbuilt sub-area 9A, with an average number of pits, and 9D, in which there is one very large pit (no. 123/41). The connection between pits and built sub-areas and the stratigraphical position of a large number of pits between the wooden and the stone building phases clearly indicates that many pits are linked with rebuilding or demolition activities in the fortification period, in particular the wooden buildings (see also Section 4.3).³⁰⁰ Finds occur in average and large quantities in built-on areas as well as vacant areas. They are then either a reflection of the actual active use of the space or of the rebuilding and demolition activities; if they only represented the latter they would be found exclusively in the built-on

space. Sub-areas 3C, 3E and 5B differ because few finds were found there. On the basis of the building features, sub-areas 3C and 3E may have had a special function which would then have determined the small number of finds. In sub-area 5B, there was a transition from built-on in the timber building phase to partially built-on and partially open in the stone building phase (Section 4.2.2). The significance which must be attached to the coincidence of the (altering) function and the small number of finds in this area remains unclear. The composition of the finds assemblages in this sub-area does not differ from the overall picture of area 5. This indicates that this space continued to form part of the officers' complex even in an unbuilt state.

On the basis of this analysis we may conclude that many pits, even if there is no stratigraphical evidence to support it, must be linked with rebuilding and demolition activities in the period that the legionary fortress was in use, whether it was occupied by an entire garrison or not. The pits therefore do not represent everyday military usage, but the presumably more exceptional phase of change in buildings which may then have been temporarily out of use. The only exception to this may be the small pits with much charcoal but no finds in sub-area 3A; they probably reflect a specific activity, possibly connected with the active use of this sub-area. The finds may be the reflection of the active use of the garrison as well as of the rebuilding and demolition activities. In the first case we must take into account the fact that this may have been material left behind when the sub-area in question was abandoned and which was collected and deposited during rebuilding and demolition work. It would then only represent the very last phase of active use; moreover, it would probably be only a small percentage, because the area was left in an orderly state and much was taken away.

³⁰⁰ See also for example Bishop 1986.

4.5.3 Relation between character and number of finds, use and deposition of finds and pits

This section focuses on the phenomenon of pits as a feature in the legionary fortress. One's common sense says that it is not usual to have pits, let alone open pits, in a densely-built and populated fortress which is in active use and whose open spaces are paved or metalled. After all, they are not easy to dig, and would be treacherous obstacles by day and certainly by night. The general theory that they were refuse pits does not tally with the amount of refuse the pits are able to contain nor the quantity of refuse hundreds of men produce in the course of time. The volume of all the pits in area 3 is c. 300 m³, in area 5 203 m³ and in area 9 220 m³, in all c. 725 m³, which, moreover, were probably not completely full with rubbish. Another consideration is that with an active use of the fortress over 50 years, an average of only 588 : 50 = 11.8 pits a year were dug whereas the average volume per year is 725 : 50 = 15 m³. This becomes considerably less if one subtracts the pits which were connected with rebuilding

and demolition activities. The number of finds of at least 1,000 pieces of kitchenware in areas 5 and 9, where about 100 men lived during c. 50 years, represents 1,000 : 100 : 50 = 0.2 items of deposited kitchenware per year, an extremely low number. This fact, together with considerations of a hygienic nature concerning rubbish deposition, makes it extremely unlikely that the pits were generally used for refuse. The functions they may have had are listed below. The pits are arranged in the following categories:

- a. Pits connected with rebuilding and demolition activities. This group has been referred to several times and is clearly characterized by its stratigraphical position between features of timber and stone building phases (Appendix V, IX and XIII for area 3, 5 and 9). It contains few finds and appears to be linked mainly with demolition, as for example pit nos. 983+984 with the remains of wall paintings.
- b. There are, occasionally, very large pits, some with and some without finds (Table 4.44). These may reflect incidental activities with no recognizable significance.
- c. Pits with a relatively large quantity of pottery

Table 4.48 Nijmegen. Number and classes of pits with charcoal.

	Class in m ²			Total
	0.1-1.49	1.5-1.99	Others	
Sub-area				
3A	59	6	4	69
3B	23	3	6	32
3C	17	0	6	23
3D	14	2	1	17
3E	26	4	12	42
3F	5	0	1	6
3G	3	0	2	5
Total number/%	147/76%	15/8%	32/16%	194/100%
5A	4	0	5	9
5B	6	1	5	12
Total number/%	10/48%	1/4%	10/48%	21/100%
9A	3	4	4	11
9C	12	3	3	18
Total number/%	15/52%	7/24%	7/24%	29/100%

Table 4.49 Nijmegen. Pits with very much charcoal. For the stratigraphical abbreviations see Section 4.1.4 'Method of analysis used for archaeological features ...'.

Sub-area	Pit no.	Surface area (m ²)	Volume (m ³)	Stratigraphy
3A	555	1.68	1.68	-
	556	3.09	3.09	-
3C	496	1.75	-	TFS
3E	29	0.8	-	UFS
3F	54	3	3.3	TFS
	55	0.57	6.4	-
3G	62	1.13	0.57	-
	96	0.75	-	-
	301	0.47	0.46	-
5B	820	1.6	1.44	-
	821	0.79	0.3	UFS
9A	50/36	1.65	1.32	TFW
	50/52	1.7	2.04	TFW
9C	116/40	0.94	0.61	UFS
	116/42	2.2	1.54	UFS

Table 4.50 Nijmegen. Pits with slag.

Sub-area	Number of pits	Number of fragments				Total number of slags
		1-5	6-10	10-15	>15	
3A	17	12	3	-	2	>53
3B	3	3	-	-	-	>8
3C	1	17	-	-	-	?
3D	5	4	-	1	-	>21
3E	8	6	1	-	1	>38
3F	1	-	-	-	1	14

(Table 4.46), e.g. nos. 527 (3D), 1 and 2 (3B) may reflect, by way of exception, the deposition of large quantities of refuse, for example during a special activity such as the clearance of a complex of buildings or a site.

d. Pits connected with work. Three kinds are eligible: pits with (much) charcoal which are usually no bigger than 1.5 m² (Table 4.48-49), pits with slag found frequently in sub-areas 3A, 3D and 3E (including no. 1 in 3D, no. 24 in 3E, and also no. 55 in 3F and no. 727 in 5A), and pits with smelting remains, several of

which contain a great deal (nos. 1 in 3D, 136 (64 specimens) in 3E and 472 (812 specimens!) in 3D) (Table 4.50-51). All three cases indicate metal working.

Table 4.51 Nijmegen. Pits with melting pots.

Sub-area	Number of pits	Number of fragments				Total number of fragments
		1-5	6-10	10-15	>15	
3A	10	8+?	-	-	-	>16
3B	3	6	-	-	-	6
3D	7	4	-	1	2	856
3E	3	2	-	-	1	71
3F	1	?	-	-	-	?
3G	1	1	-	-	-	2
5A	2	-	2	-	-	20

Table 4.52 Nijmegen. Sub-area 3A: drinking vessels.

Drinking vessels associated with	TFW phase	UFW phase	Charcoal	TFW phase + charcoal	Without charcoal	Total
Number	3	2	10	4	3	22
Percentage	13.6	9.1	45.5	18.2	13.6	100

4.5.4 Relation between features, finds and the socio-economic function of the (sub-)areas

Introduction

The observations concerning (sub-)areas, building features, pits and finds may be significant for various phases of activity in the legionary fortress: the layout c.q. building of a part of the camp, the actual active use with and without full occupation, the maintenance c.q. rebuilding and renovation and final abandonment.

In the layout c.q. building of the space a distinction can be made between the use of buildings and open spaces as intended for the functioning of the legionary organization and as was actually the case and at variance with the original intention, for example, if the camp was not fully occupied temporarily. The pits may be the reflection of various activities connected with the original objective such as work, building activities, maintenance and renovation or work to do with the final abandonment c.q. breaking up/ dismantling of the fortress. The finds may be the random and chance material reflection of the daily use of the space, insofar as mobilia were not removed as refuse or taken away

on departure. What remained is in this case a highly selective and fragmentary part of what was originally used. The pit contents may also be the product of specific circumstances like the clearance of household goods and commodities left behind, whether or not subjected to a prior selection, which were purposefully deposited as an assemblage. The finds may again be the residue of work from different phases of use of the camp which were not subjected to selection.

Area 3

Sub-area 3A

The number of pits and finds in sub-area 3A is the highest of all the areas; the number of pits remains high, relatively speaking, and there is an average number of finds. There is, therefore, intensive activity of various kinds:

- an unusually large quantity of refuse was deposited; the spectrum not only corresponds to the general picture but shows striking deviations in the high frequency of the drinking vessels, especially HBW 28 (Table 4.52):
- there are clear signs of work in the form of small pits with charcoal and pits with slag, which lie over the timber building phase and under the stone building phase and which

- may indicate metal working;
- c. one pit stands out with its unusual contents consisting of a great many pitchers and the virtual absence of Coarse Wares (no. 568). Two very large pits (nos. EA and 718) are found under the stone building phase. Pit no. 718 contains an unusual amount of Coarse Ware, most of which are Coarse Other Fabrics. The spatial function of sub-area 3A is a. rampart/wall with intervallum 7 m wide, where there are comparatively few pits, most of which have no finds; and b. a 10 m wide space behind a. where, during the timber building phase, there was an atypical rectangular building, and in the stone building phase a small, also atypical room.

The conclusion is that in sub-area 3A

- a. more than normal quantities of refuse were deposited;
- b. craft activities took place in which fire was used and slag was left behind as refuse;
- c. more was drunk than usual, which is perhaps connected with the activities around fires;
- d. the defence function of the rampart/wall and the intervallum was not in conflict with the deposition of refuse and the craft activities, and
- e. the function of the buildings is not clear.

Sub-area 3B

The number of pits and finds in sub-area 3B is, relatively speaking, among average for the sub-areas. In an absolute sense, the finds are remarkable because of their large numbers. More than half the finds, 54%, originate from three pits. Among the finds, the relatively high incidence of olive oil amphorae is noticeable, although this is tempered by the low absolute number of six specimens. One pit (no. 527) contains an unusual quantity of Coarse Ware belonging to the category 'Other Fabrics'. The spatial division is similar to sub-area 3A with regard to the defence function of rampart and intervallum. Behind these there was an atypical rectangular timber building in the wooden building phase, and a small stone extension to the large building in sub-area 3C in the stone building phase. During the latter phase the open space was paved with tuff.

The conclusion is that in sub-area 3B

- a. more than normal quantities of refuse were deposited;
- b. this was not adverse to the defence function

- of the rampart and intervallum and
- c. the function of the buildings is obscure.

Sub-area 3C

The number of pits is average, the quantity of finds is relatively and absolutely small. The number of cooking utensils is below average. During both the wooden and the stone building phases there was a large building with an inner courtyard in this sub-area. The stone building was interpreted by Von Petrikovits as a 'Magazin vom Hoftyp'.

Sub-area 3C can be interpreted as a space reserved for collective use. Evidence for this are the small number of finds, fewer cooking utensils, the construction of the stone building around an inner courtyard with a pond which could only be reached via the building, thus restricting free use of it. The finds assemblage would appear to support Von Petrikovits' interpretation of a warehouse, based on the appearance of the stone building; it could not have been a permanent residence. It seems probable that the wooden building may also have served the same purpose. It would then have been a warehouse in which pottery used for transport or storage was apparently of little importance.

Sub-area 3D

There are a large number of finds in sub-area 3D, in both a relative and an absolute sense, certainly in comparison with the small number of pits. The majority of the finds, 68%, originates from three pits (nos. 1, 2 and 38). Pit no. 1 contained the highest number of vessels of all the pits and stands out for its extremely large quantity of Coarse Nijmegen Ware. Among the pottery the drinking vessels (Coated Wares) and the cooking utensils of Nijmegen make (Coarse Nijmegen Ware type HNW 66) are conspicuous. In addition there are waste products (no. 1/UFS) and crucibles (no. 472/TFS) in the corner of the stone building.³⁰¹

Most of the pits are older than the stone building phase.

The sub-area has a defence function with a rampart, tower and intervallum which was unusually narrow in the stone building phase. The space was unbuilt in the wooden building phase, and in the stone building phase there was an atypical building interpreted by Von Petrikovits as a 'Werkhalle' or fabrica.

³⁰¹ For the abbreviations see Section 4.1.4 'Method of analysis for archaeological features ...' and Appendix V.

The conclusion is that in sub-area 3D

- a. a relatively large quantity of refuse was deposited mainly prior to the stone building phase, when this site was unbuilt;
- b. some craft activities took place prior to but also contemporaneous with (or after?) the stone building phase;
- c. drinking and cooking vessels were used or at least deposited;
- d. the possibilities for using the intervallum were limited by its narrowing to 2.5-3 m;
- e. the function of the stone building is difficult to determine, but it may have been connected with craft activities.

Sub-area 3E

There are very few finds, both relatively and absolutely. One pit (no. 21) contained 50 vessels, more than 37% of the total number of pottery from this sub-area. However, the number of crucibles (pit no. 136 with 64 fragments) and waste products (pit no. 24 with 24 specimens) is striking. During the wooden building phase there was a building here with a large inner courtyard, and in the stone building phase this is an open, though walled space.

The use of sub-area 3E shows similarities to that of sub-area 3C as regards the small number of finds; the space must have had a collective function on the basis of its shape and the finds. There is evidence of craft activities, some spread over the area, some still possibly belonging to similar activities in sub-area 3D (nos. 20, 24 and 467).

Sub-area 3F

In sub-area 3F there are very few finds in an absolute sense and relatively very few pits. Rampart and intervallum represent the defence function. Buildings during the stone building phase are connected with the (central ?) drinking-water supply of the fortress. The finds and buildings consisting of a wellhouse and a reservoir clearly indicate that the site had a collective function. The deposition of refuse is therefore minimal, for obvious reasons of hygiene, so the area was kept clean. The sub-area with the wooden building from the preceding phase possibly served the same purpose, which was the drinking-water supply, assuming that there was continuity in spatial use. Evidence for this are, for example, the channels from the wooden building phase

which were interpreted as water pipes or gutters.

Sub-area 3G

The finds and pits are similar to those in sub-area 3F: very few finds and very few pits. Rampart and intervallum make up the defensive elements of the area. Only in the stone building phase was there an atypical rectangular building here. It is significant that the sub-area borders the *via principalis* and *porta principalis dextra*. The site must have had a public function, and must therefore have been kept free from refuse. On the basis of its position between the *via principalis* and sub-area 3F with the water supply, it may have been a place where arriving and departing groups of people and animals could wash and refresh themselves.

Summary Area 3

The functions of area 3 may be summarized as follows:

a. defence	sub-areas 3A, B, D, F, G
b. refuse deposition (in wooden building phase?)	sub-areas 3A, B, D
c. craft	sub-areas 3A (and D)
d. collective storage	sub-areas 3C, E (wooden building), D (stone building)
e. water supply, square	sub-areas 3F, G

Area 5

Sub-area 5A

The number of pits and finds is average, relatively speaking; in an absolute sense, the finds are quite numerous, but 40% of them originates from two large pits (nos. 962/UFS and 992/TFS).³⁰² After deducting these two large pits, the number of finds is similar to that in most of the other sub-areas. In general, tableware tends to be less frequent and cooking ware more so, giving a contrasting picture to that of sub-area 9C. Among the cooking ware, the Nijmegen Coarse Ware forms HNW 62 and 66 are prominent, also in pit no. 963. In addition the virtually exclusive occurrence of Eifel region jars is striking.

The building in sub-area 5A must have served as a house for a high-ranking staff officer. In the wooden building phase there are no direct

³⁰² For the abbreviations see Section 4.1.4 'Method of analysis for archaeological features ...' and Appendix IX.

indications for any special status apart from position, size and shape; however, in the stone building phase the presence of a heating system may be an indication.

The conclusion for sub-area 5A is that

- a. it had a living and working function for a high-ranking staff officer;
- b. for a relatively small community of one officer and his personnel it yielded a relatively large quantity of finds compared to sub-area 9C, where a whole cohort was stationed;
- c. the large quantity of cooking ware points to cooking activities which made use of ordinary pottery, and Nijmegen Coarse Ware forms had a prominent place;
- d. less tableware was found, which may be accounted for if metal ware was used and taken away on departure;
- e. the large pit no. 962 may be a special deposition complex which was collected prior to the demolition of the wooden building.

Sub-area 5B

Here few finds were discovered, both absolutely and relatively. However, Terra Sigillata drinking bowls and wine amphorae are relatively distinctive due to their numbers, although there are few in an absolute sense. One pit contained five Decorated Terra Sigillata drinking vessels (no. 825). Here too, Eifel region jars are common. In the wooden building phase there was a building here for a high-ranking officer; the function of the building in the two stone building phases is unknown, there is a hypocaust and wall-paintings were added (pit nos. 983+984), which may indicate a certain status. The Terra Sigillata drinking bowls, the wine amphorae and the Eifel region jars may also point to a certain luxury, though this need not have been reserved for the officer himself but may also have been for his personnel.

Sub-areas 5C, D and E

These sub-areas were insufficiently excavated for them to play a part in the interpretation.

Summary area 5

See under 4 (summary areas 5 and 9).

Area 9

Sub-area 9A

This sub-area was not excavated sufficiently for

it to be used in the interpretation.

Sub-area 9B

An average number of pits and finds were found. Among the finds, cooking ware is less frequently represented which corresponds to the spectrum of area 9 as a whole; tableware is better represented.

In the wooden and stone building phases there was a centurio house here with an open inner courtyard.

Sub-area 9C

There are many pits in sub-area 9C; seven of them were enclosed stratigraphically between the wooden and the stone building phases; many of the pits were probably connected with the replacement of the wooden building by the stone one. The number of finds is average in a relative sense, and high in an absolute sense, but very low compared to the number of men, c. 80, of a centuria. The sub-area stands out from all the others due to the find of twelve millstone fragments. Apart from this, relatively many wine and olive-oil amphorae were found.

In the sub-area there was a barracks for a centuria of c. 80 men in the wooden and stone building phases plus an open space belonging to it.

The large number of pits and finds appears to reflect the dense population of c. 80 men, but the quantity of finds is, nevertheless, small for such a number. Compared with this, the number of finds in sub-area 5A is greater. The soldiers apparently ground their corn themselves.³⁰³

Sub-area 9D

A comparatively large number of finds originate from one pit with a very large volume (no. 123/41), but this is very small, absolutely speaking.

Summary areas 5 and 9

For the sake of comparison, areas 5 and 9 are discussed together. Areas 5 and 9 represent the living and working space of high-ranking staff officers and men belonging to one centuria. The difference in the number of inhabitants appears to correspond in an absolute sense to the number of finds; in sub-areas 5A and 5B this is less, in sub-area 9C more; in a relative sense this is quite the reverse. It is difficult to explain why relatively more material was

³⁰³ Johnson 1983, 197-202.

found in sub-areas 5A and 5B. Did the officers and their staff have more tableware at their disposal and were they in a better position to afford it, so that it was treated with less care? Did the soldiers have to be more careful with it? The pattern of food preparation may also have differed. It appears that cooking was done in the officers' section, but that no corn was ground there. The reverse seems to have been the case in the soldiers' section: the men cooked less frequently, but did grind their corn. Cooking may have taken place in the *intervallum*.³⁰⁴ The absence of *dolia* may indicate a form of central storage, although secondarily-used amphorae may also have served as *dolia*. The Nijmegen Coarse Ware forms HNW 62 and 66 and the Eifel region jars perhaps played a special part in the officers' food supply or preparation. It is obvious that large amounts of refuse must have been transported. The 349 specimens of pottery from sub-area 9C are the material expression of the c. 50-year stay of c. 80 men, which is less than one specimen per man per year. Moreover we know that probably much refuse was deposited outside the camp, namely on the slope of the outwash plain on the northeast side of the camp. Some of these layers of refuse were cut in trench 147. The results of a small test to establish the percentages of amphorae and *dolia* from the pits in the three areas and from the refuse layer are illustrative. In the case of the *dolia* from the three areas 1.3 *dolium* per 100 m² was found, whereas 9.3 *dolium* per 100 m² were found in the refuse layer, which is more than seven times as many. With the amphorae the difference is even more striking: 7.6 amphorae per 100 m² come from the pits and 72.2 amphorae per 100 m² from the refuse layer, which is nine times as many!

Many of the pits in sub-area 9C cannot be fitted in stratigraphically, but cut through the wooden and stone building features. Do they perhaps reflect digging activities during the habitation of this sub-area?

4.6 EVALUATION OF THE RESULTS IN THE LIGHT OF THE OBJECTIVES OF THE PILOT STUDY

4.6.1 Introduction

In this concluding section, the results of the analysis from Section 4.2-5 are evaluated in the light of the objectives of the pilot study as described in Section 4.1.2: the practicability of a method of approach focused on the spatial and socio-economic aspects of the entire Roman military occupation of Nijmegen in the period AD 70-120/130. The aim was in the first place to gain insight in the kinds of questions that can be asked and the sort of information that the answer to these questions may provide. In the second place, the method of working and its proceeds could be established. For the evaluation, three areas were selected which were assumed to comprise various aspects important to the analysis that could be investigated:

- a. the spatial distribution over the fortress, so that different situations would be created with regard to the intensity of habitation and manner of preservation;
- b. the socio-economic function and status represented by staff officers, officers, foot-soldiers and craftsmen spread across a space in which people lived and worked and where central facilities such as that for drinking-water and storage were to be found;
- c. the differences in excavation methods in the course of time.

In the discussion an attempt has been made to restrict it to main issues in order to avoid as much as possible the repetition of specific information from the above sections.

4.6.2 The spatial and socio-economic aspects

There are clear differences in the nature and intensity of the spatial use and the type of information available. The built-on area is characterized by its primary function of living and working, and to a lesser extent by the finds associated with this because refuse was frequently transported elsewhere. Many of the pits in the built-on area are connected with the rebuilding of sections of the camp from wood to stone, and much of the archaeological material

³⁰⁴ Johnson 1983, 200-202.

therefore reflects the final stage of use and abandonment of the wooden building phase and the rebuilding activities themselves. The nature and intensity of the use of the vacant space can almost exclusively be derived from the position inside the fortress and specific elements such as a wellhouse, a gallery or paving. Pits and finds are of secondary importance. When deviations from this pattern occur in the built and unbuilt areas, they are all the more conspicuous.

Examples of this are sub-area 3A, where a great deal of refuse was deposited in an open space and where there is also evidence of primary craft activities, and sub-areas 5A and 9C where some finds groups certainly appear to reflect primary use and differences in primary use.

The manner of preservation influences to a large extent the quality and significance of the observations. The rebuilding from wood to stone by the Roman army and the breaking away of the stone foundations has greatly restricted the information value of the built-on space. The custom of removing refuse from the army camp has also determined the extent and significance of the archaeological material discovered. The difference in treatment between pits with finds and those without may also prove important for a good understanding of the use of space and the handling of refuse.

In establishing the socio-economic function and status aspects, the spatial division of the fortress and the structure of the buildings is of major importance. The value of pits and finds from pits as an independent source of information is too restricted. Its significance lies primarily in the possibility of confirming and specifying statements on the basis of the spatial division and the buildings. An integrated approach to features and finds therefore generally provides the best opportunity to arrive at good interpretations.

The socio-economic function can be regularly traced, though not always through the presence of finds. Refuse deposition and craft activities were established in sub-areas 3A, B and D from the pits and finds, and thus influence the interpretation of the buildings. Warehouse functions (sub-areas 3C, D (stone building) and E (wooden building)), water supply (sub-areas 3F and G) and defence (sub-areas 3A, B, D, F, G and 9A) were determined by position and structure, but, with the exception of sub-areas 3A, B and

D, stand out for their relatively small number of pits and/or finds. It is surprising that the pottery from area 3 with its collective character (defence, craft, storage, water supply, open space) when arranged into tableware and cooking ware does not differ significantly from that in areas 5 and 9 with a living-working function, and so is the fact that the storage character is not reflected in the pottery. The differences in archaeological material between areas 5 and 9 - both with a living-working function - may be an indication of different methods of use of the space: in area 5 there are relatively more kitchen activities than in area 9, but on the other hand there is more storage and food preparation in the form of millstones in area 9 than in area 5. The number of Native Pottery in area 9 is surprisingly high compared to area 5 (see Table 4.22).

Differences in status are only apparent to a limited extent in the archaeological material, and concern area 5, where high-ranking staff officers must have lived. The higher relative frequency of Decorated Terra Sigillata bowls and wine amphorae, Coarse Nijmegen Ware and Eifel region jars might indicate a more luxurious eating and drinking pattern together with a preference for the use of a certain type of pottery. On the same line of thought the low proportion of tableware among the pottery might be explained by the use of a more costly metal service which the officers took with them when they left the camp.

4.6.3 Method

With respect to the applicability of the working method used here to the data in question, some statements must be made which are of vital importance to the continuation of this approach in processing the settlement features at Nijmegen from the period AD 70-120/130. First, it is fundamentally important that a useful analysis must not be made at the level of the individual feature, a pit or a trench, or the individual finds assemblage or even the individual find, but at the level of a sub-area and of material groups and categories. In the future, the method of analysis of the majority of features and finds will have to focus on this. This will also prevent the over-detailed specification of features, assemblages and material groups/categories resulting in such small numbers that all significance is lost. Attention will of

course have to be paid to cases where features, individual finds contexts such as (very large) pits with much archaeological material or material groups and categories deviate from the general picture.

Second, it is of vital importance knowing that differences in excavation techniques resulting from the long period spanned by the excavations have only very exceptionally had a noticeable influence on the quality of the data processed. This concerns the depth of the pits which was registered less frequently before 1967 than after 1972, so that only the surface area and not the volume could be used as a variable. This means that the groups of data which were excavated at different times can be treated as a whole.

Noticeable differences will be seen in other, not yet processed finds categories such as metal, bone and organic remains, where the use of a metal detector or sieving and flotation techniques may strongly influence the results.

Naturally, some remarks of a more general nature can be made about the working method. One recurring problem is how to define the norm for what is 'normal' and what deviant. Up to now, a relative norm has been used, for example in the form of the surface area of (sub)-areas and average values for pits and finds. The degree to which something differs from this was determined in a rather subjective way. One should consider whether a more statistically based approach should be developed.³⁰⁵

In the previous section it has been made clear that buildings, spaces, pits and finds must be analysed in context in order to gain insight in their relation. Stratigraphical information in the form of covering layers or cutting is of major importance but conditions are often unfavourable. The robbing of stone foundations in particular has destroyed much information. The results of the method followed here can be improved in two ways. First, the unprocessed data from the areas investigated must be included in the analysis. This concerns the relation between specific features and finds and roof tile stamps for dating and periodization, and especially groups of finds such as glass, metal, millstones and bone material which can provide additional information as to function and use. Subsequently, the extension of this form of research to other areas inside

and outside the camp can increase the understanding of the significance of similarities and differences. A final, though still distant step is comparison with other sites where analysis has focused on similar questions. These are still few in number (see Section 4.1.1).

Finally, one should not forget that in a subsequent and definitive stage of analysis all kinds of additional information will still have to be assimilated. Features will have to be presented per area in a detailed form, important finds assemblages and unusual individual finds must be described and, if necessary, illustrated. This kind of information is part of the documentation underlying the sort of analysis and interpretation aimed at in this pilot study.

4.6.4 Conclusion

The conclusion is that it is possible to gain in-depth knowledge of the spatial and socio-economic aspects of the Roman military occupation of Nijmegen in the period AD 70-120/130. As to the degree of detailing of questions and answers one should not expect too much. They are determined primarily by the spatial structures which are interpreted comparatively quickly inside an army camp. The analysis of other features and especially the finds adds new information to some of these. This can have a great influence on the final interpretation as, for example, the pits which must be considered to belong to a rebuilding phase, and the unusual occurrence of Nijmegen Coarse Ware in area 5.

The working method appears theoretically to be suited to the question in view, but it still has to be expanded. It may then become the key to an attractive and meaningful analysis of (part of) an extensive excavation complex like that of Roman Nijmegen. The advantage as regards a more usual description and analysis is that the method followed here has a less descriptive and more analytical character. Because of this it links up better with recent developments in archaeology which attach a greater value to 'meaningful analysis' by a more explicitly formulated method and hypothesis.

³⁰⁵ See for example Kloosterman, Polak & Zandstra 2014.

5 The fourth-century defence system around the Valkhof and the problem of continuity during the early medieval period

(with J.S. Boersma, W. Dijkman, M. Erdrich, R.C.G.M. Lauwerier, J. Raap, D. Teunissen and J.R.A.M. Thijssen)

The topography of Nijmegen in the fourth century shows a clear contraction of the area used in the previous centuries with the site of the medieval castle Valkhof as the new centre (Fig. 5.1). This contraction illustrates one of the classical topics of late Roman archaeology, that of continuity with past periods and with the early medieval times that followed. The late Roman fort is the primary subject of this chapter, but its full meaning has to be considered in relation to the two cemeteries³⁰⁶ and the post-Roman occupation outside its walls.

5.1 INTRODUCTION

As part of the excavation campaigns in the inner city of Nijmegen, the necessity for which has been discussed in Section 3.3.1, a series of four ditches from the late Roman period were discovered as well as traces of occupation from the early Roman period (Fig. 5.1 nos. 2-4). All the ditches seem to have surrounded the site of the later Valkhof. During the excavations up on the outwash plain no remains were found of the settlement belonging to them; however in the last few decennia two contemporaneous cemeteries were excavated and traces of intensive habitation were found up against the foot of the outwash plain and on the bank of the Waal.³⁰⁷

5.2 THE FEATURES

5.2.1 Foundations and foundation trenches

Course and form

In the extreme northeast of the excavation in the inner city and at a short distance from the Voerweg and the Belvédère three traces of walls or wall-trenches were observed over a comparatively small surface area running from north-west to south-east (Fig. 5.2 nos. 1-3; 188.3450/428.8050-8).

Trench no.1

The most northerly trench (Fig. 5.2 no.1) is 1.50 m wide and has a brown fill in which no remains of walls or rubble were found. It is uncertain whether this feature had anything to do with a foundation.

Trench no. 2

The middle trench (Fig. 5.2 no. 2; 188.3500/428.8120) is 1.00 m wide and 0.40 m deep under the first level and was observed for a distance of 6.50 m. The trench contains some scattered building material.

Foundation trench no. 3

The most southerly trench (Fig. 5.2 no.3; 188.3500/428.8100) is 1.20 m wide, 0.35 m deep under the first level, and is at least 13.00 m long. There are many pieces of tuff in the fill, but there is no question of foundation material in situ. However it is very likely that these are the remains of a robbed wall.³⁰⁸

5.2.2 The multiperiod ditch system

Course and form

Just south of the wall traces described above, a system of ditches and small ditches intersecting each other was found, running in a northwest-southeast direction for a distance of c. 25 m at the most (Fig. 5.2-3 no. 4 and 5.3).

Ditch A

Ditch A is characterized by its size and relatively clean fill. At the first level the ditch may have had an estimated width of c. 7.50 m and may have been 4.65 m deep; the exact measurements can no longer be traced due to the digging of the later ditches.³⁰⁹ This ditch has a regular V-shaped section with a rather U-shaped bottom. The fill from top to bottom consists of rather homogeneous brownish-yellow sand from which a small number of finds were collected; the lower part does not contain cleaner material, as is usual. At the top there are layers of cleaner washed-in material. This phenomenon also occurs in a wide bowl-shaped hollow (A1) which is situated a little further south of the central part of ditch A (width at least 4.00 and possibly 6.00 m; depth at least 1.70 m covered by a darker layer A2).

On the basis of its fixed form and clean homogeneous fill it is possible that ditch A was only in use for a comparatively short period of time and that it was purposely filled in with fairly clean material in a single operation.³¹⁰ The bowl-shaped feature A1 may have been a local phenomenon or a later defence element like the small ditches which were dug later, and may also have had a short life and been filled in on purpose, judging from the clean fill.

³⁰⁶ Steures 2013.

³⁰⁷ General: Bloemers, Greving & Zoetbrood 1979, 64-68; Bloemers 1985 and 1986a; Valkhof: Thijssen 1980; Waalkade: Jaarverslag ROB 1984 (1986), 45 and 1985 (1986), 52-53; cemeteries: Steures 2013. For more recent important information based on the excavations carried out in 1996-1997 on the construction site of the new Museum Het Valkhof see Van Enckevoort & Thijssen 2000, 12-31; Thijssen 2002a and 2002b; Willems & Van Enckevoort 2009, 95-108; Van Enckevoort & Thijssen 2014, 34-41. Useful maps are published by Hendriks *et al.* 2014, 58 and Hendriks & Den Braven 2016, 13 Afb. 6.

³⁰⁸ On the basis of the results of the excavations carried out in 1996-1997 on the construction site of the new Museum Het Valkhof Van Enckevoort en Den Braven consider this robber trench not as (late) Roman. However, trench no. 1 could in their opinion be the western extension of the demolished wall of the late Roman fort (Thijssen 200b, 14; Willems & Van Enckevoort 2009, 100; Van Enckevoort & Thijssen 2014, 35; Hendriks *et al.* 2014, 66).

³⁰⁹ During the 1996-1997 excavations (see previous notes) the extension to the east was observed over a distance of at least 40 metres (Hendriks & Den Braven 2016, 13 Afb. 7).

³¹⁰ This might be interpreted as an indication for an earth and timber construction of a wall which has been levelled as Thijssen 2002b, 13 and Van Enckevoort & Thijssen 2014, 34-35 suggest.

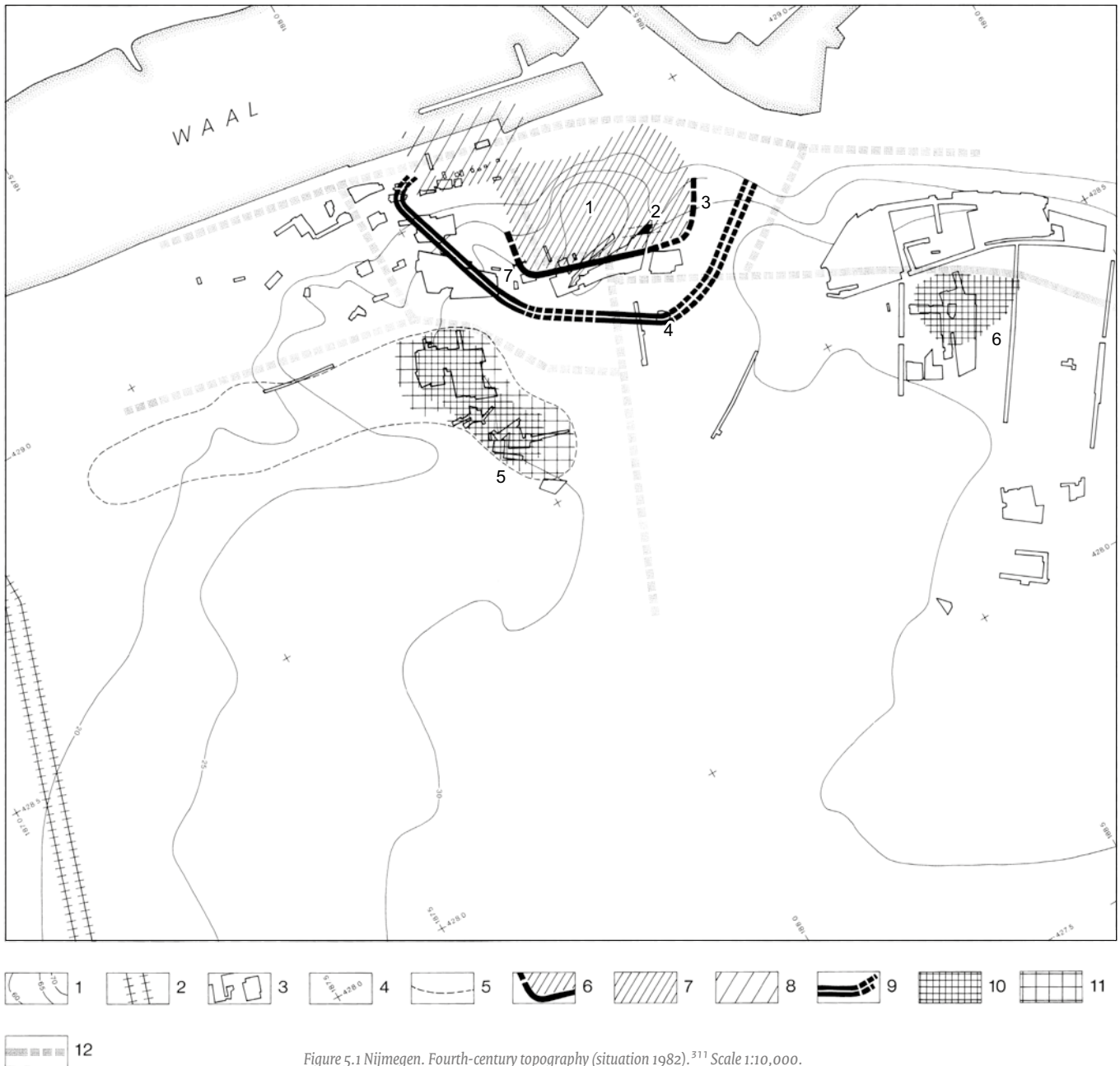


Figure 5.1 Nijmegen. Fourth-century topography (situation 1982).³¹¹ Scale 1:10,000.

Legend: 1. contour lines; 2. railway; 3. excavated areas; 4. topographical coordinates; 5. hypothetical extension of the middle Roman to early medieval cemetery; 6. ditch enclosing the inhabited area on the Valkhof; 7. inhabited area (investigated and/or many finds); 8. inhabited area (not investigated and/or few finds); 9. double ditch around investigated and uninhabited area; 10. cemetery (investigated and/or many finds); 11. cemetery (not investigated and/or few finds); 12. (hypothetical) road.

Site numbers: 1. fortification around the Valkhof (Willems 1981 no. 403); 2. the multiperiod ditch system (Fig. 5.2-3); 3. the single period ditch (Fig. 5.4-5); 4. the system of two parallel ditches (Fig. 5.6-7); 5. middle Roman to early medieval cemetery (Willems 1981 no. 405); 6. late Roman cemetery (Willems 1981 no. 410); 7. section of the ditch at the Lindenberg (Fig. 5.17).

³¹¹ For a more recent topographical overview see Willems & Van Enckevort 2009, 28 Fig. 8; Van Enckevort & Thijsen 2014, 35.

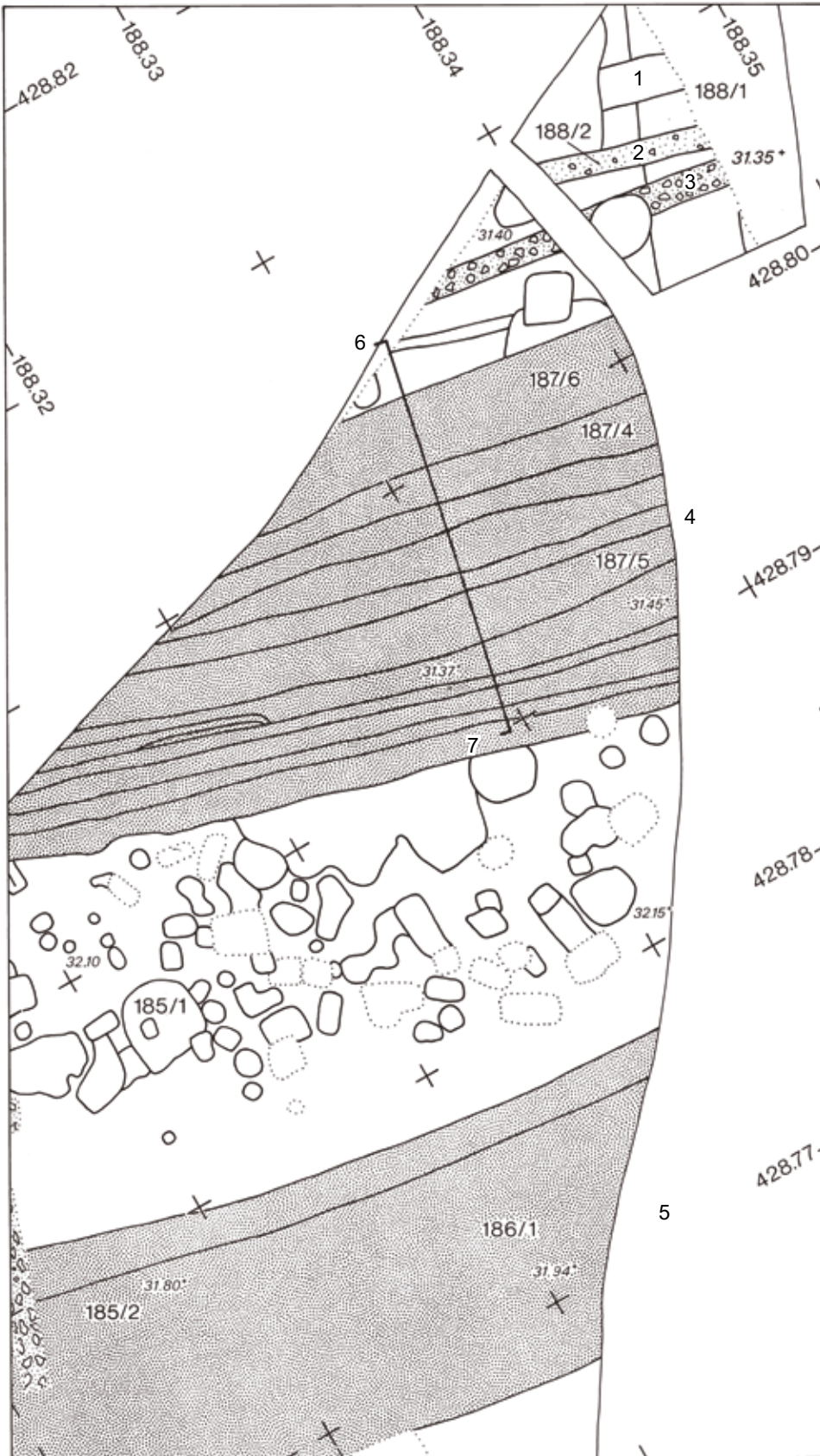


Figure 5.2 Nijmegen. The fortification around the Valkhof. The multiperiod ditch system. Scale 1:250.
Legend: 1-3. (foundation) trenches; 4. the multiperiod ditch; 5. the single period ditch; 6-7. section of the multiperiod ditch system seen from the west (see Fig. 5.3).

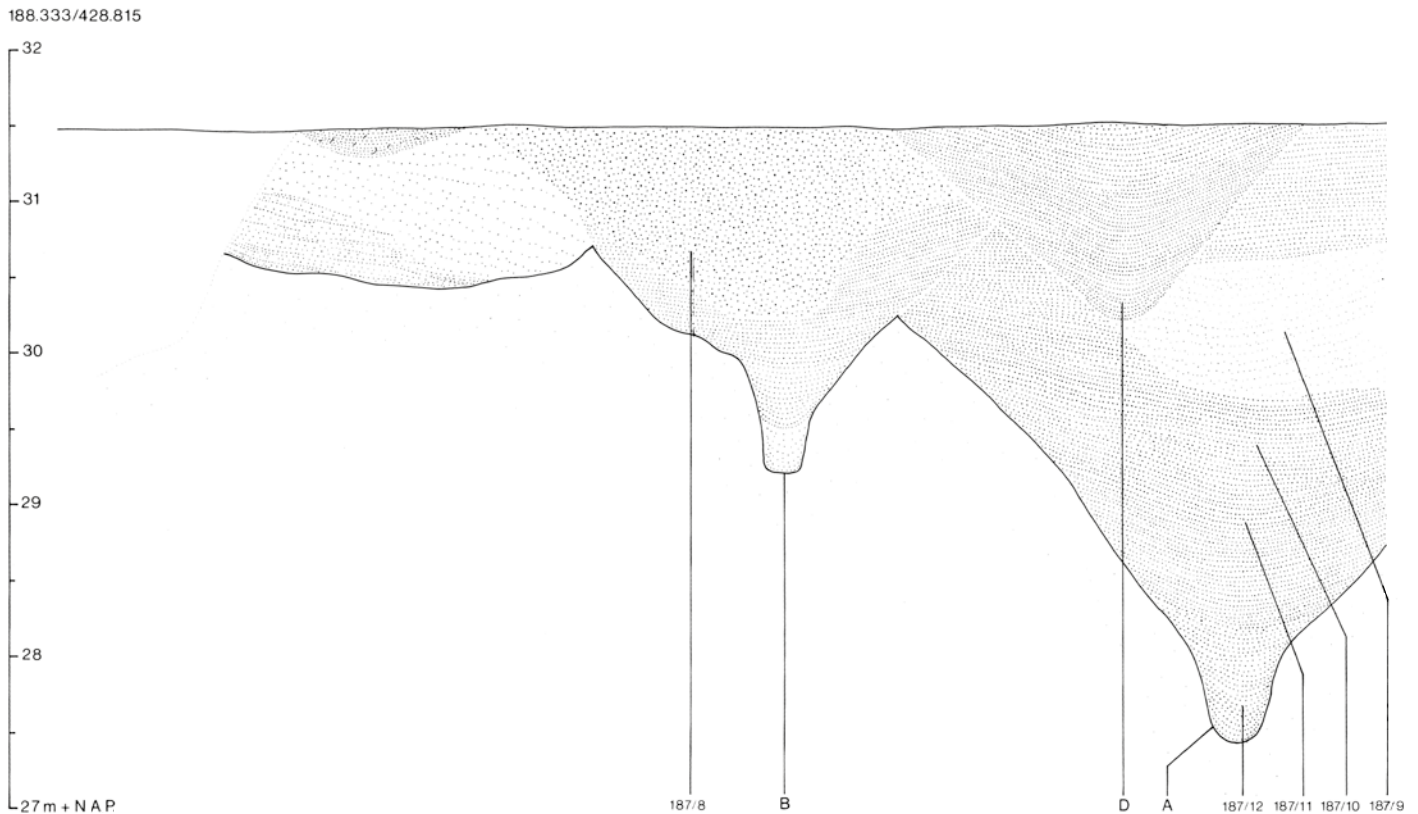


Figure 5.3 Nijmegen. The fortification around the Valkhof. Section of the multiperiod ditch system. Scale 1 : 50. A-F: ditches and other features.

Ditch B

To the north of and over the edge of ditch A there is a much smaller ditch B with the same alignment. At the first level this ditch has a width of c. 5.00 m and a depth of 2.85 m. The ditch has a somewhat irregular V-shape and a definitely U-shaped bottom. At the bottom of the ditch the fill is fairly clean but it gradually becomes darker further up. The irregular north bank could indicate that the ditch lay open long enough for pieces of the banks to fall in. The darker upper fill may imply that the process of filling took a long time.

(Foundation?) trench C

Directly south of the edge of (where) ditch A (connects) and in the fill of the bowl-shaped structure A1 there is a relatively narrow (0.50-0.70 m) but deep (at least 1.20 m) trench with straight steep banks and a homogeneous dark fill. There is no evidence that any wooden structures existed. As to its function, little can be said. There are no finds from this feature.

Ditch D

At the top of the fill of ditch A and across the edge of the south bank of ditch B there is a small

ditch D (3.90 m wide and at least 1.20 m deep) in the same direction as ditches A and B, with a V-shaped section but without the U-shaped bottom. The trench is filled with homogeneous dark material.

Irregular feature E

Parallel with all previous ditches and trench C there is a hollow with an irregular section south of ditch A. Its width cannot easily be determined due to the bowl-shaped feature A1, its depth is 2.70 under the first level. The bottom of the feature has a wide U-shaped section, the vertical axis of which slopes northwards; towards the top the bank widens on one side in a stepped fashion. Its horizontal size is unknown so it could be a smaller feature like a pit. The fill no. E1 is conspicuously clean and even lighter in colour than the fill of ditch A; the middle fill no. E2 contains a lot of gravel, and in the upper fill no. E3 washed-in layers can clearly be observed. This upper fill may also be the continuation of feature A1. Feature E appears to have lain open for only a short period of time and to have filled up again quickly with clean material. The feature may be older than ditch A and the bowl-shaped feature A1.

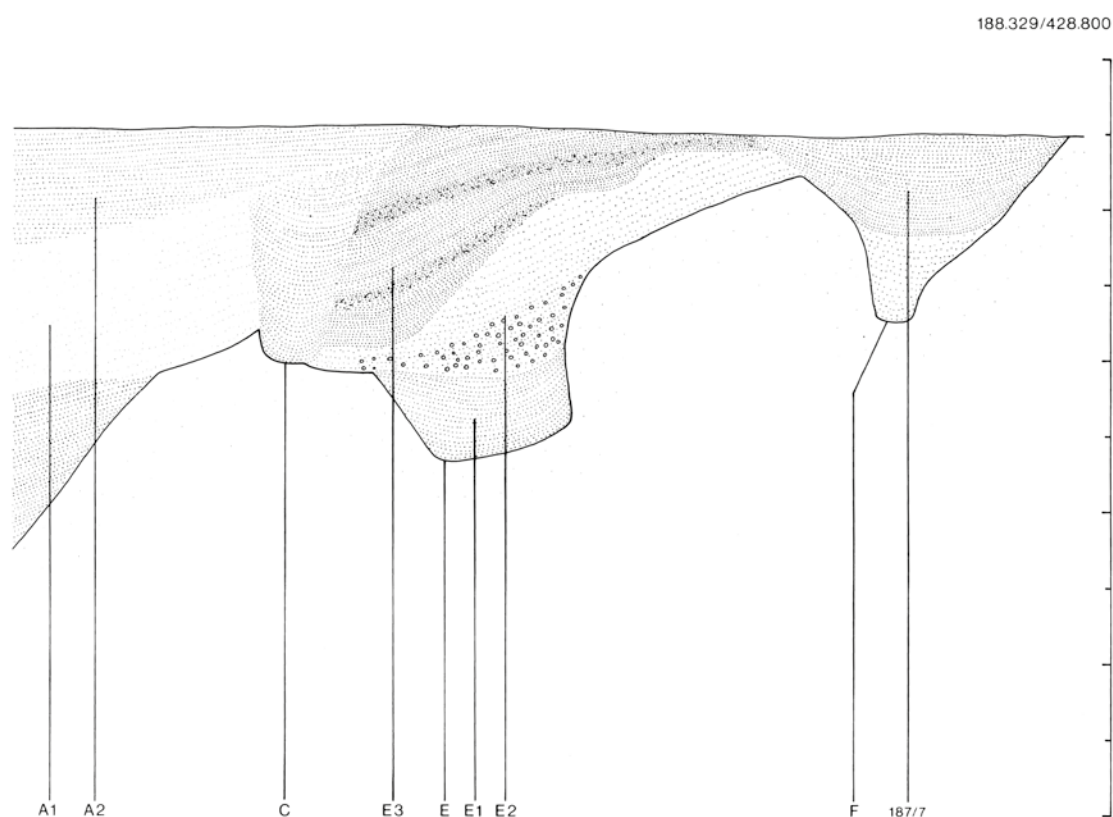


Table 5.1 Nijmegen. The multiperiod ditch system: two variants for the periodization in seven phases.

Variant 1		Phase	Variant 2	
Ditch	other traces		ditch	other traces
D	trench no. 2?	7	D	trench no. 2?
A2		6	B	trench no. 1?
C		5	A2	
B	trench no. 1?	4	C	
A1	feature E3	3	A1	feature E3
A	foundation no. 3	2	A	foundation no. 3
	feature E1-2	1		feature E1-2

Ditch F

South of but parallel with all the previous features there is a small ditch F with a somewhat irregular V-shaped profile and a more or less U-shaped bottom (3,30 m wide and at least 1.80 m deep). The ditch has a fairly dark fill.

The periodization of the ditches and other features

On the basis of the intercuts two variants are possible for classifying the succession of the

various ditches and hollows. The criterion is in which phase the construction of (foundation ?) trench C is thought to have taken place: before or after the digging of ditch B. In addition it is important whether the trenches and foundation traces described in Section 5.2.1 are considered to have belonged to these ditches or not. Table 5.1 shows the two variants.

188.307/428.796



Figure 5.4 Nijmegen. The fortification around the Valkhof. Section of the single period ditch seen from the west (trench 185 and Fig. 5.5).

188.309/428.790

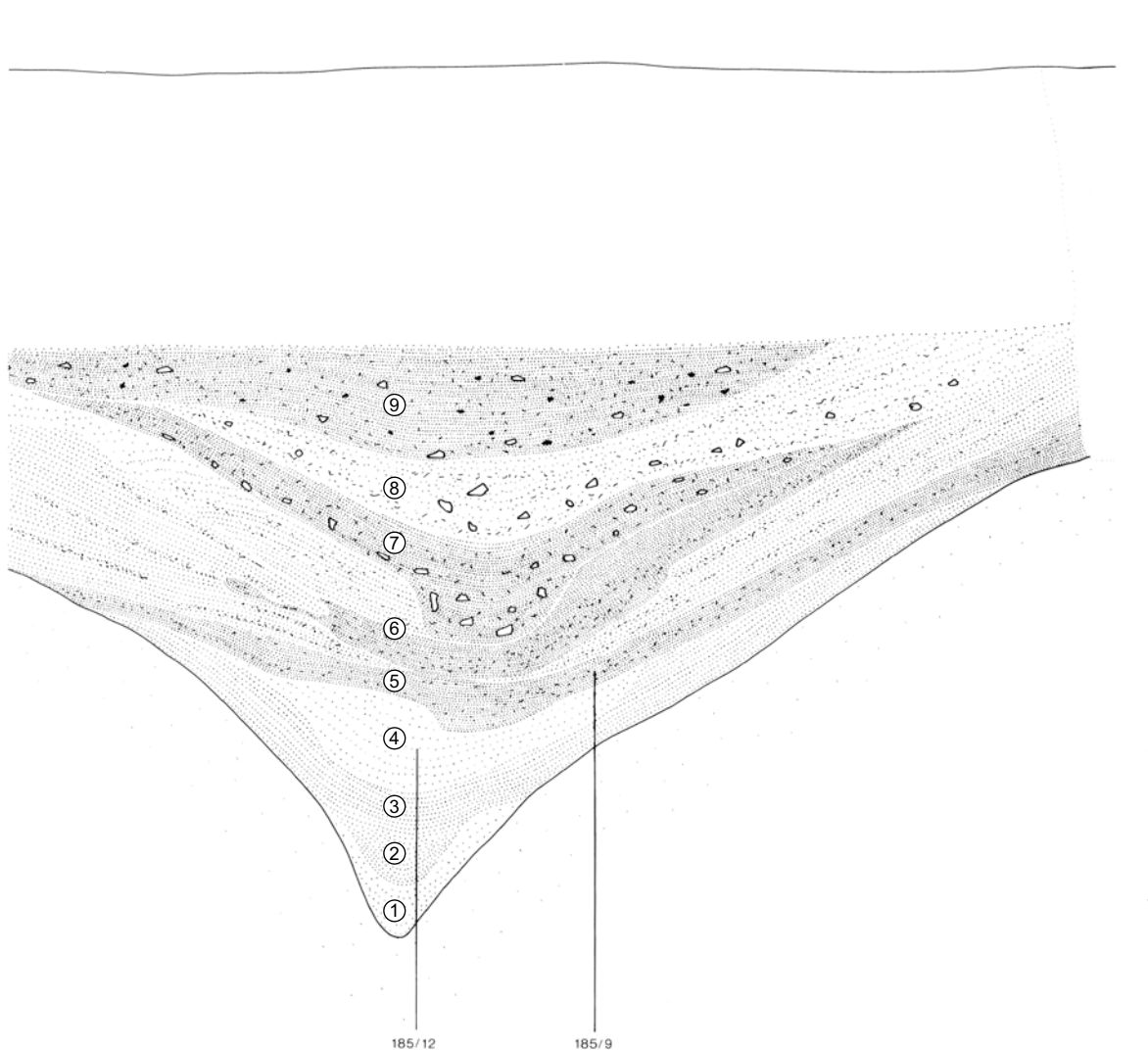


Figure 5.5 Nijmegen. The fortification around the Valkhof. Section of the single period ditch seen from the west (trench 185 and Fig. 5.4). Scale 1:50.

5.2.3 The single period ditch

Course and form

The ditch

During the building of the Cultural Centre De Lindenberg west of the Valkhof a large ditch was observed in 1969 running from north to south and recorded again in 1979 (Fig. 5.1 no. 7 and 5.17).³¹² Because of the direction, the northern end of the ditch may have run into the west flank of an erosional valley of the outwash plain, where now the road called De Lindenberg leads to the Waalkade or quay which is situated below. Later excavations showed that this ditch bends exactly south of the Cultural Centre and then continues southeast for more than 200 m (Fig. 5.1 no. 3). Its further course is unknown and

probably far too disturbed by the construction and levelling of late medieval and more recent fortification works and the traffic arrangements for the Waal bridge for it ever to be precisely determined. However, it may be assumed that the ditch curved in a north-easterly direction towards the edge of the outwash plain. The ditch must therefore have enclosed an area 110–150 m wide and at least 250 m long, with a surface area of at least 4 hectares. The later Valkhof lies within this area. More recently, the Voerweg has cut the ditch and almost completely obliterated it; there is an irregular hollow in the Voerweg at the level of the course of the ditch containing late Roman pottery which may be the remains of it (188.224/428.811).

The ditch is impressive because of its great size: the largest observed width varies from

³¹² Bogaers 1969; Bloemers, Greving & Zoetbrood 1979, 65.

Table 5.2 Nijmegen. The single period ditch: description of the layers.

Unit	Layer	Thickness	Fill	Use	Dating
Upper fill*	9		rather dark brown	end filling) early V
(2.80-4.00 > m)	8	0.20-0.40 m	rather clean brown)) late Valentinian
Middle fill	7		very dark, much rubble))
(1.40-2.80 m)	6	0.20-0.40 m	dark, sometimes) purposely filled)
			alternately clean)) IVc
	5	up to 0.40 m	rather clean brown))
	4	c. 0.20 m	very dark	standstill	
Lower fill	2+3		very clean)) not later than 350
			washed-in layers) active use) Constantinian
(0.00-1.20/1.40 m)	1		very clean yellow))

Legend: * upper fill covered by a dark-brown post-Roman layer.

12.00-14.60 m, which means that the original width must certainly have been between 13.00 and 15.00 m; the depth must have been 4.00-5.00 m originally (Fig. 5.4-5). In absolute height the part of the ditch west of the Valkhof is about 1 m lower than that to the south of it; this roughly corresponds to the natural drop in a westerly direction of the surface of the outwash plain. It is surprising that the bottom of the ditch in trench 183 (c. 188.2900/428.7900) should be about 0.40 m shallower than further southeast. This could imply that there was a crossing or bridge here. However, an interruption in the ditches, as was usual in the case of a gate, was not found.

For the whole distance observed, the ditch has a regular V-shaped section. No evidence was found anywhere of other periods in the construction or redigging of a part of the ditch. However, the course of the bank in the southwest bend is more irregular than elsewhere; this may have been caused by pieces of soil from the bank slipping down. The fill of the ditch in the various sections made over a large area shows a remarkable similarity in general constitution (Table 5.2).

From this description the following interpretation of the use and filling process of the ditch can be given. The lowest part of the ditch (layer 1) was filled up quite quickly, as generally happens in Nijmegen with the rather coarse and gravelly sand of the outwash plain. The washed-in layers and the humus lupins which, in places, are sharply defined,

in layers 2 and 3 may have some connection with the material which has washed and slipped down from the possible bank covering of the ditch, which may, for example, have consisted of turves. The dark level of layer 4 probably marks a standstill in this process in which humus material accumulated under relatively damp conditions. Layers 1-4 most probably represent the period in which the ditch was in active use. Layers 5-8 may be the result of purposely filling the ditch when it lost its function. The zones of fairly clean material (layers 5, 6 partly and 8) continuing for a long distance and over the whole width of the middle fill may come from soil which had originally been placed on the surface during the digging of the ditch or which had served to strengthen the wall of the fortification. The dark zones (layer 6 partly and layer 7) containing large quantities of building rubble may originate from an old surface with demolition debris. Finally, layer 9 may constitute the end of this filling process or a later layer like for example an arable soil.

A wall?

No concrete evidence was found anywhere between the multiperiod and the single period ditch of the existence of a wall or rampart in earth and timber or stone on the inner side of the great ditch, although it was specifically sought. One explanation may be that a large part of the wall has disappeared due to the construction of the Voerweg. Further to the

southeast, the topsoil has been disturbed to a depth of one to two metres so that here too a fairly shallow foundation could have been completely destroyed or purposely broken out without leaving any observable trace. The two large sculptured blocks and countless smaller fragments of limestone from the middle fill of the ditch (see Appendix XVII Section 5.1.2) may also indicate that there was, in fact, a stone wall.³¹³ The wall may perhaps have been built (partly) of material from demolished monuments. The fact that several parts of these ended up in the middle fill of the ditch could indicate that the wall was again (partly) levelled when the ditch was filled up.

5.2.4 The system of two parallel ditches

Course and form

South and west of the great single period ditch (see Section 5.2.3) a system of two parallel ditches was discovered (Fig. 5.1 no. 4). The ditches can be followed in the northwest as far as the corner of the Groene Balkon. Here an erosional valley cuts into the plateau of the outwash plain where Grote Straat was built. The southwest ditch curves westwards about 50 m from the edge of the erosional valley, which causes the V-shaped profile to change into a bowl-shaped section (Fig. 5.6). Because of this the two ditches form a kind of funnel.³¹⁴

Parts of several other ditches were also found at the foot of this plateau during the excavation of Steenstraat and Nieuwe Vleeshouwerstraat, but for the time being these cannot be linked with the two ditches on top of the plateau.³¹⁵ The two ditches run in a long drawn out curve for c. 450 m southeast and then bend rather sharply eastward. A north-easterly projection of their course shows that the ditches reached the edge of the plateau near a depression or erosional valley just as in the northwest. The construction of the medieval fortifications and the approach to the Waal bridge with Trajanusplein have completely altered the original relief and have obliterated many traces. The total length of the ditch system must have been about 700 m. It enclosed a surface area of 8.6 to 9.3 hectares, depending on the reconstruction of the course on the northeast side. All the ditches mentioned above lie in this area.

The two ditches are about 6.50 m apart measured between the banks and c. 10 m



Figure 5.6 Nijmegen. The fortification around the Valkhof. The western part of the system of two parallel ditches in trench 1014 seen from the southeast; to the right the inner ditch, to the left the outer ditch.

between the bottoms. It is difficult to establish what the original width and depth can have been, because the top soil had been raised in most cases and much is disturbed (Fig. 5.7 W-X and R-Q). At the places where fairly accurate measurements could be taken, the ditches appear to have been c. 4.25 to 4.75 m wide and 1.80 to 2.00 deep.

In conformity with the general slope of the plateau the ditches run down gradually from southeast to northwest; over a distance of 450 m the drop is c. 4.40 m (in the southeast c. 31.00 m NAP, and in the northwest c. 26.50 m NAP). Both ditches have a sharp and symmetrical V-shaped profile observed for long stretches. No obvious evidence of any small U-shaped 'ankle breakers' was found in the points of the ditches. In some places the inner ditch more or less clearly indicates two phases (Fig. 5.7 WX 188.080/428.868; 188.085/428.850; 188.085/428.854; 188.073/428.887). The older

³¹³ Bloemers 1985, 36 Afb. 4. See also Willems & Van Enckevort 2009, 100, where 45 m north 'from the outer edge of the double ditch ... the demolished castellum wall (a robber trench c. 1.5 m wide, filled with mortar and small pieces of tuff)' is mentioned.

³¹⁴ Hendriks & Den Braven 2016, 13 afb. 7 for a more detailed overview.

³¹⁵ Jaarverslag ROB 1984 (1986), 45.

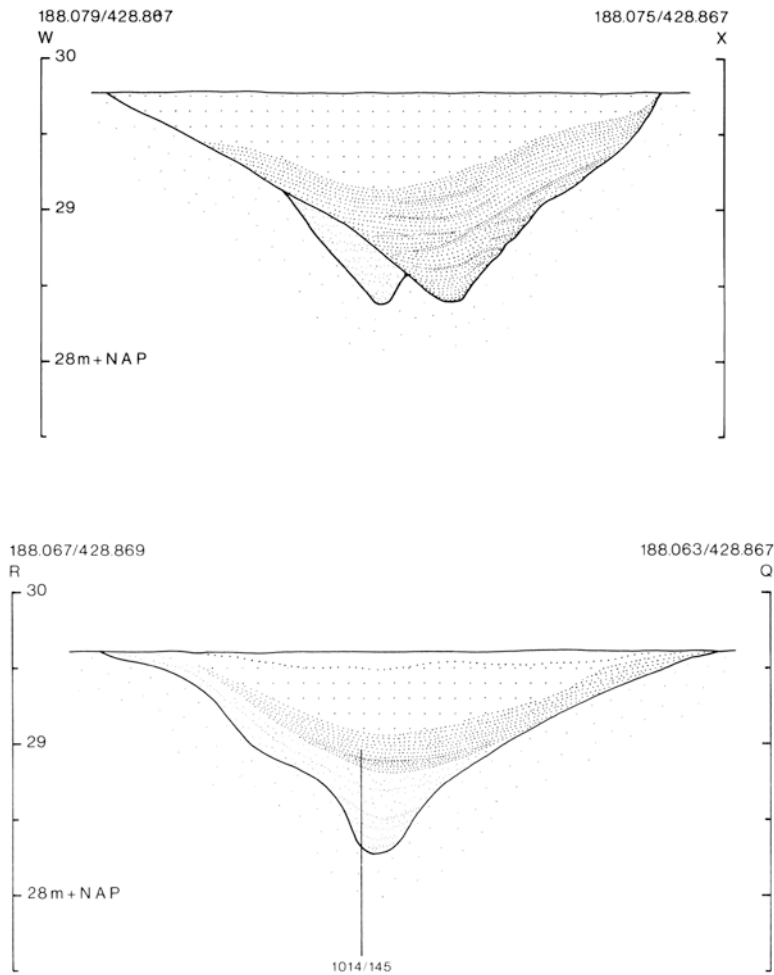


Figure 5.7 Nijmegen. The fortification around the Valkhof. The western part of the system of two parallel ditches in trench 1014: (a) section W-X over the inner ditch (showing two phases) and (b) section R-Q over the outer ditch. Scale 1:50.

phase has a cleaner fill than the younger. In these places parts of the ditch which had become silted up to such an extent that the original point of the ditch could no longer be seen clearly were possibly redug. During this process the point of the ditch sometimes shifted to the north and then again south of the original point. Longitudinal sections through the centre of the ditches did not provide any evidence of the existence of any additional constructions at the base or in the wall such as rows of piles, for example.

Long stretches of both ditches show a similarity in composition of the fill. The bottom 0.20-0.40 m consists mainly of clean gravelly sand with thin washed-in layers; there may sometimes have been (slipped) turves against the bank of

the ditch. Above this there is a layer of brown and rather humous material of about the same thickness without any structure. The fill on top of this is very dark and humous and contains all kinds of archaeological material, and this clearly represents the period in which the ditch fell into disuse. The general impression is that the two ditches both filled up gradually.

5.3 THE FINDS AND SAMPLES

5.3.1 The method of collecting the finds and samples

Among other things preservation conditions and the method of collecting the finds in the various ditches have influenced the composition and the distribution pattern of the finds. The preservation conditions for organic material were comparatively favourable in some parts of the ditches. Bone material was fairly well preserved, especially where the fill of the ditch was clayey and rich in refuse. In the clean fill at the bottom of the ditch it is seldom found. Plant remains are almost always found in a carbonized state. Inorganic material such as pottery, stone, glass and metal is generally well preserved.

The method of collecting finds and samples is, of course, of the utmost importance. The method used was determined by the time and personnel available, the technical possibilities and, above all, the excavation strategy and timely insight into the nature and significance of the archaeological features on which the investigation focused. These factors were of varying significance in the excavation of the single period ditch and that of the system of two parallel ditches, and will therefore be discussed separately. Three methods were used in collecting the finds: the spade or trowel, a sieve and flotation machine and a metal detector. In the case of the last two working methods there were usually people available who specialized in these jobs and were thus quite experienced.

During the excavation of the part of the single period ditch running east-west, the method of collecting and registering finds was influenced by the comparative shortage of time, together with the unusually large size of the ditch and the large quantity of finds piled up within the

Table 5.3 Nijmegen. Possible combinations for the comparison of the number of finds from groups collected in the multiperiod ditch system (ditches A-D) with spade or detector (=H) and with sieve (=S). The combinations marked * occur in the tables following; the other combinations will be left aside.

Number	A	B	C	D
	H/S	H/S	H/S	H/S
1	++/++ *	+ / ++	- / ++	-- / ++ *
2	++ / + *	+ / + *	- / + *	-- / + *
3	++ / - *	+ / - *	- / -	-- / -
4	++ / --	+ / -- *	- / --	-- / -- *
Combinations marked with *				
Positive	A1, A2	B2		D4
S-positive			C2	D1, D2
H-positive	A3			
Neutral		B3, B4		

Legend: ++ very frequently occurring; -- completely absent; + frequently occurring; - rarely occurring.

short distance of 30 m at the most. Moreover, at the same time attention was distracted by the surprising discovery of the two sculptured blocks (see also Section 3.6.1) and by a technical problem in the form of the wreck of a Mustang airplane which had crashed in 1944 and buried itself metres down in the single period ditch. The excavation of the bend in the ditch in the southwest (trench 161) which took place before all this happened was carried out much more peacefully.

The conditions for the excavation of the system of two parallel ditches in trenches 1014, 212 and 218 were more favourable. There was far less time pressure, the depth and width of the ditches and the number of finds were much smaller. This meant that searching for finds with the metal detector and taking sieve samples could be done more systematically than in the case of the single period ditch.

A comparison of the composition of the finds from parts of ditches where they were collected with the spade and detector (=H) as well as with the sieve (=S) may throw some light on specific differences between the two. The comparison is restricted to groups of material as a whole with no special attention being paid to subsets: pottery, metal, coins, glass, stone, tiles, bone and botanic remains. It was decided not to

express the quantities in absolute numbers (specimens, weights, minimum number of individuals, fragments etc.). Instead of this, a combination of quantification and presence (+)/absence (-) was chosen. The line between + and - is subjective. The occurrence of a material group in a complex collected by hand and with the sieve can be indicated by the H/S value. The combinations possible are shown in Table 5.3. Combinations are considered as positive when they confirm each other either by presence (+ / ++) or weak presence/absence (- / --), as S-positive when sieving gave strong presence (+ / ++) and hand-collecting weak presence/absence (- / --), as H-positive when hand-collecting gave strong presence (++) and sieving weak presence (-) and as neutral when hand-collecting gave positive (+) and weak negative (-) results.

The chance of finding a certain material group among the two kinds of samples is determined by its frequency of occurrence, the volume of the soil from which the finds were collected and the method of collection used. The sieve samples had a volume of 60-125 litres and were therefore much smaller than the volume of the part of the ditch investigated by hand. There is not much chance of finding in a sieve sample a material group which does not occur very often (in a sieve sample) and the fact that

Table 5.4 Nijmegen. Comparison of the composition of finds from soil from the single period ditch examined by hand (=H) and with sieve (=S). Legend: see Table 5.3.

Nos.	Sample	Ceramics	Metal	Coins	Glass	Stone	Tile	Bone	Total
(volume)									
161/37	H	--	--	--	--	--	--	--	
(100 l)	S	--	--	--	--	--	--	+	
161/38	H	--	--	--	--	--	--	--	
(75 l)	S	--	--	--	--	--	--	+	
161/38	H	--	--	--	--	--	--	--	
(75 l)	S	--	--	--	--	--	--	--	
182/6	H	++	++	--	--	+	+	++	
(125 l)	S	+	-	--	+	-	+	++	
182/18	H	--	--	--	--	--	--	--	
(20 l)	S	--	--	--	--	--	--	--	
183/18	H	--	--	--	--	--	--	--	
(20 l)	S	--	--	--	--	--	--	--	
183/20	H	no sample	no sample	no sample	no sample	no sample	no sample	no sample	
(20 l)	S	-	--	--	--	--	--	++	
Sum									
Positive		5	4	5	4	4	5	3	30
S-positive		-	-	-	1	-	-	3	4
H-positive		-	1	-	-	-	-	-	1
Neutral		-	-	-	-	1	-	-	1

it is absent is not, in this case, very significant. This can be seen in the combinations B3 and B4 (Neutral). The composition of finds in the two types of sample confirm each other in the combinations A1, A2, B2 and D4 (Positive). In the combination C2, D1 and D2 a material group is found in the S-sample which is absent in the H-sample and which may have been missed there (S-positive). In the combination A3 a category is absent in the S-sample which is well-represented in the H-sample (H-positive).

There are six finds complexes from the single period ditch in which a comparison can be made

between a H- and S-sample (Table 5.4).

From Table 5.4 it appears that, in the case of the material groups of pottery, metal, coins, stone and tiles, there is a similarity in the composition of the finds collected by hand or detector and those collected with the sieve. With two of the material groups the sieve sample shows a positive deviation: glass and animal bone. The glass consists of small thin fragments which are easily overlooked. In the case of the animal bone material, the extra information mainly concerns the remains of fish and birds which again are easily thrown away when collected by hand.³¹⁶ It is significant that the sieve sample does not show any

³¹⁶ Lauwerier 1988, 68-74.

Table 5.5 Nijmegen. Comparison of composition of finds from soil from the system of two parallel ditches examined by hand (=H) and with sieve (=S): inner ditch.

Nos.	Sample	Ceramics	Metal	Coins	Glass	Stone	Tile	Bone	Total
(volume)									
1014/154	H	+	--	--	--	--	--	--	
(60 l)	S	--	+	--	--	--	+	--	
1014/155	H	+	+	--	--	--	--	--	
(60 l)	S	+	--	--	--	--	+	+	
1014/135	H	++	+	+	--	+	+	--	
(60 l)	S	+	--	--	--	--	+	+	
Sum									
Positive		2	-	2	3	2	1	12	22
S-positive		-	1	-	-	-	2	1	4
H-positive		-	-	-	-	-	-	-	0
Neutral		1	2	1	-	1	-	-	5

Tables 5.6 Nijmegen. Comparison of composition of finds from soil from the system of two parallel ditches examined by hand (=H) and with sieve (=S): outer ditch.

Nos.	Sample	Ceramics	Metal	Coins	Glass	Stone	Tile	Bone	Total
(volume)									
1014/134	H	+	+	+	--	+	+	--	
(60 l)	S	+	--	--	--	--	+	--	
1014/136	H	+	--	--	--	--	+	--	
(60 l)	S	+	--	--	--	--	--	--	
1014/145	H	+	--	--	--	--	--	--	
(60 l)	S	--	--	--	--	--	+	--	
Sum									
Positive		2	2	2	3	2	1	3	15
S-positive		-	-	-	-	-	-	1	1
H-positive		-	-	-	-	-	-	-	0
Neutral		1	1	1	-	1	1	-	5

deviation for the metal finds and the coins, and the H-sample occasionally even yields better information. Nails, especially, can be useful in verifying a statement like this because, due to their frequent occurrence, they can easily

be found in a sieve sample but also by hand-collecting using the detector.

Tables 5.5-6 show the system of two parallel ditches. The overall picture indicates a higher degree of correspondence between the H- and

S-samples in the two ditches than was the case in the single period ditch. The fact that they correspond implies that the two ditches are rather poor in finds. It is interesting that the tile fragments are better represented in the sieve samples. This is because the fragments were mostly so small that they were often overlooked. No coins were found in the S-samples nos. 1014/134 and 1014/136, which is significant. In the part of the ditch between these numbers 18 coins were found by the detector, a quantity which cannot be improved on by sieving.

5.3.2 Pottery finds from the late Roman fortifications at Nijmegen (by M. Erdrich)

Description of the pottery

The pottery described in this Section comes from the fill of late Roman ditches at Nijmegen, the single period ditch, a system of two parallel ditches and the multiperiod ditch system.³¹⁷ These ditches were dug on the site of the first-century civilian settlement. Among the over 60 kg of late Roman sherds only a few fragments were found which belonged to this early settlement, less than 1% altogether. These sherds, which represent what was dug up during the construction of the late Roman ditches, will not be discussed here because of their secondary position. There were no finds at all from the second and third centuries.

The pottery corresponds, as far as the firing, colour and variability of shape within a type are concerned, with already existing typochronologies.³¹⁸ For this reason only a few characteristic forms of the types have been described which reflect the whole range of forms. Finally, special attention has been paid to the range of pottery and traces of its use in different socio-economic and functional contexts (Appendix XIV).

Terra sigillata

All terra sigillata fragments belong, without exception, to the so-called Argonne ware. Firing and gloss, if present, vary from orange, orange-red to reddish-brown. The fine clay is free of coarser inclusions. The pottery is fired to varying degrees of hardness, but is in general not as hard as comparable earlier Central or East Gaulish ware. The gloss does not differ much in colour

from the fabric, it is often thin, dull or patchy. The decline in quality of the later Argonne products compared to that of the East Gaulish ware is confirmed by the material found at Nijmegen. On finishing a pot, little lumps of clay were left sticking to the base or base ring of the pot which was still wet, and these were not removed later. Turning marks were not usually touched up. The shape of the lip can vary on the same pot which excludes the use of a template. The roulette decoration applied on some types, in particular the Chenet 1941 type 320, is mostly only superficially and often irregularly done, so that the stamped bands either do not connect or overlap each other.

What is striking is the qualitative difference between the Chenet 1941 type 320 bowls and the plates (Pirling 1966 type 40) or the flanged bowls (Chenet 1941 type 324). The latter two types are generally better finished and can easily be compared in quality to the East Gaulish products. The Chenet 1941 type 333 cup which is decorated with barbotine refutes any decline in craftsmanship with its bright orange fabric and high gloss. The impression is given that the less frequent types were better finished. The question here is whether we are concerned with the differing skills of individual potters or with the different price categories of pottery. Remarkable is the presence of some fragments of North African terra sigillata belonging to a dish with oblique walls and flat bottom type Hayes 1972 type 50.

Colour-coated ware

The coloured ware is confined to the Pirling 1966 type 59-62 cups. The fine slip fabric is reddish in colour and the coating is always greyish-black to black and matt. The cups are almost always well finished, turning marks are always touched up and the coating covers the whole outer wall apart from the fingerprints on the base, and at least part of the inner wall.

Marbled ware

The fabric of this kind of pottery, which was mainly used for large flagons and plates, is greyish-brown in colour and tempered with fine sand. The paint which was applied with a sponge or brush is light to dark-brown and matt.

³¹⁷ P.A.M. Zoetbrood, Amersfoort, gave me permission to use unpublished data from his research on the cemetery at Nijmegen-East. W.J.H. Willems supplied information about the research he was doing on villas at Voerendaal. W.H.N.M. Dijkman was so kind as to identify the roulettes on the decorated terra sigillata (see Appendix XV).

³¹⁸ Chenet 1941; Metzler, Zimmer & Bakker 1981; Pirling 1966; Cüppers 1969, also Gechter & Kunow 1986, 384-385, note 21.

Table 5.7 Nijmegen. Selected finds from the multiperiod ditch system. Numbers represent individual specimens; weights are in grams.

Type	Numbers	%	Weight	%	Total in %
1. terra sigillata					
Chenet 301	1	6.3	15	3.4	
Pirling 40	2	12.5	80	18.4	
Chenet 316	1	6.3	30	6.9	
Chenet 320	4	25	110	25.3	
Chenet 324	3	18.8	50	11.5	
Chenet 330	5	31.3	150	34.5	
Total	16	100.2	435	100	15.3
2. colour-coated ware					
Pirling 59-62	5		190		6.7
3. marbled ware					
Pirling 71-72	5		480		17
4. coarse ware					
Pirling 105	10	40	645	37.3	
Pirling 106/109	1	4	12	6.9	
Pirling 120	8	32	725	41.9	
Pirling 126	3	12	120	6.9	
Pirling 128	2	8	80	4.6	
Lid	1	4	40	2.3	
Total	16	100.2	1730	99.9	61
5. total	42		2835		100

Coarse ware

This pottery makes up the largest group of finds in the late Roman ditches of Nijmegen as it does elsewhere. There are products of two major production centres: Urmitz and Mayen. The fabric of the earlier centre Urmitz is characterized by its fine sandy tempering and light grey-yellow colour, sometimes the surface seems to have a greenish gloss. The Mayen fabric is strongly tempered with coarse volcanic sand and very hard fired. The colour of the sherds which with a few exceptions had been burnt is greyish-brown, often with a reddish tint, or dark-brown to dark-grey/black. The pottery from the ditches is generally well finished and the handsome forms of the Urmitz cooking-pots are remarkable; there are no wasters.

Dating of the multiperiod ditch system

During the excavation of the ditch it was assumed for some time that this was an early Roman ditch because of the clean fill and almost complete lack of finds. Only after the discovery of some fragments of late Roman terra sigillata was the dating altered to the late Roman period (Table 5.7). On the basis of a few fragments of the Chenet 1941 type 320 a *terminus post quem* of AD 325/330 may be assumed; clear fifth-century finds are absent. Nothing can be said about the construction or period of use of the multiperiod ditch system.

Dating of the single period ditch

A thorough survey³¹⁹ of all the finds from the section of the single period ditch confirms the

³¹⁹ L. Bakker, Augsburg, kindly checked all the pottery determinations during two long weekends. The chronology of the pottery now proposed is based on these intensive discussions. This resulted in a thorough correction for the dating of the late Roman ditches.

Table 5.8 Nijmegen. Selected finds from the single period ditch. Numbers represent fragments; weights are in grams. The weight of the platter Pirling 1966 type 126 includes bases without distinguishing rims.

Type	Early		Late		Total				
	numbers	%	numbers	%	numbers	%	weight	%	total in %
1. terra sigilata									
Chenet 301	0	0	1	0.4	1	0.3	20	0.1	
Chenet 303	0	0	1	0.4	1	0.3	30	0.2	
Pirling 40	0	0	29	10.3	29	9.8	2280	12.1	
Pirling 39	0	0	1	0.4	1	0.3	50	0.3	
Chenet 310	0	0	1	0.4	1	0.3	40	0.2	
Chenet 313	0	0	4	1.4	4	1.3	490	2.6	
Chenet 316	0	0	1	0.4	1	0.3	180	1	
Chenet 317	0	0	1	0.4	1	0.3	45	0.2	
Chenet 319	2	10	5	1.8	7	2.3	80	0.8	
Chenet 320	6	30	134	48	140	46.9	4940	26.3	
Chenet 324	6	40	41	14.7	49	16.5	3250	17.2	
Chenet 325	2	10	5	1.8	7	2.3	110	0.6	
Chenet 326	0	0	3	1	3	1	960	5.1	
Chenet 330	2	10	51	18.3	53	17.8	6195	32.9	
Chenet 333	0	0	1	0.4	1	0.3	160	1	
Total	20	100	279	100.5	299	100	18850	100.6	31.5
2. colour-coated ware									
Pirling 59-62	2	-	71	-	73	-	2190	-	3.7
3. marbled ware									
Pirling 48	1	-	4	-	5	-	-	-	
Pirling 71-72	2	-	19	-	21	-	2400	-	
Total	3	-	23	-	26	-	-	-	4
4. mortaria	0	-	26	-	26	-	4200	-	7
5. coarse ware									
Pirling 105	5	45.5	157	44.1	162	43.1	14330	44.5	
Pirling 106/109	0	0	32	9	32	8.5	2585	8	
Pirling 120	3	27.3	58	16.3	70	18.6	6275	19.5	
Pirling 126	0	0	62	18	62	16.5	8405	26.1	
Pirling 128	3	27.3	31	8.7	34	9	-	-	
Lid	0	0	16	4.5	16	4.3	620	2	
Total	11	100.1	356	100.6	367	100	32215	100.1	53.8
6. total	36		755		791		59855		100

Table 5.9 Nijmegen. Selected finds from the inner ditch of the two parallel ditches. Numbers represent fragments; weights are in grams. As a general reference the weight of a bowl Chenet 1941 type 320 is c. 680 grams.

Type	Numbers	%	Weight	%	Total in %
1. terra sigillata					
Pirling 40	1	11	200	16.2	
Chenet 320	5	55.6	935	75.7	
Chenet 324	1	11.1	20	1.6	
Chenet 330	1	11.1	60	4.9	
Chenet 333	1	11.1	20	1.6	
Total	9	100	1235	100	45.8
2. marbled ware					
Pirling 48	1		10		
Pirling 71-72	3		70		
Total	4		80		3
3. mortaria	1		310		11.5
4. coarse ware					
Pirling 105	10	52.5	700	65.4	
Pirling 106/109	1	5.3	50	4.7	
Pirling 120	4	21.1	200	18.7	
Pirling 126	4	21.1	120	11.2	
Total	19	100.1	1070	100	39.7
5. total	33		2695		100

picture seen in the stratigraphical investigation of a fill which was effected in several stages (Table 5.8). The ditch which was originally dug as a V-shaped ditch was backfilled in at least three stages, the most recent of which (layer 9) gives the impression that it was levelled in a later period. This could mean that any later fills are lacking.

In contrast to datings proposed earlier the large ditch remained intact until long after the middle of the fourth century.³²⁰

Layers 1-3

Under the dirty fill of the ditch which is rich in finds, three fairly clean layers of washed-in sand (1-3) were found which contained only few finds. Due to the natural erosion of the slopes, the ditch which had been dug as a V-shaped ditch

became one with a rounded profile. The finds from these layers date the phase between the construction of the ditch and the first filling with settlement refuse. Important is the absence of roulette decoration dating from the middle of the fourth century onwards on the bowls Chenet 1941 type 320. The roulette decoration on a bowl Chenet 1941 type 324 is dated in the Constantinian period (stamp no. 50; Bakker 1983, 53 and Pl. 58.1, 59.12). Most of the coarse ware is made in Urmitz, only a few fragments come from Mayen (Pirling 1966 type 105). In view of the late Roman settlement traces from the rest of Nijmegen and the eastern cemetery the construction and the 'active' phase of the large ditch can be dated in the Constantinian period and not much later than AD 350, possibly in the second quarter of the fourth century.

³²⁰ Willems 1984, 307. See also Willems & Van Enckevort 2009, 100 and 103.

Table 5.10 Nijmegen. Selected finds from the outer ditch of the two parallel ditches. Numbers represent fragments; weights are in grams.

Type	Numbers	%	Weight	%	Total in %
1. terra sigilata					
Chenet 301	1	6.3	20	6.3	
Pirling 40	2	12.5	40	12.5	
Chenet 320	11	68.8	170	53.1	
Chenet 324	1	6.3	40	12.5	
Chenet 330	1	6.3	50	15.7	
Total	16	100.2	320	100.1	14
2. colour-coated ware					
Pirling 58-62	6		110		4.8
3. mortaria	1		270		11.8
4. coarse ware					
Pirling 105	12	42.9	675	42.6	
Pirling 109	2	7.1	70	4.4	
Pirling 120	7	25	580	36.6	
Pirling 126	7	25	260	16.4	
Total	28	100.2	1535	100.1	69.4
5. total	51		2235		100

Layers 4-7

The size of the sherds characterizes the pottery from the upper fill of the single period ditch. There are numerous fragments the size of a quarter of the profile of a pottery specimen. Post-depositional weathering or traces of secondary burning are exceptional. Only on the occasional fragment were traces of uric deposits found. These are clear indications of the quick and final deposition of the settlement refuse in the disused ditch. Most of the coarse ware comes from the production centre of Mayen, which can easily be recognized by the tempering with volcanic sand and the heavy rims. The roulette decoration on the Chenet 1941 type 320 and other bowls have parallels dated between the middle of the fourth century and the Valentinian period, i.e. during the third quarter of the fourth century.

Layers 8-9

As in layers 4-7 the coarse ware from Mayen dominates layers 8-9. Characteristic of the latest

finds are the cooking-pots Pirling 1966 type 105 and the outwardly-curved rims of the bowls Pirling 1966 type 120. In combination with a series of motifs on decorated Samian bowls they indicate a date in the late Valentinian period; some rims would even fit within a purely early fifth-century context.

In conclusion the single period ditch was constructed in the Constantinian period. About the middle of the fourth century its bottom part was filled in by erosion. In this form it remained in use into the Valentinian period, when it was filled in with settlement rubbish within a short period of time (layer 4-7). The ditch must have remained visible as a depression where rubbish was still deposited. Its defensive function however must have been restricted.

Dating of the system of two parallel ditches

The severe fragmentation of the sherds is striking, as is the fact that traces of

post-depositional weathering, such as that caused by damp and temperature, were found on almost all the sherds, giving the impression that the settlement refuse had been exposed to the air for some time, and/or that it had been deposited in the ditch from a secondary position.

From the lists of types it is clear that both ditches were filled in with the same refuse material more or less simultaneously (Table 5.9-10). The presence of Valentinian coarse ware rims and roulette decoration on terra sigillata bowls indicate a filling in of both ditches during the last quarter of the fourth century. There is no stratigraphical or chronological evidence available for the construction of this ditch system and the period it was in use.

5.3.3 Numismatic evidence for the dating of the late Roman defence system (by J.S. Boersma & J. Raap)

The excavations of the ditches which constituted the fourth-century defence system of the Valkhof area have provided a number of coin finds which will be briefly discussed.

Coins from the single period ditch

Thirteen bronze coins were found in the single period ditch (see the catalogue in Appendix XVI.1). They include three heavily-burnt asses which cannot be precisely dated, but may be assigned to the first century AD.

Approximately 6% of all coin finds from Nijmegen which can be related to other finds are dated to the first century but are found in a fourth-century context. As to the single period ditch, the percentage turns out to be twenty. Of course a number such as thirteen coins has little statistical significance, but it may have some value when the evidence from the two parallel ditches is taken into consideration.

The presence of the first-century coins in a late context at Nijmegen is not surprising. During the first century AD the site of the fourth-century military defence system had been in use as - what is now called - a proto-urban settlement.³²¹

This settlement lost its importance at the end of the Neronian period, and this is also reflected in the coin finds. It seems that the early coins must have arrived on the spot in soil brought from elsewhere to fill up the ditch and that they had been part of the monetary circulation in the

proto-urban settlement.

Three large-sized coins are dated to the fourth century, probably the first half, and two coins of smaller size are dated to the fourth century in general, a more precise dating is not possible. The remaining five coins were all struck during the reign of Constantine the Great and his sons, covering a period from AD 330-348. On account of these coins and their find spots in the dark fill more than 3 metres above the bottom of the ditch (see Fig. 5.15 approximately layer 8) it has been suggested that the ditch fell into disuse after AD 350, and this is indeed a plausible suggestion.³²²

Coins from the two parallel ditches

Fifty-five coins were found in the two parallel outer ditches which enclose the Valkhof area (see the catalogue in Appendix XVI.2). With the exception of one silver denarius of Augustus, all coins are bronze. Among the first-century coins are eleven coins from the early-Imperial period, two Celtic coins, struck before 9 BC, three coins of Augustus, to which the denarius must be added, and one coin of both Tiberius and Nero. Three coins can only be roughly dated, namely two asses, one of them halved, from the first century and a *sestertius*, from the first or possibly the second century. As the two parallel ditches provide more material, we may use statistics with less reserve than when dealing with the single period ditch. However, the outcome is exactly the same: eleven of the fifty-three coins found in the fourth-century context of the ditches date back to the first century, amounting to the same percentage of twenty as was established for the single period ditch.

Just as has been suggested for the first-century coins which were found in the single period ditch, it is plausible to assume that all first-century coins from the parallel ditches were also part of the money circulation of the proto-urban settlement. They ended up in the ditches together with the soil and other material with which these were gradually filled.

Continuing the coin series, a barbarous radiate from the second half of the third century is next in line, leaving a gap of several centuries. The remaining all date from the fourth century, covering a period from AD 330-375, all but three of them dating from the reign of Constantine I and his sons, the majority dating from AD 330-340, twenty-six pieces, and eleven pieces to AD

³²¹ Willems 1984, 73-76; Bloemers this publication Chapter 3.

³²² Haalebos 1976, 205. See however Thijssen 2002b, 14; Willems & Van Enckevort 2009, 100 for 'numerous coins of Arcadius (388-394) and Theodosius I (379-395)' found in 'the upper layers ... to a considerable depth'.

340-350. Two coins were issued during the reign of Valens and Valentinianus, between AD 364-375; one coin can only be dated to the fourth century in general.

These fourth-century coins, the barbarous radiate included, represent the monetary situation at the Valkhof shortly after the middle of the fourth century.

Most of the evidence points to a date shortly after AD 350 for the filling-up of the ditches.³²³ But such a dating does not account for the presence of the two Valentinian coins. Earlier numismatic evidence from the Valkhof area produces a number of coins up to the end of the fourth century which points to continued human presence and activity on the spot.³²⁴ But as yet it is not clear in what way the site was used in the second part of the fourth century.

It is, however, probable that the parallel ditches fell into disuse shortly after AD 350 and regularly filled up in a natural way. The nearby human activity explains the presence of the two Valentinian coins which landed in the ditches while they were filling up. The coin of Valentinian in the upper part of the fill shows that the process of filling up ended shortly after AD 375.

5.3.4 Animals and animal food in fourth-century Nijmegen (by R.C.G.M. Lauwerier)

Introduction

The information we have about the fourth-century occupation of the Valkhof and its surroundings in Nijmegen was mainly provided by the defensive ditches that have been excavated since 1969.³²⁵ The largest ditch, 14-15 m wide and 5-6 m deep, was found in 1969 on De Lindenberg,³²⁶ in 1979 and 1980 its further course could be traced on De Lindenberg and on Kelfkensbos.³²⁷ It is clear that the single period ditch enclosed the whole area of the present-day Valkhof, c. 3 ha.³²⁸ The coins found during the first excavation³²⁹ and the pottery found in 1979 and 1980 confirm a fourth-century dating for the fill of the ditch. In this contribution an overview is given of the animal bones that were found during the excavations in 1979 and 1980 and some conclusions are presented that can be drawn from this material about the spatial distribution of the bones, the use of the animals and the animal products

and about food economics. The data about the bone material and the methods used for description and interpretation have been previously presented in detail.³³⁰

The bones

Most of the animal bones were collected by hand. An overview of this material is given in Table 5.11. The most abundant species is cattle, which scores 62% in terms of both numbers and weight. Of the other meat-providing farm animals pig comes in second place with 10.2% (3.0% by weight). Sheep and goat, both of which are definitely present, account for less than 1% of the material.

About a quarter of the bones are of horse. During the excavation it was observed that some of the horse bones lay in the soil in an articulated state (personal communication J.R.A.M. Thijssen). Dog accounts for 1% (0.3% by weight).

The only bird species found was fowl, accounting for 0.4% of the bones and less than 0.05% of the bone weight.

The wild mammals aurochs, elk, red deer and wild boar, together constitute 3.1% of the number of bones (5.7% by weight). To distinguish between the domesticated and wild forms of *Bos* (cattle) and *Sus* (pig) the measurements data were used as main criterion.³³¹

Because collecting by hand hardly gives any information about small species like birds and fishes,³³² in five places samples for sieving were also taken. Three samples were taken from the western north-south profile of excavation trench 161 (sample no. 161/37, 38, 39). Of the two other samples one (no. 182/6) comes from the dirty-black fill of the ditch in trench 182, while the other (no. 183/20) comes from a greyish-brown fill from trench 183. A summary of these finds is presented in Table 5.12.

Although the amount of sieved material is very small in comparison to the proportions of the ditch - 415 litres samples from a ditch containing over 1.5 million litres - these samples provide information about the occurrence of some new species. The occurrence of pike, perch and salmon or sea trout could be established. Sample no. 182/6 contained an exotic element: the vertebra of a fish belonging to the genus *Sphyræna*, a barracuda. Also a fragment of the shell of an oyster was found, as well as a small

³²³ Willems 1984, 146.

³²⁴ Daniëls 1950, 6.

³²⁵ Bloemers 1985 and 1986a.

³²⁶ Bogaers 1969.

³²⁷ Bloemers, Greving & Zoetbrood 1979; 1980.

³²⁸ Bloemers 1986a.

³²⁹ Haalebos 1976.

³³⁰ Lauwerier 1988.

³³¹ Lauwerier 1988, 28-31.

³³² Clason & Prummel 1977.

Table 5.11 Nijmegen. The hand-collected bones from the single period ditch. Frequencies and weights (g).

Species	Number	%	Weight (g)	%
Domestic mammals				
Cattle	971	62.0	105953	61.9
Sheep	5	0.3	184	0.1
Goat	1	0.1	118	0.1
Sheep or goat	8	0.5	263	0.2
Pig	159	10.2	5128	3.0
Horse	349	22.3	49201	28.8
Dog	16	1.0	429	0.3
Domestic birds				
Domestic fowl	7	0.4	25	0.0
Wild mammals				
Aurochs (<i>Bos primigenius</i>)	6	0.4	4447	2.6
Elk (<i>Alces alces</i>)	2	0.1	1927	1.1
Red deer (<i>Cervus elaphus</i>)	33	2.1	2963	1.7
Wild boar (<i>Sus scrofa</i>)	8	0.5	490	0.3
Total identified	1565	80.1	171128	94.0
Unidentified mammals				
No size assignment	1	0.3	42	0.4
Sheep-pig size	19	4.9	134	1.2
Cattle-horse size	369	94.9	10666	98.4
Total unidentified	389	19.9	10842	6.0
Total	1954		181970	

fragment of another indeterminate mollusc. Further unidentified fragments of mammals, birds, fish and amphibians were found. For information about the distribution of the skeletal elements of the different species, the measurements data and the epiphyseal fusion data see Lauwerier 1988.³³³

The spatial distribution of bone finds: a rubbish dump

The spatial distribution of bone finds in the ditch is expressed in the density of finds, number of bones per m³, per block (Fig. 5.8). These blocks

are arbitrary units that were determined by the particular circumstances connected with practical aspects of the excavation. Expressed in terms of bone weight per m³ the spatial distribution gives the same picture.³³⁴

A high concentration of bones is present in blocks 7 and 6. The adjacent blocks, insofar as they include the lowermost part of the ditch (4, 10, 11), also have a somewhat higher density of finds than the rest of the ditch. This suggests that in that part of the ditch where excavation trench 183 is situated much bone material was thrown away, and that this is

³³³ Lauwerier 1988, Chapter 2.

³³⁴ Lauwerier 1988, 76-77 fig. 21.

Table 5.12 Nijmegen. The single period ditch: sieved material from the 5 mm fraction (5 mm sieve) and from the 2.5-5 mm fraction (residue of 5 mm sieve sieved with 2.5 mm sieve). Frequencies and weights (g).

Fraction	5 mm		2.5-5 mm	
	Number	Weight (g)	Number	Weight (g)
Species				
Domestic mammals				
Cattle	15	77.3	-	-
Sheep or goat	3	5.5	-	-
Pig	14	128.7	-	-
Horse	1	715.2	-	-
Wild mammals				
Red deer (<i>Cervus elaphus</i>)	2	6.1	-	-
Unidentified mammals				
No size assignment	155	58.5	134	6.8
Sheep-pig size	32	38.4	-	-
Cattle-horse size	25	68.9	-	-
Unidentified birds	1	0.3	2	0.3
Unidentified amphibians	-	-	1	0.0
Fish				
Pike (<i>Esox lucius</i>)	-	-	-	-
Perch (<i>Perca fluviatilis</i>)	1	0.1	-	-
Salmon or sea trout (<i>Salmo salar cf. trutta</i>)	1	0.3	-	-
Barracuda (<i>Sphyraena sp.</i>)	1	0.2	-	-
Cyprinidae	-	-	2	0.0
Unidentified	2	0.2	5	0.2
Mollusca				
Oyster (<i>Ostrea edulis</i>)	1	0.4	-	-
Unidentified	1	0.3	-	-
Total	255	1128.4	145	7.3

detectable in adjacent parts of the ditch too. Although determined more roughly, the density of potsherd material presents the same general picture: a concentration on the place where trench 183 is situated (Table 5.13). From this it can be concluded that this part of the ditch was

used as a rubbish dump.

The reason for the concentration precisely here can be explained if we assume a bridge at this spot. An argument for this is the fact that trench 183 is probably situated halfway along the whole length of the ditch. However, no traces of such

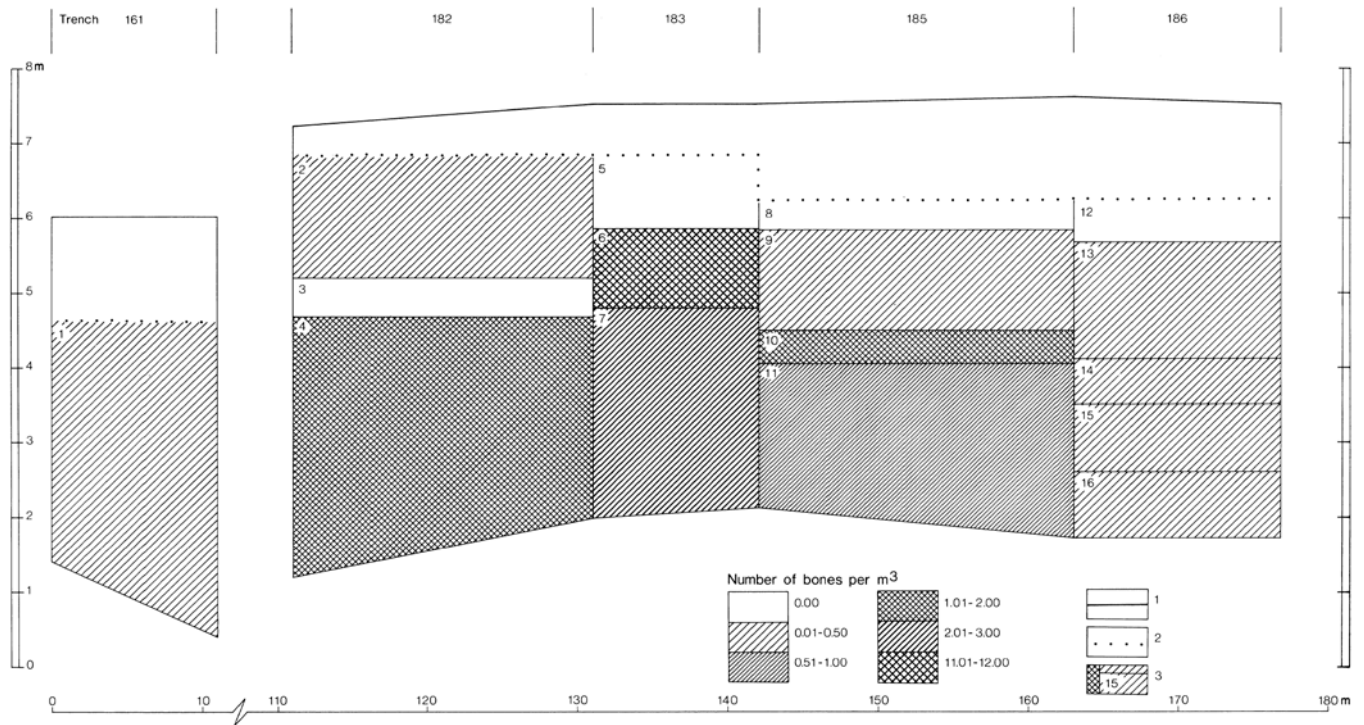


Figure 5.8 Nijmegen. The fortification around the Valkhof. Schematic longitudinal cross-section of the single period ditch. The density of bone finds per block is indicated in terms of fragments per m^3 . Scale vertically 1:100; horizontally 1:500.

Legend: 1. present-day ground surface; 2. lower limit of soil disturbed after the Roman period; 3. block no. ...

Table 5.13 Nijmegen. The single period ditch: density of finds of pottery per excavation trench. For each trench the weight of pottery found, the volume of the ditch and the density of finds are given based on data provided by P.A.M. Zoetbrood (RCE).

Trench	Weight (kg)	Volume (m^3)	Density (g/m^3)
161	2.8	c. 100	0
182	24.0	448.6	6
183	46.2	303.9	152
185	22.9	510.4	45
186	8.9	311.7	29

a bridge have been found. Another possibility is that there was a road that came to a dead end next to the ditch, precisely for the purpose of conveniently dumping rubbish after the ditch lost its defensive function. Seeing that nothing is known of the structure within the settlement, this is all mere speculation.

The use of animals in fourth-century Nijmegen

Nijmegen or the surrounding area?

In the following we try to interpret the remains found in the ditch in terms of the significance animals and animal products had for fourth-century people. The question is, however, which people are concerned: the inhabitants of the Nijmegen-Valkhof site or, for instance, farmers from the surroundings of Nijmegen. Concerning animal food, it is of course the food of the fourth-century inhabitants of Nijmegen; it is their slaughter and kitchen refuse that was found in the ditch. The animals not used for consumption, dogs and horses, belonged most probably to the inhabitants of the Valkhof as well. This is less clear for the other farm animals, pig, sheep, goat and cattle. It is very likely that they were slaughtered and eaten at the Nijmegen settlement. However, were they also kept there as living animals? The problem is that we know nothing about the layout and structure inside the settlement. Possibly farms were present within the fortified settlement and had their fields and pastures in the surrounding area. Another possibility is that the farmers that produced for the Valkhof lived in the surroundings. In the last case, conclusions about agriculture based on data from cattle, for example, do not concern the inhabitants of Nijmegen but the farmers in the neighbourhood. However, the fact that there are indications that horses were bred in the settlement (see hereafter) could indicate agrarian activities within the settlement; in that case it is quite possible

that this was not limited to horse rearing and that other agrarian work was concentrated under the protection of this otherwise military settlement as well.

If the animals were kept at farms on the Valkhof they were possibly put out to pasture outside the settlement. For pigs the woods in the neighbourhood were eminently suitable for herding.³³⁵ However, pigs could also have been kept within the Valkhof settlement as walking garbage bins, even if there were no farms present.

Horse: transport

Horse was not eaten, as was the general rule in the Roman area.³³⁶ Clear indications of the absence of horse meat on the menu are the absence of butchery marks on the bones and the greater average weight values of bone fragments found as compared with cattle (141 and 109 g respectively). Another indication for this was the observation that some horse bones lay in an articulated state. This last observation makes it clear that at least part of the horse bones belonged to carcasses. Therefore we are probably concerned here with horses that were used for riding, or as pack animals or draught animals, that died from natural causes, or that were killed in action, or that had been put down on account of their advanced age, or because they were diseased or considered no longer fit to do their job.

In densely populated civilian and military settlements the amount of space available for dumping a rotting and stinking horse carcass will have been a problem. These carcasses will have been removed from the settlements. We have evidence of this for example from Kesteren³³⁷, Zwammerdam³³⁸ and Stanwix.³³⁹ For the inhabitants of the settlement in Nijmegen the big, dry defensive ditch, at the time when it was no longer functional as such, but before it was filled in, served for a short while as an enormous refuse pit at a convenient spot to dispose of these hundreds of kilograms of stinking carcasses.

A quarter of the horses died at immature age (Fig. 5.9). This indicates that in any case a number of horses were probably bred in or near the settlement, and that the inhabitants of the settlement trained their animals themselves and did not obtain trained animals from stud farms. According to written sources, in Roman times,

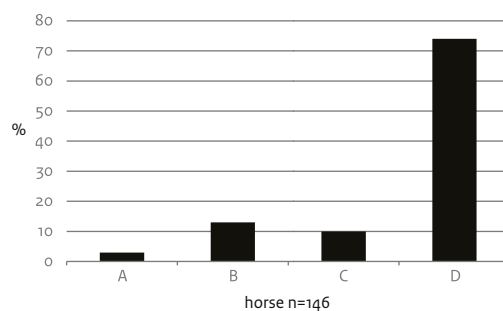


Figure 5.9 Nijmegen. The fortification around the Valkhof; the single period ditch. Age distribution at death of horse based on the epiphyseal fusion.

Age at time of slaughter (months): A. 0 - 10/15; B. 10/15 - 15/24; C. 15/24 - 42; D. 42 <.

³³⁵ Ten Cate 1972.

³³⁶ Luff 1982, 248; Lauwerier 1999; Lauwerier & Robeerst 2001.

³³⁷ Lauwerier & Hessing 1992.

³³⁸ Van Wijngaarden-Bakker 1970.

³³⁹ Birley 1961, 206.

just as today, horses for the army were trained to jump only when they had reached the age of four years, since only then is the skeletal system strong enough.³⁴⁰

The withers height of the horses ranges from 132 to 150 cm with a mean value of 141 cm.³⁴¹ According to the nine classes made by Vitt the withers heights fall in the classes 4–6.³⁴² These are normal values for ‘Roman’ horses in the Netherlands, as we know from the castella at Valkenburg and Zwammerdam, and from the location of the cemetery near the castellum at Kesteren.³⁴³ The only place where horses appear to be bigger is in the mid-Roman castra at Nijmegen and its surrounding canabae legionis, where the mean height was 150 cm with a maximum of 163 cm (n=4). Probably these bigger animals were only available for legionaries. In contrast to the ‘Roman’ horse we see the much smaller animals in, for example, the northern part of the Netherlands which was not occupied by the Romans, with a mean height of 131 cm (min. = 112; max. = 138; n = 27).³⁴⁴

Dog

As a general rule, dog was not eaten in Roman times.³⁴⁵ The absence of cut and chop marks on the bones found makes it clear that this was also the case in Nijmegen. Following the estimation method of Harcourt³⁴⁶ the dogs had withers heights ranging from 42.5 cm to 55.1 cm (n = 4). These are medium-sized dogs, also for the Roman period, from which withers heights are known ranging from lap dogs of less than 20 cm to large animals of over 70 cm.³⁴⁷ For the Dutch territory, withers heights are known from 26 cm at Valkenburg³⁴⁸ to 65 cm at Rijswijk.³⁴⁹

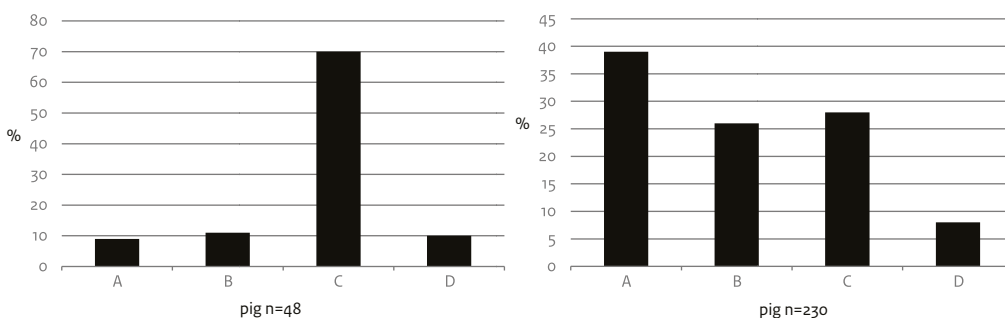
Pig: production of bacon and pork

In contrast to other farm animals, pigs are economically valuable mainly as a source of meat. An indication for the purpose for which pigs were kept is the age at which the animals were slaughtered. This age was determined on the basis of the data on the degree of epiphyseal fusion of the various skeletal elements. Because there are only 48 data available, the value of the information about slaughter ages is limited. Only a few animals reached a mature age (Fig. 5.10.a). Most of the animals were slaughtered at an age between 24–30 and 36–42 months. This relatively late slaughter age indicates that the pigs were not only kept to provide pork, but that the production of bacon, fat, was important too. Only one-tenth of the pigs were slaughtered in the first year of life. This is in contrast to the data from the military settlements in Nijmegen of the mid-Roman times, the Flavian-Trajanic legionary fortress and the surrounding canabae legionis (Fig. 5.10.b). Here it is clear that sucking pigs, or at least pigs less than one year old were in favour.

Other products of pig that were probably used are the bristles for making brushes and the skin for making leather. Wherever possible pig’s dung will have been used as manure. There are no indications that bones were used for making objects.

Sheep/goat

Sheep and goats played a minor role in fourth-century Nijmegen. The only thing we know for sure is that they were eaten. Their additional economic value may have been the provision of milk (cheese), dung and leather. Sheep were possibly kept for the production of wool.



Figures 5.10.a–b Nijmegen. The fortification around the Valkhof; the single period ditch. Age distribution of slaughtered pig based on the epiphyseal fusion. a. Nijmegen, fourth-century single period ditch; b. Nijmegen, Flavian-Trajanic legionary fortress and canabae legionis. Age at time of slaughter (months): A. 0–12; B. 12–24/30; C. 24/30–36/42; D. 36/42 <.

³⁴⁰ Davies 1969, 445.

³⁴¹ Lauwerier 1988, table 80.

³⁴² Von den Driesch & Boessneck 1974.

³⁴³ Clason 1960; Van Wijngaarden-Bakker 1970; Lauwerier & Hensing 1992; Lauwerier & Robeerst 2001.

³⁴⁴ Clason 1965; Prummel 1979; Knol 1983; Lauwerier 1999; Lauwerier & Robeerst 2001.

³⁴⁵ Luff 1982.

³⁴⁶ Harcourt 1974.

³⁴⁷ Boessneck 1989; Harcourt 1974.

³⁴⁸ Clason 1967.

³⁴⁹ Clason 1978.

Cattle: production of traction power, manure, milk, meat and leather

As with pig, the data on the age at which animals were slaughtered, based on the degree of epiphyseal fusion, can inform us about the purpose for which cattle were used and the primary and secondary reasons for keeping cattle. The age distribution of slaughtered cattle based on this data is presented in Figure 5.11. The cattle that were slaughtered at a fully mature age, i.e. 42-48 months or older (phase F) was 64%. In the third year of life (phase D and E) 28% of the animals were slaughtered, in the second year (phase B and C) 4% and in the first (phase A) 5%. It has to be pointed out that the ages referred to here, that are based on the epiphyseal fusion of recent breeds, represent minimal values for cattle in the past; in Roman times the epiphyses probably fused at a much later age, which means that the animals were killed at later ages than that are presented here.³⁵⁰

It is evident that cattle served as a source of meat, witness the butchery marks on the bones and their fragmentation. However, cattle would not have been kept primarily for the production of meat, seeing that a high percentage of the cattle were adult animals. With cattle-farming aimed at meat production one would expect a high proportion of calves and young animals. The age at which beef cattle are slaughtered nowadays is between 1.5 and 2.5 years for cows (usually animals that were intended for milk production but that did not become pregnant), 1.5 years for bulls, and 2-2.5 years for oxen.³⁵¹ For veal production the slaughter ages are

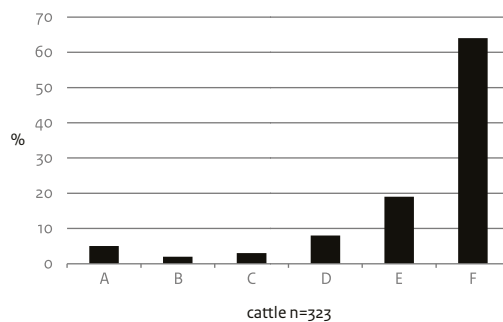


Figure 5.11 Nijmegen. The fortification around the Valkhof; the single period ditch. Age distribution of slaughtered cattle based on the epiphyseal fusion.

Age at time of slaughter (months): A. 0-7/15; B. 7/15-15/24; C. 15/24-24/30; D. 24/30-36/42; E. 36/42-42/48; F. 42/48 <.

earlier. In terms of our slaughter-age phases, if meat production were the chief aim of the cattle farmer then we would expect to find high percentages in the slaughter-age phases A-D, which is in fact not the case.

The low percentages of cattle slaughtered in the first years of life indicate that the animals were not kept primarily for the production of dairy products, i.e. milk or cheese. If the farmer wishes to concentrate on the production of milk then the cows must be allowed to calve once a year. This is because lactation only occurs when the cow is with calf and after the calf has been born. The annual calving yields a number of newborn calves that greatly exceeds the number required for maintaining the herd. Consequently there is a large surplus of calves. If the cattle, like modern highly-bred dairy cows, only needed low-level stimuli for milk production (for example the rattling of buckets or the voice of the milker or milkmaid) then the calves would have been taken away from their mothers soon after birth so that the farmer could use the milk. If this were the case then we would expect a high percentage of slaughtered animals in age phase A, or if they were kept for the production of meat, in the phases up to and including D. For milk production more primitive breeds require stronger stimuli, the sucking action or at least the presence of the calf.³⁵² If the presence of the calf was necessary for stimulating milk production then the calves would have been available for slaughter only after 1 year of age, in the age phases A and B. In this case also, the animals could have been kept for the production of meat and slaughtered in the phases up to and including D. As stated before, we do not find any high percentages of animals killed in the phases A-D. So we can conclude that milk production was at most a secondary reason for keeping cattle.

The mature age at which most cattle were slaughtered indicates that the animals were kept mainly as a source of traction power and manure. When the supply of traction power and manure are the main objectives of a farmer, a high rate of reproduction is not important and may even be disadvantageous. It is obvious that cattle were important as working animals, since before the invention of the horse-collar and shafts in the ninth or tenth century, horses could pull only light loads of 200-300 kg, and thus only cattle were suitable for the heavier work.³⁵³

³⁵⁰ Meitinger 1983.

³⁵¹ Ministerie van Landbouw en Visserij 1970.

³⁵² Amoroso & Jewell 1963.

³⁵³ Slicher van Bath 1960.

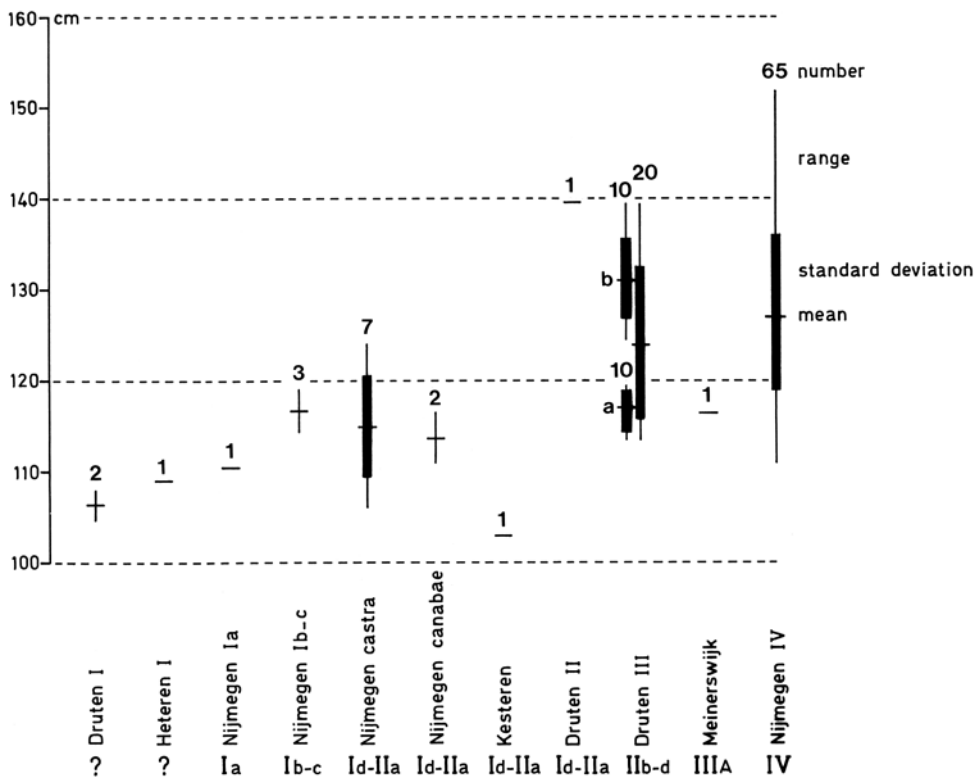


Figure 5.12 Withers heights of cattle in different sites in the eastern river area (after Lauwerier 1988, fig 42).

Legend for sites and dating: ? possibly pre-Roman Iron Age; Ia. first quarter of first century AD.

Until the ninth and tenth centuries agriculture in particular was completely dependent on the traction power provided by cows and oxen. Also the non-agrarian sector, the civilian population and the army, was largely dependent on cattle for traction power.

Assuming that cattle were used mainly for agricultural purposes, we may also assume that in addition to traction power, the production of manure was of great importance. Cattle, being the most frequently occurring species in the bone material, will have provided the bulk of the manure. Taking into consideration the relative proportions of manure produced by farmyard animals: 1 cow = 2/3 horse = 4 pigs = 10 sheep³⁵⁴, we can state that agriculture in the surroundings of Nijmegen was almost completely dependent on the manure production of cattle.

There are no indications that bones of cattle were used for the production of objects. The skin of these animals will certainly have been used for making leather.

The withers heights for fourth-century Nijmegen, calculated with the multiplying factors recommended by Von den Driesch and

Boessneck³⁵⁵, range from 110.7 to 154.6 cm, with a mean value of 127.59 cm (n = 65; s = 8.49). The data obtained from several Roman period sites in the eastern river area show an increase in size of cattle in the first and second centuries (Fig. 5.12). It has already been stated that this increase was a result of Roman influence on stock-breeding practices.³⁵⁶ It is assumed that with the Roman know-how a different exploitation technique came into use that may have consisted of improved nutrition and better treatment of the animals, as well as breeding schemes applied to native cattle aimed at increase in size with a view to obtaining more traction power. However, other personal and economic factors could have played a part as well.³⁵⁷ For second-century Druten, the separate group of larger animals can be explained as a population imported from elsewhere as has been assumed for other places in the Roman Empire too.³⁵⁸ The data from the fourth century suggest a continuity in the high level of cattle-farming practices from the second to the fourth century.

³⁵⁴ Slicher van Bath 1960, 321-322.

³⁵⁵ Von den Driesch & Boessneck 1974.

³⁵⁶ Lauwerier 1988, Section 6.1.

³⁵⁷ MacKinnon 2010.

³⁵⁸ Zeuner 1967; Boessneck et al. 1971.

Animal food

As was stated before, neither horses nor dogs were a source of food for human consumption. Because there is only information from a few sieve samples, it is impossible to say to what extent birds and fish contributed to the meat diet. And even if more sieve samples had been taken from the ditch it is still very disputable whether the data then available would be a proper representation of the contribution of fish and fowl to meat consumption. It is more likely that the inhabitants of the settlements disposed of the minor refuse from these animals near their houses instead of bringing them to the ditch. The only thing we can say is that birds, at least domestic fowl, were eaten. The finds of several remains of fish indicate that fishing certainly took place. The exotic fish from the genus *Sphyraena*, a genus with excellent and tasty fish for the table, must have been brought from faraway southern coasts.³⁵⁹ It was not possible to identify the bone of this barracuda to species level, but with the aid of the Copenhagen Museum collection we can say that the species is possibly *S. sphyraena*, which occurs in the eastern Atlantic Ocean, the Mediterranean and the Black Sea, with *S. guachancho* and *S. viridensis* as alternative possibilities (Rosenlund, personal communication). Seeing that the transport of fresh fish over great distances is unlikely to have occurred, we should be thinking in terms of fish products like *liquamen* or *allec*, or possibly also salted fish.³⁶⁰

Another product of the sea that was eaten in Nijmegen was oyster.

If we compare the hunted mammals with the domesticated meat-providing mammals such as cattle, sheep/goat and pig, we see that hunting was of minor importance as a means of providing meat (Table 5.14). Aurochs, elk, red deer and wild boar together constitute 4% or 8 weight-% of the bones. Probably the contribution of these wild mammals was less than these figures suggest; eight of 33 fragments of red deer are antler fragments and the few bone fragments of aurochs and elk that were found are rather heavy, on average 1 kg. Possibly, the social meaning of hunting was more important than gaining foodstuff.

Of the domestic animals, cattle were the main suppliers of meat. Because bone weights give a better indication of meat weight than the numbers of bones, we can say that probably

Table 5.14 Nijmegen. The single period ditch: percentage distribution of the meat-providing mammals.

Species	%	Weight %
1. Domestic mammals: total	96	92
Cattle	85	95
Sheep/goat	1	1
Pig	14	5
2. Wild mammals: total	4	8
Aurochs	+	+
Elk	+	+
Red deer	+	+
Wild boar	+	+

Legend: + present.

more than 90% of the meat was beef. Pork comes in second place while the contribution of meat of sheep and goat constitutes only one percent.

Possibly cattle, sheep and goat were also kept for the supply of milk and cheese. But, as mentioned before, milk production of cattle was not a primary aim of the farmer.

Conclusion

Summarizing, we arrive at the following conclusions:

1. As often in the Roman area, of the domesticated mammals only cattle, sheep, goats and pigs were eaten. Over 90% of the meat was beef. Pigs were kept somewhat longer and probably fattened so that they produced not only pork, but bacon as well. To a small degree cattle and the few sheep and goats may have been kept for their milk and for making cheese.
2. To a limited degree the menu was supplemented with game: aurochs, elk, red deer and wild boar. However, possibly social and mental aspects played a more important role in hunting than gaining food.
3. Fowl, fish and shellfish were eaten as well. However, it is not possible to establish their importance for supplying proteins and fats. A find of *sphyraena* indicates long distance trade of fish products from southern Europe.
4. Considering the age structure of cattle the agrarian economy in the surroundings of

³⁵⁹ Müller 1983.

³⁶⁰ Forbes 1965.

Nijmegen was based on mixed farming with the emphasis on arable farming. For that purpose cattle delivered traction power and were also possibly a source of manure for fertilizing the soil. On a small scale other animals possibly provided manure as well.

5. The above-mentioned animals, but horses as well, were skinned for their hides and for making leather. Possibly sheep were also kept for the supply of wool.
6. Dogs and horses were not eaten. Dogs could have been kept as watchdogs, for the hunt or just as companions, horses as pack animals, for riding or for pulling not too heavy loads.
7. Concerning the ages of the horses found, at least some of the horses were possibly bred and trained by the inhabitants of the settlement themselves. This means that we have to take into account the possible presence of a stud farm or possibly other farms within the protection of the ditches.
8. Although speculative, the special distribution of the bones in the ditch suggests a bridge or a dead end of a road situated halfway along the whole length of the ditch.
9. The heights of the withers of cattle are comparable with those of the large 'Roman' cattle known from the second century. Also, the horses found are relatively large animals with a 'Roman' stature. This suggests that, in contrast to elsewhere, in or around Nijmegen the standard of cattle farming and horse breeding from the past was kept up, possibly influenced by the Roman military presence at Nijmegen.

5.3.5 Palynological investigation of the late Roman single period fortification ditch at Nijmegen (by D. Teunissen)

Introduction

During the building of the Cultural Centre on the Lindenberg at Nijmegen in 1969 a ditch was discovered which must have belonged to a late Roman fort on the Valkhof.³⁶¹ In 1979 the same ditch was again exposed on the south side of Ridderstraat and on Kelfkensbos opposite the Cultural Centre (the single period ditch in Section 5.2.3). The fill of the ditch proved to consist of humous sandy deposits. Generally speaking, such sediments do not form a favourable environment for the conservation of

pollen. It was, therefore, in accordance with the expectations that much of the pollen found was greatly corroded.

To what extent do corroded pollen communities provide useful information?

In the case of well-aerated and/or richer soils, especially when these are found above ground water level, there is the danger that the preserved sporomorphs may be affected by oxidation and biological activity. Certain types of sporomorphs are more resistant to attack than others. The pollen from the liguliflore composites is one of the most resistant kinds.³⁶² This may lead to the over-representation of this type of pollen in the deposits concerned. Locally, this over-representation can be increased by the activity of pollen-collecting digger bees³⁶³, but this factor is far less significant, at least, it is in this country. Over-representation of the composites will usually result in under-representation of tree pollen for example. Does this now mean that, if composites are dominant in the pollen communities in richer and/or well-aerated sediments, the pollen communities are not able to provide any real information as to the composition of the original cover of vegetation? Firstly it must be mentioned that richer and/or well-aerated sediments do not always show composite dominance automatically. This indicates that the original situation must certainly influence the final composition of pollen communities in such sediments. An investigation of the slope sediments on the north edge of Kops Plateau at Nijmegen³⁶⁴ revealed that nowhere in these somewhat clayey humous sands which lie far above the ground water level do the composites achieve extreme values. Moreover, it appears that these sediments do not give a static picture of pollen but show the development of a wooded to an open vegetation, which is later followed by the restoration of the woods. If the pollen were only determined by an environment which was unfavourable to conservation, such sequences would not be possible.

A similar situation can be seen at the Roman fort of Meinerswijk at Arnhem.³⁶⁵ In sandy clay deposits the pollen develops from a rather poorly-wooded vegetation prior to the 'Batavian Revolt' to an almost treeless vegetation cover immediately after, without, however, the

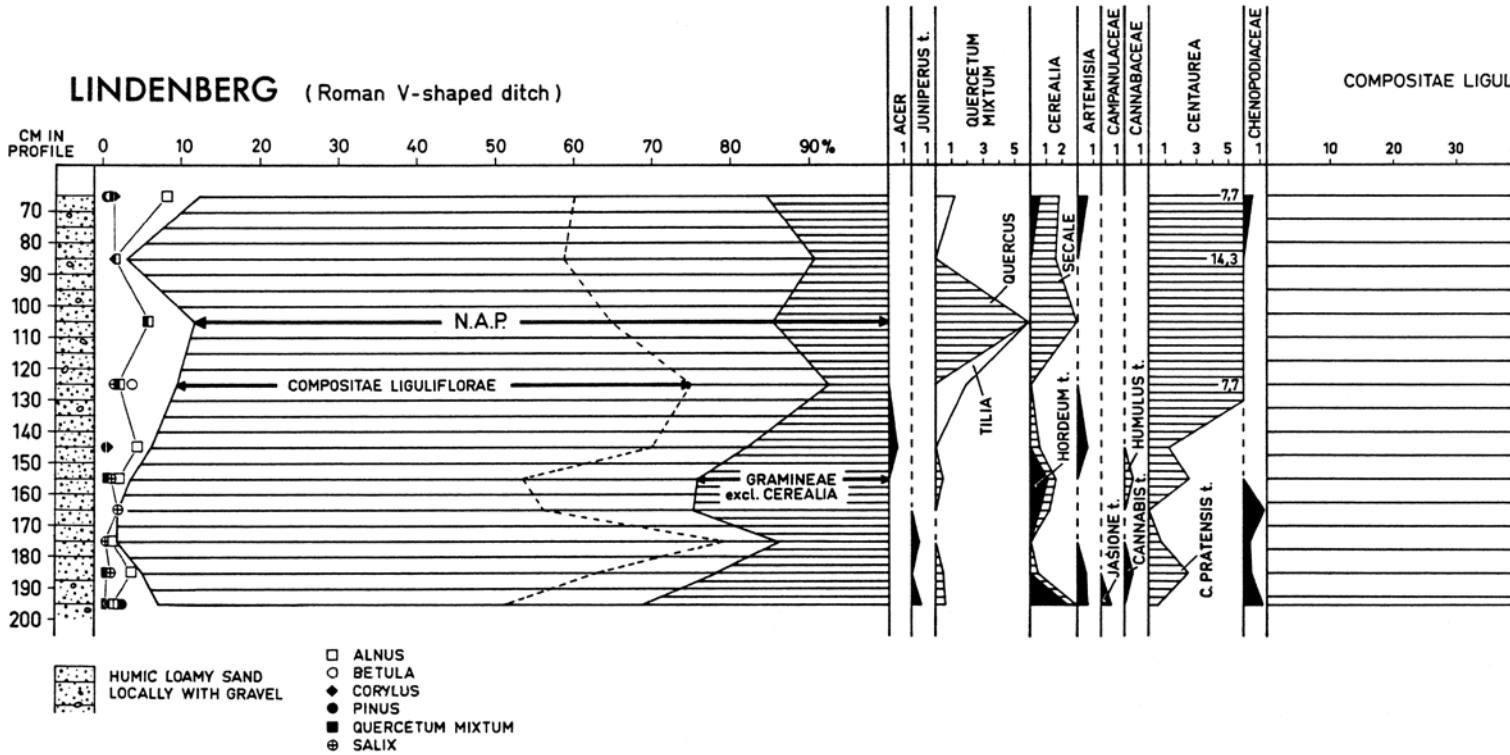
³⁶¹ Bogaers 1969.

³⁶² Havinga 1962 and 1984.

³⁶³ Bottema 1975.

³⁶⁴ Teunissen & Teunissen-Van Oorschot 1980.

³⁶⁵ Willems 1980a and 1980b; 1981 and 1984a.



composites ever reaching extremes.³⁶⁶ On the other hand, the well-aerated humous sandy fills of the Roman ditches in and around Nijmegen, which usually contain a small amount of clay, almost always show high percentages of the liguliflore composites as well as the low percentages of tree pollen. Considering what has been discussed above, the high proportion of composites can hardly only be due to selective corrosion in an environment which is not very conducive to conservation. It should also be remembered that the composite pollen present in huge quantities must have been produced on the spot, although it is known that composites do not usually produce large quantities of pollen in a shady wood.

In the case of extreme numbers of composites in richer and/or well-aerated sediments, the possibility that the environment was more wooded than the pollen would lead us to believe must be taken into consideration, nevertheless it must still be concluded that the palaeo-vegetation concerned had an open character.

A general picture of the palynological developments around Nijmegen in the Roman period
 Palynological evidence from environments

which are relatively conservative in the lowlands around Nijmegen points to a rather strong human influence on the vegetation cover (many synanthropic types of vegetation as well as woody vegetation surviving in affected positions).³⁶⁷ The percentages of tree pollen are between 35 and 70%, with an average of c. 50%. Already in the early Roman period a kind of restoration of the woods can be observed in many places, probably as a result of changed (more efficient) agricultural methods of production, causing the acreage under cultivation to decrease.³⁶⁸ However, in the late Roman period restoration took place far more intensively, reaching a peak in the early Merovingian period. The percentages of tree-pollen rise to 70-90%, with an average of 85%. This is undoubtedly connected with a decrease in the population density which was caused by the unrest of the migrations of the peoples, the collapse of the Roman social order and the first plague epidemics.³⁶⁹

The palynological picture of some early and middle Roman ditches at Nijmegen
 As has already been mentioned, the sandy deposits at the base of the slope sediments on the north flank of Kops Plateau at Nijmegen

³⁶⁶ Teunissen, Teunissen-Van Oorschot & De Man 1987.
³⁶⁷ Teunissen & Teunissen-Van Oorschot 1982.
³⁶⁸ Willems 1981 and 1984a; Teunissen & Teunissen-van Oorschot 1982.
³⁶⁹ Jansen 1978, 110; Zinsser 1935; Willems 1986.

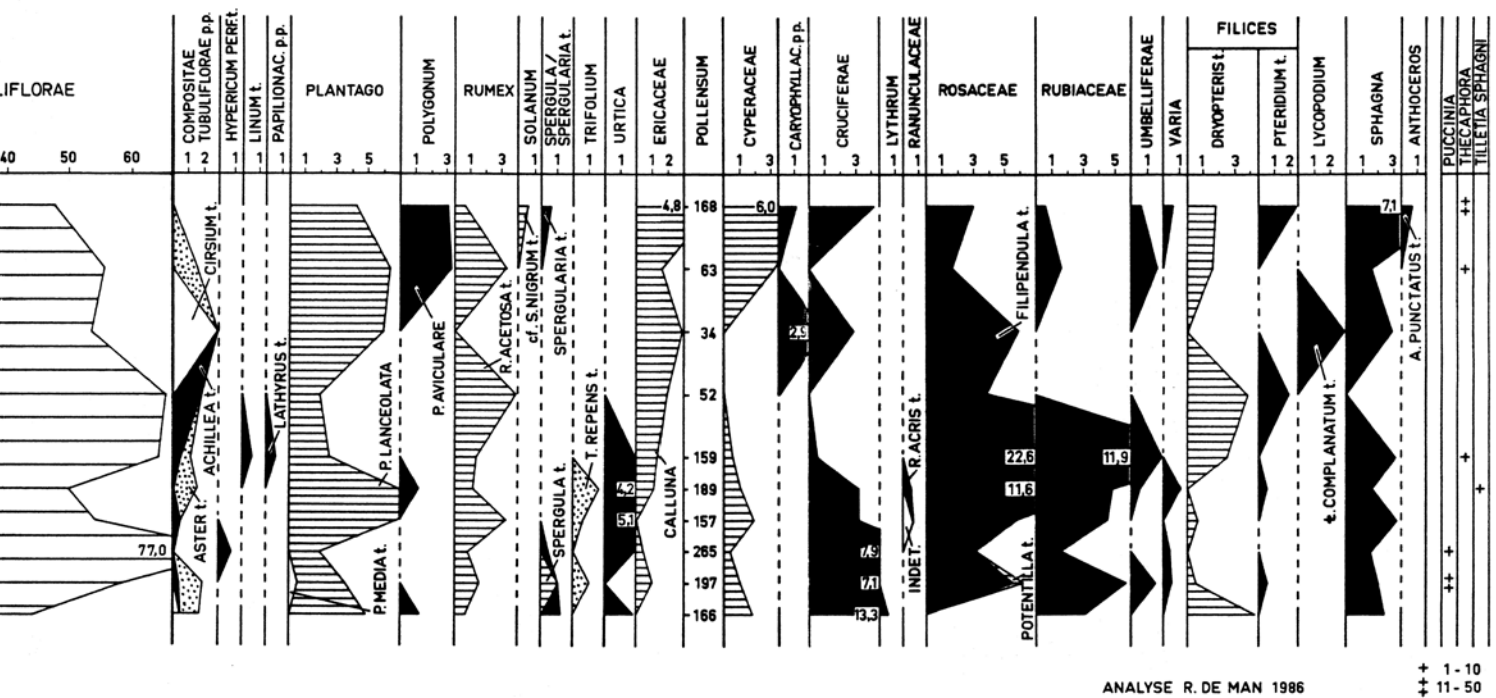


Figure 5.13 Nijmegen. The fortification around the Valkhof. The single period ditch (trench 161; see Fig. 5.5); palynological diagram.

show a still somewhat wooded vegetation (85 to 50% tree pollen). There are only few composites. The layers concerned were formed just before the arrival of the Romans.

The humous sandy fills of the oldest V-shaped ditch round the Roman fortification on Kops Plateau which were formed a little later contain, besides a great deal of composite pollen, about 20% tree pollen.³⁷⁰ Furthermore, the middle Roman ditches belonging to the legionary fortress on the Hunerberg only show an average of 10% tree pollen, apart from an increase in composite pollen. Even if the composites were over-represented as a result of selective corrosion it must still be assumed that, after the arrival of the Romans, the vegetation in the surroundings of the Roman fortifications became more open (less wooded), in contrast to simultaneous developments in the surrounding lowlands.

The palynological evidence from the Lindenberg ditch

The ditch of the fort found on the Lindenberg at Nijmegen must be dated to the late Roman period on the basis of the archaeological finds. This gave rise to the question whether palynological evidence could be found in the

sandy fill of the ditch, rich in humus but with little clay, which might indicate that the more intensive restoration of the woods which took place towards the end of the Roman Empire in the surrounding lowlands had now started to reach the vicinity of the Roman fortifications on the hills of Nijmegen.

Samples were taken from the bottommost part of the ditch fill (195-65 cm below the modern surface) for this reason and were examined palynologically at about ten levels (Fig. 5.13). Below 145 cm the concentration of pollen was moderate, above this level the concentration was low.

What strikes one most in the pollen spectrum is the low percentage of tree pollen (5% of the total number of pollen grains from vegetation which was not dependent on a damp or wet habitat and which came from more than ten spectra) and also the predominance of liguliflore composites (45 to 65% of the pollen total). The remaining herb community represented is however varied enough for certain conclusions to be made regarding the plant communities then present in and around the ditch which was gradually filling up.

Summarizing all the spectra counted (a sound starting-point since together they only represent

³⁷⁰ We thank W.J.H. Willems (former State Service for Archaeological Excavations, Amersfoort) for permission to take samples of this ditch.

a very short period of time) the following can be concluded.³⁷¹ The ditch which had fallen into disuse must have formed a damp environment as a result of the humosity and sunken position of the soil, which only dried out superficially in the summer. This is indicated by the presence of elements from *Molinio-Arrhenatherete*, such as *Centaurea pratensis*, *Lythrum salicaria*, *Filipendula t.* and *Plantago lanceolata*. There was probably some form of grazing as well. Much of the pollen found from *Graminaeae*, *Caryophyllaceae*, *Cruciferae* and *Rubiaceae*, as well as that from the other composites including *Centaurea pratensis* will have originated from this community.

The presence of nitrophile communities (*Chenopodietea*, *Artemisietea vulgaris*) is indicated by pollen from *Chenopodiaceae*, *Artemisia*, *Urtica* and probably also part of the *Umbelliferae* (the umbellifer *Aegopodium podagraria* is very common in these types of vegetation). Communities such as these develop easily in the vicinity of human settlements or other human concentrations of longer duration (on fields, manure heaps and rubbish dumps, ruderal-influenced fringes of woods and along paths etc.). Part of the *Caryophyllaceae*, *Cruciferae* and *Rubiaceae* pollen found may also originate from these types of vegetation.

Some of the pollen of the *Spergularia* type may indicate the remains of pioneer vegetation on the sides of the ditch (*Spergularia rubra* in the association *Spergulario-Illebreacetum* of the *Isoeto-Nanojuncetea* class); nowadays this kind of vegetation is to be found on sandy soil in dry ditches which provide a damp environment in winter but which more or less dry up in summer.³⁷² The *Polygonum aviculare* type and the *Trifolium repens* type may indicate that in places the soil was compressed by being trodden on. Together with the appearance of pollen from cereals (including *Secale!*) much of the evidence mentioned above points to the fact that human activity in the area was still very intensive during the filling-up of the ditch (second half of the fourth century AD).

The possible over-representation of liguliflore composites in the pollen spectrum probably led to the under-representation of tree pollen, among others. It is possible that the surrounding vegetation was not as treeless as the palynological data would have us believe. Apart from the composites, the extremely varied representation of elements from photophile

vegetation does however indicate that, if there were in fact any woods, they must have been very open and probably did not consist of anything more than scattered copses.

Of the sporomorphs generally produced in woods, those of the *Quercetea roboripetraeae* in particular are well-represented: *Betula*, *Quercus*, *Pinus* and *Pteridium*, whereas in this case the pollen of *Fagus* and the spores of the *Dryopteris* type can also be considered to originate from (remains of) this community, which belongs on sandy soils.

Final conclusion

If we compare the available palynological data from sandy sediments from the Roman period originating from the hilly area in and around Nijmegen with the evidence from the low-lying Holocene river valley in the surrounding area, several differences become clear immediately. We will leave aside the greater pollen poverty of the sandy sediments and the higher average degree of corrosion of the sporomorphs in them and also the less varied assortment of sporomorphs found, and confine ourselves to the general development tendencies.

As has already been mentioned, the palynological data from the low-lying areas around Nijmegen point to a certain degree of reafforestation which became apparent early on in the Roman period. This development became much more pronounced in the late Roman period, and the restoration of the woods finally reached its peak in the Merovingian period.

The sandy deposits from the hilly area of Nijmegen, which mostly came from Roman defensive ditches, showed a different picture on examination. Deposits from just before the arrival of the Romans (base sediments from the north slope of Kops Plateau) still contain 85-50% tree pollen;³⁷³ somewhat more than the average of 50% which was normal in low areas just before the beginning of the Christian era. However, the earliest ditch on Kops Plateau, dating from the beginning of the early Roman period, only contains about 20% tree pollen. The average tree pollen values in the middle Roman ditches around the castra on the Hunerberg fluctuate in the region of 10%. As we have already seen, the tree pollen in the fills of the late Roman Lindenbergh ditch only amounts to 5% of the pollen total (Fig. 5.13).

³⁷¹ For the syntaxonomic descriptions see Westhoff & Den Held 1969.

³⁷² Westhoff & Den Held 1969.

³⁷³ Teunissen & Teunissen-Van Oorschot 1980.

Comparison of the pollen content of sandy sediment dating from about Roman times near Nijmegen

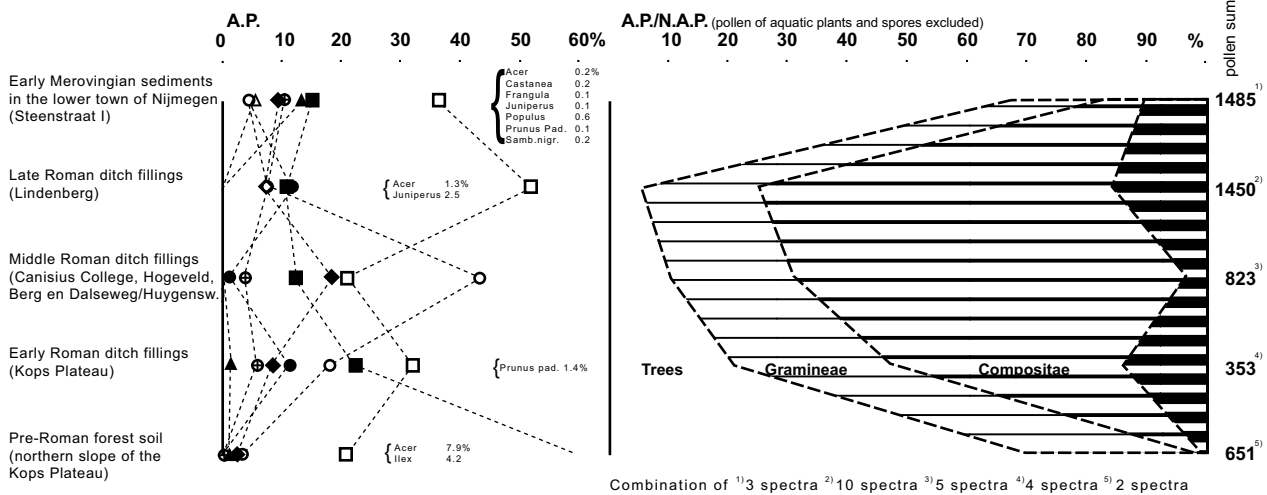


Figure 5.14 Nijmegen. Comparative diagram of the pollen content of sandy sediments dating from pre-Roman to post-Roman times in the Nijmegen region. For the legend of the tree pollen see Fig. 5.13.

Even if the trees in the humous sandy sediments were somewhat underrepresented because of selective corrosion which is probably the case, the percentages of tree pollen which decreased while the sediments concerned were being formed later in the Roman period still deserve attention. It seems to be of great historical significance that the percentage of tree pollen in the late Roman Lindenberg ditch is lower on average than during the preceding periods of the Roman occupation of this country, whereas the percentages concerned show a considerable increase in the surrounding lowland.

It has already been observed that the palynological spectrum of the Lindenberg ditch indicates considerable human activity in the vicinity. This fits in with the archaeological and (proto)historical evidence. The fact that the percentages of tree pollen in this ditch are on average even lower than those from the equally sandy fills of the earlier Roman ditches leads one to suspect that restoration of the woods was still being resisted even in the second half of the fourth century AD. On the other hand one should not forget that the results of the palynological investigation of the north slope of Kops Plateau give the impression that, in the period around and shortly after the end of the Roman Empire, reforestation of the hills was achieved far more laboriously than in the low-lying area.³⁷⁴

It is important to mention here that the

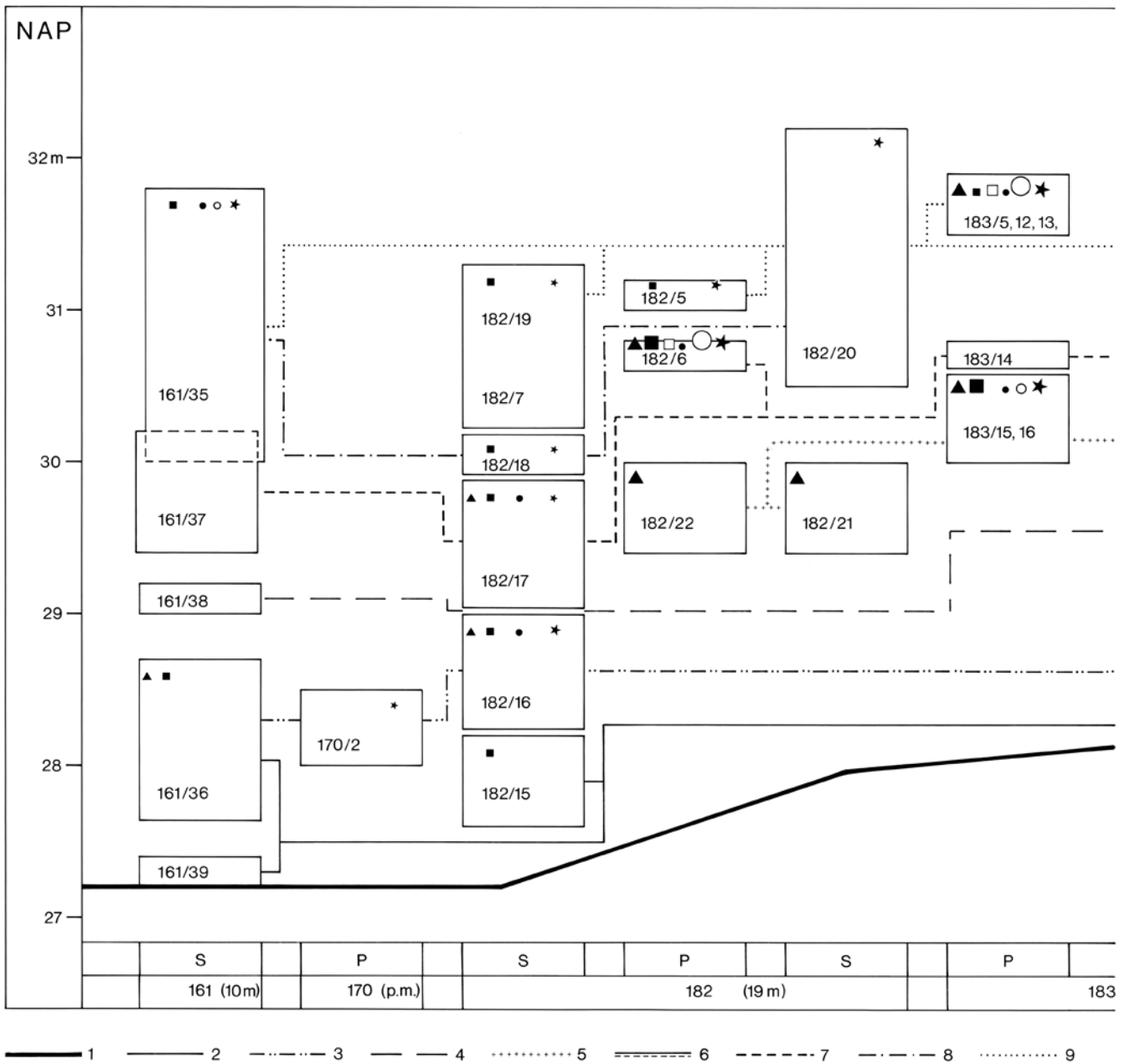
- sandy - late Roman levels at the Waalkade at Nijmegen (at a distance of 300 m from the excavated point of the Lindenberg ditch and at the transition from hilly area to lowland) also show percentages of tree pollen of 5% (rising to 20% towards the end of the period), while the early Merovingian sediments on top of them give percentages of 60-70% (Fig. 5.14).³⁷⁵ This certainly gives the impression that the Romans really did keep the woods away from the surroundings of their military settlements, almost to the last.³⁷⁶

The diagram is composed of 24 spectra from humous sandy and mostly somewhat loamy deposits dated shortly before till shortly after the Roman period. So far as the Roman period itself is concerned the spectra come from fillings of defence ditches exclusively. The palynological data make it clear that the oak forest predominated on the sandy grounds shortly before the Roman period. The ditch fills bear witness to an increasing deforestation of the hills around the military settlements which reached its peak only in late Roman times. This is corroborated by the influx of pollen of lowland trees (*Alnus*, *Salix*) with the advancing of the Roman period. At the foot of the Valkhof area the late Roman deposits show a pollen picture that fits in with that of the Lindenberg ditch, but early Merovingian sediments there attest to a rapid expansion of the woods. On the higher parts of the hills reforestation was probably slower.

³⁷⁴ Teunissen & Teunissen-Van Oorschot 1980.

³⁷⁵ Westhof & Den Held 1969.

³⁷⁶ The author (D. Teunissen) expresses his gratitude to R. de Man for analysing the samples from the Lindenberg ditch, and also to H. Teunissen-van Oorschot for drawing the diagram of the Lindenberg ditch (both formerly Department of Biogeology of the Katholieke Universiteit Nijmegen, now Radboud University)



5.3.6 Miscellaneous finds

A small group of miscellaneous finds collected from the various ditches has been described in Appendix XVII (limestone, iron, bronze, lead, stamps on tiles and bricks). The most significant objects are the two large blocks with a square section and reliefs on all four faces representing human and divine figures dating from the early first century (Appendix XVII 5.1.2 nos. 182/21 and 182/22; see Section 3.6.1).

5.3.7 The distribution and deposition of the finds

The single period ditch

To get a good idea of the vertical and horizontal distribution of the finds in the single period ditch it must first be established which finds numbers belong to the same phase stratigraphically (see Section 5.3.1). This is shown in Figure 5.15 using the levels of the finds indicated in Fig. 5.5.

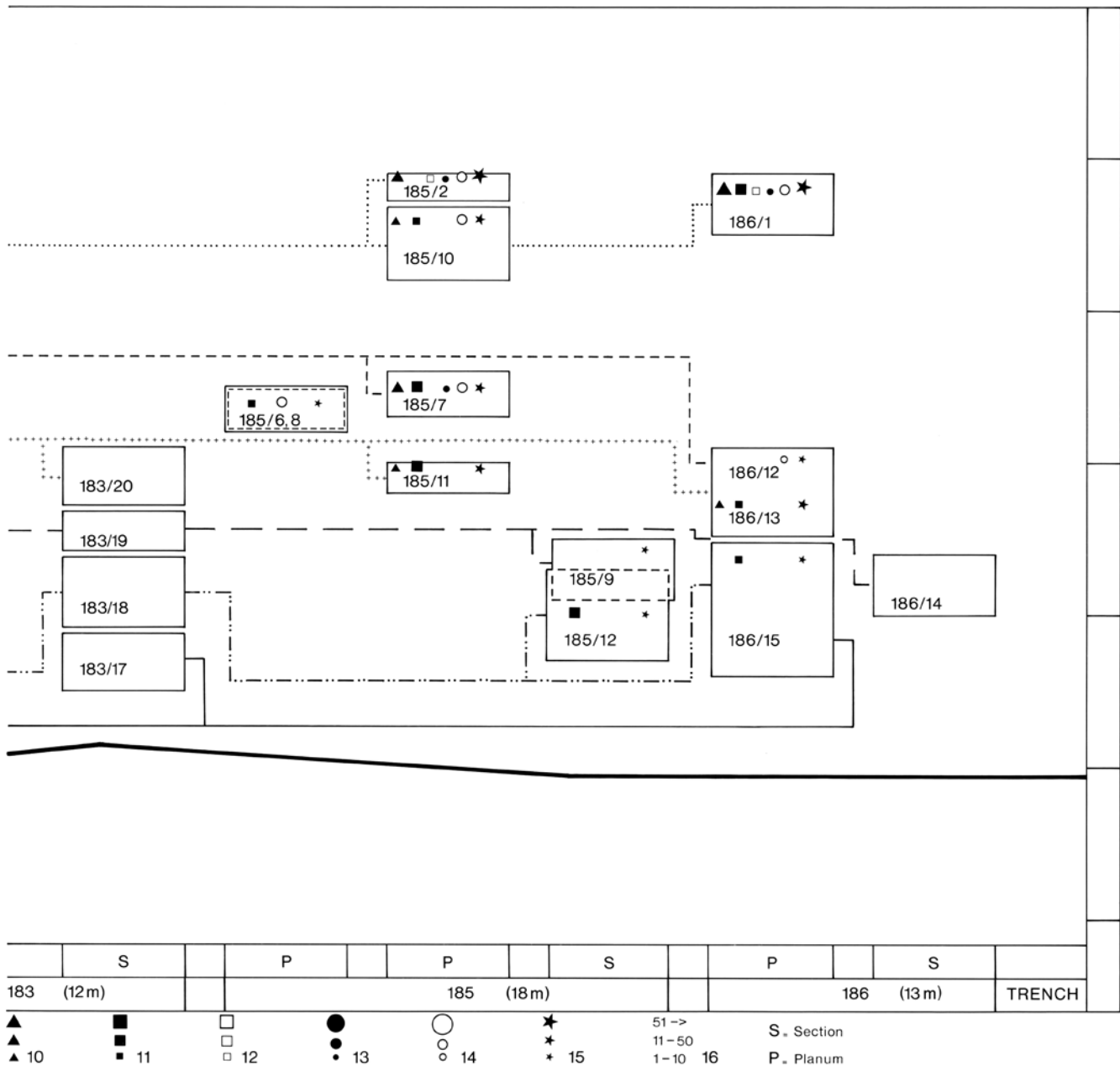


Figure 5.15 Nijmegen. The fortification around the Valkhof. Schematic section of the single period ditch with the stratigraphic distribution of finds. Scale horizontally 1:500, vertically 1:50.

Legend: 1. bottom of the ditch; 2. layer 2; 3. layer 3; 4. layer 4; 5. layer 5; 6. layer 6; 7. layer 7; 8. layer 8; 9. layer 9; 10. limestone; 11. bone; 12. coins; 13. metal; 14. nails; 15. pottery; 16. numbers. Trench: number and length (in brackets).

The distribution of the various categories of finds is remarkable. The clean bottom fill of the ditch consisting of layers 1, 2 and 3 yielded little material, and even the first dark layer 4 did not hold more. It is clear that the ditch was in use when these layers were deposited and, although not kept at its original depth it was

not used for dumping refuse and suchlike. This changed in the phase in which the upper layers were deposited. The majority of all kinds of finds comes from the middle (layers 6 and 7) and upper fill (layer 9) of the ditch. The finds in layers 6 and 7 are concentrated especially in the part of the ditch between trenches 182 and

183 (188.2900/428.7900), i.e. over a distance of 30 m at most and at a height of 1.60 to 2.60 m above the lowest point of the ditch. The large quantity of animal bone and lumps of limestone is particularly noticeable. Further southeast the total number of finds quickly decreases. In this respect the density of finds in layer 9 shows a different picture; in this part of the excavation there are many finds throughout the whole length of this layer. In the extreme northwest (188.1600/428.8340) the number of finds even in the upper layers is very small.

A closer examination of the nature of the finds and possible significance of their deposition and location may provide information about certain events in the existence of the ditch (see also Table 5.2). Finds older than the fourth century AD which are not made of limestone will not be taken into consideration since they may date back to earlier activities. The finds from layers 1, 2, 3 and probably 4 are connected with the construction and upkeep of the ditch and settlement belonging to it. This is supported by the small number of finds found in these layers, consisting mainly of some pottery, animal bone, some slag and a few small pieces of limestone. What can be seen in layers 6 and 7 is completely different especially because of the contrast between the part of the ditch in which most of the finds are concentrated and the rest of the ditch. The pottery and most of the animal bones can be considered part of the settlement refuse. The pottery shows signs of intensive use such as wear and traces of soot, and the bone shows traces of slaughtering. It concerns large quantities which ended up here in different ways: over a long period of time or within a short period either as the direct dumping of refuse or, indirectly, in soil originating from the settlement. It may be assumed that individual and scattered coins ended up in the ditch in approximately the same way. However in the case of a larger quantity which may well have been scattered over a relatively small area such as the excavation of the Cultural Centre De Lindenberg, other factors may have played a part.³⁷⁷ The concentration may have developed because there were many people at this spot as there are in the case of a road, bridge, gate or watch post, and therefore more chance of finding a lost coin or one which had been thrown away; or because there was a suitable point of recognition here where a purse full

of coins could be hidden, like the corner or tower of the fortification. Horse bones must have been dumped purposely and directly, if found completely or partially articulated; unfortunately there were no good observations during the excavation itself.³⁷⁸ The large quantity of limestone was very probably dumped here more or less on purpose in the form of the remains of the demolition and/or construction of the fortification. The same goes for the nails. On the basis of their length they must have been used for fairly light joints and may have come into the ditch together with wood from the settlement rubble. In this connection, the concentration of large quantities of material over a relatively small area deserves attention. It could indicate that close by there was a passage through the wall. This may have been the gate already mentioned, but it may also have been an opening made during demolition. The fact that two pillar fragments weighing about 1000 kg and fitting together and also a fragment of a third (nos. 182/21-22 and 183/16) which probably fits these were all found close to each other in the ditch might indicate that walls were demolished at this point of the ditch. Much of the material discovered may have been brought out of the fortification through the passage which may or may not have originally existed, and thrown into the ditch. On the basis of the above, it may be concluded that the concentration of finds in layers 6 and 7 stems from a purposeful deposition of settlement and demolition refuse in a relatively small area. The position of the finds in layer 9 makes it likely that there were no obstacles such as walls to obstruct the wider and more regular distribution of material; even limestone is found quite frequently throughout. It would appear that the process of demolition and rebuilding was coming to an end.

The system of two parallel ditches

The distribution and density of the finds in the two parallel ditches is less complex than in the single period ditch: there are fewer finds and the stratigraphical structure of the ditch fills is considerably simpler. Moreover, a large part of the pottery dates from the first century; it is possible that the bone material is of a similar age too.

There is little fourth-century pottery in the inner ditch; only in the southeast (188.264/428.697)

³⁷⁷ Haalebos 1976, 210.

³⁷⁸ Lauwerier 1988, 69 and 74-77.

is it found a little more frequently, as are the coins (4 specimens). Limestone is only found in the north (188.042/428.980). The finds in the outer ditch present a different picture. Pottery (188.077/428.864 and 188.290/428.667) and limestone (188.077/428.840 and 188.290/428.667) are slightly more frequent in two places. In trench 1014 for a distance of c. 35 m several dozen coins with a concentration of 14 specimens were found within a distance of 5 m (188.077/428.840). The proximity of the great cemetery lying not more than 200 m southwest may perhaps provide an explanation for this phenomenon, since it must regularly have attracted visitors.

5.4 THE DATING, PERIODIZATION AND EVOLUTION OF THE DEFENCE SYSTEM

The absolute dating of the ditches is based on coins and pottery found in the ditches. The relation between the ditches themselves can only be determined by taking other factors like stratigraphy and filling into consideration as well as the results of the absolute dating. Finally, on the basis of the results obtained, certain statements can be made about the development of the defence system as a whole.

5.4.1 The dating

The few datable finds from the filling of the multiperiod ditch system are dated after AD 325/330 (Section 5.3.2). This means that this ditch system could have been in use during the second quarter of the fourth century, but the time of construction may have been earlier. However, during the Valkhof Museum construction site excavation in 1996-1997 a ditch segment was found that is possibly linked to our multiperiod ditch system; Valentinian coins from the lower layers of this ditch were well represented. If both segments belong to the same ditch system, our multiperiod ditch system must have remained in use for the same period as the single period ditch.³⁷⁹

The earliest datable material from the single period ditch can be dated during the Constantinian period and not much later than AD 350 (Section 5.3.2-3). After the initial silting up of the lower parts the ditch must be in active use during the Valentinian period and

finally partially filled in. Nevertheless the ditch must have remained visible as a clear depression for a very long time, at least into the (early) fifth century. This is confirmed by Thijsen's observation during the above-mentioned 1996-1997 excavation, where coins of Theodosius and Arcadius were found up to a considerable depth. The system of two parallel ditches outside the multiperiod and single period ditch was filled in sometime during the third quarter according to the numismatical evidence (Section 5.3.3) or the last quarter according to the pottery (Section 5.3.2) of the fourth century.

5.4.2 The periodization

It is extremely important that the succession of the various ditches be determined as precisely as possible. The ditches may all have functioned during different periods, but they may also have existed at the same time as others, and in addition, have been in various stages of filling.

The relation between the multiperiod ditch system and the single period ditch

There are some differences between the multiperiod ditch system and the single period ditch which may prove useful when determining the relation between them. The large ditch A of the multiperiod ditch system was probably filled up with virgin soil material in one operation, was not used as a dumping ground for settlement refuse, and contains few finds in a secondary position ('dug ups') and little or no rubble. It is the innermost ditch of all those bordering the area which is closed on the north side by the steep slope by the Waal. On top of ditch A at least three small ditches (B, D and F) were dug, each in a slightly shifted position. The large single period ditch has shifted to the land side, was filled in several phases and contained enormous quantities of settlement material and rubble.

Similarity of form and size make the contemporaneity of the multiperiod ditch system and the single period ditch possible (Table 5.15).³⁸⁰ However, the differences in filling are so great in every respect that this possibility is not very likely for their function during the whole fourth century. Moreover, the largest ditch would be expected to lie on the wall side and not on the land side, since this gives a stronger protection.

³⁷⁹ Van Enckevort & Thijsen 2000, 18-19 and Thijsen 2000a, 454 and 2000b, 13-14; Van Enckevort & Thijsen 2014, 34-37.

³⁸⁰ Based on results of excavations on the Valkhof Museum construction site in 1996-1997 Thijsen considers the two ditches as contemporaneous: Van Enckevort & Thijsen 2000, 17-19 and Thijsen 2002a, 454; 2002b, 14. See also Willems & Van Enckevort 2009, 100-101 and Van Enckevort & Thijsen 2014, 35.

Table 5.15 Nijmegen. The fortification around the Valkhof. Tentative schematic sequence of the multiperiod and single period ditch based on the stratigraphy with various fillings and the typochronological analysis of the finds.

Period	Dating multi-period ditch	Multiperiod ditch	Rampart or wall	Single period ditch	Dating single period ditch
6	after early fifth century	construction and filling ditch D			after early fifth century
5	after Arcadius and Theodosius	construction ditch D		still visible	after Arcadius and Theodosius
4	Arcadius and Theodosius	upper filling over filling A ₁ and trench C		upper filling layer 9	Arcadius and Theodosius
3	after 364-378	* bowl shaped filling A ₁ * clean filling in ditch A ←←	* construction of stone wall? * demolition earth+ timber →→ rampart?	* limestone (pillar) fragments from construction of stone wall * purposely filling+dumping → layer 5-8	IVc
2	after IVa	lower filling		* construction and active use layer 1-4	Constantinian?
1	IVa?	construction ditch A →→	* earth+timber → rampart filled with soil from ditch A?		

If the multiperiod ditch system is more recent than the single ditch system, then the latter must have fallen into disuse and the wall belonging to it must have been pulled down to ensure an unobstructed view. The single period ditch in a partially filled state may have served as an extra defence; the period of standstill in layer 4 might correspond to this. During the breaking down of the wall remains of stones may have ended up in the single period ditch, however, it may be assumed that most of these were used again to build the new wall. The fact that the two great pillar blocks were left behind might be in conflict with this.

If the multiperiod ditch system was older than the single period ditch, the former must have been completely filled up and the wall must have been pulled down before the single period ditch with its wall could have been used. The nature of the fill of the multiperiod ditch system fits in well with this order. The younger and shifting ditches B, D and F can perhaps be interpreted as successors of a smaller size than ditch A, temporary interim provisions, products of a changeable and hesitant policy or features contemporary with the single period ditch. All things considered, it is more acceptable to assume that the multiperiod ditch system was built earlier than the single period ditch. However, some overlap of phases in

construction, use and filling between the two systems is likely, because of the complex and large scale of the processes involved. In this way the various observations of features and finds on the Kelfkensbos and construction site of the Valkhof Museum can be accommodated in a reasonable way.

The relation between the system of two parallel ditches on the landside, the single period ditch and the multiperiod ditch system

It is essential to the line of reasoning on the relation between the system of two parallel ditches and the other ditches whether the two parallel ditches are to be considered as an independent system of ditches or in connection with the other ditches (the multiperiod and the single period ditches). In the first case it would concern the construction of a large surface area (8.69.3 hectares), a large part of which has not yielded any traces of settlement. In addition, no indications have been found of the existence of a rampart or wall. This makes it unlikely that the two parallel ditches are to be interpreted as an independent defence system.

The alternative is therefore to regard the two ditches as being contemporaneous and linked with one or both of the other ditches as a defence. In this case the two ditches would then have enclosed a vacant zone of at least

40 to 90 m wide, which surrounded the actual fortification like a sort of glacis. The coin finds in particular from the ditch on the land side show that it is possible to prove that the two ditches date from the same period as the single period ditch. It cannot be excluded that the two parallel ditches had already been dug when the multiperiod ditch was constructed. There are some indications that there were two phases which point to the redigging of the inner ditch (Section 5.2.4).

5.4.3 The evolution of the defence system

From the above, certain assumptions can be made about the development and appearance of the various fortifications.

In a first period a fortification was enclosed by means of ditch A of the multiperiod ditch system which may have had a surface area of 130 x 200 m (2.6 hectares). Ditch A may have followed the east side of the former erosional valley at the Lindenberg. Because of the small quantity of stone material recovered, the fortification may not, or may not entirely have been built of stone. It is possible that the fortification only existed for a rather short time in this form. The two parallel ditches in the southwest and south may have been constructed in this period, but this need not have been the case.

In a second period in the first or second quarter of the fourth century the large single period ditch was constructed on the outer side of the fortification surrounded by ditch A, possibly enclosing an estimated area of 110-150 x at least 250 m (c. 2.75-4 hectares or more). The ditch follows the northwest side of the former erosional valley at the Lindenberg. During the period of active use (phase 3) into the reign of Valentinian I (363-375) it was fairly well maintained. An earth and timber rampart on the inside of ditch A may have been replaced by a stone wall on the inner side of the single period ditch which possibly had a gate in or near the excavated part of the southwest side. At that time - after 364-378 - ditch A might have been filled in completely with the (relatively clean) earth from the rampart. The two parallel ditches in the southwest and south date from the same period at any rate, and bordered a vacant zone. The third period ends with the purposeful filling up of the single period ditch in one operation (up to and including layer 7), and the dumping of

large quantities of settlement refuse and rubble in the ditch near a gate or passage in the wall of the fortification. Finds from the last quarter of the fourth century and the early fifth century and later in layer 8-9 point to the incidental re-use and/or demolition of the former fortification site (phase 4-5).

Ditch B intersecting ditch A might have been constructed during this period to replace ditch A or as temporary provision. Trench D must be considered as a still later feature.

5.5 SYNTHESIS AND INTERPRETATION (BY J.H.F. BLOEMERS & J.R.A.M. THIJSSSEN)

5.5.1 Introduction

This paragraph discusses the insights gained in the previous sections on the fourth century defence systems around the Valkhof in relation to the general development of the late Roman occupation at Nijmegen.³⁸¹ In addition the data now available for activities during the subsequent 350 years are presented to prepare the ground for the discussion in the next paragraph of the problem of continuity from the late Roman to the early medieval period in Nijmegen.

5.5.2 The defence system in relation to the fourth-century topography and occupation of Nijmegen

Until the last part of the third century AD, the centre of the occupation at Nijmegen consisted of the great urban settlement which extended west of the outwash plain along the south bank of the Waal. Recent investigation along the Waal embankment at the foot of the outwash plain between Grotestraat and Voerweg has convincingly shown that it was occupied too in the second and third centuries; the erosive action of the post-Roman Waal has, however, made it impossible to determine the size of the settlement more precisely. Between both these settlements the great cemetery of Hees extended at the foot of and partly across the western foothills of the outwash plain, also attaining its greatest size in the second and third centuries. No settlement remains dating from this period which are of any significance have been found up to now on the adjoining part of the outwash plain.³⁸²

³⁸¹ This paragraph is a slightly altered version of the earlier publication Bloemers & Thijssen 1990.

³⁸² Willems 1984, 102-107. See also Willems & Van Enckevort 2009, 24-28 and Fig. 7-8 and 98-102.

The beginning of the fourth century is characterized by a complete revision of topography in Nijmegen. The centre of occupation was moved to the area on the Valkhof and surroundings, approximately where it had been between in the first century. The nucleus was formed by a fortification in the Valkhof area, which took up a 2.75 to 4 hectare area and was surrounded by the multiperiod and single period ditch system. It must have undergone several great changes, at any rate as far as the size and nature of the defensive works were concerned during the fourth century. The first construction with the multiperiod ditch can cautiously be dated to about AD 325-330 or earlier and may have had a surface area of 130 x 200 m (2.6 hectares). Before c. 350 AD it was transformed in a larger construction of 110-150 x 250 m at least (at least 4 hectares) with a wall which probably was built of stone, at least partially, and which was surrounded by the large single period ditch. This ditch must have been partially filled in in one intentional operation before AD 380-385. What remained was a shallow bowl-shaped ditch which may have served as a defence of the fortification. This most recent construction may have existed until the beginning of the fifth century; the upper fill of the ditch contained finds which may date until c. AD 420.

Around this nucleus lay a 40-90 m vacant zone enclosed by two ditches. The course of this system of two parallel ditches apparently determined the location and form of the great cemetery in the present centre of the city of Nijmegen, which was brought into use at the beginning of the fourth century and may possibly be the late Roman extension of a cemetery from the second and third century which was situated a little further west. The location of the smaller contemporaneous cemetery in the east was determined by the presence of a road, which came into use at the beginning of the first century and which still played a part in the topography of that area about three hundred years later. The south side of the single period ditch lies approximately 25 m north of the western continuation of this road. From the south it must have led from Nijmegen to North Limburg, but its course in the vicinity of the Valkhof is unknown even in earlier periods. There are only three possibilities in this area of projecting the

course of a road from the outwash plain to the bank of the Waal: via the erosional valley of Grotestraat, that of the Lindenberg or that of Terwindtstraat. The first and last run outside the two parallel ditches; the second lies within the area enclosed by the single period ditch, but in the extreme west of it. This could mean that there was a gate right in the southwest corner of the fortification. However, if the gate had been near the middle of the south side, as was customary, the road must have curved sharply inside the fortification in the direction of the Lindenberg. The concentration of finds near the presumed middle of the single period ditch which has already been discussed supports the argument for the location of a gate at this spot. It is, theoretically, possible for the road from the south to have forked outside the fortification, and for the side road to have run around the two parallel ditches and along the cemetery in the modern city centre via the valley of Grotestraat to the Waal, and for the main road to have led into the fortification and linked up with the bank of the Waal via the Lindenberg. The road from the east could then have joined up with the continuation of the road from the south in the vacant zone between the two parallel ditches and the single period ditch.

The excavations along the Waal embankment between Grotestraat and the Lindenberg at the foot of the outwash plain have yielded large quantities of material from the fourth century AD which is concentrated to the north of the Roman wall running east-west. The fact that there must have been at least an embankment with mooring and storage facilities along the bank of the Waal to serve the fortification on the outwash plain seems obvious. However, the relation between the two parallel ditches on the outwash plain and the supposed settlement on the Waal embankment is still a mystery. In 1985 it was established that 'two pointed ditches west of the Besiendershuis, which had previously been observed up on the plateau of the Eiermarkt, descended the hill perpendicular to the river, appeared to curve round the end of the wall at the bottom of the hill, and, having crossed Steenstraat, continued in an easterly direction and finally faded away in the direction of the river'. This might imply that here (part of) the fourth century finds are not contemporaneous with the two ditches

north of the east-west wall. The same might then also apply to the system of the two parallel ditches and the fortification on the outwash plain and the fourth century finds on the Waal embankment.³⁸³

The two cemeteries from the fourth century contained an estimated 1500 and 850 inhumation burials giving an estimated population been about 460 and 230 on average.³⁸⁴ The total number of 690 persons gives an indication of the size of the settlement as a whole. Steures however estimates the number of burials between 650 and 1590 and a total population of over 1300.³⁸⁵ A group of relatively late graves in the smaller cemetery to the east stands out from the rest because of its deviant pattern of grave gifts, the direction of burial and features normally attributed to Germanic soldiers in Roman military service.³⁸⁶ In the larger cemetery in the southwest too there are in a few cases definite indications of the Germanic origin of some of the dead.³⁸⁷ It is questionable whether the existence of two separate cemeteries was due to the fact that there were two types of settlement, military and civilian, or two social or ethnic groups, Germanic and Roman for example, or whether it was just arbitrary.³⁸⁸

5.5.3 Generalization of some morphological aspects of the fourth-century defence system at Nijmegen

To gain a clear insight into the form of the fourth-century defence system at Nijmegen it is necessary to compare several aspects of it with more or less contemporaneous fortifications elsewhere. The form and dimensions of the single period ditch and the absence of any interruption in it, the position and construction method of a rampart or wall inside this ditch, the existence of the system of two parallel ditches with a wide vacant zone around the fortification itself and the surface area of the fortification all deserve attention. It should be mentioned that the information available is somewhat insufficient and is influenced by the varying state of excavation, dating problems and functional differences between urban and military defence systems. A survey of the state of research and views on various regions and categories of fortifications in Gaul, Germania and Britain can

Table 5.16 Widths and depths of ditches from various forts.

Findspot	Width (m)	Depth (m)	References
Xanten CUT	12	3	Rüger 1979
Qualburg	16	?	Von Petrikovits 1937
Cologne-Deutz	12	3	Precht 1980
Oudenburg III	20	?	Mertens & Van Impe 1971
Maastricht	9	?	Panhuysen 1984, 56

Table 5.17 Widths of the verge between the wall or towers and ditches from various forts.

Findspot	Width (m)	References
Xanten	4 m	Rüger 1979
Krefeld	6.5-18.5 m	Pirling 1986, 19 Abb. 13
Cologne-Deutz	30 m	Precht 1980
Cuijk	5-7/14-15 m	Bogaers 1967
Maastricht	6 m	Panhuysen 1984, 56

be found in Von Petrikovits, Johnson, Maloney & Hobley, Crickmore and Gilles.³⁸⁹ The choice of examples is mainly restricted to Germania Secunda and Belgica Secunda.

Common sizes for ditches and military fortifications from the first and second century AD are a width of 2.5 to 6 m and a depth of 1.2 to 2.7 m.³⁹⁰ Ditches which are considerably wider and deeper are no exception in the fourth century (Table 5.16).

The absence of an interruption in the ditch for a gate was established in Xanten on the west side and in Cologne-Deutz on the east side; in Xanten even traces of a bridge construction over the ditch were observed.³⁹¹

The position and construction method of a rampart or wall round the fortification may vary as the width of the verge between the wall c.q. towers and the ditch does (Table 5.17).

Ramparts were constructed both of timber and earth as well as of stone. An example of the first method is the rampart of the first fort at Cuijk (phase 1; from the days of Constantine I) consisting of three rows of wooden posts and piled turves.³⁹² Examples of the second method of construction are fairly common (Xanten, Krefeld, Cologne-Deutz, Cuijk phase

³⁸³ Van Tent 1973, 131-134; Jaarverslag ROB 1985 (1986), 52-53.

³⁸⁴ Bloemers 1983b, 193-195 and 1986a, 124.

³⁸⁵ Steures 2013, 405-406.

³⁸⁶ Bloemers 1983b, 193-198 and 1986a.

³⁸⁷ Böhme 1974, 285-286; Bloemers, Greving & Zoetbrood 1979, 64-68; Bloemers 1986a.

³⁸⁸ Willems & Van Enckevort 2009, 146 suggest that the deceased [of the eastern cemetery] used to live in the nearby Frankish settlement at the corner of St. Canisiussingel and Berg en Dalseweg. This settlement area has not been mapped on our Figure 5.1.

³⁸⁹ Von Petrikovits 1971; Johnson 1976; Maloney & Hobley 1983; Crickmore 1984; Gilles 1985a.

³⁹⁰ Johnson 1983, 47-48.

³⁹¹ Rüger 1979, 507; see also Otten & Ristow 2008.

³⁹² Bogaers 1967, 111.

2, Asperden, Oudenburg III, Maastricht, among others). In many cases new building materials were used; the re-use of fragments of older buildings which had been pulled down seems to have occurred especially in civilian contexts.³⁹³ The width varies from 1.50 m in Cuijk to 3.40 m in Cologne-Deutz.

The construction of the system of two parallel ditches outside the single period ditch with a wide vacant zone in between is a phenomenon which is not familiar in the northwest of the Roman Empire. A construction which can best be compared with it was discovered during the excavation of the late Roman fortification at Krefeld. At a distance of about 100 to 170 m outside the ditch of the fourth-century fortification there is a second ditch which encloses a probably polygonal area of about 8.5 or more hectares. As far as is known, there is no contemporaneous settlement or burial in the intermediate zone.³⁹⁴ At Heerlen two parallel ditches were dated to the fourth century; the distance between them measures about 64 m. In general, this kind of outwork found some distance from the central defence zone and with no features or finds worth mentioning in the intermediate zone will very easily escape the attention of the investigator. It can therefore be assumed that they occur more frequently than would appear from the above examples. The construction of very wide and deep ditches, the layout of wide verges between wall and ditch and of deep vacant zones combined with ditches pushed far forward can be linked with new concepts of defence. This brings to mind in particular the use of different forms of weapons with greater precision and range than in former days. The changes in construction of the walls of late Roman fortifications with projecting towers supports this. The need for this kind of technological adaptation need not primarily be attributed to the increasing Germanic attacks, but may rather be connected with the countless military operations of rebelling Roman troops: for they, just like the defenders, had an extensive knowledge of siege and the use of heavy weapons and tools.³⁹⁵

A comparison of the surface areas of other fortified settlements which are surrounded by the innermost ditch may provide a better understanding of the relative significance of the fortification at Nijmegen (Table 5.18). The surface areas of Xanten and Tongeren stand

Table 5.18 Surface areas of various forts.

Findspot	Surface area (ha)	References
Xanten CUT	12.7	Rüger 1979
Krefeld	min. 1.3	Pirling 1986, 19 Abb. 13
Cologne-Deutz	1.8	Precht 1980
Cuijk	1.5	Bogaers 1967
Maastricht	1.5	Panhuyzen 1984, 60
Oudenburg	2.4	Mertens & Van Impe 1971
Tongeren	41.2	Vanvinckenroye 1975

out from the rest, probably because these were primarily fortified towns. Compared with the obviously military fortifications of Krefeld, Cologne-Deutz, Cuijk and Oudenburg, the fortification at Nijmegen with its surface area of 2.75 to more than 4 hectares occupies a prominent position.

On the basis of the above comparison, it can be established that the Nijmegen fortification links up, as far as form and construction are concerned, with what is known at the moment about other fortifications in *Germania Secunda* and *Belgica Secunda*. From its size, it may be assumed that it was a relatively important fortification. Naturally the fact cannot be excluded that part of the civilian population was also housed inside the fortification, and that therefore the surface area was greater than that of a purely military fortification. The drastic levelling of the single period ditch does not support any continuity of settlement, which one would expect in the case of a civilian settlement in about the middle of the fourth century.

5.5.4 Evidence of habitation in Nijmegen between c. AD 400 and 750

The evidence of habitation in Nijmegen between c. AD 400 and 750 concerns cemeteries as well as house-sites and arable land. These are found in three areas, the Valkhof and immediate surroundings, the town centre and the lower town, and will be dealt with in this order (Fig. 5.16).

Habitation and burial on the Valkhof from the fifth to the seventh century AD

The existence of a fortification from the fourth century on the Valkhof was first discovered in

³⁹³ Blagg 1983, 131-132.

³⁹⁴ Pirling 1986, 26.

³⁹⁵ Von Petrikovits 1971, 197; Baatz 1983, 137 and 139.

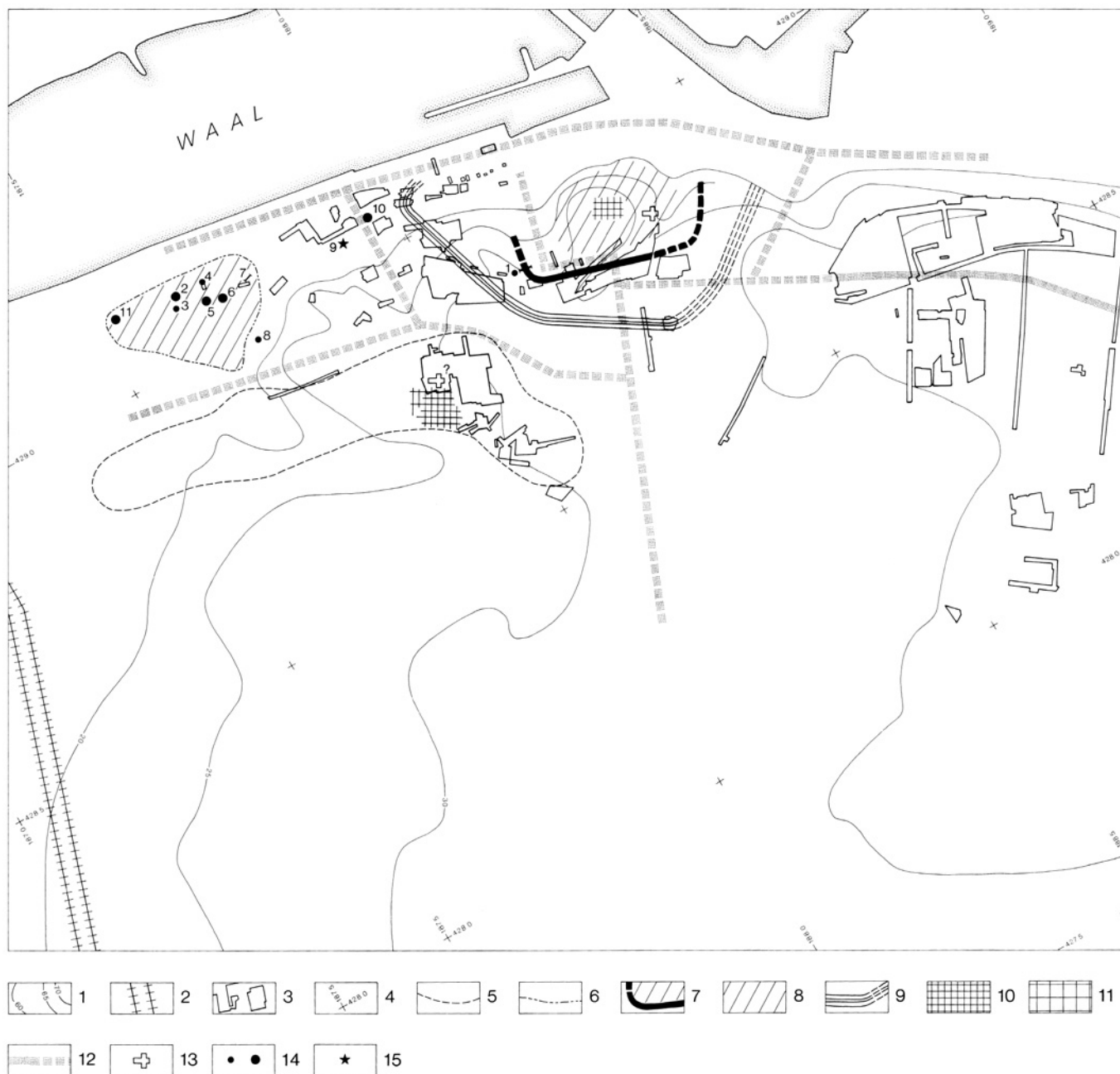


Figure 5.16 Nijmegen: fifth-seventh century topography (see also Fig. 5.1; situation 1982).³⁹⁶ Scale 1:10,000.

Legend: 1. contour lines; 2. railway; 3. excavated areas; 4. topographical coordinates; 5. hypothetical extension of middle Roman-early medieval cemetery; 6. extension of humous sandy layer; 7. ditch enclosing the extensively inhabited area on the Valkhof; 8. inhabited area, not investigated and/or few finds; 9. fourth-century double ditch around investigated and uninhabited area, out of use; 10. cemetery, investigated and/or many finds; 11. cemetery, not investigated and/or few finds; 12. road and hypothetical road; 13. hypothetical early medieval churches; 14. early medieval pottery finds (small dots: less than 5 fragments; large dots: 5 or more fragments); 15. sceatta.

Site numbers: 1. section of large ditch at the Lindenberg (see Fig. 5.1 no. 7); 2. Oude Haven; 3. Oude Koningstraat; 4. Korte Brouwerstraat; 5. Oude Haven/Korte Brouwerstraat; 6. Vinkegas; 7. section Priemstraat (Fig. 5.20); 8. Ganzenheuvel; 9. sceatta; 10. Grotestraat; 11. Oude Havenstraat.

³⁹⁶ For a more recent overview Hendriks et al. 2014, 44.

188.151/428.854

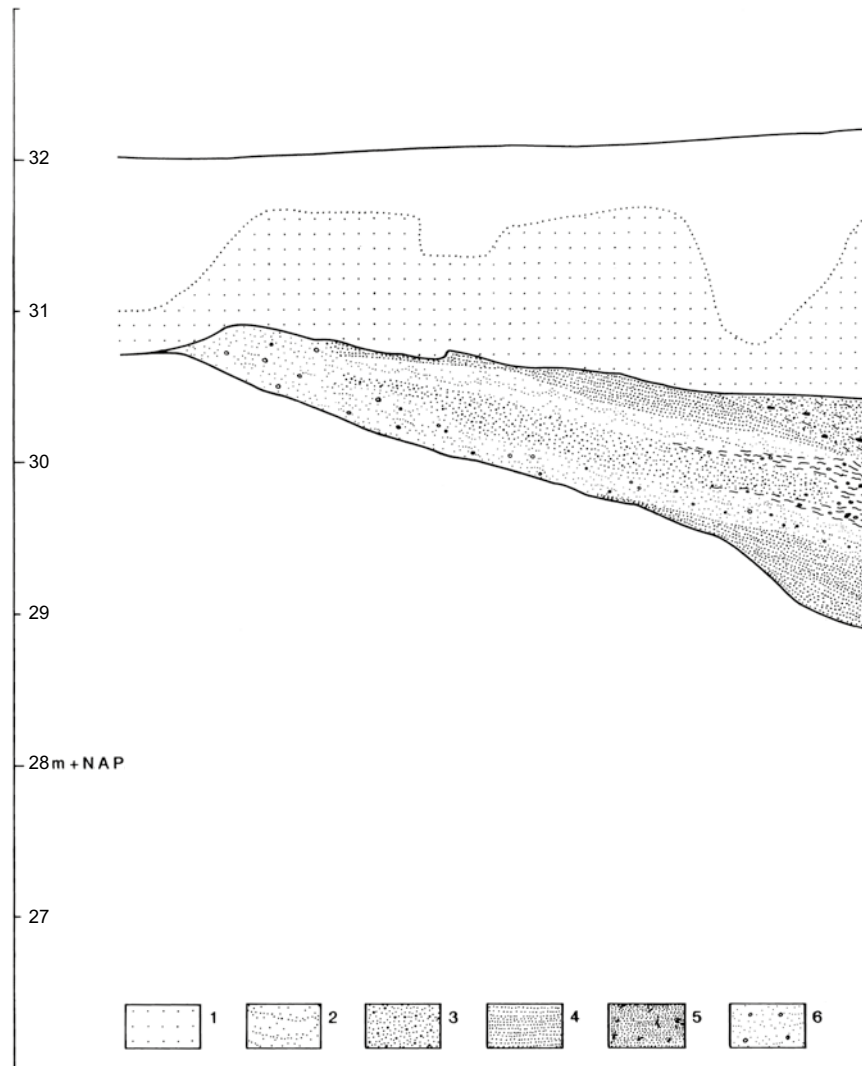


Figure 5.17 Nijmegen. Section of the single period ditch at the Lindenberg (Fig. 5.1 no. 7). Scale 1:50.

Legend: 1. topsoil; 2. clean sandy layers; 3. almost clean soil; 4. slightly humous soil; 5. humus soil with few finds; 6. clean soil with gravel; 7. dark humus soil; 8. finds (pottery, coins, bones etc.); 9. large fragments of finds.

1969, when the great single period ditch was found on the construction site of the Cultural Centre 'De Lindenberg' (Fig. 5.17).³⁹⁷ The ditch was about 14 m wide and came up as far as 5 m under the present surface. The original construction was in use from the first or second quarter of the fourth century until the last quarter of the same century. At about the end of this century a narrow and shallow ditch with a bowl-shaped cross-section was dug in the fill, and the bottom of this ditch lay c. 2.5 m under the present surface.

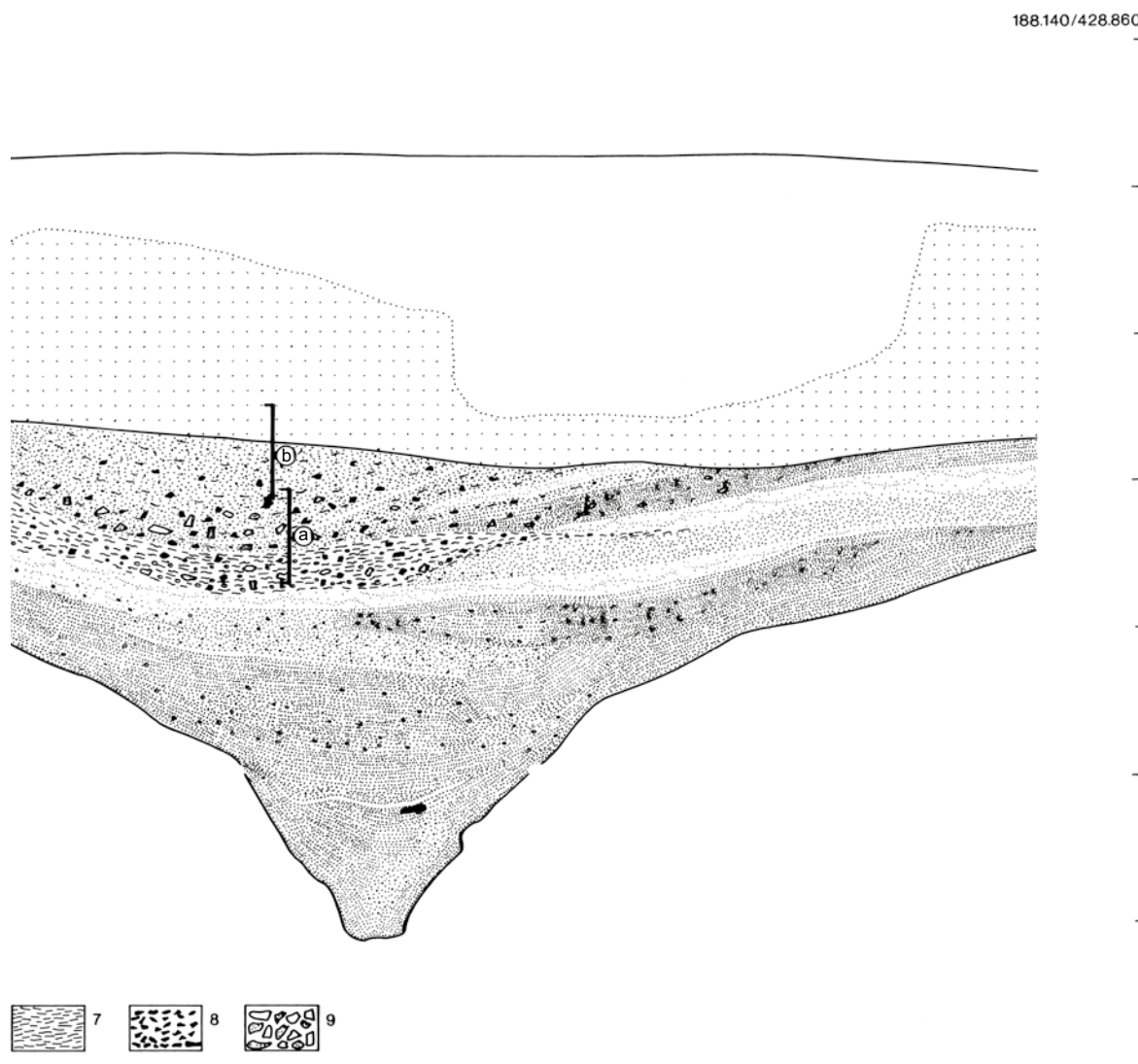
Of the finds which were collected at the time only the coins have been used up to now to

demonstrate that the ditch must have become filled up in about AD 350 (see however Section 5.4 for a later date); no attention was paid to the pottery by Haalebos.³⁹⁸ However, intensive examination of this group of material has now proved that this dating should be drastically revised.³⁹⁹ The finds described below (Fig. 5.18) come from the fill of the shallow bowl-shaped ditch (a), a darkcoloured (arable?) layer above it (b), from the large ditch as a whole without further specification of the position (c) and from the building excavation near the course of the large ditch (d). In order to classify the finds typochronologically, use was made of

³⁹⁷ Bogaers 1969.

³⁹⁸ Bogaers 1974, 78; Haalebos 1976, 205; Willems 1984, 146-148.

³⁹⁹ Bloemers, Erdrich and Thijssen in this chapter.



two complexes of finds in the surroundings of Nijmegen itself on the one hand: the findspot of Driel-Oldenhof in the Betuwe, which in the late Roman period was probably a military fortification with, among other things, finds from the fifth-eighth century, and the findspot with late Merovingian refuse from a potter's kiln at Ubbergen, near the village of Beek to the east of Nijmegen, where in 814 a 'villa Becki' is mentioned. On the other hand the typochronological classification of Nijmegen, Driel-Oldenhof and Ubbergen is based on data from the Moselle (Böhner's typology) and Middle-Rhine area (typology Alzey findspot).⁴⁰⁰

This is wheel thrown pottery of the Unverzagt 1919 type Alzey 27, 28 and 32/33, Böhner 1958 type D 912 and handmade ceramics.⁴⁰¹ The cooking-pot with lid groove Unverzagt 1919 type Alzey 27 is represented by the late Roman variant Unverzagt 1919 type 27e⁴⁰² with a sickle-shaped rim in Mayen fabric (from c), which according to L. Bakker appears shortly before the last quarter of the fourth century.⁴⁰³ Two early medieval specimens in rough-walled and finely-sanded red fabric from the fifth-sixth century were found in layers a and b respectively (Fig. 5.18 nos. 1970/49 and 70).⁴⁰⁴ From this shape the so-called lantern-shaped

⁴⁰⁰ Unverzagt 1919; Böhner 1958; Oldenstein 1986.

⁴⁰¹ Willems 1981, 163-182 and 1984a, 324-325.

⁴⁰² Von Petrikovits 1937, 333-334.

⁴⁰³ Bakker 1981a, 249 and 1981b, 335.

⁴⁰⁴ Willems 1981, 167-168 and Fig. 41.1-6.

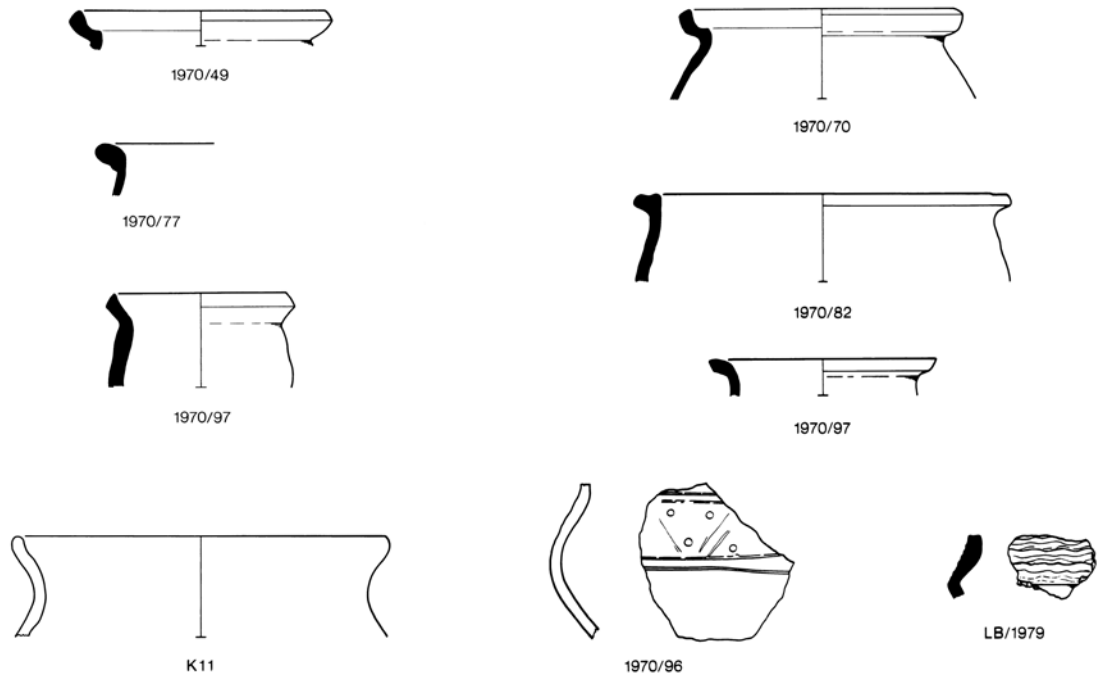


Figure 5.18 Nijmegen. Late Roman and early medieval finds from the single period ditch at the Lindenberg.

pots developed, which can roughly be dated to the seventh-eighth century.⁴⁰⁵ The rim-shape however is also found in cooking-pots of the type Böhner 1958 type D 912, which will be discussed later. One fragment of this was found in layer b (Fig. 5.18 no. 1970/82), which is quite similar, as far as fabric is concerned, to several rims from the kiln refuse at Ubbergen.⁴⁰⁶ The best dating for this fragment would appear to be about AD 700. Two specimens of the bowl Unverzagt 1919 type Alzey 28 in its late variant ‘mit überquellendem Rand’ from the first half of the fifth century were found in c and d.⁴⁰⁷ Also from c is the rim of a cooking-pot Unverzagt 1919 type Alzey 32/33 (Fig. 5.18 no. 1970/77) which is mainly found in the first half of the fifth century but which may also occur at the end of the fourth and in the second half of the fifth century.⁴⁰⁸ Willems regards the occurrence of this type (=Willems’ type 3) as an important indication of occupation in the fifth century.⁴⁰⁹ The Böhner 1958 type D 912 cooking-pot typochronologically represents the most recent material, but following Willems’ example it was decided not to classify this group further within the overall period of use from AD 450 to 750.⁴¹⁰ Several rims from layer b are related in shape and fabric to the kiln refuse from

Ubbergen (Fig. 5.18 no.1970/97). On the basis of fabric, about twenty wall fragments from layer b can be included in this group or the early medieval variant of Unverzagt 1919 type Alzey 27e, of which only the later forms are found in this fabric. Some base fragments and the odd wall sherd were included in the group, but are of different workmanship. One wall fragment comes from a biconical pot (Böhner 1958 fabric B).⁴¹¹ During the laying of cables in 1979 a wall sherd with horizontal combed decoration (Böhner 1958 fabric D) like that also found on spouted pots in the kiln refuse at Ubbergen, was found in layer b (Fig. 5.18 no. LB 1979). The handmade pottery is in general difficult to date precisely in the late Roman to early medieval period. A decorated sherd with grooves and dents from c has counterparts north of the Rhine (Fig. 5.18 no. 1970/96).⁴¹² Two wall fragments stand out because of tempering with shell grit. This kind of pottery is usually referred to as Carolingian⁴¹³, but was found in the eastern river area in Resen and in Elst in a context which was definitely late Roman.⁴¹⁴ Decoration with finger and nail impressions on the rim and shoulder of this type of pottery shows a similarity to finds from the Veluwe, Overijssel and especially Westphalia.⁴¹⁵ There is a high degree of similarity between

⁴⁰⁵ Van Es 1964, 267-268.
⁴⁰⁶ Willems 1981, 126 (site 420), 135 and 177.
⁴⁰⁷ For the further evolution of the type: Bakker 1981a, 249 and 1981b, 335; Oldenstein 1986, 337 and especially Abb. 17.
⁴⁰⁸ A good parallel was found in Echternach: Bakker 1981b, 335 and Abb. 246.40.
⁴⁰⁹ Willems 1981, 168-170.
⁴¹⁰ Willems 1981, 177-178.
⁴¹¹ Böhner 1958, 37; Willems 1981, 171.
⁴¹² Van Es 1967, 278-280: decoration IXB3 and IXC1, but in combination. See also Von Uslar 1970, Taf. 36.10.
⁴¹³ Hübener 1959, 96-98 and 166-167 (Aufriss 8); Van Es & Verwers 1980, 59 fabric H-2 and 144-146.
⁴¹⁴ Bloemers & Hulst 1983, 148 Anm. 65; also possibly in Oss-Eikenboomgaard: Verwers 1983, 49-51 and Afb. 44.3; Elst-Galgenplek: Tuyn 1987, 25 and afb. 2. See also Bennekom: Van Es, Miedema & Wynia 1985, 595 fabric b.
⁴¹⁵ Van Es, Miedema & Wynia 1985, 599-603 Type IIB (dating AD 50-250/300); Van Es & Verlinde 1977, 52, 1.2.15 and note 44 and 54 Fig. 39, but without shell temper (personal communication A.D. Verlinde); Von Uslar 1970.

these observations at 'De Lindenberg' and what is known of the late Roman fortification at Schneppenbaum-Qualburg. At the last findspot a ditch with a bowl-shaped cross-section was excavated in 1937, in which rim fragments of the Unverzagt 1919 type Alzey 27e and even Unverzagt 1919 Alzey 32 were found in the layers from level 2d and possibly from level 2b and above.⁴¹⁶

Taking into consideration the number of sherds from the construction site of 'De Lindenberg', the question arises whether similar finds were also discovered in other parts of the ditch. In 1946 H. Brunsting dug several trenches on Kelfkensbos, and on the basis of the finds it can now be assumed that he cut into the upper fill of the single period ditch. The later archaeological material contains some Merovingian and Carolingian sherds.⁴¹⁷ During the investigation of 1979-1981 some finds were also discovered, but these consisted only of a small number of wall fragments from pots of the Böhner 1958 type D 912 type, and a rim from a *Kugeltopf* tempered with shell-grit, which were collected from soil discarded during excavation (Fig. 5.18 no. K11). The fact that there were so few finds is undoubtedly connected with the method of excavation. The highest and most legible excavation level was roughly on a level with the bottom of the shallow bowl-shaped ditch. This means that most of the fill together with the humus (arable?) layer above it (b) and the topsoil was removed by machinery. It is true that finds and samples were taken from the profiles, but the walls were so high that the highest levels were not easy to reach. The already scarce material from the fifth-seventh century thus almost entirely escaped notice.

From the Valkhof itself important evidence from earlier investigations is also available.⁴¹⁸ The rouletted sigillata from J.J. Weve's excavations in 1910 and 1911 can be found with W. Unverzagt⁴¹⁹ and listed in Hübener's classification of groups (Table 5.19).⁴²⁰

Of these the stamps from groups 4, 6 and 8 (?) certainly date from the late fourth or beginning of the fifth century.⁴²¹ Revised determination of the coarse pottery from J.J. Weve's excavations in 1910 and 1911 showed the occurrence of, among other things, late variants of the Unverzagt 1919 Alzey 27e forms in Mayen fabric

Table 5.19 Nijmegen. Valkhof: classification of rouletted sigillata from the excavations in 1910 and 1911 according to Hübener 1968.

Hübener group	Number
1	2
2	1
3	3+2 ?
4	2
5	6
6	2
7	-
8 (?)	1 (stamp 178)
rest	1 (stamp 167)

and Unverzagt 1919 Alzey 28, and an Alzey 33 rim dating from the fifth century (Fig. 5.19).⁴²² The coins of Arcadius and Honorius which Daniëls dated between AD 388 and 395 support this. H. Brunsting's observations on the Valkhof in 1946 also produced Merovingian and later pottery.⁴²³

The dating of several finds belonging to the six skeletons discovered by Weve is of particular significance. Two saxes from two graves and two bronze ornamental studs on one of the sheaths give a dating from between c. 620-630 and 670-680, i.e. Böhner 1958 Stufe IV (seventh century).⁴²⁴ Leupen is of the opinion that in about AD 600 a church belonging to the Frankish king and dedicated to St Stephen was founded on the Valkhof, and shortly after or at the time of bishop Kunibert (AD 623-c. 650) but at any rate before AD 630, it came into the possession of the bishop of Cologne.⁴²⁵ In this case it is remarkable that these graves were not dug until the parish church had been built in the immediate vicinity. The site of the parish church can be located near the present Voerweg. It was pulled down in AD 1249 for the construction of the fortification of the Valkhof castle.

The cemetery in the town centre

During the excavations hardly any evidence was found from the fifth-seventh century AD in the region of the fourth-century cemetery in the town centre (Fig. 5.1 no. 5).⁴²⁶ Since the area was inhabited during this period and there was a series of graves which did not contain

⁴¹⁶ Von Petrikovits 1937, 337-339 and Taf. 77. The finds complex is younger than can be expected on the basis of the dating of the coins.

⁴¹⁷ We thank S.L. Wynia, who made the finds available to us for study.

⁴¹⁸ Daniëls 1921. See also Van Enckevort & Thijssen 2000, 15-17 and Thijssen 200a, 454.

⁴¹⁹ Unverzagt 1919, 35; Nijmegen-Valkhof with change of stamp no. 93 for 95 and no. 157 for 159.

⁴²⁰ Hübener 1968.

⁴²¹ Schallmayer 1987, 492.

⁴²² Oldenstein 1986, 337.

⁴²³ Thijssen 1980, Afb. 1.

⁴²⁴ Thijssen 1980, 13; Ypey 1983. It is probable that the beads and bronze ring which were thought to be lost and which came from graves were in fact preserved (Museum Het Valkhof; Museum G.M. Kam Collection Gem. Nijmegen box 42). During the demolition of the Valkhof another 'Frankish' jug was found in 1797 (Abeleven & Bijleveld 1895, 4:5).

⁴²⁵ Leupen 1979; Leupen & Thijssen 1980, 687. See also Hendriks *et al.* 2014, 56-57.

⁴²⁶ Brunsting 1983, 41: *sceatta* at the top of the grave fill (Lange Nieuwstraat; according to S.L. Wynia a second *sceatta* was found there. At the ROB excavation in Lange Nieuwstraat in 1979 several fragments of biconical pots were found.

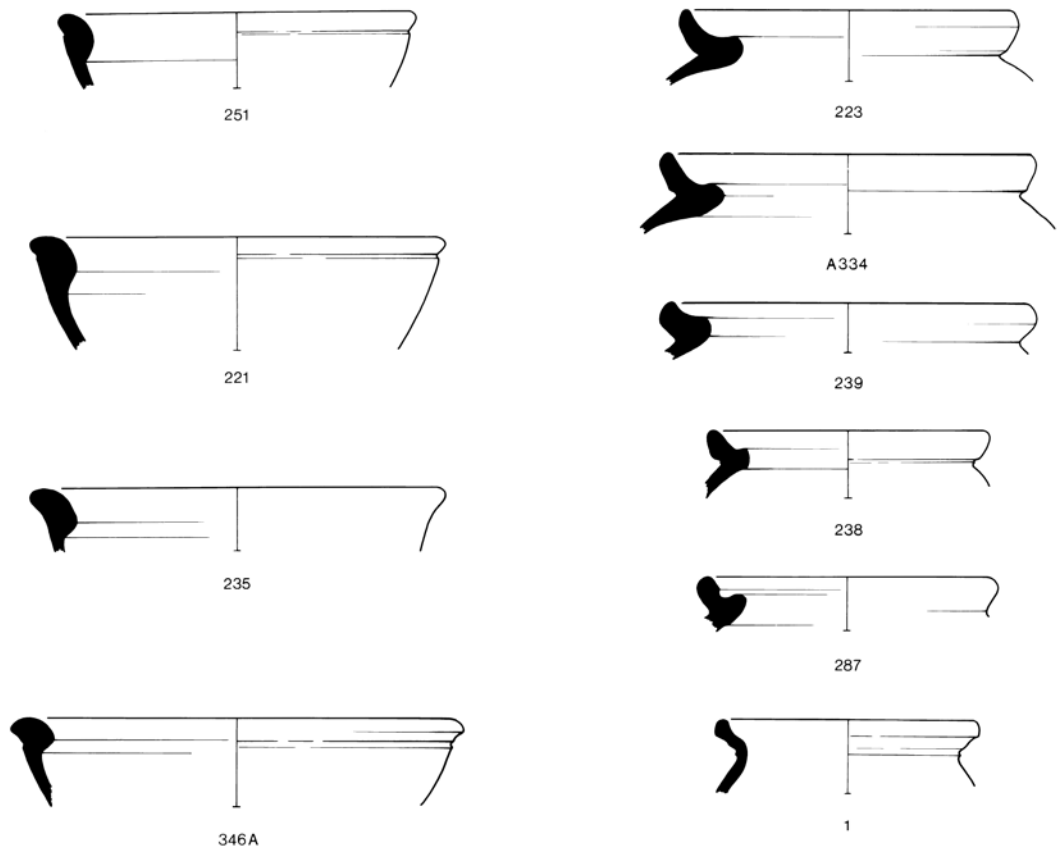


Figure 5.19 Nijmegen. Late Roman finds from earlier excavations in the Valkhof area.

gifts and which cannot therefore be dated more precisely, it may be assumed that some of them originate from the fifth century. Moreover there are indications from various observations that burials did take place in the immediate vicinity in the early Middle Ages as well. From 1945-1948 and later complete biconical pots and fragments of these were found to the east of Broerstraat.⁴²⁷ This pottery can be dated from the beginning of the sixth until the eighth century. One of the most recent specimens bears a strong resemblance to the kiln refuse from Ubbergen.

Settlement in the lower town

The term 'lower town' refers to the area at the foot of the outwash plain and along the Waal. The recent and extensive investigation of the habitation along the Waalkade near the Valkhof has produced so few finds and occupation traces from the fifth-seventh century that one can hardly speak of constant habitation. The activities of the Stichting Stadsarcheologie Nijmegen have drawn

attention to the significance of the area west of the Ganzenheuvel and Priemstraat. In 1979 Merovingian finds were discovered near Priemstraat in an arable-like humus layer 0.80-1 m thick consisting of dirty sand which became more humous towards the top (Fig. 5.20). A profile further down the slope revealed a soil which was covered by several rather thin layers sometimes of humous sand; on top of this was a raised layer of virtually clean sand on which the burnt remains of a wooden building were found. Further south and higher up the slope the layers of sand became thicker and the red burnt floor of a wooden house lay on the raised layer. The levels above this had been obliterated by the construction of cellars and wells.

On the basis of the pottery found, the arable-like layer there must have been used as farmland in the early thirteenth century. Observations made in the surrounding region show that the arable-like layer extends over an area lying between Lange Hezelstraat, Bottelstraat, Oude Haven and Priemstraat. It therefore covers the northwest slope of the

⁴²⁷ Daniëls 1955, 239-242; Kruysen 1978, 55 and Fig. 1. More finds can be seen in Museum Het Valkhof. See also Enckevort & Thijssen 2000, 24-27 and 2002a, 455-456; Willems & Van Enckevort 2009, 146-147.

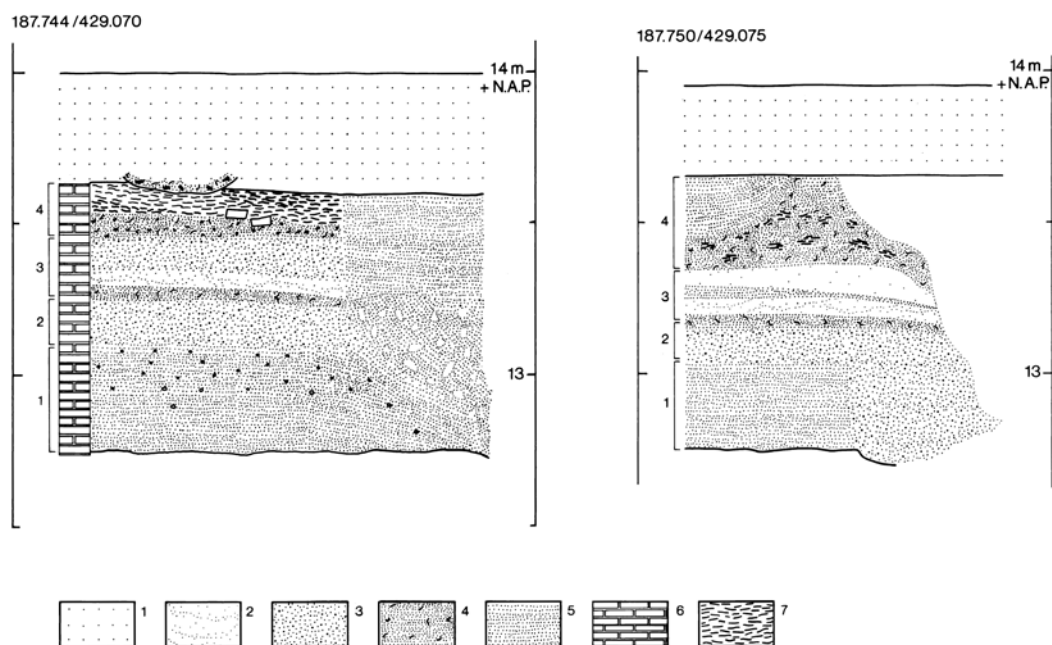


Figure 5.20 Nijmegen. Sections at Priemstraat. Scale 1:25.

Legend: 1. topsoil; 2. clean sandy layers; 3. almost clean soil; 4. humus soil with gravel and/or few finds; 5. dark humous soil; 6. brick; 7. charcoal.

Number of layers: 1. subsoil; 2. humous sandy layer; 3. clean sand, alternating with humous layers; 4. occupation horizon.

outwash plain plateau, which bends away from the river here. The layer varies in thickness from 0.5-1 m. In various places Merovingian pottery was found in the arable layer but no clear archaeological features. This indicates that there must have been a ploughed-up early-medieval settlement here. The pottery consists of fragments of several sherds from handmade pots and from the types Böhner 1958 D 912 mentioned earlier, dating from the six-seventh century (Fig. 5.21). A rim fragment from Oude Havenstraat could be considered as Unverzagt 1919 Alzey 27e type, but a late medieval dating cannot be excluded (Fig. 5.21 OH3).⁴²⁸

Between this area and Grotestraat a *sceatta* was found which is difficult to identify because of its corroded surface, but which nevertheless provides an interesting chronological clue to seventh-century activities. On the east side of Grotestraat the only archaeological feature known until now from this period was observed in a profile in 1981. It is the last remnant of a pit filled with dirty sand which was cut by a more recent pit from c. AD 1200. In the fill of the older pit were some pottery fragments: the rim of a pot of the type Böhner 1958 D 912 and similar to the kiln refuse at Ubbergen as far as

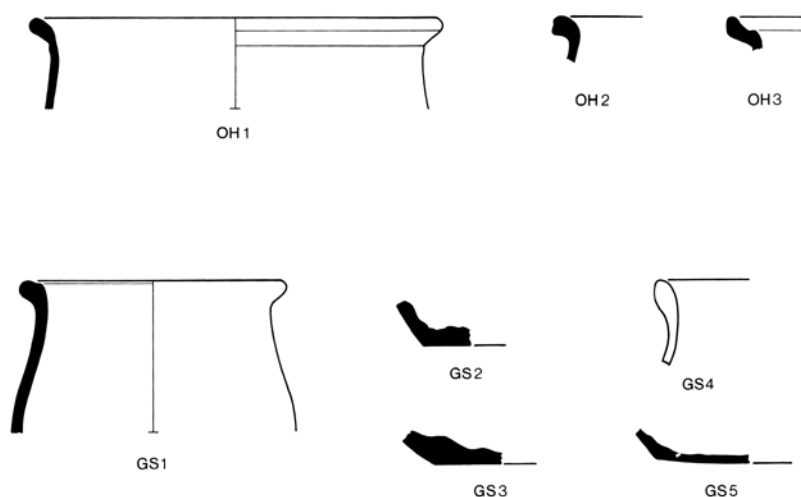


Figure 5.21 Nijmegen. Early medieval pottery from the area with the humous sandy layer (Fig. 5.16 no. 6).

workmanship is concerned, some wall and base fragments of various rough-walled fabrics, a lenticular base of Badorf ware and a rim sherd from a *Kugeltopf* tempered with granite grit (Fig. 5.21 GS1). To date the contents of the pit at about AD 700 is perhaps a little early because of the Badorf sherd, but it is certainly not impossible.⁴²⁹

⁴²⁸ Leupen & Thijsen 1980, 689; Willems 1981, 124 site 401; Thijsen 1982, 9; Willems & Van Enkevort 2009, 102-103.

⁴²⁹ Thijsen 1981, 36-37 and Afb. 18.

5.6 REFLECTIONS ON THE CONTINUITY OF SETTLEMENT AT NIJMEGEN BETWEEN AD 400 and 750

5.6.1 Introduction

The archaeology of the fifth and sixth century AD is a no man's land between two traditional centres of investigation: the archaeology of the late Roman period and the early medieval archaeology, both with a comparative wealth of finds, mainly from cemeteries.⁴³⁰ This no man's land spans a period which is remarkable for its scarcity of archaeological and historical information. Those areas and places where settlement in the late Roman and early medieval period has been discovered or where it may be assumed on the basis of archaeological and historical data hold the answer to a classic problem in (West-)European archaeology and history: the continuity between Roman and medieval settlement.⁴³¹ Classic as the problem of continuity may be, that is how fundamental and topical it is today to the process of change in socio-political systems such as the transition of the northwest part of the Roman Empire into the early Frankish states.

One aspect of continuity is the way in which it is expressed in the organization of settlements and the use of space. Settlements with an urban character or large military fortifications are particularly significant and also therefore the question to what extent did the Roman towns retain their function and form the basis for urbanization in the Middle Ages.⁴³² In Nijmegen too the old theme has again become topical because of the excavations of the late Roman settlement and cemeteries and the medieval town centre.⁴³³

The purpose of this section is by using the relevant archaeological information concerning the continuity problem in Nijmegen and similar data from elsewhere to formulate a model for the formal and actual use of space, which justifies the presupposed socio-economic characteristics of the period in question, and the formation processes there. This model could represent one variant of the different forms of spatial continuity.

5.6.2 Continuity in the late Roman period and the early Middle Ages and processes of formation

The continuity problem in the late Roman and early medieval period

Two related problems are of importance to research into continuity in the late Roman and early medieval period: the way in which continuity was preserved and the formation processes which have influenced archaeological and historical tradition.

The transition from the late Roman to the early medieval period and the great changes which accompanied it are more than just a chronological problem. Continuity is really the product of human behaviour and human communities. The root of the problem is the measure and nature of the continuity between 'late Roman' and 'early medieval' communities; in the Rhine and Meuse area these communities form part of the Roman Empire of the fourth century and the early Frankish state of the late fifth and sixth-seventh centuries AD.

From this definition of the problem the term 'continuity' can be described as 'change and persistence expressed by phenomena that are historically and empirically related to one another'.⁴³⁴ Starting from this definition the criteria for our continuity problem can be more closely specified: there must be a chronological and historical connection, there must be a connection between inhabitants and settlement even though these may change ethnicity or location⁴³⁵, and there must be a functional connection. The continuity of towns or central places should therefore also and in particular imply the functional continuity as a town as well as the chronological and spatial aspect.⁴³⁶

The developments from the fourth to the eighth century in Nijmegen can only be understood if they are set against the background of developments in the Rhine and Meuse area as a whole. In the first half of the fourth century the greater part of this area, if situated left of the Rhine, belonged to the Roman province of Germania Secunda. This was subdivided into four administrative units, *Civitas Batavorum*, *Civitas Traianensium*, *Civitas Agrippinensium* and *Civitas Tungrorum*.⁴³⁷ The second and third-century capitals of Nijmegen, Xanten, Cologne and Tongres also served as administrative centres of the *civitates* in the fourth century.

⁴³⁰ This paragraph has been previously published in a different form as Bloemers & Thijssen 1990.

⁴³¹ Böhner 1959, 85-88; Blok 1981, 143-148; Werner 1979, 11.

⁴³² Von Petrikovits 1959 and 1965; Ennen 1972, 29; Schönberger 1973; Kunow 1994.

⁴³³ Van Enckevort & Thijssen 2014, 39-41.

⁴³⁴ Dunnell 1980, 38.

⁴³⁵ Janssen 1976, 41.

⁴³⁶ Ennen 1970, 161. See also Wolff 1991, 291-293.

⁴³⁷ Von Petrikovits 1980, 217.

The Civitas Cananefatum and its capital of municipium A(elium/urelium) Cananefatum is the only one whose continued existence in the fourth century is doubtful. In the meantime it has been established that the Rhine formed part of the Roman border defences as far as its estuary in the North Sea until the second half of that century at least.⁴³⁸ In Germania Libera on the other side of the Rhine and in particular in the Pleistocene areas between Lippe, Eems, Vecht and IJssel and adjoining regions a coalition of tribes formed at this time, referred to in historical sources as Franks. They include the tribes of the Chamavi, Chattuarii, Bructeri, Sallii and Amsivarii. It was these Franks who entered into a dualistic relation with the Roman Empire. On the one hand they were a political and military threat to the safety of the Roman province of Germania Secunda, and on the other hand they contributed towards maintaining Roman authority in the northwest border region of the empire by cooperating politically with the *imperium* and by being incorporated in the Roman army.⁴³⁹ This even led to the actual settlement of the Sallii in the territory of the Civitas Batavorum in the second half of the fourth century, forming the basis for the formal continuation of authority in the beginning of the fifth century when Rome conceded Germania Secunda. These developments may explain why, at the end of the fourth century, the Civitas Batavorum and the Civitas Traianensium no longer appear in the *Notitia Galliarum*.⁴⁴⁰

The fourth-century province of Germania Secunda forms the basis for the fifth-century region of Francia rinensis, whose nucleus consisted of the pagus Batua and the pagus Hattuaria. The pagi of Hamaland and Borahtra were situated on the right of the Rhine.⁴⁴¹ After the fall in AD 459 of Cologne, it became the seat of the Frankish kings during the second half of the fifth century; the inhabitants of the former Civitas Agrippinensium were referred to in the seventh century as the Ripuarii. Ewig is of the opinion that a political concentration identical to that in the territory of the Salian Franks in former Belgica Secunda was found in Francia rinensis during the second half of the fifth century. In about AD 510 Francia rinensis was absorbed into the expanding kingdom of the Merovingian Frankish kings and thus shared in the development of this early state.⁴⁴² Some important manifestations of the political

development in this period are coinage and fiscal and ecclesiastical organization. In the course of the sixth century the Merovingian kingdom made itself known by depicting its own king on coins and by mintage in the name of its own mint masters; Nijmegen is thought to have been one of the minting places.⁴⁴³ The Frankish kings acquired the rights of the Roman state and *fiscus*. In this way the territories of former Roman towns and military fortifications came into their possessions as royal estates.⁴⁴⁴ At this time the Frankish kings were being converted to Christianity; this gave an incentive to the expansion of ecclesiastical organization, in which Cologne as well as Tongres were to play an important part as episcopal sees. By about AD 600 the diocese of Cologne had spread to Xanten and Nijmegen, and in AD 625 to Utrecht.⁴⁴⁵ The inclusion of Nijmegen in a wider political context and therefore in the political, fiscal and religious organization of the Merovingian kingdom provides the foundation for its role as a centre in the Carolingian period and its development into an urban nucleus in the late Middle Ages. Historically and functionally speaking, there is a continuous development from the central position held by Nijmegen in the Roman period at a regional level. What is lacking is the empirical archaeological evidence for the way in which this development in Nijmegen between the fifth and the seventh century found its expression in the use of space.

Formation processes

As far as the question of continuity of settlement in general and of Nijmegen in particular is concerned, it is necessary from the point of view of methodology to determine the factors influencing the availability, usefulness and significance of the archaeological information in the particular situation. This appears obvious but is not yet a matter of course in pre- and protohistory. These problems are usually referred to as 'formation processes'. There are two current descriptions of formation processes, each with its own terminology; the simpler one by Hodder, and the more complicated one by Schiffer. The latter starts from the processual approach to cultures as systems and distinguishes between cultural remains in a systemic context and in an archaeological context. The deciding factor here is whether cultural materials are still part

⁴³⁸ Groenman-van Waateringe 1986; Groenman-van Waateringe & Van Beek 1988; Willems 1984, 291-297.

⁴³⁹ Bloemers 1983b, 183-202.

⁴⁴⁰ Willems 1984, 281-300.

⁴⁴¹ Blok 1979, 11; Heidinga 1987, 174-192 and 1990, 10 Fig. 1.

⁴⁴² Ewig 1976, 487-503 and 1980, 9-17.

⁴⁴³ Blok 1979, 25-27; Ewig 1980, 44-45.

⁴⁴⁴ Ewig 1980, 46-47.

⁴⁴⁵ Ewig 1980, 55-57.

of a behavioural system or not. The behavioural system may be the pre- or protohistoric system which is the subject of investigation, but may also be later cultural systems which come into contact with the remains of older systems, or the modern system including the archaeological investigation itself. Cultural materials are subjected to cultural (c) and natural (n) transformation processes. Cultural transformations 'permit an investigator to specify the ways in which a cultural system outputs the materials that eventually may be observed archaeologically. Only c-transforms can be used to predict the materials that will or will not be deposited by a system'. The natural transformations are natural post-depositional factors like erosion, sedimentation, weathering and the like, which affect the archaeological record after deposition.⁴⁴⁶ Hodder only uses the terms deposition and post-deposition. Depositional processes are determined by human or cultural factors, and post-depositional ones by natural factors.⁴⁴⁷ The meaning of Hodder's twin concepts deposition/post-deposition corresponds therefore with Schiffer's systemic and archaeological context. There are two reasons for giving preference to the more complicated terminology of Schiffer. Firstly, the term 'deposition' evokes associations with the throwing away, placing or burying of movable property, and would appear therefore to exclude immovable constructions such as buildings and roads. This brings us to the second reason. After deposition, movable and immovable objects may again or in some other way find themselves in a depositional process, especially if they are durable or if settlements are inhabited for very long periods of time. Stone buildings from the Roman period in varying states of decay may have been inhabited in a completely different way in the post-Roman period or may have remained a decisive element in the environment; the same remains may subsequently have been exploited in the late Middle Ages as quarries for medieval buildings. In both cases it is a matter of a specific, though later, systemic context in which they each play their own part. Schiffer's interpretation offers more possibilities of naming such variations at different stages of time with their specific contexts.

⁴⁴⁶ Schiffer 1976, 14-15 and 27-28; Bloemers 1991, 144-147.

⁴⁴⁷ Hodder 1982, 47-67.

⁴⁴⁸ Willems 1984, 226-301 *passim*; Willems & Van Enckevort 2009, 19-28.

⁴⁴⁹ Leupen & Thissen 1981, 17-18; Willems & Van Enckevort 2009, 103; Thijsen 2014.

5.6.3 Continuity and formation processes in Nijmegen

Nijmegen as a regional centre down the centuries

For the kind of continuity in the sense of 'change and persistence expressed by phenomena that are historically and empirically related to another' the actual occurrence of uninterrupted occupation is not enough to comply with the demands imposed by the term. It is important to know how and in what way the functional character of the settlement was preserved as well. In the early Roman period Nijmegen first began to take on the role of a regional centre. Insofar as forerunners of such centres in the eastern river area can be identified, they were outside Nijmegen. As a proto-urban regional centre in the first century, Nijmegen bore the name of *Oppidum Batavorum* or *Batavodurum* and still had the character of a town in the making. Its size and facilities were still limited, and there was little administrative and economic integration with the surrounding area. This changed at the end of the first century and in the course of the second and third centuries one can speak of a real town, *Ulpia Noviomagus*, as being the administrative and economic centre of the *Civitas Batavorum*. In the fourth century one can no longer see an urban centre; however, the relative size of the population and the fortified area is such that the settlement is by far the largest in the region. In these four centuries the settlement twice radically changed its location: from the area on the outwash plain around the later Valkhof in the first century to the lower-lying area near the Waal in Hees during the second and third century, returning then to the site on and at the foot of the Valkhof.⁴⁴⁸

For the fifth and the greater part of the sixth century there are no archaeological or historical indications of Nijmegen's position as a regional centre. Not until the end of the sixth century do we see a first sign of the importance of Nijmegen on the increase again in the form of possible mintage. The mentions in historical sources from the last quarter of the eighth century referring to Nijmegen as palace, villa, royal estate and *castrum* change this for good.⁴⁴⁹ In the Carolingian period Nijmegen expanded within the socio-political structure of the time to become a centre of supraregional importance. It does not maintain this position during the

following centuries, but does remain a regional centre. The fact that in AD 1230 Nijmegen received the same rights as other imperial cities can be interpreted as the formalization of its development into an urban centre which had already been completed by then. Nijmegen has had this function up to the present day.⁴⁵⁰ From the above it appears that the period between c. AD 400 and 750 was crucial to the problem of continuity in Nijmegen, especially if the aspect of Nijmegen retaining its position as a centre is considered.

Formation processes in Nijmegen throughout the centuries

In the Nijmegen situation three systemic contexts and one archaeological one play an important role and each has its specific series of formational factors.

The first systemic context dates from the period between the fourth and seventh centuries AD, in which the following formational factors must be taken into account:

1. the differences in size and usage of the space and the material culture by the inhabitants of a settlement with a function within socio-economic systems of varying levels of complexity, such as the imperium, the early state or chiefdom;
2. the use of space and material remains under the influence of actual or formal conditions which are determined by historical developments, such as the presence of buildings, cemeteries and boundaries, or the ideological significance connected with these in the form of rights of ownership or symbolic value. It is possible that stone buildings from a fourth-century fortification may still have existed in the fifth and sixth century, and that some of them were still used, while others served as a source of building materials and yet others functioned as topographical features. The remains of a filled-in ditch may still have been visible, and the location and significance of a late Roman cemetery may still have been known.

The medieval and postmedieval stage of urban development makes up the second systemic context. In the course of this development most of the surface traces will unwittingly have been obliterated. The episode from the thirteenth century on, in which on a large scale

all the Roman stone building remains were systematically and intentionally excavated down to and including the foundations, deserves a special mention. Fragments of tuffstone and tiles were incorporated as materials in the early stone buildings of medieval towns, tuff was ground into trass and limestone from Roman monuments and wall covering was burnt to lime in medieval kilns. The finds which were discovered in the process aroused the first conscious archaeological and historical interest of collectors and investigators.⁴⁵¹

It would be going too far and would not be relevant to describe the formation processes and factors of this context in detail.

The third systemic context is that in which the present modern archaeological research has been conducted. Less decisive than the people and means available was the aim of the archaeological investigation, which determined where the attention was to be focused. In Nijmegen it was mainly on settlement in the Roman period, and since 1979 on that of the later Middle Ages as well; the intervening period which followed the Roman period has never been the object of anything more than incidental and superficial archaeological interest. A second factor may have been the accessibility for archaeological research of the areas in which early medieval settlement might be found. Because of the buildings of the late medieval town, large areas became inaccessible for archaeological research, and the renovation of the town centre after 1980 only altered the situation in the area on both sides of Grotestraat.⁴⁵² However the area in which there were important indications of settlement activity in the seventh century to the west of Ganzenheuvel and Priemstraat remained built over for the most part and has scarcely received any systematic and intensive archaeological attention. What was found has been collected since 1978 by the Stichting Stadsarcheologie Nijmegen and the Bureau Archeologie en Monumenten Gemeente Nijmegen. The fact that the foundations and cellars of the buildings here had not been removed by demolition was an advantage so that the most recent levels of habitation were still there. Finally, there is the way in which archaeological investigation was conducted which may have caused gaps in the settlement and chronology. Occupation levels

⁴⁵⁰ Gorissen 1956, 67-80; Scholtes 1980, 17-18.

⁴⁵¹ Bloemers, Greving & Zoetbrood 1979, 12-14; Thijsen 1987, 2-3.

⁴⁵² Docter 1982; Verheijen 1981.

which are just below the surface and which do not stand out as such are easily removed by machinery without being noticed.⁴⁵³

The archaeological context covers the whole time span from the Roman period to the present day without allowing itself to be further divided. The important factors are the bad conditions of preservation for organic material in the gravel and coarse sand base of the outwash plain and the position of the habitation levels from the fourth to the seventh century and later, which were relatively high up compared with older layers and close to the surface. Habitation on the bank of the Waal must therefore have been a more favourable exception to this because of wetter conditions and cover in the form of thick raised layers of sand. However much has disappeared here due to erosion by the river, which particularly affected the Roman, early medieval and Carolingian layers. On top of the outwash plain there was little need for raising, so that early-medieval surfaces easily fell prey to later activities.

5.6.4 A hypothetical model for the continuity of occupation at Nijmegen

The archaeological, historical and formational data discussed above can acquire significance in a model which makes continuity of occupation at Nijmegen as a hypothesis a reasonable case. The starting-point for this is the influence of the socio-economic structure and the changes which occur in it from the fourth to the seventh century on the nature and extent of habitation and its ability to be recognized archaeologically and historically. Important changes in the socio-economic structure may have taken place in about AD 410, when direct defence of the border along the lower Rhine was abandoned under Constantius III or Iovinus, and between AD 460-476, when Cologne and Trier finally fell into the hands of the Franks.⁴⁵⁴

Until about AD 410 the area around Nijmegen must still have been part of the Roman Empire and must have functioned in the administration and defence of a border zone. Scattered coin finds from the end of the fourth century and the use of both cemeteries up to that point make this quite plausible, as does the location of Nijmegen on the route between

the demonstrably contemporaneous bases from this period at Cuijk and a possible one at Arnhem-Meinerswijk.⁴⁵⁵ The great fortification from the fourth century may have been reduced in size during the last quarter of the same century to a smaller one with a defence, part of which was formed by the shallow bowl-shaped ditch; if the latter fortification was situated on the inner area of its predecessor, i.e. on the present Valkhof, it was completely dug up or hidden under later walls.⁴⁵⁶ It is quite possible that a staple town and specialized trade and crafts district may have been situated along the bank of the Waal and at a bridgehead, which owed their economic existence to the fortification and its garrison. The function of the fourth-century settlement as a military fortification of the border defence was of a specialist nature. The garrison was designed and equipped to carry out military operations. The infrastructure of a fortification with large ditches and defences and housing partly built of stone required to do so was extensive, concentrated, and therefore comparatively lasting. The concentrated form of habitation and the size of the population may have called for special hygienic requirements. Refuse, for example, may have been dumped outside the settlement, so that little remained inside and therefore few pits were dug. Such behaviour considerably reduces the ability of archaeologists to recognize phenomena. The provision pattern of pay, equipment and food was part of a centralized organization on a provincial or even higher level and was to a large extent dependent on production and supply from elsewhere. The coins, the pottery from the settlement and cemeteries and the belt fittings and fibulae from some of the graves illustrate the fact that habitation at Nijmegen was firmly fixed in the provision pattern of the northwest part of the *imperium*. Characteristic of this centralized system are a complex hierarchy, legitimation of authority and force and far-reaching specialization in all sectors of society. Relevant expressions of these are written historical sources, coinage with the relatively precise registration of the ruling monarch, complete or partial monetized economy and a more or less specialized pottery production, all of which provide recognizable leads which are easy to handle chronologically. In the case of Nijmegen all this implies that

⁴⁵³ Bloemers, Greving & Zoetbrood 1979; Jaarverslagen ROB 1979-1986 s.v. 'Project Oostelijk Rivierengebied (en Maasdal)' and 'Project Urbanisatie in het Nederlandse rivierengebied tijdens de Middeleeuwen'.

⁴⁵⁴ Von Petrikovits 1980, 274-281; Ewig 1980, 9-12.

⁴⁵⁵ Willems 1984, 296.

⁴⁵⁶ For the absence of foundation trenches and very shallow foundations cf. the fourth-century castellum at Krefeld-Gellep: Reichmann 1987.

the late Roman habitation can be recognized and dated relatively easily because of its concentrated nature and the finds which go with it.

After about AD 410 Nijmegen and the surrounding area do not in fact belong to the imperium any longer. This is in contrast to an important town like Cologne which remains part of the imperium until about AD 460 and the same goes for the area south of the line Cologne-Tongres.⁴⁵⁷ With this the highly-developed tribe c.q. the early state made its entry in the Scheldt, Meuse and Rhine area, depending on the place and time. Its characteristics are a comparatively simple hierarchic structure and the important part played by kinship in the socio-political sphere, the limited existence of full-time specialisms and the importance of the 'domestic mode of production'.⁴⁵⁸ It is possible that since the region north of the Roman territory was a foreland, it was used in a strategic sense as much as possible for the purpose of defence. In that case political and military relations were sustained between the Roman territory and the inhabitants of the foreland, as previously happened in the region east and north of the Rhine. Just as before, this may have taken place with the aid of payments in gold; the treasures of Velp and Xanten may date from this period.⁴⁵⁹ However the withdrawal of official and specialized Roman troops did lead to a reduction in the population of the abandoned Rhine zone and put an end to the provision pattern which was supported by the state. It also meant that the direct supply of low currency denominations, military equipment, pottery and food ended, and consequently for us the possibilities of better dating and easily-recognizable finds. Because of this, the population which remained behind in a centre like Nijmegen must have had to resort to self-sufficiency more than had been the case up to then. For this reason habitation may have diminished and have become more dispersed and mobile like that of a rural settlement, so that it was capable of providing its own food by means of its own agriculture and cattle-breeding. The thick humous layers in the surroundings of the Valkhof and the lower town point in the same direction. New houses generally will have been built of wood, and so have had shallower foundations, making

them less lasting. Refuse may now have been dumped near the house-sites. Only if this was done in pits and if sunken huts were built these may have left recognizable traces. Apart from these, stone buildings which were still standing such as those of the fortification on the Valkhof would have been partially re-used or used as construction material for other buildings. Materials and objects available may have been used longer and more intensively because of shortage causing the volume of material goods to become more scarce.

A good example of this process can be found at Krefeld-Gellep. The late Roman fortification itself shows clear signs of secondary usage and outside the walls Germanic triple-aisled wooden houses cum byres were found from the same period. The contemporaneous cemetery there also illustrates the decline in population: of the graves which can be dated, about 640 date from the fourth century, c. 50 date from the fifth century and 600 from the sixth century.⁴⁶⁰ Examples of similar 'secondary' usage have meanwhile been found in Mehring, West Germany, among other places.⁴⁶¹

The chance of finding similar wooden houses and re-use of stone buildings in Nijmegen is very slight because of the deep disturbance of the topsoil in a later period. Finally, this is the episode in which the production of small coins in the nearest minting place of Trier came to an end, the circulation of coins stagnated and it becomes extremely difficult to identify well-recognizable and datable pottery forms.⁴⁶² The scattered nature of the habitation, the use of perishable materials or the re-use of older durable materials and the scarcity of material goods which are well-recognizable and datable impede the archaeological identification of the settlement.

When Cologne was taken over by the Franks in about AD 460 and the expansion of the early Frankish state in the Scheldt, Meuse and Rhine area ensued, Nijmegen and its surroundings must finally have come outside the range of influence of the Roman imperium or what was left of it.⁴⁶³ The external stimuli to continue to serve Roman interests from Nijmegen also ceased. We can only guess at the part Nijmegen was to play within the Frankish order. The remains of Roman habitation and burial and the necessity for self-sufficiency must have

⁴⁵⁷ Lemant 1985, 132.

⁴⁵⁸ Claessen 1978, 589 and 1983, 218-219.

⁴⁵⁹ Bloemers 1983a, 198-200; Willems 1984, 159 (site 28): mid-fifth century.

⁴⁶⁰ Kunow 1987, 106 and Pirling 1987, 533-534. Reichmann 1999, for example Abb. 3-5.

⁴⁶¹ Gilles 1985b, 38.

⁴⁶² Gilles 1984, 58-59; Gilles 1985a, 42 and 66-68; Heinen 1985, 368; Van Ossel 1985.

⁴⁶³ Ewig 1980, 12-14.

determined the pattern of settlement. It is probable that the Valkhof area, since it was formerly Roman imperial property, passed into the hands of the Frankish kings. We may assume that a *curtis* on or in the immediate vicinity of the Valkhof played a leading part in the administration of the royal estate around Nijmegen. In the early seventh century a church was founded from Cologne and was built in the south part of the castellum. At a later stage this church, like the one at Ingelheim, may well have served as a chapel for the palace which had meanwhile been built along the north slope. This section later formed the nucleus of the Valkhof castle, for which the parish church had to make way in about AD 1250 when the defences were being constructed. The Merovingian counts of the seventh century in and near the ruin of Barbarossa may have belonged to this parish church. The datings of the graves and the church's support of the Merovingian elite at this time make a connection like this quite possible.⁴⁶⁴ The Valkhof therefore represented official authority and property, but incidentally it could still have had a defensive function. Settlement must have been mainly agrarian and must have covered the area with the humous layer in the lower town, particularly the part west of Priemstraat between the outwash plain and the river. As far as is known this was the only region to remain unbuilt in the late Roman period and where there were no cemeteries. Characteristic of an agrarian settlement in the Roman period and in the early Middle Ages are the scattered wooden houses and the comparatively scarce use of durable material remains; this is often connected with a small number of deeply-dug features such as pits, wells and sunken huts. The density of sub-recent building and the small scale of archaeological investigation provide very little chance of finding recognizable and datable evidence about this type of habitation. The borders of this area may be influenced by the quality of the soil and the elevation which may have been more favourable than up on the outwash plain. However the river to the north and the Roman cemetery to the south must have been important. Somewhere along the river between the Valkhof and the agrarian region there must have been a mooring-place for ships, where transshipment and trading took place on a limited scale. The southern border of the agrarian part was also

determined by the location of the Roman cemetery from the second-third century on the western foothills of the ridge, the existence of which may perhaps have been known. This is all the more probable if one takes into account the possibility that these graves connect chronologically and spatially with the fourth and fifth century burials southeast of it. This is where the cemetery belonging to the agrarian settlement must be sought. The settlement appears to have moved eastwards later. Pottery was found in the surroundings of Grotestraat which indicates contacts with places outside the region. Coin finds and the presumed mint at Nijmegen are the harbingers of the increasing importance of royal property in the Carolingian period.

The hypothetical habitation structure outlined above may have been the starting-point for the role of Nijmegen in the eighth century known from historical evidence. The model is not a new one, and has features in common with those of other settlements in the Rhine and Meuse area.⁴⁶⁵ It is estimated that in Gaul and Germania urban centres comprised various settlement elements which could also occur in combination: comparatively small fortifications going back to late Roman fortifications, *vicus*-like settlements outside the walls of these fortifications and preferably in connection with rivers, 'suburban' settlements with an agrarian and in some cases Germanic character, 'extra muros' settlements which grew up around cemetery churches because of the worship of saints.⁴⁶⁶ In a number of late Roman urban settlements in Britain 'dark layers' were found. The discussion on the significance of this phenomenon focuses on the question whether it is a desertion layer used in the fifth and sixth centuries as plough soil; clear indications of this were found in Winchester and Cirencester.⁴⁶⁷ A similar picture can be evoked in the case of Cologne from archaeological observations and historical sources about the appearance of towns like Mainz and Kempten.⁴⁶⁸ It is obvious that the following factors played a decisive part in solving the continuity problem of civilian settlements with an urban character and large military fortifications from the fourth and fifth century AD in the Rhine and Meuse area: the changing socio-economic structure which led to greater emphasis on agriculture and stock-breeding for self-sufficiency and the resultant

⁴⁶⁴ Werner 1986, 99.

⁴⁶⁵ Böhner 1959, 100-101 and 107-108.

⁴⁶⁶ Weidemann 1976.

⁴⁶⁷ Brooks 1986, 93-94.

⁴⁶⁸ Schönberger 1973, 103-104; Steuer 1980, 59-62. A slightly different view: Schindler 1973; see also Janssen 1984, 285.

shifting of settlement elements outside the late Roman centres. The evidence concerning settlement at Krefeld-Gellep in the fourth and fifth centuries which has already been discussed is a good example. In Maastricht too there may have been a similar process. Settlement on the site of the late Roman fortification in the Stokstraat area must have continued until well into the early Middle Ages, but raising inside the fortification did not take place from the sixth to the beginning of the eighth century. Outside the fortification a thick black arable layer is found, and 500 m further north a new 'residential nucleus' with an agrarian character and its own cemetery developed in the sixth century.⁴⁶⁹ In the case of Trier it is also assumed that small village-like settlements grew up inside the walls of the former Roman town in the early Middle Ages.⁴⁷⁰ The phenomenon of settlement outside the original Roman centre is also found in rural settlements. Examples of this can be seen in the Roman villas of Voerendaal, Ehrang and Wintersdorf.⁴⁷¹

This hypothesis answers the question of historical-chronological and empirical continuity in Nijmegen between c. AD 400 and 750. However the question of its functional continuity as a regional centre is still open. It is clear that the urban character and the infrastructure connected with it have been lost. There is no evidence of the preservation of an administrative and economic regional function in the fifth and sixth centuries. Late sixth-century mintage at Nijmegen also shows that the hiatus may have been relatively short. On the basis of its regional function in the preceding centuries and also in successive ones it seems obvious that Nijmegen also filled this position in the two intervening centuries. The regional function cannot however be determined absolutely, but only relatively. If the political organization level as a whole is low, then the level of a place with a central position with regard to the other settlements will be low too from an absolute point of view and its features will not be very developed. The regional function is still difficult to demonstrate either archaeologically and historically or empirically for two reasons. The socio-economic structure of the early state determines the use of space and material goods, so that self-sufficiency in daily requirements and prestige goods and

kinship in social relations are key concepts; in this area durable material goods are scarce in the fifth and sixth centuries, difficult to recognize and hard to place chronologically. Moreover the scarce and scattered data have been subjected to intensive formation processes and reduced to a negligible or unnoticeable size. In a formal sense the settlement may still have performed the role of a regional centre. Its functional continuity remains a hypothesis though, but quite a plausible one if we are aware of the role of the Frankish elite as a socio-political organization on a regional level and as ideological-legalistic successors to the Roman state.

⁴⁶⁹ Panhuysen 1984, 75-76 and 1986, 135-136.

⁴⁷⁰ Flink 1970 and map 'Trier um 1150'; Böhner 1977a, 193-196; Heinen 1985, 372.

⁴⁷¹ Böhner 1959, 92-93 and 1977b, 74 and 81-85; Heinen 1985, 376; Wightman 1985, 309; Willems 1986, 41. A survey of rural settlement in Northern Gaul during the late Roman period: Van Ossel 1987; Van Ossel & Ouzoulias 2000 and the contributions of Ouzoulias & Van Ossel, Polper and Vermeulen in Ouzoulias *et al.* 2001.

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LIST OF REGULAR USED ABBREVIATIONS

AB	Archaeologia Belgica	KJ	Kölner Jahrbuch für Ur- und Frühgeschichte
BAR	British Archaeological Reports	MZ	Mainzer Zeitschrift
BJ	Bonner Jahrbücher	NKNOB	Nieuwsbulletin van de Koninklijke Nederlandse Oudheidkundige Bond
BKNOB	Bulletin van de Koninklijke Nederlandse Oudheidkundige Bond	OML	Oudheidkundige Mededelingen uit het Rijksmuseum van Oudheden te Leiden
BRGK	Bericht der Römisch-Germanischen Kommission	OML N.R.	Oudheidkundige Mededelingen uit het Rijksmuseum van Oudheden te Leiden, Nieuwe Reeks
BROB	Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek	PSHAL	Publications de la Société Historique et Archéologique dans le Limbourg
CBA	Council of British Archaeology	RCRFA	Rei Cretariae Romanae Fautorum Acta
JROB	Jaarverslag van de Rijksdienst voor het Oudheidkundig Bodemonderzoek	TZ	Trierer Zeitschrift
JRS	Journal of Roman Studies		
JVT	Jaarverslag van de Vereeniging voor Terpenonderzoek		

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Appendix I Nijmegen. Chapter 2

Chapter 2 A small Middle Iron Age cemetery with a cart burial in Nijmegen: textiles and cremation remains

I.2.1 Textiles (by S.Y. Comis)

Grave no. 60/9

Metal with two (?) layers folded textile of wool (?). Measurements of upper layer are 1.0 x 1.5 cm, of the lower layer only 0.5 x 0.5 cm is visible. Twill weave with warp of Z-spun yarn with c. 15 threads per cm and with weft of S-spun yarn with c. 15 threads per cm. The textile is fine and of good quality.

I.2.2 Cremation remains (by E. Schouten, L. Smits and G.F. IJzereef)

Cremation no. 60/9, human bones (E. Schouten and L. Smits)

Weight: c. 450 g. Degree of burning: > 700 °C. Degree of fragmentation: ? Age: 30-40 years (Schouten) or 43-52 (Smits). Sex: female (Schouten and Smits).

Cremation no. 60/21, human bones (L. Smits)

Weight: 130 g. Degree of burning: 650-800 °C. Degree of fragmentation: 5 cm. Age: Infans II, max. 13 years. Sex: unknown.

Cremation no. 60/22, human bones (L. Smits)

Weight: 247 g. Degree of burning: 650-800 °C. Degree of fragmentation: 7 cm. Age: 23-40 years. Sex: unknown.

Cremation no. 60/9, animal bones

(G.F. IJzereef)

16 fragments of at least 3 individuals of domesticated pig: 1. rib, younger than 6 months; 2. 3rd molar mandible, older than 2 years; 3. 3rd molar mandible, 9-21 months.

Cremation no. 60/20, animal bones

(G.F. IJzereef)

Several fragments of a horse: 2 phalanx x I, 1 mandible, 1 incisor, 1 milk molar, 2 metatarsus, 1 metacarpus, several fragments of a skull. Age: 2-3.5 years.

Appendix II Area 3: number and ratios of pits with data for surface area and volumes, grouped in sub-areas.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Total	Mean of (sub-)area
Surface area (m ²)	1279	1053	1536	1348	1484	1298	1024	9022	-
A.1 number	117	43	27	33	63	24	17	324	46.3
2. ratio number pits/area	0.09	0.04	0.02	0.02	0.04	0.02	0.02	-	0.036
B.1 total area of pits (m ²)	160.4	64.1	81.05	33.3	117.75	27.5	22.3	506.4	-
2. ratio area pits/sub-area	0.13	0.06	0.05	0.02	0.08	0.02	0.02	-	0.054
3. total area without large pits (m ²)	136.6 ¹	=	25.3 ²	=	88.5 ³	=	=	397.6	-
4. ratio as B.2 without large pits	0.11	=	0.02	=	0.06	=	=	-	0.044
D.1 total area+volume pits (m ³)	131.18	53.27	31.97	16.44	71.89 ³	7.58	14.24	327.19	46.7
2. total area+volume without large pits (m ³)	92.58 ¹	=	10.71 ²	=	1.42	=	=	246.86	35.3
3. ratio volume pits/sub-area	0.1	0.05	0.02	0.01	0.05	0.01	0.01	-	0.034
4. idem without large pits	0.07	=	0.01	=	0.03	=	=	-	0.027

Legend: = similar value as in previous row of this column with analogues calculation (sum of ratio).

For the structure of A, B and D see Table 4.13; A.1 number of pits; A.2 number of pits (A.1) divided by surface area (m²) of the sub-area; B.1 total surface area of all pits in a sub-area; B.2 total surface area of all pits in a sub-area (B.1) divided by surface area (m²) of the sub-area; B.3 as B.1, but without large pits; B.4 as B.2, but without large pits; D.1 total volume of pits (m³) with surface area; D.2 as D.1, but without large pits; D.3 total volume of pits (m³) with surface area (D.1) divided by surface area (m²) of the sub-area; D.4 as D.3, but without large pits.

¹ Without large pits nos. 718 and EA in sub-area 3A.

² Without large pits nos. 494, 496 and 575 in sub-area 3C.

³ Without large pit no. 355 in sub-area 3E.

Appendix III Area 3: mean surface area and volumes of pits, grouped in sub-areas.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Mean	Mean of all areas
1. mean pit area (m ²)	1.6	1.6	5.71	1.19	2.3	1.02	1.51	2.35	2.04
2. idem without large pits (m ²)	1.52 ¹	=	1.89 ²	=	1.66 ³	=	=	2.01	-
3. mean pit volume (m ³)	1.43	1.33	3.2	0.97	1.67 ³	0.69	1.42	1.69	1.7
4. idem without large pits (m ³)	1.03 ¹	=	1.53 ²	=	1.22	=	=	1.17	-

Legend: = similar value as in previous row of this column; 1. mean area of pits from appendix II sub D.1 (for this number see Table 4.14 sub A.2); 2. mean area of pits from appendix II sub D.2 (for this number see Table 4.14 sub A.2 minus the number of large pits mentioned above); 3. mean volume of pits from appendix II sub D.1 (appendix II sub D.1 divided by Table 4.14 sub A2); 4. mean volume of pits from appendix II sub D.2 (appendix II sub D.1 divided by Table 4.14 sub A2 minus the number of large pits mentioned above).

¹ Without large pits nos. 718 and EA in sub-area 3A.
² Without large pits nos. 494, 496 and 575 in sub-area 3C.
³ Without large pit no. 355 in sub-area 3E.

Appendix IV Nijmegen. Chapter 4 Section 4.3.2

Appendix IV Area 3: percentages of pits ordered in classes for surface area and volume, grouped in sub-areas.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Mean of sub-areas
B. area pits (%)								
0-2.5 m ²	88	83.7	74.1	96.7	74.6	87.5	94.1	85.5
> 3 m ²	10.3	14	25.9	3	11.1	12.5	5.9	11.8
C. volume pits (%)								
0-2 m ³	87	85	80	88.2	82.5	90	80	84.7
> 4 m ³	5.43	10	20	-	4.7	-	10	7.2
D. area+volume pits (%)								
0-2.5 m ²	81.7	82.5	50	100	79.1	100	90	83.3
> 3 m ²	13	15	50	-	16.3	-	10	14.9

Sub B, C and D are always one or more classes lacking per sub-area, consequently the total per sub-area is never 100%.

Appendix V Area 3: Number and ratio for surface-area and volume of pits ordered in stratigraphic phases, grouped in sub-areas.

Sub-area	3A	3B	3C	3D	3E	3F	3G	Total	Mean of (sub-)area
Surface area (m ²)	1279	1053	1536	1348	1484	1298	1024	9022	-
A.1 number of pits									
2. TFW	22 (18)	-	-	-	1 (1)	4 (2)	-	27 (21)	-
3. TFW/UFS	-	5(5)	2 (2)	-	5 (3)	-	-	12 (10)	-
4. UFS	9 (8)	28 (25)	20 (6)	20 (8)	33 (21)	4 (2)	3 (3)	117 (73)	-
5. TFS	-	2 (2)	3 (2)	6 (5)	13 (13)	1 (-)	-	25 (22)	-
6. total	31 (26)	35 (32)	25 (10)	26 (13)	52 (38)	9 (4)	3 (3)	181 (126)	-
B.1 ratio area pits/sub-area x 100									
2. TFW	2.22 (1.4)¹	-	-	-	0.13	0.39	-	-	0.39
3. TFW/UFS	-	1.08	0.43	-	0.97	-	-	-	0.35
4. UFS	2.27 (1.2)²	2.93	1.14	1.08	2.08	0.19	0.45	-	1.45
5. TFS	-	0.72	3.63 (-)³	0.46	3.8 (1.83)⁴	0.17	-	-	1.24
C.1 ratio volume pits/sub-area x 100									
2. TFW	1.5 (0.5)¹	-	-	-	0.09	0.28	-	-	0.26
3. TFW/UFS	-	1	0.3	-	0.4	-	-	-	0.24
4. UFS	3.1 (1.1)²	1.6	0.4	0.5	1.3	0.07	0.42	-	1.06
5. TFS	-	1.3	1.39 (-)²	0.5	2.43 (1.1)⁴	-	-	-	0.42

Legend: **bold** high values; () sub A: number of pits with values for volume; TFW over Flavian timber construction phase; TFW/UFS over Flavian timber construction phase and under Flavian stone construction phase; UFS under Flavian stone construction phase; TFS over Flavian construction phase; B.1 total area of pits from a stratigraphic phase divided by the total surface area of a sub-area times 100; C.1 total volume of pits from a stratigraphic phase divided by the total surface area of a sub-area times 100.

¹ Without large pit no. 716.
² Without large pit no. EA.
³ Without large pits nos. 494, 496 and 575.
⁴ Without large pit no. 355 in sub-area 3E.

Appendix VI Nijmegen. Chapter 4 Section 4.3.3

Appendix VI Area 5: number and ratios of pits with data for surface area and volumes, grouped in sub-areas.

Sub-area	5A	5B	5C	5D	5E	Total	Mean of (sub-)area
Surface area (m ²)	790	1020	166	462	39	2477	-
A.1 number	36	29	7	12	5	89	17.8
2. ratio number pits/area	0.05	0.03	0.04	0.03	0.13		0.056
B.1 total area of pits (m ²)	107.6	125.3	10.8	26.1	11.9	281.7	-
2. ratio area pits/sub-area	0.14	0.12	0.07	0.06	0.31		0.14
3. total area without large pits (m ²)	79.6 ¹	67.3 ²	=	=	=	195.7	-
4. ratio as B.2 without large pits	0.1	0.07	=	=	=		0.08
D.1 total area+volume pits (m ³)	84.57	88.45	3.58	15.11	11.15	202.81	-
2. total area+volume without large pits (m ³)	49.97 ¹	42.05 ²	=	=	=	121.81	-
3. ratio volume pits/sub-area	0.11	0.09	0.02	0.03	0.29		-
4. idem without large pits	0.06	0.04	=	=	=		0.05

Legend: = similar value as in previous row of this column with analogues calculation (sum of ratio).

For the structure of A, B and D see Table 4.13; A.1 number of pits; A.2 number of pits (A.1) divided by surface area (m²) of the sub-area; B.1 total surface area of all pits in a sub-area; B.2 total surface area of all pits in a sub-area (B.1) divided by surface area (m²) of the sub-area; B.3 as B.1, but without large pits; B.4 as B.2, but without large pits; D.1 total volume of pits (m³) with surface area; D.2 as D.1, but without large pits; D.3 total volume of pits (m³) with surface area (D.1) divided by surface area (m²) of the sub-area; D.4 as D.3, but without large pits.

¹ Without large pits nos. 963 and 992 in sub-area 3A.

² Without large pits nos. 983 + 984 in sub-area 3C.

Appendix VII Area 5: mean surface area and volumes of pits, grouped in sub-areas.

Sub-area	5A	5B	5C	5D	5E	Mean	Mean of all areas
1. mean pit area (m ²)	4.42	5.11	1.35	1.89	3.63	3.28	2.04
2. idem without large pits (m ²)	3.2 ¹	2.3 ²	=	=	=	2.47	-
3. mean pit volume (m ³)	4.7	4.42	0.9	1.68	3.72	3.08	1.7
4. idem without large pits (m ³)	3.1 ¹	2.2 ²	=	=	=	2.32	-

Legend: = similar value as in previous row of this column; 1. mean area of pits from appendix VI sub D.1 (for this number see Table 4.16 sub A.2); 2. mean area of pits from appendix VI sub D.2 (for this number see Table 4.16 sub A.2 minus the number of large pits mentioned above); 3. mean volume of pits from appendix VI sub D.1 (appendix VI sub D.1 divided by Table 4.16 sub A2); 4. mean volume of pits from appendix VI sub D.2 (appendix VI sub D.1 divided by Table 4.16 sub A2) minus the number of large pits mentioned above).

¹ Without large pits nos. 963 and 992 in sub-area 3A.
² Without large pits nos. 983 + 984 in sub-area 3C.

Appendix VIII Nijmegen. Chapter 4 Section 4.3.3

Appendix VIII Area 5: percentages of pits ordered in classes for surface area and volume, grouped in sub-areas.

Sub-area	5A	5B	5C	5D	5E	Mean of sub-areas
B. area pits (%)						
0-2.5 m ²	66	65.5	85	58	60	66.9
> 3 m ²	30.6	27.6	14.3	33.3	40	29.2
C. volume pits (%)						
0-2 m ³	33.3	60	100	66.6	33.3	58.6
> 4 m ³	50	20	0	0	33.3	20.6
D. area+volume pits (%)						
0-2.5 m ²	38.8	65	100	66.6	33.3	60.8
> 3 m ²	55.6	25	0	22.2	66.6	33.8

Sub B, C and D are always one or more classes lacking per sub-area, consequently the total per sub-area is never 100%.

Appendix IX Area 5: Number and ratio for surface-area and volume of pits ordered in stratigraphic phases, grouped in sub-areas.

Sub-area	5A	5B	5C	5D	5E	Total	Mean of (sub-)area
Surface area (m ²)	790	1020	166	462	39	2477	-
A.1 number of pits							
2. TFW	5 (2)	1 (0)	-	1 (1)	-	7 (3)	-
3. TFW/UFS	2 (2)	1 (1)	-	-	-	3 (3)	-
4. UFS	10 (4)	12 (8)	4 (2)	5 (4)	-	31(18)	-
5. TFS	3 (3)	2 (1)	-	-	1 (1)	6 (5)	-
6. total	20 (11)	16 (10)	4 (2)	6 (5)	1 (1)	47 (29)	-
B.1 ratio area pits/sub-area x 100							
2. TFW	1.24	0.08	-	0.68	-	-	0.67
3. TFW/UFS	1.64	0.5	-	-	-	-	1.07
4. UFS	4.3	3.35	3.01	2.4	-	-	3.26
5. TFS	2.66	6.3	-	-	15	-	7.99
C.1 ratio volume pits/sub-area x 100							
2. TFW	0.6	-	-	0.65	-	-	-
3. TFW/UFS	1.69	0.25	-	-	-	-	-
4. UFS	4.67	2.18	1.54	1.81	-	-	1.8
5. TFS	1.79	4.55	-	-	21	-	9.11

Legend: **bold** high values; () sub A: number of pits with values for volume; TFW over Flavian timber construction phase; TFW/UFS over Flavian timber construction phase and under Flavian stone construction phase; UFS under Flavian stone construction phase; TFS over Flavian construction phase; B.1 total area of pits from a stratigraphic phase divided by the total surface area of a sub-area times 100; C.1 total volume of pits from a stratigraphic phase divided by the total surface area of a sub-area times 100.

Appendix X Area 9: number and ratios of pits with data for surface area and volumes, grouped in sub-areas.

Sub-area	9A	9B	9C	9D	Total	Mean of (sub-)area
Surface area (m ²)	334	303	773	123	1533	-
A.1 number	17	24	121	13	175	43.75
2. ratio number pits/area	0.05	0.08	0.16	0.11		0.11
B.1 total area of pits (m ²)	36.5	31.1	192.6	37.5	297.7	-
2. ratio area pits/sub-area	0.11	0.1	0.25	0.3		0.19
3. total area without large pits (m ²)	24.82 ¹	=	=	17.87 ²	266.39	-
4. ratio as B.2 without large pits	0.07	=	=	0.15		0.17
D.1 total area+volume pits (m ³)	27.41	13.45	116.05	63.82	220.72	-
2. total area+volume without large pits (m ³)	20.4 ¹	=	=	10.81 ²	160.7	-
3. ratio volume pits/sub-area	0.08	0.04	0.15	0.52		0.14
4. idem without large pits	0.06	=	=	0.09		0.1

Legend: = similar value as in previous row of this column with analogues calculation (sum of ratio).

For the structure of A, B and D see Table 4.13; A.1 number of pits; A.2 number of pits (A.1) divided by surface area (m²) of the sub-area; B.1 total surface area of all pits in a sub-area; B.2 total surface area of all pits in a sub-area (B.1) divided by surface area (m²) of the sub-area; B.3 as B.1, but without large pits; B.4 as B.2, but without large pits; D.1 total volume of pits (m³) with surface area; D.2 as D.1, but without large pits; D.3 total volume of pits (m³) with surface area (D.1) divided by surface area (m²) of the sub-area; D.4 as D.3, but without large pits.

¹ Without large pit no. 50/54 in sub-area 9A.

² Without large pits no. 123/41 in sub-area 9D.

Appendix XI Area 9: mean surface area and volumes of pits, grouped in sub-areas.

Sub-area	9A	9B	9C	9D	Mean	Mean of all areas
1. mean pit area (m ²)	2.16	1.16	1.57	2.88	1.94	2.04
2. idem without large pits (m ²)	1.53 ¹	2.3 ²	=	1.49 ²	1.44	-
3. mean pit volume (m ³)	1.71	0.75	0.98	4.91	2.09	1.7
4. idem without large pits (m ³)	1.36 ¹	=	=	0.9 ²	1	-

Legend: = similar value as in previous row of this column; 1. mean area of pits from appendix X sub D.1 (for this number see Table 4.18 sub A.2); 2. mean area of pits from appendix X sub D.2 (for this number see Table 4.18 sub A.2 minus the number of large pits mentioned above); 3. mean volume of pits from appendix X sub D.1 (appendix X sub D.1 divided by Table 4.18 sub A2); 4. mean volume of pits from appendix X sub D.2 (appendix X sub D.1 divided by Table 4.18 sub A2) minus the number of large pits mentioned above).

¹ Without large pit no. 50/54 in sub-area 9A.
² Without large pits no. 123/41 in sub-area 9D.

Appendix XII Nijmegen. Chapter 4 Section 4.3.4

Appendix XII Area 9: percentages of pits ordered in classes for surface area and volume, grouped in sub-areas.

Sub-area	9A	9B	9C	9D	Mean of sub-areas
B. area pits (%)					
0-2.5 m ²	88.2	87.5	86	84.6	86.57
> 3 m ²	11.8	8.3	7.4	15.4	10.72
C. volume pits (%)					
0-2 m ³	81.25	88.9	90.7	84.6	86.36
> 4 m ³	12.5	0	2.54	7.7	5.68
D. area+volume pits (%)					
0-2.5 m ²	87.5	94.44	86.44	84.62	88.25
> 3 m ²	12.5	5.56	6.78	15.38	10.05

Sub B, C and D are always one or more classes lacking per sub-area, consequently the total per sub-area is never 100%.

Appendix XIII Area 9: Number and ratio for surface-area and volume of pits ordered in stratigraphic phases, grouped in sub-areas.

Sub-area	9A	9B	9C	9D	Total	Mean of (sub-)area
Surface area (m ²)	334	303	773	123	1533	-
A.1 number of pits						
2. TFW	9 (8)	3 (2)	18 (17)	-	29 (27)	-
3. TFW/UFS	-	1 (1)	7 (7)	-	8 (8)	-
4. UFS	-	6 (5)	56 (56)	9 (9)	71 (70)	-
5. TFS	-	-	-	-	-	-
6. total	9 (8)	9 (7)	81 (80)	9 (9)	108 (105)	-
B.1 ratio area pits/sub-area x 100						
2. TFW	7.54 (4.0)¹	0.67	4.18	-	-	-
3. TFW/UFS	-	0.74	1.42	-	-	-
4. UFS	-	3.36	11.35	23.36 (7.4)²	-	-
5. TFS	-	-	-	-	-	-
C.1 ratio volume pits/sub-area x 100						
2. TFW	5.28 (3.2)¹	0.33	2.8	-	-	-
3. TFW/UFS	-	0.66	0.85	-	-	-
4. UFS	-	1.83	7.42	47.76 (4.66)²	-	-
5. TFS	-	-	-	-	-	-

Legend: **bold** high values; () sub A: number of pits with values for volume; TFW over Flavian timber construction phase; TFW/UFS over Flavian timber construction phase and under Flavian stone construction phase; UFS under Flavian stone construction phase; TFS over Flavian construction phase; B.1 total area of pits from a stratigraphic phase divided by the total surface area of a sub-area times 100; C.1 total volume of pits from a stratigraphic phase divided by the total surface area of a sub-area times 100.

¹ Without large pit no. 50/54 in sub-area 9A.

² Without large pits no. 123/41 in sub-area 9D.

Appendix XIV Nijmegen. Chapter 5 Section 5.3.2

The fourth-century defence system around the Valkhof and the problem of continuity during the early medieval period: traces of use on late Roman pottery (by M. Erdrich)

XIV.5.1 TRACES OF USE ON LATE ROMAN POTTERY

The analysis of pottery discovered during archaeological activities is generally limited to typo-chronological studies; the dating of a 'type' or of a site or a collection of finds is more important. The decoration of the pottery is almost always examined for stylistic criteria, and possible functional aspects such as the sanding of beakers are disregarded. Hilgers approached this subject from a different angle. He compiled a catalogue of Roman pottery forms starting from the terms for pottery which were used in classical literature. Unfortunately no link was made with archaeological finds, and the question remains whether all the objects mentioned in literature, which refers mainly to the situation in Italy and reflects a higher social milieu, were familiar in the province of Germania Inferior and whether they were actually used. Neither does he give any indication of the life of a particular type of pottery.¹

The sherds found in the fill of the large single period ditch must be seen as a sample which reflects the composition of the standard kitchen or tableware in circulation in Nijmegen at that time.² This pottery ended up in the ditch as refuse after it had been used for a period of time and then discarded. At the beginning this investigation was focused on to what extent traces of this use which were left on the pottery were characteristic of a certain type of ware. These traces might then indicate what the function of the type was. Finally, the pottery from the single period ditch was compared to the finds from the late Roman cemetery of Nijmegen-East.³ The pottery from the single period ditch proved to be extremely suitable for an investigation of this kind, for many reasons. As already mentioned, the pottery from the single period ditch was deposited in the ditch together with the rest of the fill within a short period of time. This prevented any further fragmentation by post-depositional processes on the sherds which might cover up or obliterate the traces of use originally present. Moreover, the quantity of sherds was enough to arrive at trends of some statistical significance.

Finally a few remarks about the treatment of the sherds during and after excavation. The pottery was washed almost immediately after excavation, causing almost all the primary

evidence of use to be washed off, including any organic remains, fat and suchlike caked on to it.⁴ Only on inaccessible places as, for example, under the rims and on the rough walls of the coarse ware pottery were the remains of the soot deposit preserved. Brushes were not used to wash the sherds. After washing, the sherds were dried, numbered and stored in plastic bags.

XIV.5.2 ESTABLISHING DESCRIPTIVE CRITERIA

Right at the beginning of this investigation two problems emerged which were of importance for the progress of the investigation and the later analysis of the data obtained:

- a. the recognition of the difference between damage to the surface of a sherd caused by post-depositional processes⁵ or by the original use. Post-depositional damage covers a diversity of phenomena such as weathering by damp and temperature in the open air or underground and recent damage caused by washing and storage;
- b. the quantification of the observations and the intensity of damage to the sherds.

During a more exploratory stage of the investigation the damage to each individual sherd was carefully described; this led to an extensive catalogue of traces which was too lengthy and detailed for the intended analysis of more than 60 kg of pottery. Eventually the observations for all the groups of pottery except coarse ware were reduced to five basic types:

1. chips, i.e. notches or dents caused by a more or less pointed object;
- 2 + 3. scratches, i.e. short, usually straight lines which were mostly shallow. The difference between scratches made vertically or horizontally to the base of the ware did not supply much additional information and was therefore disregarded;
4. horizontal longer uninterrupted 'scratches' caused by a turning action;
5. a gloss on terra sigillata sherds which had been completely rubbed off; on a number of sherds this gloss had been worn down to the clay, especially on the base.

In the case of the mortaria, particular attention was paid to the grains of quartz. All the sherds except for the coarse ware pottery were examined for traces of secondary burning. Quantification of the data formed the other

¹ Hilgers 1969.

² Hilgers 1969, 13-16.

³ Steures 2013 cemetery OO.

⁴ Attention should be focused on this source of information during the course of excavation by means of systematic sampling.

⁵ Schiffer 1976, 14-15; Bloemers 1991, 144-147.

Appendix XIV Table 5.1 Nijmegen. Registration list used for the description of traces of use on late Roman pottery.

Key	Code	Description
no.		number for each sherd examined
find		find number
frag		description of the fragment being examined:
		B(ase) W(all) K(raag) R(im) L(ip)
bsrg		base ring
	0.	no visible wear, gloss and any irregularities (lumps of clay) under the base rings completely preserved
	1.	gloss partially missing, smaller irregularities rubbed off
	2.	rubbed down to the clay, profile of base ring can no longer be reconstructed
inner/ outer		position of traces, on inner or outer wall, subdivided into five types:
	1.	knocks
	2.	horizontal scratches
	3.	vertical scratches
	4.	wheel traces
	5.	inner surface rubbed down to the clay
lip		location of traces on lip, subdivided into
	1.	inside
	2.	top
	3.	outside
quartz		wear of quartz grains, subdivided into:
	0.	unworn, quartz angular, gloss intact
	1.	grains half-round, gloss partially preserved
	2.	worn down to the clay
flange		wear of flange, subdivided into:
	0.	no wear
	1.	scratches or knocks
	2.	worn down to the clay
sec. burn		secondary burning, only presence/absence registered

The following coding was used in the columns: 0 = not present; 1 = present; 9 = not applicable, mainly due to post-depositional processes.

problem. Every sherd was described by means of a simple 'present/not present' code. The intensity of the wear was only measured in the case of the quartz grains of the mortaria and the bases of the terra sigillata specimens. Later analysis is therefore based on the counts of the scores in each separate column.

In the case of the coarse ware pottery a special type of description was chosen. The ware is fired so hard that even scratches made with a steel pen did not cause any damage to the surface. Moreover, almost all the sherds, with the exception of the dishes, showed signs of

secondary burning caused by use. The most important clue to their original use was the presence of soot on the outer wall of the sherds, whereas on the inner wall no traces of soot were found at all.

In this way the basis was formed for the registration lists used with the key described in Table 5.1.

Relevant observations which were not directly connected with one of the criteria already mentioned, for example repair holes, were made under the heading 'remarks'.

XIV.5.3 RESULTS OF THE INVESTIGATION

The transport and storage containers such as amphorae and dolia which are characteristic of the first and second centuries AD are not found at all in the excavated late Roman complex at Nijmegen. Bulk goods such as olive oil and fish sauce traditionally carried in special transport containers were probably no longer consumed in Nijmegen, which implies that the dietary pattern had changed or that these goods had been replaced by local products. In the case of wine and corn, it is possible that containers such as wooden barrels, linen or leather bags were used which leave no archaeologically traceable evidence. In connection with this, it is interesting to point out the absence of large dolia, a fact which can be explained by a change in the storage system compared to that of the early and middle Roman periods.

The pottery from the large ditch can be divided into two functional groups, namely kitchenware and tableware consisting of drinking utensils and serving ware. The coarse ware pottery served *cum grano salis* as kitchenware, the terra sigillata, the coloured and marbled ware for the table.

The coarse ware pottery was pre-eminently suited for use in the kitchen because of its fabric. It was fired so hard that it was resistant to scratches and chips. Moreover it could take the extreme differences in temperature which occurred while cooking, and it was a good conductor of heat. Unfortunately, the fabric does not always show whether a cooking-pot was burnt from use or by an accidental fire. The shape of both 'real' cooking-pots, Pirling 1966 type 105 and 120, is ideally suited for cooking in hot ashes. The centre of gravity of both forms, especially in the case of the larger specimens, if filled completely is higher than the centre of the cooking-pot. This construction would be too unstable if used on a baking tray, and it is not very likely that it was hung from an iron chain. Because the walls turn outwards, the area of contact with the hot ashes is increased, thus guaranteeing that the food is evenly cooked. The rims which turn quite far inwards, especially in the Pirling 1966 type 120 form, prevent liquids such as wine or soup which produce a lot of froth or scum from boiling over. With the odd exception, all the sherds show signs of secondary burning or a deposit of soot, often

washed off apart from vestiges left under the rims or on the rough outer walls.

The Pirling 1966, 106/109 types were also used as cooking-pots, judging from the sooty deposit found on two sherds. The relatively broader base of these types compared to those mentioned above, and the centre of gravity which is lower as a result, is notable. This type of jar can well be used on a baking tray.

Although the Pirling 1966 type 126 and 128 dishes appear to be closely related typologically, they were actually used in different ways. No sooty deposit was found on any of the 38 sherds which certainly belonged to the Pirling 1966, 128 type, and secondary burning was exceptional. In the case of the dish with the rim sloping inwards, traces of secondary burning were observed 29 times and a sooty deposit eleven times. It is probable that the Pirling 1966, 128 type was used rather for warming up or serving, and this can be seen in the dishes which were used as grave gifts in the cemetery. Only six of the 43 dishes showed signs of secondary burning (Table 5.2). In contrast, the cooking function of the Pirling 1966, 126 type is certain.

The small number of lids (16 sherds) compared with the much larger number of cooking-pots with a lid-groove is remarkable. From this it can be assumed that not all cooking-pots had a lid, or that they stood inside each other during cooking or were covered by a dish. Another possibility is that wooden lids were used. Finally, also larger fragments of broken pottery were used as lids. In some cases the bases of broken terra sigillata bowls were cut off to function as lids.⁶

The mortaria were originally connected with Mediterranean food preparation.⁷ Altogether, sherds of 30 specimens were found in the fill of the large ditch. There is a noticeable contrast between the amount of wear shown by the quartz grains on the inside, which in some cases has worn through, and the outside which is almost always intact. It may therefore be concluded that the mortaria had a regular place in the kitchen, probably hanging in a holder. They were only removed from this holder to pour out the finely-ground food. One mortarium had been repaired with at least four strips of lead.

The late Roman terra sigillata was probably only used at table. Because of the relatively soft fabric and because no traces of use or secondary burning were found, it does not

⁶ This form of secondary use was pointed out to me by L. Bakker, Augsburg.

⁷ Baatz 1977.

Appendix XIV Table 5.2 Nijmegen. Cemetery OO: pottery types.

Type	Number	Wasters	Not used	Used
1. terra sigillata				
Chenet 304	17	0	2	14
Chenet 320	2	0	0	1
Chenet 324	9	0	2	6
Chenet 330	1	0	0	1
2. jar	28	0	0	28
3. colour-coated ware				
Pirling 58-62	83	0	44	38
4. coarse ware				
Pirling 105	23	11	8	4
Pirling 106/109	14	3	5	14
Pirling 120	17	6	5	2
Pirling 126	9	4	3	1
Pirling 127-128	43	21	13	6

Types in small numbers like Chenet 1941 type 301 are not considered. Jars of Samian and colour-coated ware taken all together.

appear to have been used for the preparation of food. Characteristic of usage traces on the various types are shallow scratches or chips which, like the wear under the projecting flanges were caused by the method of storage, which was to stack them. On the other hand the base rings were heavily worn. There are no specific traces of use for a particular type, so one must assume that they were multifunctional. It was, therefore, impossible to attribute a certain function, familiar to us from historical sources or illustrations, to a particular type of tableware. Furthermore, there is a possibility that similar operations were performed in forms which differed greatly from each other typologically. This suggestion is supported by the observation that a steady decrease in the variability of types can be seen throughout the whole of the Roman period, a development which went hand in hand with the deterioration in craftsmanship of the products.

The most common type is the large Chenet 1941 type 320 bowl. All the 149 sherds with the exception of five show signs of use or storage. Scratches and chips increase the closer one gets to the base. Damage to the lip or outer wall are

mainly due to the method of storage, and is usually only superficial.

A rather clearer picture is shown by the traces of use on the 49 sherds of the flanged bowls Chenet 1941 type 324 which despite the flange are very similar to the bowls of the Chenet 1941, 320 type described above. All of the eleven base rings were worn. If one observes the traces of use on the inside wall, two groups are seen. 26 sherds had scratches or chips, 18 were intact. This proportion is confirmed by the damage to the rim zones (32 worn sherds to 17 intact). It can therefore be assumed that both groups were certainly used, judging from the wear of the base rings, but that traces of the actions performed only remain on about half of these. This may be an important indication of the supposed multifunctional use of the pottery.

The assumption can be made that the Chenet 1941 type 330 mortaria were used at table, and were necessary for the preparation of sauces, savoury and suchlike⁸. The wear of the quartz grains on the inside does not permit any other interpretation. A wooden pestle was probably used. The comparatively hard wear of the base rings (Appendix XIV Table 5.1: eleven worn down

⁸ Baatz 1977.

to the clay grade 2, five grade 1), and the outside walls which were covered with scratches and chips which cannot all have been caused by storage in a cupboard, points to intensive use. As has already been mentioned, the mortarium is connected with Mediterranean eating habits. Little can be said about the traces of use on the terra sigillata dishes, they tend to be mostly storage traces.

There is a surprising similarity between the traces of wear on five of the seven small bowls of the Chenet 1941, 319 type, the only fragment of a Chenet 1941 type 319 and three small specimens of the Chenet 1941, 324 type. Apart from the small rim diameter (less than 13 cm), all the bowls have an inner surface which has been worn down to the clay. This confirms the impression that a certain use is not restricted to a type defined by morphological characteristics.

The colour-coated ware is only represented by 74 fragments of the cup Pirling 1966 type 58-62. The base rings and outside walls are often intact, but because the varnish does not adhere to the wall very well it is often difficult to distinguish the real traces of use from signs of weathering. In the case of the Pirling 1966, 58-62 type the base discs were made separately and were stuck underneath the dried wall of the beaker later. This explains why, with these beakers, the base disc is often found detached from the wall.⁹ There is a remarkable concentration of chips on the bottom. The only possible explanation for this is that the chips occurred while the contents were being stirred. The beakers found among the settlement refuse must be considered to be mixing cups on the basis of their relatively large size. Small beakers (less than 14 cm) were not found in the settlement deposits but only in the graves.

The marbled ware, which is generally restricted typologically to imitations of terra sigillata, was used in the same way as the terra sigillata specimens. The odd base fragments of jars clearly show traces of use caused by them being pushed backwards and forwards on a table. Finally, the complete absence of small drinking-beakers or dishes with clearly visible traces of deep cuts should be mentioned. It is possible that wooden dishes and beakers were used for drinking and eating which typologically might have resembled the metal, pottery or glass specimens. Evidence is known of the

existence of wooden copies, for the early Roman period from Velsen I.¹⁰

As already stated, one can take the pottery from the fill of the ditches as a sample of the pottery circulating in the settlement. If this assumption is correct, the percentage of the various types of pottery from different - more or less contemporaneous - settlement sites should be the same. Here, the scores of the pottery from the fortified settlement of Nijmegen, the rural villa of Voerendaal (Prov. Limburg; only terra sigillata and coarse ware) and the late Roman fortification of Echternach-Pfarrhügel in Luxemburg are compared (Table 5.3). All three sites show approximately the same scores. Major differences are only found in the percentage of the colour-coated beakers Pirling 1966 type 58-62. The low representation of these beakers has already been noticed by Bakker.¹¹ Here we probably have to think of wooden substitutes. The rather high score of the bowl Chenet 1941 type 320 at Echternach can be explained by the multifunctional character of this type. At Echternach the functions of the Chenet 1941 type 319 and 324/325 were taken over by the bowl Chenet 1941 type 320. Despite the regional and (small) chronological differences and the diverse character of the sites the scores of the pottery assemblages are similar. Thus it seems possible to reconstruct the stock of pottery used at a single average household.¹²

⁹ Both the base foot and the wall of the small tulip-shaped beakers which are generally less than 14 cm tall and which technologically are in Oelmann 1914, type 30 tradition, are made from a single lump of clay.

¹⁰ Verbal information J.-M.A.W. Morel, Amsterdam; concerning a small beaker of the Loeschke 1909 type Haltern 10.

¹¹ Metzler, Zimmer & Bakker 1981, 332.

¹² x represents a number, as yet unknown, of individual specimens, which in turn is dependent on the size of the individual households in question.

Appendix XIV Table 5.3 Pottery assemblages from contemporaneous settlements.

Type	Nijmegen	%	Voerendaal	%	Echternach	%
1. terra sigillata						
Chenet 301	1	0.3	0	0	0	0
Chenet 303	1	0.3	0	0	0	0
Chenet 304	30	9.6	6	16.7	3	15
Chenet 309	1	0.3	0	0	0	0
Chenet 310	1	0.3	0	0	0	0
Chenet 313	4	1.3	1	2.5	1	5
Chenet 316	1	0.3	0	0	0	0
Chenet 317	1	0.3	0	0	0	0
Chenet 319	7	2.3	0	0	0	0
Chenet 320	144	46.3	20	55.5	13	65
Chenet 324	49	15.8	3	8.3	3	15
Chenet 325	7	2.3	0	0	0	0
Chenet 326	3	1	0	0	0	0
Chenet 330	60	19.3	4	11.1	0	0
Chenet 333	1	0.3	2	5.6	0	0
Total	311	100	36	100.1	20	100
2. colour-coated ware						
Pirling 58-62	81		0		0	
3. marbled ware						
Plate	5		0		0	
Flagon	22		0		0	
4. mortaria						
	27		0		0	
5. coarse ware						
Pirling 105	162	43.1	9	47.4	31	43
Pirling 106/109	32	8.5	0	0	4	5.6
Pirling 120	70	18.6	8	42.1	22	30.6
Pirling 126	62	16.5	2	10.5	12	16.7
Pirling 128	34	9	0	0	3	4.2
Lid	16	4.3	0	0	0	0
Total	376	100	19	100	72	100.1

Voerendaal per 31.12.1985 (Willems 1986); Echternach: Bakker 1981a.

XIV.5.4 COMPARISON OF THE POTTERY FROM THE SINGLE PERIOD DITCH AND FROM THE CEMETERY AT NIJMEGEN-EAST (GENERALLY INDICATED AS 'OO').

The 348 graves in the late Roman cemetery of Nijmegen-East (OO; Chapter 5 Fig. 5.1 no. 6) date from the first three-quarters of the fourth century AD, however most of the graves with grave gifts must be dated in the first half of the century. The pottery from the cemetery and from the single period ditch represent roughly the same period and perhaps also the same group of users.¹³

If one compares the range of types from both Nijmegen sites (Table 5.4), one immediately notices several differences. The most common types of terra sigillata in the settlement, the Chenet 1941 type 320 and 324 bowls, the mortaria and the Chenet 1941 type 330 mortaria, are hardly found at all in the cemetery. The Pirling 1966 type 105 and 120 cooking-pots are less common in the cemetery. Only the Pirling 1966 type 40 serving-dish is found in a reasonable number of graves. The coloured Pirling 1966 type 58-62 beakers and the jars, jugs or bottles made of terra sigillata or marbled ware occur frequently, as does the coarse ware dish Pirling 1966 type 128. There is a noticeable overrepresentation of types with a serving or drinking function in the cemetery ware; pottery related to the preparation of food is of less importance in the burial ritual.

Analysis of the traces of use on pottery from the cemetery shows a similarity between both the Nijmegen finds complexes in the case of terra sigillata and marbled ware. The coarse ware pottery shows a different result. In the cemetery forms which had been secondarily burnt proved to be the exception rather than the rule, and in this group, the majority of the ware was unused. Of the 83 colour-coated beakers from the cemetery 21 were less than 14 cm tall. Beakers of a similar size were not found in the large ditch. Among the coarse ware there was a surprisingly high percentage of wasters with fine cracks, wavy walls or bases, and small stones in the clay. So pottery which was of inferior quality or which was unsuitable for the purpose originally intended was chosen for the burial ritual.

A comparison of the sizes of the pottery (Table 5.4) makes it clear that the ware used as grave

gifts was, on average, much smaller in size (a third to a half) than the settlement pottery. There is a difference in the range of sizes. A large number of big cooking-pots and dishes were used in the settlement as well as the small specimens which were also placed in the graves as gifts. This trend was confirmed by the size of the terra sigillata Pirling 1966 type 40 dishes. A remarkable phenomenon is seen in the case of the Pirling 1966 type 106/109 in the cemetery. In 14 of the 24 specimens secondary burning was observed on the outside wall opposite the handle. Considering the small number of wasters (3) and the fact that only a few specimens of this type were found in the single period ditch, it seems possible that the traces of fire on these jars were the result of some burial ritual. Summing up, the pottery used as grave gifts can be described as follows: the ware tends to be smaller than that found in the settlement and, in many cases, is unsuitable for the original purpose. Most of the jars, bottles or jugs as well as the other terra sigillata forms and the colour-coated ware show the same pattern of wear as the sherds from the large ditch.

¹³ This comparison is based on the information kindly made available by P. Zoetbrood in 1986. The data presented by Steures 2012 are not considered. There is a considerable difference in numbers of graves and objects between this publication and Steures 2012, 7.

Appendix XIV Table 5.4 Nijmegen. Diameter of pottery types from cemetery Nijmegen-East (OO) and the single period ditch.

Type	Cemetery OO			Single period ditch		
	range/cm	diameter/cm	number	range/cm	diameter/cm	number
1. terra sigillata						
Chenet 304	17.0-24.5	21.4	17	17.0-36.0	27.8	10
Chenet 320	0	0		12.0-24.0	18.5	32
Chenet 324	0	0		11.0-22.0	15.2	11
Chenet 330	0	0		24.0-30.0	27.0	7
2. coarse ware						
Pirling 105	8.0-13.0	10.3	23	11.0-29.0	14.7	49
Pirling 106/109	7.5-10.0	9.2	24	0	0	0
Pirling 120	12.5-23.0	16.2	17	19.0-37.0	26.3	25
Pirling 126	15.0-20.0	16.5	9	16.0-31.0	24.4	20
Pirling 128	12.5-29.0	16.7	43	13.0-26.0	22.3	9
Lid	0	0	0	15.0	15.0	2

Diameter of pottery types from cemetery Nijmegen-East (OO) and the single period ditch with indication of diameter ranges (in cm), average diameters (in cm) and numbers.

Appendix XV Nijmegen. Chapter 5 Section 5.3.2

The fourth-century defence system around the Valkhof and the problem of continuity during the early medieval period: identification of the roulettes on terra sigillata (by W. Dijkman)

IDENTIFICATION OF THE ROULETTES

The rouletted decoration applied to the Argonne sigillata from the late Roman fortifications at Nijmegen was identified by means of photographs of these stamped impressions. Recognizing the various roulettes posed fewer problems than determining the form type. In most cases this concerns bowls of the Chenet 1941 type 320. In addition, the rouletted decoration on pottery of the Chenet 1941 type 324 and 330 is usually easily recognizable. The identification of the Chenet 1941, 304, 313 and 317 types was more difficult. If the roulettes were not found in Chenet's survey¹, other works were consulted which included roulettes which had not been published before. As far as the Nijmegen specimens are concerned, references could be made to parallels from Asperden², Bavai³, Northwest France.⁴ In some cases the roulette had a unique series of sections, which permitted it to be called a 'new' roulette. Assigning the individual roulettes to one of the groups published by Hübener also posed problems.⁵ Most of the sherds were too

fragmentary to be able to distinguish any complete roulettes, and the definition of the groups in Hübener is too arbitrary because of duplication and omissions. Nevertheless the classification of the groups was kept because it is often referred to in the literature and because no better classification has been made up to now. The place of origin is determined from the data given in Hübener.⁶

Various fragments are decorated with the same rouletted impressions (for example roulette Chenet 1941 type 199 on seven specimens). It was not usually possible to establish from black and white photographs whether the sherds came from one bowl or more than one. The bowls are mass products of the type Chenet 1941 type 320 and therefore it is very likely that a large quantity of bowls were made in one go by the same potter, all of the same size, colour and clay mixture. Furthermore, it is also possible that a whole batch of these bowls was sold to Nijmegen and ended up in different households. By comparing the sherds more information can probably be obtained about the specimens mentioned.

¹ Chenet 1941, pl. XXIX-XXXVIII.

² Hinz & Hömberg 1968, Abb. 6.

³ Gricourt 1950, fig. 4.

⁴ Piton & Bayard 1977, pl. 45-48.

⁵ Hübener 1968, 241-298.

⁶ Hübener 1968, 243-257.

Appendix XVI Nijmegen. Valkhof: coins from the late Roman ditches.

Catalogue number	Find number	Period	Coinage	Date	Mint	Catalogue	Specific features
1. single period ditch							
383	183/15	-	as	AD I	-	-	-
384	185/2	-	as	AD I	-	-	-
386	186/1b	-	as	AD I	-	-	-
378	182/6e	-	fol.	330-340	-	-	-
374	182/6a	-	fol.	335-340	-	-	-
376	182/6c	-	fol.	335-340	-	-	-
375	182/6b	Constans	fol.	347-348	-	-	-
379	183/13a	Constantius II	fol.	347-348	Lugd./Arel.	RIC 45	-
377	182/6d	-	fol./aes	AD IV	-	-	-
380	183/13b	-	fol.	AD IV	-	-	-
381	183/13c	-	fol.	AD IV	-	-	-
382	183/13d	-	fol.	AD IV	-	-	-
385	186/1a	-	aes	AD IVB	-	-	-
2. two parallel ditches							
522	1014/38	Celtic	aes	before 9 BC	-	Scheers 217	-
569	1014/147a	Celtic	aes	30-10 BC	-	-	Roymans & Van der Sanden 1980, XVIb
570	1014/147b	Augustus	as	12-13	Lugd.	RIC 245	obv. Tib.; c.m. GVA
442	218/45a	Augustus	as	10-13	Lugd.	RIC 230	-
528	1014/56	Augustus	as	10-13	Lugd.	RIC 230	-
525	1014/43	Augustus	den.	7-6 BC	Lugd.	RIC 207	-
527	1014/46	Tiberius	dup.	22-23	Rome	RIC 43	-
575	1014/160	Nero	as	67	Rome/Lugd.	-	cut
443	218/45b	-	as	AD I	-	-	-
556	1014/134a	-	as	AD I	-	-	-
566	1014/139	-	as	AD I	-	-	-
576	1014/161a	-	as	AD I	-	-	-
577	1014/161b	-	sest.	AD I	-	-	traces of cutting
549	1014/130i	-	ant.	AD III d	-	-	barbarian radiate
538	1014/129b	'Constantinop.'	fol.	323-330	Trev.	RIC 543	TRP
537	1014/129a	'Urbs Roma'	fol.	330	Arel.	RIC 343	PCONST
425	212/22b	'Constantinus II	fol.	330-331	Lugd.	RIC 238	PLG
533	1014/124	'Urbs Roma'	fol.	330-340	-	-	-
551	1014/130k	'Urbs Roma'	fol.	330-340	-	-	-
571	1014/148	'Urbs Roma'	fol.	330-340	-	-	-
555	1014/131b	'Constantinop.'	fol.	330-340	Trev.	-	TR ?
558	1014/134c	'Constantinop.'	fol.	330-340	-	-	-
561	1014/135c	'Constantinop.'	fol.	330-340	-	-	-
564	1014/137b	'Constantinop.'	fol.	330-340	-	-	-

Appendix XVI Nijmegen. Valkhof: coins from the late Roman ditches.

Catalogue number	Find number	Period	Coinage	Date	Mint	Catalogue	Specific features
565	1014/137c	'Constantinop.'	fol.	330-340	-	-	-
523	1014/41	Constantius II	fol.	335-337	-	-	-
536	1014/127	Constantius II	fol.	336	Arel.	RIC 395	PCONST/
534	1014/125	Constans	fol.	337-340	Trev.	RIC 106	TRS/M
548	1014/130h	Constantius II	fol.	337-340	Arel.	RIC 2	PCONST/O
568	1014/142b	Constantius II	fol.	337-340	Arel.	RIC 12	PCONST/O; barbarian?
542	1014/130b	Helena	fol.	337-340	Trev.	RIC 78	TRP
557	1014/134b	Helena	fol.	337-340	Trev.	RIC 42	TRP/+/-
535	1014/126	Theodora	fol.	337-340	-	-	-
540	1014/129d	Theodora	fol.	337-340	Trev.	RIC 65	*TRP*
560	1014/135b	Theodora	fol.	337-340	-	-	-
543	1014/130c	Constans	fol.	340	Trev.	RIC 111	TRPO/M
552	1014/130l	Constans	fol.	340	Trev.	RIC 106/13	TRPO/M of TRP/M
562	1014/135d	Constans	fol.	340	Trev.	RIC 111	TRPO/M; pierced
424	212/22a	Constans	fol.	340	Trev.	RIC 111	TRPO/M
544	1014/130d	Constantius II	fol.	340	Arel.	RIC 56	PARO/G
546	1014/130f	Constan...	fol.	340	Trev.	RIC 106/9	TRPO/M
541	1014/130a	Constans	fol.	347-348	Trev.	RIC 188/9	TRP/*
547	1014/130g	Constans	fol.	347-348	Trev.	RIC 195	TRS/D
550	1014/130j	Constans	fol.	347-348	Rome	RIC 95	RP/
563	1014/137a	Constans	fol.	347-348	Trev.	RIC 185	TRS
572	1014/149	Constantius II	fol.	347-348	Lugd.	RIC 59	PLG/HR
539	1014/129c	Constantius II	fol.	347-348	-	-	-
545	1014/130e	-	fol.	347-348	-	-	-
554	1014/131a	Constan...	fol.	347-348	TREV.	RIC 183/5	TRP/
559	1014/135a	Constans	aes	348-350	Trev. ?	RIC 215?	T.. ?
567	1014/142a	Constans	aes	348-350	Trev. ?	RIC 223?	-
526	1014/44	Constantius II	aes	348-350	Rome	RIC 107	RQ
426	212/22c	Valens	aes	364-367	Trev.	RIC 6b	TRSO/
422	212/4	Valentinianus I	aes	367-375	Trev.	RIC 7a	TRP
553	1014/130m	-	fol./aes	AD IV	-	-	-

Appendix XVII Nijmegen. Chapter 5 Section 5.3.6

The fourth-century defence system around the Valkhof and the problem of continuity during the early medieval period: miscellaneous finds

XVII.5.1 INTRODUCTION

In this Appendix a small group of miscellaneous finds (limestone, iron, bronze, lead, stamps on tiles and bricks) collected from the various ditches has been described. The most significant objects are the two large blocks with a square section and reliefs on all four faces representing human and divine figures dating from the early first century (Section XVII 5.1.2 nos. 182/21 and 182/22; and Section 3.6.1).

XVII.5.2 LIMESTONE

The multiperiod ditch system

In the fills of the multiperiod ditch system 0.05 m³ of limestone fragments were collected. The majority (no. 187/9) comes from ditch A1; two fragments have flat sides and must have been corner pieces. One fragment was found in the top fill of ditch B (no. 187/8). The rest was collected on level 1 (no. 187/4) and consequently belongs to the top fill of ditch D.

The single period ditch

Some 0.25 m³ of limestone fragments were found in the fill of the large single period ditch together with the two large sculptured blocks of the early-Roman column (see Chapter 5 Fig. 5.15). In the lower fills of the ditch (layers 2 and 3) only six small fragments (c. 0.4–0.8 kg each) were found (nos. 161/36, 170/2 and 182/16) spread over a distance of c. 130 m. All had one or two flat and more or less smoothly chiselled sides.

The most important quantity comes from the middle (nos. 6 and 7) and the top layers (no. 9). Apart from c. 12 pieces (nos. 183/15, 183/16 and 186/13) with one or more polished sides the following items all found in layer 6 deserve a special description:

No. 182/21* and 182/22*

Two large blocks with a square section and reliefs on all four faces representing human and divine figures (Fig. 3.31). These two blocks are published in detail elsewhere see (Section 3.6.1). Kars & Broekman 1981, 432 discusses the petrographical analysis.

No. 183/15

a. Fragment of limestone with pyramidal form and three fine polished faces and one flat side.

L. 12.2 cm; w. 9.7 cm; h. 7 cm.

b. Fragment of a cylindrical piece of limestone. Diameter c. 8.5 cm; h. 3.2 cm.

No. 183/16

a. Fragment of limestone with the relief of a man in a toga with his right arm stretching downwards. The fragment must have belonged to a third block fitting to block nos. 182/21–22 and especially to the *togatus* in the upper zone. H. 20.2 cm; w. 26.5 cm; d. 15.5 cm.

b. Fragment of limestone from the corner of a third block like nos. 182/21 and 182/22, decorated with a zone or small pilaster of leaves. H. 13.2 cm; w. 13.8 cm; d. 6.4 cm.

c. Fragment of limestone with foot and ankle from a human figure; on the well finished face is a thick support, the other face has no fine finishing. H. 13.2 cm; w. 17.5 cm; d. 13.5 cm.

d. Fragment of limestone with an oval and conical shape. On one end is a 2.3 cm broad band or strap running over both faces; under the strap are carved folds. On one face of the other end fine folds suggesting hairs are moulded. The form and the relief point to the neck of a horse with harness and manes on one side. H. c. 18 cm; w. c. 22–33 cm; d. 11–18.5 cm.

No. 185/11

a. Fragment of limestone with one polished side and part of the letter O. L. 12 cm; w. 11.8 cm; d. 9.7 cm.

b. Fragment of the corner with part of a ridge from the top of a limestone altar. H. 15 cm; w. 12.5 cm; d. 13.5 cm.

Eight pieces of limestone with one or more polished or levelled faces were collected in layer 7 (nos. 182/6, 185/7 and 186/12).

No. 185/7 is a fragment with two polished faces and on one of them a V-shaped groove of circular profile (h. 29 cm; w. 11 cm; d. 28 cm).

Seven pieces of limestone with one or more flat or smoothly dressed faces were found in layer 9 (nos. 183/5, 183/13, 186/1). Special mention must be made of:

No. 183/13

a. Fragment of limestone from a relief with a bare foot and the edge of a long dress. H. 10.4 cm; w. 14 cm; d. 7.5 cm.

b. Fragment of a corner edge with on both sides leaf motifs curving outwards, possibly from a

capital. H. 10.5 cm; w. 11 cm; d. 11.8 cm.

No. 185/2

a. Fragment of a limestone relief with curved ridge, possibly belonging to a scroll. H. 6 cm; w. 13.2 cm; d. 8.6 cm.

b. Fragment of limestone with four stepwise levelled faces. H. 9 cm; w. 12.8 cm; d. 6 cm.

c. Fragment of limestone from the top left corner of an altar (?). The upper and rear faces are flat; on the front face is the edge of a niche flanked by a column (w. 5 cm) and capital (?) like an *aediculum*. On the small side the top of a *cornucopia* with three fruits, possibly an apple between two pears. H. 17 cm; w. 16 cm; d. 17.4 cm.

No. 185/10

a. Fragment of a limestone cornice moulding with flat top and backface. H. 14.2 cm; w. 14.4 cm; d. 19.2 cm.

Several decorated or sculptured fragments of limestone were collected from other features in the trenches where the single period ditch was found.

No. 183/2

a. Fragment of a relief with an arm (?) (l. 12.5 cm) partly covered by a dress with two folds. W. 4-6 cm.

b. Fragment of a relief with grooves or folds of a dress. L. 10.4 cm; w. 5.8 cm; h. 5 cm.

c. Fragment of a relief with small tapering ridge on a curved face. H. 8.4 cm; w. 4.5 cm; d. 3.5 cm.

No. 185/1

a. Fragment of a cornice moulding with two zones: the lower one with leaves, the upper one with ovolo and in between an undecorated plate (h. 1.8 cm).

No. 186/9

a. Corner fragment from the top of an limestone altar decorated with a rosette. H. 12.7 cm; w. 15.2 cm; d. 20.9 cm.

No. 186/16

a. Fragment from the lower part of a limestone altar or gravestone with a foot (h. 8.5 cm;) and undecorated or uninscribed face. H. 27.8 cm; w. 24.5 cm; d. 15.2 cm (foot) and 11.7 cm (face).

It is clear from the description that the limestone fragments belong to various monuments from

different periods like public monuments, votive stones and possibly tombstones.¹

XVII.5.3 IRON

The single period ditch

Iron nails belong to the category of common finds. Their length varies generally from 4 to 10 centimetres. Most of them have square-sectioned shanks and straight ends. The finds inventory mentions the following finds and numbers: 161/35 (4), 181/21 (2), 182/6 (23), 183/5 (19), 183/13 (20), 183/15 (9), 185/2 (9), 185/6 (5), 185/7 (9), 185/10 (9), 185/11 (3), 186/1 (5) and 186/12 (2). Several other objects were collected which deserve individual description:

No. 182/6

Fragment of bent strip tapering to one end and with half circular section; l. 10 cm; w. 0.8-1.4 cm; h. 0.8-1.1 cm.

No. 182/17

Ring-headed pin with two ends and a rectangular section; l. 7.5 cm; w. 3.2 cm; h. 0.5 cm.

No. 182/16

Head of a arrowhead with square section; l. 7.8 cm; w. 1.1 cm.

No. 183/5

Knife; l. 22.3 cm; w. 2.4 cm; h. 0.4 cm.

No. 183/13

Hook (for a lamp?).

No. 183/13

Blade of a knife; l. 10.3 cm; w. 3.1 cm; h. 0.3 cm.

No. 183/13

Part of the blade and handle of a knife; l. 8.8 cm; w. 3.2 cm; h. 0.6 cm.

No. 183/13

Ring with circular section; diam. 4.8 cm; h. 0.5 cm.

No. 183/13

Ring-headed pin with one end; l. 7.5 cm; w. 1.8 cm; h. 0.5 cm.

No. 183/15

Ring-headed pin with one end and a rectangular

¹ For building fragments, sculptures and gravestones used as *spolia* in post-Roman constructions and collected from the Valkhof area: Daniëls 1955 passim; Lemmens 1980, 69-72.

section; l. 5.5 cm; w. 2.6 cm; h. 0.6 cm.

No. 185/7

Bent plate with two holes for nails or rivets; l. 7.6 cm; w. 2.7 cm; h. 0.3 cm.

No. 186/1

Arrowhead with socket; l. 7.1 cm; w. 1.2 cm; h. 0.8 cm.

The system of two parallel ditches; the inner ditch

A number of square-sectioned iron nails were collected which vary generally in length from 1 to 8 cm; one has a length of 14 cm and a curved end (no. 212/22) and must be hammered in a wooden construction with a thickness of 8-9 cm. The finds inventory mentions nos. 212/4 (14), 212/22 (31) and 212/19 (7). There is one L-shaped hook with a length of 5 cm (no. 212/4). Special mention is made of:

No. 212/4

Blade of a knife; l. 9.9 cm; w. 3.0 cm; h. 0.7 cm.

No. 212/9

Fragment of a flat plate; l. 9 cm; w. 4.2 cm; h. 0.4 cm.

No. 212/22

Arrowhead with socket; l. 11.5 cm; w. 2.1 cm; h. 0.8 cm; weight 16 gr. Erdmann 1982, 6: arrowheads have a weight under 12 grams, spear- or light catapult heads over 12 grams.

The system of two parallel ditches; the outer ditch

A number of square-sectioned iron nails were collected, which vary generally in length from 2 to 6 cm; two nails have a length of c. 12 cm (nos. 212/21 and 218/45). The finds inventory mentions nos. 212/3 (1), 212/21 (9), 218/20 (1), 218/45 (19) and 218/87 (1). Special mentioned are:

No. 212/21

Ring-headed pin with one end and more or less circular section; l. 4.3 cm; w. 2.4 cm; h. 0.7 cm.

No. 218/45

Stylus with eraser on one end and writing point on the other; l. 11.5 cm; w. 1 cm; h. 0.5 cm.

No. 218/45

Tumbler-lock slide key with four teeth and pierced handle; l. 6.2 cm; w. 2.9 cm; h. 2.5 cm.

XVII.5.4 BRONZE

The single period ditch

No. 183/14

Fragment of a thin needle; l. 2.5 cm.

No. 183/15

The pin and part of the spring of a brooch; l. 6.5 cm.

No. 185/2

Fragment of a small undecorated strip; l. 2.5 cm; w. 0.6-0.9 cm.

No. 185/9

Fragment of a folded undecorated plate; l. 1.4 cm; w. 1.4 cm.

The system of two parallel ditches; the inner ditch

No. 1014/55

Small irregular fragment; diam. 1.5 cm.

No. 212/4

Thin undecorated strip with one small punched hole to take a small tack; l. 3.3 cm; w. 1.3-1.6 cm.

The system of two parallel ditches; the outer ditch

No. 218/20

D-shaped buckle with one hole for a rivet fitted by a hinge to a strap-end with two holes for rivets; l. 6.3 cm; w. 2.3 cm. Schönberger 1978, Taf. 20 no. B 105.

No. 218/45

Thin undecorated and curved sheet with a punched hole in the middle to take a small tack; l. 7.2 cm; w. 1.6-2.2 cm.

XVII.5.5 LEAD

No. 218/20

Two fragments of probably one lead strip with one flat and one curved side; l. 3.4 and 4.9 cm; w. 1.0-1.2 cm; h. 0.7 cm.

No. 218/45

Circular piece with one flat and one curved side like a game counter; on the flat side a small circular hole, on the curved side a square-sectioned hole; diam. 1.8 cm; h. 0.8 cm.

XVII.5.6 SLAG

Iron slags are found in small quantities in the single period ditch (nos. 170/2, 182/5, 6, 15) and in the system of two parallel ditches (nos. 1014/127, 135, 155; 212/22).

XVII.5.7 STAMPS ON TILES AND BRICKS**XVII.7.1 The single period ditch**

No. 161/35

Fragment of a stamp >LG[---] on a *tegula*.



This monograph presents a selection of conceptual and methodological framed issues relating to the excavations in 'Roman Nijmegen' carried out by the former State Service for Archaeological Investigations in the Netherlands (ROB) from 1972 until the end of 1981. The main focus lies on the wider surroundings of the previously investigated fortress of the Tenth Legion on the Hunerberg. This led to substantial new insights into the organization and spatial development of the 3 km² area between the modern town centre of Nijmegen and the Kops Plateau from the late first century BC until the beginning of the fifth century AD. Applying a thematic approach to the analysis of characteristic (pre-)Roman settlement structures for each of four chapters a specific conceptual issue has been selected: cultural evolution (Chapter 2), acculturation (Chapter 3), socio-economic function (Chapter 4) and continuity (Chapter 5).

This scientific report is intended for archaeologists, as well as for other professionals and amateur enthusiasts involved in archaeology.

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